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Kang Hyeok Hweon April 17, 2013

Big Heads, Bird Guns and Gunpowder Bellicosity: Revolutionizing the Chosŏn Military in Seventeenth Century Korea

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Abstract

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Chosŏn Dynasty of Korea (1392-1910) underwent a Military Revolution during the seventeenth century. Pressured by repeated foreign invasions, Chosŏn revolutionized its military around firearms and infantry drill. As in Western Europe, Korea raised musketeers as the mainstay of its army, produced military manuals, revamped the line-of-command, and manufactured firearms. This crescendo of military strengthening was tested too early in the Manchu invasions of 1627 and 1636 but reached a pinnacle around the reign of Hyojong (1649-1659) when Korean musketeers gained recognition as excellent marksmen from their Manchu and Russian counterparts. Dubbed Big Heads (*daeduin* 大頭人), Korean musketeers became recognized in continental East Asia for their excellence in the use of Bird Guns (cho'chong 鳥銃), fowling pieces introduced to Koreans via the Imjin War of 1592-1598.

The Korean Military Revolution replaced the traditional cavalry-based system with an infantry-based system based on *en masse* musketry tactics. The growing fiscal and logistical demands of sustaining this way of war challenged the late Chosŏn state to adapt institutionally through new military surtaxes and centralized methods of census-taking. However, the Korean Military Revolution fell short of culminating because excessive military spending without proper fiscal and logistical backing reined back on impetuses of reform. This trend in reducing military expenditures was reinforced by the combination of *yangban* resistance to tax reforms, diminishing base of taxable commoners, consolidation of the *pax manjurica* and the lack of interstate warfare in eighteenth and nineteenth century East Asia. Nonetheless, bolstered by the Korean Military Revolution, Chosŏn was clearly an active gunpowder state during the seventeenth century. The Korean variation on the theme of gunpowder revolution produced professional bodies of firearms military units, innovations in military tactics and vibrant commercial and manufacturing activities, contributing to cumulative processes of political integration and consolidation in Korea.

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Preface

> At any rate, the sun rose for them in the peaceful splendor that wraps the morning hours there even to this day, and the sunbeams fell into the valleys between the hills and nestled on the land. "Morning Calm" they called it and it seemed not so much a name as its very essence. The drowsy quiet of the spot lulled them to rest, and they fell asleep. They were in the world, yet it was to them as if it had passed away. And so they slept on for ages.[1]

The fanciful imagination of the American astronomer and orientalist Percival Lowell saw human-built canals in Mars and perhaps, by no larger margin of error, a hypnotic sunshine drooping over the Korean people. This "Land of the Morning Calm" was Percival's glimpse of the tottering Chosŏn Korea (1392-1910), a dynasty that outlived its neighbors but was fast approaching its end by the nineteenth century. The enduring memory of Chosŏn, hopelessly isolationist and debilitated by political factionalism, belies its dynamic and reformist state during seventeenth century when warfare was unforgiving to drowsy idlers. During the seventeenth century, the entire Korean peninsula became a frequented battleground for Japanese musketeers, Chinese infantry and Manchu horseman. As transcultural interactions also reached a new threshold, strangers as varied as Portuguese mercenaries, Russian frontiersmen and Dutch castaways engaged with the Chosŏn people. Even more striking was the thunderous sound of gunfire that shook the earth and violently awakened the Koreans to the looming age of gunpowder weapons. From the Imjin War of 1592-1598 to the Northern expeditions of 1654 and 1658, Chosŏn revolutionized its military system and produced professional musketeers whose excellence was widely recognized in East Asia.

Few people know about the profound changes that firearms engendered in Chosŏn Korea. This lack of understanding perhaps speaks to a scholarly apathy stemming from the enduring

[1] Percival Lowell, *Chosön, the land of the morning calm; a sketch of Korea* (Boston: Ticknor and company, 1885), 7.

misconception that Chosŏn military was a monolith: incapable, isolationist and stagnant. Historians seemed to have examined Korean military reforms through a presentist lens, reading into the seventeenth and the eighteenth centuries a deterministic trajectory of ineptitude leading up to the faltering Chosŏn army in the late nineteenth century. Such narrative ignores important contingencies and fails to explain the late Chosŏn military's firearms-based growth and its ripple effects across early modern Korean society and state.

The seventeenth century Chosŏn military was more dynamic and resilient with important contingencies in mind. Foreign invasions such as the Imjin War (1592-1598) and the Manchu invasions (1627 and 1636) were important setbacks to the Koreans but they also triggered wide-ranging reforms that revolutionized Korea's armed forces around firearms and rigorous drill. Licking its wounds, Chosŏn raised musketeers as its mainstay and fortified its defenses along the northwestern border. The fledgling Korean infantry was put to test too early in the Manchu invasions but was widely recognized by the mid-seventeenth century when Korean King Hyojong (1649-1659) raised elite standing armies of musketeers. Thus, notwithstanding narratives of defeats and frustrations, Chosŏn was a milieu of vibrant military activities and reforms in the seventeenth century.

I hope to contribute a new narrative by studying how gunpowder technology was a potent accelerator of change in early modern Korea. Borrowing Historian Geoffrey Parker's Military Revolution model, this thesis shows that Korean military system underwent a revolution of its own, adopting firearms into the mainstay of its army with unprecedented alacrity and eagerness. The Korean experience with firearms then provides an important counterpoint to the standard Military Revolution model and challenges its paradigm for the 'rise of the West.' Parker argues that gunpowder-propelled military reforms had far-reaching ramifications for the European

society at large, triggering state formation and debilitating feudal relations. Did the same 'revolutionary' effects follow Korean adoption of firearms? How similar and different was the Korean variation on the theme of 'gunpowder revolution'?

Military historians have written volumes about battles but less about military tactics and drill. I hope not only to revisit Korean military reforms but also to delve into the nitty-gritty of war-making. With new comparative data and untapped archival material, I will address the following questions. How did Korean drill, tactics and formations change after the introduction of firearms? How was the Korean way of firearms warfare similar to or different from that of the Western Europeans? The current English scholarship has yet to address Korean military manuals on drilling, firearms manufacturing and military arts that can provide cutting-edge answers.

This thesis is Korean history as much as it is global history. I hope that the narrative of Korean firearms-oriented reforms contributes to a broader picture of military advances in early modern East Asia as it responded to the advent of reliable European firearms starting in the sixteenth century. The joining of Korea to the existing scholarship on the Asian Military Revolution will pave new ways of understanding East Asia as a transcultural unit marked by gunpowder bellicosity and one that provides intriguing counterpoints to the European Military Revolution. In addition to my methodology, transculturality is deeply engrained in the experiences and histories presented in this thesis. Contrary to the repute of Chosŏn as the "Hermit Kingdom," transcultural borrowing profoundly shaped Korean military reforms during the seventeenth century. For instance, Koreans adopted Chinese infantry drill and learned methods of firearms manufacturing from the Japanese and the Dutch. By partaking in this burgeoning nexus of military adaptations, Chosŏn dynasty tuned into global currents of changes in warfare.

All of this brings us back to the very question that fuels my scholarly inquiry: Why were Koreans in a severe state of military atrophy in the nineteenth century, which earned them the enduring stigma of the 'Hermit Kingdom'? Was there a fundamental divergence in the European and East Asian way of firearms warfare that mattered? The answer comes a full circle to warfare, and firearms warfare in particular. Military historians are divided in their answers to these questions, focusing on different aspects such as the type of musketry drill and the presence of nomadic cavalry. In different chapters of this thesis, I will address each argument, evaluate its application to the Korean case and build my own proposition about the scope and limitations of the Korean Military Revolution. Through a compelling narrative of gunpowder-propelled reforms in Korea and their profound effects on Chosŏn society, this thesis explores new grounds in understanding early modern Korea as integral and contributory to an irreversible flow of global military history – gunpowder.

Chapter 1: The Korean Military Revolution

> If you think the world is divided into geographical regions, that the talents and skills of each are different, and that those of one region cannot be understood by another, then how do you explain how [in the Zhou period in China] the armored soldiers of the state of Wu learned from the state of Chu her method of fighting on chariots and in the end was able to subjugate Chu? Even if one does not talk about examples from remote antiquity, in recent times in China, they did not have muskets [either]; they first learned about them from the Wokou pirates in Zhejiang Province. Qi Jiguang trained troops in their use for several years until they became one of the skills of the Chinese, who subsequently used them to defeat the Japanese.[2]

As the Imjin War of 1592-1598 engulfed the Korean peninsula, Yu Sŏngnyong, Prime Minister of Chosŏn dynasty, forcefully underscored the importance of military "adaptation and progress."[3] Yu drew from historical as well as concurrent examples to show that the interadoption of foreign "talents and skills" was crucial to defeating Japanese invaders.[4] Under his supervision, Chosŏn learned hurriedly from its bellicose neighbors and revolutionized its armed forces around firearms and disciplined soldiers. Throughout the seventeenth century, Koreans combined Japanese musketry technology with Chinese infantry tactics and forged their own way of war, which depended heavily on musketeers. Both in the prominence of firearms and transcultural borrowing, these reforms resemble the Military Revolution in Western Europe, which allegedly expedited European state formation and kickstarted the West's world-stirring imperial career.[5] The Korean experience with firearms then provides an intriguing counterpoint to the standard Military Revolution narrative and joins a new historical paradigm that configures

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[2] Yu Hyŏngwŏn 柳馨遠, Pan'gye surok 磻溪隨錄, ed. Kojŏn kanhaenghoe 古典刊行會 (Sŏul: Tongguk munhwasa, 1958), 14:11 a-b cited in James B. Palais, Confucian Statecraft and Korean Institutions: Yu Hyŏngwŏn and the late Chosŏn Dynasty (University of Washington Press: Seattle, 1996), 520.
[3] Palais, 520
[4] Ibid.
[5] See Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West* (Cambridge: Cambridge University Press, 1996); Clifford J. Rogers, Ed., *The Military Revolution Debate* (Colorado: Westview Press, 1995); Donald A. Yerxa, Ed., *Recent Themes in Military History: Historians in Conversation* (Columbia, S.C.: University of South Carolina Press, 2008), 11-48.

East Asia, and the Eurasian continent, as a transcultural region marked by gunpowder-based bellicosity.

The Military Revolution Model argues that Westerners pioneered and held the unique advantage of firearms warfare during the early modern era (1500-1800). Its most powerful proponent Geoffrey Parker proposes that gunpowder weapons found an unusual nursing ground in Western Europe where sustained interstate warfare spawned a "challenge and response dynamic," one that made the "penalty of not imitating" and innovating military technologies "extermination."[6] Fueled by this dynamic, European armies forged a powerful military based around professional soldiers, broadside ships, robust fortresses, and mobile artillery. Over time, pressures to sustain this expensive way of war stimulated state-building and triggered wide-ranging fiscal and institutional reforms, contributing to the "rise of the West" in the early modern era.[7] However, this model has come under increasing revision as a recent upwelling of comparative data on non-European warfare has reconfigured the Military Revolution as a Eurasian-wide phenomenon.

My proposition that Chosŏn underwent a military revolution in the seventeenth century draws from this recent movement in scholarship that one may call the Asian Military Revolution School.[8] Military historians of Asia, notably Sun Laichen, Tonio Andrade, Stephen Morillo and

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[6] Geoffrey Parker, Interview with Rolf Strøm-Olsen, IE University (Hay Festival Segovia), 28 October 2010.

[7] Parker, *The Military Revolution*.

[8] Sun Laichen, "Ming-Southeast Asian Overland Interactions, 1368-1644," Ph.D. Dissertation, University of Michigan Department of History, 2000; 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; 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; Kenneth Swope, *A Dragon's Head and a Serpent's Tail: Ming China and the First Great East Asian War, 1592–1598* (Norman: University of Oklahoma Press, 2009); and Tonio Andrade, *Lost Colony: The Untold Story of China's First Great Victory over the West* (Princeton: Princeton University Press, 2011)

No Yŏnggu, have argued that guns wrought deep changes in East Asia. Sun Laichen argues compellingly that Zhu Yuanzhang, founder of the Ming dynasty, used gunpowder technology to subdue his enemies and established "the first 'gunpowder' empire in the early modern world."[9] Stephen Morillo posits that the Warring States Period of Japan (戦国時代),[10] which lasted from the mid-1400s to the early 1600s witnessed an infantry revolution and a rapid adoption of muskets, including the development of the musketry volley technique.[11] Korean historian No Yŏnggu first suggested the possibility of a Korean military revolution, which allegedly had socio-political consequences such as state centralization, increase in the size of the standing army, and growth of the market economy.[12] Further, in a systematic comparison of English and Korean drill manuals, Tonio Andrade, Kirsten Cooper and I have found striking parallels between European and Korean military changes throughout the seventeenth and eighteenth century.[13]

The Military Revolution was indeed global. Rather than having a fixed core-periphery, it took off in disparate parts of the world and engaged military traditions across Eurasia into

[9] Ibid., "Ming-Southeast," 75.

[10] During the Warring States Period (*sengokujidai* 戦国時代), an epoch of fierce interstate competition from the mid-1400s to the early 1600s, Japan fragmented into numerous states each led by a daimyo, a regional samurai landlord, whose survival depended on effective mobilization of military resources to maintain and expand his domain. The harquebus was introduced to Japan during this time and was quickly adopted.

[11] Stephen Morillo, "Guns and Government: A Comparative Study of Europe and Japan," *Journal of World History* 6, No. 1 (1995): 95-100.

[12] No Yŏnggu, "Kihoek nonmun: chŏnjaeng-ui sidaejeok yangsang; 'kunsa hyŏngmyŏngron (Military Revolution)'-gua 17~18 saegi chosŏn-ui kunsajeok byŏnhwa" [Featured Articles: The Historical Aspects of Warfare; "Military Revolution" and Chŏson Dynasty's Military Reforms in the 17th and 18th Centuries], Sŏyangsa yŏngu 西洋史研究 5, No. 5 (2007): 39-43; No Yŏnggu, "Chosŏn hugi pyŏngsŏ-wa chŏnpŏp-ŭi yŏn'gu" [Military Tactical Manuals and Military Strategies Written and Devised in the Late Chosŏn Dynasty] (Ph.D. Dissertation, Sŏul National University, 2002), 130-134; and No Yŏnggu, "Injocho ~ byungja horan sigi chŏnsul chŏn'gae [Joseon's Military Tactics from the Early Years of King Injo through the Second Manchu Invasion of 1636]," Han'guk sahakbo 韓國史學報 41, No. 0 (2010): 175-207; and Peter Lorge, *The Asian Military Revolution: From Gunpowder to the Bomb* (Cambridge: Cambridge University Press, 2008).

[13] Tonio Andrade, Hyeok Hweon Kang and Kirsten Cooper, "A Korean Military Revolution? Parallel Military Innovations in East Asia and Europe," forthcoming in the *Journal of World History*.

conversation with one another. The epoch-making innovation of gunpowder weapons first emanated from a Chinese epicenter, then rippled out towards neighboring states in Eurasia. When Europeans took up the baton, fierce inter-state competition relayed gunpowder technology rapidly across the European continent with enhancements and modifications. Military revolution soon bounced back to East Asia. By the sixteenth century, European maritime expansion carried Portuguese cannons and matchlocks to Japan and Dutch sailors to Korea. Shaped by a sustained increase in transcultural borrowing, the Military Revolution was polycentric and trans-Eurasian.

As much as firearms development spurred similar changes across borders, it advanced at different paces and trajectories in different regions. Did the same 'revolutionary' effects follow the Korean variation? As in Europe, the adoption of firearms, particularly muskets, necessitated a new way of warfare in Korea, one that included rigorous infantry drill and the musketry volley tactic. Ensuing was a 'musketry revolution' in seventeenth century Chosŏn. The traditional cavalry-based system gave way to new forms of *en masse* infantry tactics based around musketeers. This radical shift involved proliferation of drill manuals, revamping of the line-of-command, and training of new officer corps to allow for systematic use of guns in battle. Following tactical changes, armies grew larger and more professional.

In the European Military Revolution, adopting muskets as the mainstay led to strikingly similar patterns in military reform. In order to maximize the utility of firearms, European drill sergeants, notably Dutch ones, employed elaborate drilling patterns to execute musketry volley fire and enforced new levels of coordination and discipline.[14] However, the European Military Revolution was more variegated in its ramifications and had multiple revolutions over the *longue durée* of 1500-1660, each punctuated with spurs of innovations. For instance, Western Europe witnessed an earlier revolution around late fifteenth and early sixteenth century in artillery and

[14] Parker, "Military Revolutions, Past and Present," 14-15.

fortress design, one that came belatedly and remained mainly theoretical in Chosŏn Korea. Parker weighs in on this revolution and explains that the advent of effective siege artillery and subsequently the *trace italienne* (star fortress)[15] sparked a dramatic increase of armies and the first wave of innovations in military tactics and state-building.[16]

The lack of a Fortress Revolution, however, does not necessarily indicate that Korean military reforms failed. As Historian Victor Lieberman warns against Eurocentric indices of comparison, exploring the possibilities of a Korean Military Revolution should entail methods based on *local standards* and a *variation-on-theme* approach to help understand early modern growth in relative terms. Throughout the seventeenth and eighteenth century, Korean fortresses shifted from mountain-based to city-centered designs[17] and exhibited increasing concern with deflecting artillery fire and maximizing defensive crossfire, which is similar in nature to the functions of the *trace italienne*.[18] Nonetheless, these changes fell short of a revolution because Korean fortresses did not have the same extent of investment return: nomadic intruders could easily circumvent them, as demonstrated in the Manchu invasions of 1626 and 1627. Despite these discrepancies, the Korean variation of the Military Revolution, which was mostly confined to musket-based changes, did include elements such as army size growth and state centralization, ones that were, in the European case, alleged byproducts of fortress reforms. Then, if Korea adopted musketeers as the mainstay of its central army but failed to revolutionize its fortresses,

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[15] As siege artillery became prevalent in the fifteenth century, medieval walls crumbled and yielded to new fortress designs in the fifteenth century. The *trace italienne* had low earthen walls and polygonal bulwarks that minimized the impact of artillery attack and allowed for effective defensive cross fire. They were virtually impossible to overtake, which made siege warfare indefinitely longer and larger in scale.

[16] Parker, *Military Revolution*, 6-44.

[17] Paek Chongo, Kim Pyŏnghŭi, and Sin Yŏngmun, *Han'guk sŏnggwak yŏn'gu nonjŏ ch'ongnam* 韓國城郭研究論著攬 (*Han'guk sŏnggwak yŏn'gu nonjŏ ch'ongnam*. Sŏul: Sŏgyŏng Munhwasa, 2004), 345-379.

[18] No Yŏnggu, "Chŏson hugi sŏngjae byŏnhwa-wa hwasŏng-ui sŏnggwaksa-jeok uimi" [Change in late Chŏson fortress design and its significance], Chindan hakbo 88, No.0 (December 1999): 319-320.

its development should not necessarily be considered less revolutionary than that of Western Europe.

A clearer benchmark for measuring the extent of a Military Revolution is whether it had wide-ranging effects on the broader state and society. In Western Europe, pressures to sustain firearms warfare triggered wide-ranging financial and institutional reforms and ultimately led to the modern state in Europe. Providing a non-European counterpoint, Lieberman posits that firearms warfare also accelerated administrative centralization in Asian states because it "magnified the physical superiority of emergent political cores over less favored districts" and facilitated political integration.[19] He underscores that the advent of reliable European-style firearms in the 1500s gave a tremendous power boost to states that could procure them and adopt them into their central armies. The cores that had this military advantage could then centralize their control and subjugate peripheral regions more effectively.[20] In turn, this new way of firearms warfare "demanded more efficient systems of supply, recruitment, taxation and command," making bureaucratic reforms necessary[21] Consequently, Lieberman identifies gunpowder technology as one of several potent factors that contributed to "cumulative, rachet-like" [22] growth across Eurasian states towards increasing geo-political integration and consolidation.

In Korea, the musketry revolution also spurred cascading changes across its state and society, rendering Chosŏn more centralized, stimulating its economy, and weakening existing social relations. The Korean state instituted central armies to reinforce capital defense and

[19] Victor B. Lieberman, *Strange parallels: Southeast Asia in global context, c 800-1830* (New York: Cambridge University Press, 2003), 30.
[20] Ibid.
[21] Ibid., 33
[22] Ibid., 49.

managed these standing armies through centralized conscription methods and tax reforms.[23] The fiscal burdens of maintaining firearms warfare were enormous. Salary payments for soldiers in the Military Training Agency alone amounted to as much as two-thirds of the entire Ministry of Finance's budget in the late seventeenth century.[24] Such demands then triggered the promulgation of supplementary surtaxes and the Taedong reforms.[25] Chosŏn also reinforced census-taking to bolster conscription and expand the military's fiscal base, doubling the number of registered households from 658,771 to 1,313,453 in the 1650s.[26] In addition, the increasing numbers of lowborn musketeers in the Korean army also led to social conflicts between military aristocrats and the lower class.[27] In efforts to sustain conscription numbers while appeasing both parties, the state endeavored to accommodate the desires of lowborn military men for upward social movement and for commercial activities in the capital through institutional reform.[28] In this sense, the musketry-based changes that Chosŏn underwent in the seventeenth century were revolutionary within and beyond the context of the military.

But what constitutes a revolution? Was there a Korean Military Revolution? Yes. In describing gunpowder-propelled military reforms, Historian Peter Lorge defines a revolution as a "permanent change," one in which a "new idea or device became ubiquitous and indispensable to an institution, society, or practice, particularly if the invention drastically altered previous

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[23] No, "Kihoek nonmun," 47-48.
[24] Kim Jongsu 金鍾洙, *Chosŏn hugi chungang kunje yŏn'gu: Hullyŏn Togam ŭi sŏllip kwa sahoe pyŏndong* 朝鮮後期中央軍制研究：訓鍊都監設立의社會變動[*A Study on the Central Military System in the Late Joseon Dynasty*] (Sŏul: Haean, 2003), 149.
[25] No, "Kihoek nonmun," 50-52.
[26] Han Wookeun, *The History of Korea*, trans. Lee Kyungshik (Honolulu, 1970), 309 as cited in William S. Atwell, "A Seventeenth-Century 'General Crisis' in East Asia?," *Modern Asian Studies* 24, No. 4 (Oct., 1990), 680-681.
[27] Kim Jongsu, 114-136.
[28] Eugene Y. Park, *Between dreams and reality: the military examination in late Chosŏn Korea, 1600-1894* (Cambridge, Mass: Harvard University Asia Center, 2007).

functions."[29] Under this operational definition, the Chosŏn state underwent a Military Revolution in the seventeenth century: not only did firearms, chiefly muskets, become the permanent mainstay of the Korean military apparatus they also sparked institutional changes across the state and society. At the same time, the Korean Military Revolution was incomplete in that it was mostly confined to a 'musketry revolution' and its ramifications. For reasons to elaborate later, concomitant revolutions in fiscal and institutional frameworks that accompanied the European adoption of firearms did not take root in Chosŏn. Consequently, the Korean Military Revolution fell short of sustaining military innovations beyond the seventeenth and eighteenth century. In this sense, the Korean Military Revolution was efficacious but incomplete, successful in musketry reforms but limited in other aspects of war-making.

Chronologically, the Korean Military Revolution had three clusters of military innovations, punctuated by rapid developments in technology and techniques of gunpowder violence. The first two occurred in the first half of the seventeenth century, respectively, around the Imjin War and the Manchu invasions. During these times of turmoil, the pressure to imitate and innovate was immediate and life-threatening. Koreans appropriated methods of manufacturing muskets and cannon and laid the foundation of Korean infantry tactics to employ firearms effectively in battle. In the last spur of innovation, military experiments and advances continued, albeit at less remarkable rates, during King Hyojong's Northern Conquest campaign in the 1650s and the brief revival of his campaign in the 1680s. During this time, Korean musketeers became known widely in continental East Asia for their excellent marksmanship. Army size grew dramatically and organizational structures in Chosŏn military and society began to change in tandem. Nonetheless, due to the sudden death of Hyojong and the resulting budget cuts on the military, innovations slowed with the temporary exception of Hyojong's grandson,

[29] Lorge, 20.

Hyŏnjong's rule (1659-1675). While the Korean military revolution fell short of culminating, for reasons I will elaborate later, Chosŏn was clearly an effective gunpowder state and an active military force, a crouching tiger ready to plunge into Northeast China when opportunities emerged.

The First Spark: The Imjin War of 1592-1598

The first catalyst for Korea's military reforms was the Imjin War of 1592-1598. The megalomaniac leader of unified Japan Toyotomi Hideyoshi invaded Korea in 1592 and stirred a war that engaged massive armies, embroiling as many as 900,000 soldiers and three belligerent states.[30] The Japanese troops swept through Korean defenses with their capable musketeers and captured the Korean capital within a month. The Japanese excelled at both musketry tactics and close combat but their naval forces paled in comparison to those of Chosŏn, which wielded superior cannons and threatened their supply lines since the outbreak of the war. Both belligerents learned quickly. The Japanese requested more firearms from the state and Hideyoshi ordered the construction of warships, even imitating the Korean design of turtleboats. Under an emergency decree by King Sŏnjo, Chosŏn also raised musketeers and extorted methods of firearms manufacturing from Japanese captives.[31]

The war escalated further when Ming China sent auxiliary troops to assist its tottering buffer state. The Chinese thwarted Japanese advances northward and helped turn the tide of the war around. They brought large cannons that dwarfed Japanese firepower in set-piece battles. Particularly, their Southern Troops (南兵), infantrymen drilled with the revolutionary tactics of

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[30] Hŏ Daeyoung, and Cha Inhan, *Minjok Jeonlansa: Imjinwaeransa* (Sŏul: Kukpangbu Chŏnsa P'yŏnch'an Wiwŏnhoe, 1987), 285.
[31] *Sŏnjo sillok*, *j.* 36 (宣祖 26:3: 丙寅 [1593/3/11]).

Chinese general Qi Jiguang, were toxic to the Japanese.[32] They fought in tight, multi-supportive formations that resembled, at least functionally, those of the Spanish tercios or Gustav Adolph's formations. The Koreans explicitly adopted Qi's tactics and fine-tuned his manuals to forge their own reforms. Suffice to say, the Imjin War brought together in juxtaposition the military capabilities of the three belligerents, which highlighted the importance of firearms and led to an unprecedented increase in transcultural borrowing.

The allies recognized that Japanese victories were largely based on superior musket units. In 1593, for example, Ming General Song Yingchang (宋應唱, 1536－1606) noted that the Japanese employed the musketry volley technique, writing that he feared the Japanese would "break into squads and shoot alternately against us (分番休迭之法)."[33] In 1595, Korean King Sŏnjo shared the same apprehension that "the Japanese [would] divide themselves into three groups and shoot alternately by moving forward and backward (若分三運, 次次放砲)?"[34] King Sŏnjo of Chŏson further stated that "the only reason why the enemies [Japanese] have invariably defeated us is firearms" and repeatedly stressed that Chosŏn armies adopt firearms as their mainstay.[35]

However, Japanese musketeers were more significant tactically than numerically. During the war, they were special troops that served as vanguard, not the mainstay of Japanese forces. From Yu Songnyong's observations, Japanese superiority not only lay in advanced musketry technology but their ability to coordinate musketeers with other close-combat units and to organize themselves in multi-layered echelons that advanced and receded flexibly in battle.

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[32] Swope, "Crouching Tigers, Secret Weapons," 16-18.
[33] Song Yingchang 宋應唱, *Jing lüe fu guo yao bian* 經略復國要編: [14 juan, fu 2 juan] (Taipei: Hua wen shu ju 華文書局, 1968), 506.
[34] *Sŏnjo sillok, j.* 50 (宣祖 27:4:乙丑 [1594/4/17])
[35] Ibid., *j.* 39 (宣祖 26:6:壬子 [1592/6/29]). The Chinese text is as follows: 且賊之全勝, 只在於火砲.

Considering that muskets only constituted about 20% of the Japanese army,[36] Japanese lethality in battle also depended on close-combat tactics, grounded in advanced swordsmanship and the use of pikemen.

But muskets were clearly lethal and King Sŏnjo quickly became a zealous proponent. In 1593 and 1594, he repeatedly ordered Japanese captives to be kept alive so that Korean artisans could learn Japanese methods of making gunpowder and muskets.[37] In 1594, King Sŏnjo went so far as to attempt to design a new musket that could supposedly fire rounds in quick succession.[38] He was also openly embracive of excellent musketeers and did not hesitate to reward them generously with promotions and gifts that made other types of soldiers envious. For example, in 1595, while observing drill practices of the Military Training Agency (*Hullyŏndogam* 訓鍊都監), a new central army, Sŏnjo declared that the musketeers outperformed archers and bestowed thirty horses to the former, enraging the archers, some of whom left the army out of humiliation.[39]

Sŏnjo's obsession for firearms wasn't empty-minded or without justification either. With close reading, we can see that his rationale for championing firearms is surprisingly precocious.

> Nothing is more imperative than having firepower. Even if the mighty Xiang Yu of antiquity [who is known for his legendary military capabilities] were to resurrect himself, he wouldn't be able to strike the outnumbering enemy without firepower.[40]

Xiang Yu was powerfully built and towering over six feet, a paragon of physical strength in ancient China, and he was known to be able to lift a *ding*, a bronze vessel weighing as much as a

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[36] No, "Chosŏn hugi pyŏngsŏ, 73-75.
[37] *Sŏnjo sillok*, *j.* 36 (宣祖 26:3: 丙寅 [1593/3/11]).
[38] The fact that the Korean king himself attempted to design his own musket makes clear how highly the Korean government prioritized the development of musket technology and techniques. Ibid., *j.* 44 (宣祖 26:11:壬戌 [1593/11/12]).
[39] Ibid., (宣祖 28:10:*mujin* [1595/10/29]) as cited in Kim Jongsu, 85.
[40] Ibid., *j*.50 (宣祖 27:4: 乙丑 [1594/4/17]).

ton. This passage, inserted into a conversation about acquiring more cannon against the Japanese, suggest that Sŏnjo seemed to recognize the shift in the way of war that increasingly harnessed the power of disciplined men and reliable firearms. Least to say, he recognized firearms as an innovation that has rendered the age of heroes and valiant warriors obsolete.

With such royal support, institutional changes followed swiftly. In 1593, a year after the outbreak of the war, Sŏnjo issued emergency decrees to institute the Military Training Agency (*Hullyŏndogam* 訓鍊都監), a new standing army designed specifically to raise musketeers as its mainstay.[41] To meet the urgent demands of the war, the Military Training Agency recruited from all social classes and organized new conscripts with clearly stratified troop divisions.[42] In 1593, the first 500 soldiers were recruited into the Military Training Agency, which, with governmental fiscal support, increased to 2,000 by the end of the war and was augmented to 4,000 by 1616 and 6,350 by 1658.[43]

The creation of this army is a watershed moment for multiple reasons. It was the first professional standing army established in Chosŏn Korea that employed salaried men and benefited from governmental surtax. Unlike other soldiers in the Korean military who served in rotations to accommodate farming seasons, those of the Military Training Agency were professional men living in the capital. As a direct response to the Imjin War, this army also mostly raised infantrymen and was the catalyst of broader shift in Chosŏn military from cavalry-based to infantry-based way of war. Throughout the seventeenth century, it served as a testing ground for new infantry tactics, including the musketry volley technique. Military manuals

[41] Kim Jongsu, 76-77.
[42] Kim Jongsu, 114-137.
[43] Ibid., 105.

containing diagrams for volley techniques proliferated throughout the seventeenth century[44] and state-sponsored military experiments begot innovations in battle formations and tactics.[45] By 1594, only a year after the institution of the Military Training Agency, some opined Korean musketeers were already more competent than their Japanese and Chinese counterparts.[46]

Transcultural borrowing undergirded the successful growth of the Military Training Agency. As Yu who oversaw the army's institution would have emphasized, openness to inter-adaptations of foreign technologies and tactics was crucial. Japanese surrenders such as Kim Ch'ungsŏn (金忠善) who most likely originated from a musket-manufacturing guild in Japan, served in this army and taught Korean artisans how to manufacture muskets and gunpowder. Other surrenders instructed swordsmanship and partook in drills against which soldiers of the Military Training Agency practiced fighting. In addition to the Japanese and the Dutch, the officers of the Military Training Agency adopted the infantry techniques of Qi Jiguang to bolster Korean military drill. They drew on his military manuals, the *Ji iiao xin shu* 紀效新書 (*The new book of effective techniques*) and the *Lian bing shi ji* 練兵實紀 (*The veritable record of troop drilling*) and learned Qi Jiguang's tactics by direct observation.[47]

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[44] The *Orientation to the Military Arts* (*Pyŏnghakchinam* 兵學指南) is one of the few surviving military manuals from seventeenth century Chosŏn Korea. The earliest known copy is dated 1684 but is allegedly an edition of the original, which some scholars trace back to the mid-seventeenth century. This manual includes a diagram labeled the "Continuous Fire Musket Shot" (*Jochong yunbangdo* 鳥銃輪放圖), which shows the sequence of musketry volley technique used by the Korean musketry squads. *Pyŏnghakchinam* 兵學指南, the National Library of Korea, Sŏul, Korea.

[45] No, "Military Tactical Manuals and Military Strategies," 130-134.

[46] *Sŏnjo sillok*, *j*.54 (宣祖 27:8: 甲午 [1594/8/2]).

[47] Qi Jiguang's most renowned work, *Ji xiao xin shu,* comes in two very different versions, one published in 1560 and one published in 1588. A good edition of the latter is Qi Jiguang, Qi Jiguang Bing Fa: Shi si juan ben 'Ji xiao xin shu' zhu zhi 戚继光兵法：一一十四卷本《纪效新书》注释, Edited by Fan Zhongyi 范中义, Xu Daji 余大吉, Yuan Zhenlan 哀镇澜, and Liu Qing 刘庆 (Beijing: Shi shi chu ban she 时事出版社, 1998). A good edition of the earlier version is Qi, Jiguang 戚繼光, Ji xiao xin shu: 18 juan ben 紀效新書 : 18 卷本, Edited by Cao Wenming 曹文明 and Lü Yinghui 吕穎慧 (Beijing : Zhong

By the mid-seventeenth century, even Dutch castaways contributed to this intermingling of mercenaries and drill instructors. Jan Jansz Weltevree, a Dutch military advisor to King Hyojong, joined the Military Training Agency and allegedly commanded his fellow Dutch men, Chinese castaways, and surrendered Japanese soldiers. Weltevree transmitted sophisticated cannon manufacturing skills to Koreans and Korean blacksmiths enhanced the efficiency of Korean muskets by copying European models brought over by the Dutchmen.[48] By tapping into this burgeoning nexus of military adaptations, the Military Training Agency produced professional bodies of musketeers by the late seventeenth century.

As the impressive growth of the Military Training Agency suggests, the Imjin War of 1592-1598 was a game changer. Not only was its sheer magnitude unprecedented in East Asian history but the increasing role that firearms played in battles and the resulting technological transfers among the belligerents were remarkable. By the end of the war, radical reforms were well under way. Chosŏn revamped its army around musketeers and manufactured firearms. Cavalry-based military system of the sixteenth century gave away to musketeer-based forms of infantry warfare and armies grew larger and more professional. In the next few decades, Koreans would continue developing firearms and their musketeers would be widely recognized, coveted and exploited in East Asia.

Gunpowder Bellicosity, Chŏson Style

Firearms were no passing fancy for Chosŏn. Pressured by repeated foreign invasions, Chosŏn raised musketeers as the mainstay of its army, produced military manuals, revamped the

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hua shu ju 中華書局, 2001). A recent edition of the *Lian bing shi ji* is Qi Jiguang 戚繼光, Lian bing shi ji 練兵實紀, edited by Qiu Xintian 邱心田 (Beijing: Zhong hua shu ju 中華書局, 2001).

[48] Yun Haengim 尹行恁, *Seokjaego* 碩齋稿, *j.* 9 *Haedong waesa* 海東外史, the National Library of Korea, Sŏul, Korea, p. 23-24.

line-of-command, and manufactured firearms. This crescendo of military strengthening was tested too early in the Manchu invasions of 1626 and 1636 but reached a pinnacle around the reign of Hyojong (1649-1659) when Korean musketeers gained recognition as excellent marksmen from their Manchu and Russian counterparts. Dubbed Big Heads (*daeduin* 大頭人)[49] for their distinctive helmets and impressive marksmanship, Korean musketeers impressed Manchu leader Hong Taiji who commended these musketeers and employed them multiple times in his own war against the Ming Chinese and the Russian Cossacks. In several battles that put these men to supreme test, their lethal efficacy was tangible: the Ming loyalists were so devastated in the Jinzhou Battle of 1641 that they counted Korean heads for twice as much as Manchu heads[50] and the Cossacks, defeated in 1654 and 1658, retreated from the inner reaches of Amuria. Recognized for their mastery of muskets, these intimidating marksmen were the fruits of the Korean Military Revolution in the first half of the seventeenth century.

Korean gunpowder bellicosity was no accident but an outcome forged in a world of escalating violence. The seventeenth century was an unusually turbulent period in East Asia, one fraught with famines, natural disasters and peasant upheavals especially during the 1630s and the 1640s.[51] In Korea, constant warfare engulfed the peninsula during first half of the seventeenth century and threatened every fabric of its society. Chosŏn bore the brunt of three devastating foreign invasions and its troops were embroiled in the Ming-Qing conflicts as well as Russo-Qing altercations in the Amur region of Northeast China. Particularly, the Imjin War of 1592-

[49] The title Big Heads (*daeduyin* 大頭人) was given to the Koreans by the Nanais who served both the Qing and the Cossacks. Sin Yu 申瀏, trans. by Park Taegeun 朴泰根, *Kugyok Pukchong ilgi* 國譯北征日記 (Kyŏnggi-do, Sŏngnam-si: Han'guk Chŏngsin Munhwa Yŏn'guwŏn, 1980), 71.

[50] Yi Yŏ, *Yŏndo kihaeng* 燕途紀行, trans. by Yi Minsu (Sŏul: Minjok Munhwa Ch'ujinhoe), *j.* 14 (Hyojong 孝宗 7:9: 癸丑 [1656/9/8]). The Chinese text is as follows: 摠能射命中。明師論功。虜頭半百金。麗頭倍之。東方將卒。

[51] Atwell, 666.

1598 was destructive beyond measure, leaving "amount of land under cultivation… less than a third of the pre-war amount" and destroying census registers that undermined its taxation system.[52] Thus, Chosŏn dynasty was in a constant state of war and military strength became imperative to its survival.

Advances in the Chosŏn military during and after the Imjin War revolved around muskets. In 1594, only a year after the outbreak of the Imjin War, musketeers constituted 54% of the Military Training Agency and were quickly replacing traditional units such as archers and cavalry. By 1708, this same army reached 80% of the entire force with approximately 4,000 musketeers.[53] Further, another central army known as the Anti-Manchu Division employed as many as 5,400 musketeers in 1639. Changes were slower in regional armies but of the same nature. For instance, as early as 1596, the provincial army of P'yŏngan had 1673 musketeers, which amounted to 53% of its army as opposed to archers who made up 37% of the army.[54] The growing importance of musketeers, as shown, strongly indicates a radical shift in Chosŏn military from cavalry-based to infantry-based way of war.

Musketeers not only grew numerically dominant but tactically central to the Korean army. Muskets wrought deep changes in drilling patterns because handguns necessitated more elaborate and rigorous drilling regimes to ensure that soldiers would "maintain concentration on a series of minute mechanical tasks in the face of possible death or mutilation."[55] To instill such discipline, Koreans explicitly adopted the infantry techniques of the legendary Chinese general Qi Jiguang, whose tight, multi-supportive infantry formations had proven lethal during the Imjin War. Particularly, Koreans replaced their traditional cavalry-based military system with Qi's

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[52] Ibid., 671.
[53] No, "Chosŏn hugi pyŏngsŏ, 161.
[54] Ibid., 49.
[55] Bert Hall, *Weapons and warfare in renaissance Europe: gunpowder, technology, and tactics* (Baltimore, Md: Johns Hopkins University Press, 1997), 149

Samsu kibŏp (三手技法). Literally "Three-Unit-Technique," this method employed three distinct types of infantry: the musketeer (*chongsu* 砲手), the archer (*sasu* 射手), and the swordsman or spearman (*salsu* 殺手 [literally, the "killing unit"]).[56] These soldiers would be disciplined in tight, multi-supportive formations that complement each other. Musketeers were the most deadly and effective but were slow and inaccurate, which left them vulnerable to cavalry charges and other types of close-quarters combat. Thus, archers buttressed the musketeers at long range and swordsmen/spearmen units protected them from encroaching enemies.[57]

The Korean musketry drill was particularly rigorous to maximize efficiency in battle. A description found in *Orientation to the Military Arts* (*Pyŏnghakchinam* 兵學指南), a Korean manual derived from Qi's methods, shows that musketeers were trained with rigor and precision in Korea.

> When the enemy enters within hundred steps of range, fire the signaling cannon and blow the conch (bara 哱囉) to command the soldiers to rise and be poised for action. Next, play the gong (鉦, notated as 企 in the manuscript) to halt the sound of the conch (bara 哱囉) while blowing the double-reed trumpet (ch'ŏnasŏng 天鵝聲) to command the musketeers to shoot simultaneously (齊放). Either fire all at once or divide in five shots.[58]

Dated as early as 1649, this manual makes clear how Koreans employed a variegated and intricate system of visual and auditory commands in their drill, including flags, signal cannon-shots, horns, and conches. To instill musketeers with the ability to act with an "automatism of habit," drill was elaborate, rigorous and relentless.[59] In this way, Korean musketeers were drilled

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[56] Park, 51-52.
[57] No, "Chosŏn hugi pyŏngsŏ, 78-79.
[58] *Pyŏnghakchinam* 兵學指南,「場操程式」(鳥銃鈀弓齊方), KDCP692, p. 184, The National Library of Korea, Sŏul, South Korea. The original text is as follows: 賊在百步之內舉號砲吹哱囉各兵起立鳴企哱囉止舉號砲吹天鵝聲鳥銃齊放或一次盡擧或分五擧.
[59] Michel Foucault, *Discipline and punish: the birth of the prison* (New York: Pantheon Books, 1977), 135.

with methods "based on hard-nosed practicality."[60]

But were Korean musketeers really that remarkable in history? Yes. While European musketeers were generally clumsy shooters, Koreans highly valued marksmanship and selective shooting. As early as 1594, those in the central armies were evaluated as better than their Chinese counterparts. In 1636, Chŏng On claimed that the combination of "Korean musketeers and archers were peerless under heaven."[61] Records get clearer in the next few decades. After the invasion of 1637, Manchu leader Hong Taiji considered them excellent and "of great use when storming a fortress."[62] Indeed, he had Korean musketeers to aid his siege of Jinzhou castle in 1641 where they allegedly inflicted 70%-80% of Ming casualties.[63] Their efficacy was tested again in the Amur frontiers where a few hundred disciplined Korean musketeers firing against Russian Cossacks earned the reputation of Big Heads. Composed of elite musketeer units, Korean aid troops were incredible sharpshooters in early modern standards and in contrast to Qing musketeers who paled in comparison. Using a surprisingly narrow target (1.6 m tall and 10 cm wide) placed 72 m from point of fire, Big Heads averaged 25% accuracy, with the highest rate being 32.5% and the lowest 20%.[64] Using standard deviation to extrapolate on ballistic performance, these men would have scored an average accuracy of 66.2% with a roughly man-sized target (1.6 m tall and 30 cm wide) from the same distance and the best of them (those who scored 32.5%) would have had a staggering marksmanship of 79.8% within 72 m of range. Both narrative and quantitative data suggest that Korean musketeers were indeed exceptionally lethal

[60] Andrade, Kang and Cooper, "A Korean Military Revolution?," 23.
[61] Chŏng On 鄭蘊, *Tonggyejip 東溪集*, trans. by Cho Donggyŏng (Sŏul-si: Minjok Munhwa Ch'ujinhoe, 2000), 303-304.
[62] *Qingshilu* 清實錄 [Veritable records of the Qing dynasty], *Qingtaizong shilu* 清太宗實錄, *j.* 37, p. 27 (崇德 2:7:*renchen* 壬辰 [1638/2]) as cited in Liu JiaJu 劉家駒, "Qingchu zhengbing chaoxian shimo" 清初徵兵朝鮮始末, *Shi huo yue kan: Zhongguo li shi she hui ke xue za zhi* 食貨月刊: 中國歷史社會科學雜誌 1, No.2 (1971): 382.
[63] *Injo sillok*, *j. 42* (仁祖 19:9 *kyeongjin* [1641/9/7])
[64] Sin, 73-75.

in battle.

As in Europe, widespread adoption of guns resulted in substantial army size growth in Korea. Parker, the doyen of the Military Revolution model, argues that the advent of siege guns and, the *trace italienne* (star fortress) thereafter, led to a dramatic increase of armies in early modern Europe. Made to withstand artillery fire, these new forts had polygonal embattlements that allegedly required more infantrymen to garrison. While this fortress revolution seems to absent in the Korean case, dramatic increase in army size did occur in the seventeenth century due to Korea's radical shift towards infantry- and firearms-based tactics. Koreans measured their army size by *kunaek* (軍額), a composite number which includes both the actual number of regular soldiers (正兵) and the Support Persons (保人) who financed the regular soldiers in lieu of directly serving in the military. This number for total military forces of Chosŏn was as high as 508,504 in 1477, plummeted to 300,000 in the late 16th century due to military atrophy and bounced back up, reaching an unprecedented height of 820,000 by early 18th century.[65] In the central armies, *kunaek* was as high as 104,000 in the seventeenth century. As shown in Figure 1, records of regional armies also show that their army size and number of support persons doubled from 95,226 in 1600 to 200,000 in 1681.[66] Records of *kunaek* (軍額), however, only show "paper army strength" and cannot be used as the sole yardstick to measure actual army size growth. Ratios of regular soldiers to support persons varied over the years and we simply do not know how much percentage actual armies constituted the composite number. Nonetheless, the dramatic increase of *kunaek* at least shows that the Korean military was dramatically expanding its fiscal foundation to sustain its armies.

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[65] Han'guk Yŏksa Yŏn'guhoe, *Chosŏn chunggi chŏngch'i wa chŏngch'aek = Politics and policy in the middle Chosun period* (Sŏul: Ak'anet, 2003), 0.
[66] Ibid.

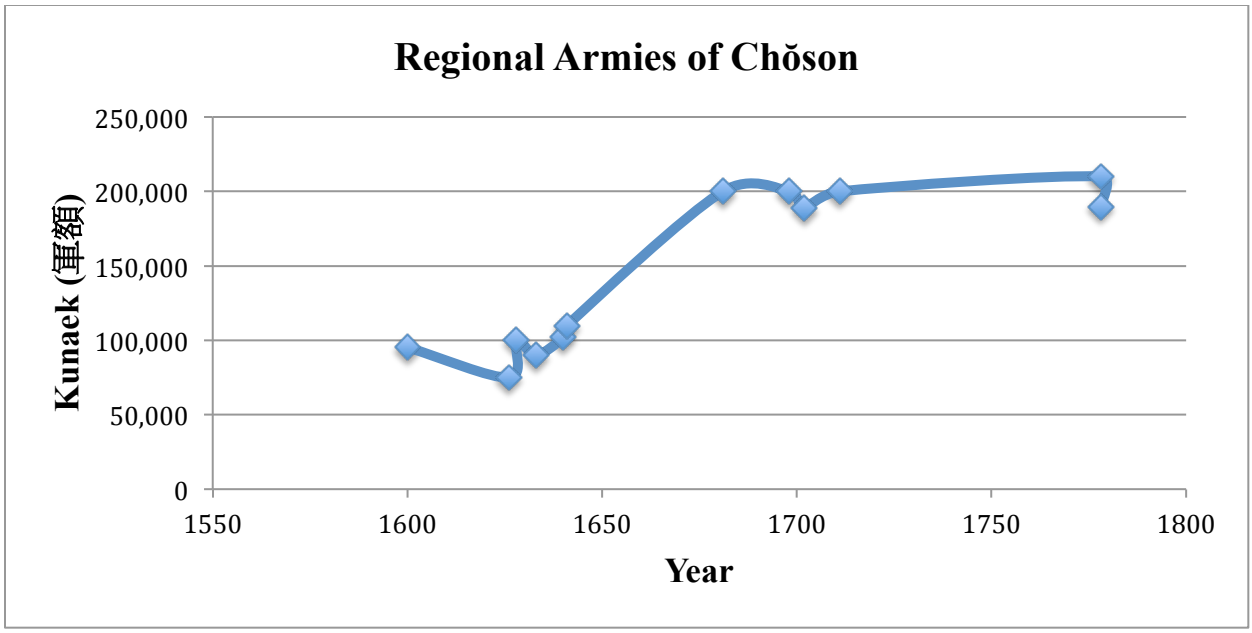

Figure 1. This graph shows the change in *kunaek* (軍額) of Chosŏn's regional military, particularly their *Sog'o* army (束伍軍), which were modeled after Chinese general Qi Jiguang's principles of "Control-the-Ranks Method" (束伍法).[67]

The growth trend of central armies in seventeenth century Chosŏn is clear, thanks to better, albeit spotted, data that separate actual army strengths from *kuaek*. As shown in Figure 2, three capital armies of Chosŏn, the Military Training Agency and the Imperial Battalion (御營聽) and the Imperial Defense Army (守禦聽) had sustained growth during most of the seventeenth century, increasing dramatically until the 60s and the 70s and reaching a pinnacle of 46,000 men in total by 1680. Starting around 1660s, both the Military Training Agency and the Imperial Battalion diminish gradually in number, presumably due to their strongest proponent King Hyojong's death in 1659. Power shifts in regimes and factions, indeed, profoundly influenced central armies because of their function as the basis of political power and legitimacy. Men were often moved around between different central armies, which suggests that the reduction of some

[67] Kim Uch'ŏl, *Chosŏn hugi chibang kunjesa* 朝鮮後期地方軍制史 [History of Late Chŏson Regional Armies] (Sŏul-si: Kyŏngin Munhwasa, 2001), 127. See corresponding table in the Appendix section.

armies does not necessarily indicate a general decline. In fact, as numbers in the two aforementioned armies declined, the Imperial Defense Army (守禦聽) was growing and the total number of men increased dramatically and consistently from 1593 to 1680. While there are two other central armies – the Anti-Manchu Division (摠戎廳) and the Forbidden Guards Army (禁衛營) – in seventeenth century Chosŏn, data are impossibly sparse and unreliable. Nonetheless, the three central armies shown here underwent sustained growth throughout much of seventeenth century.

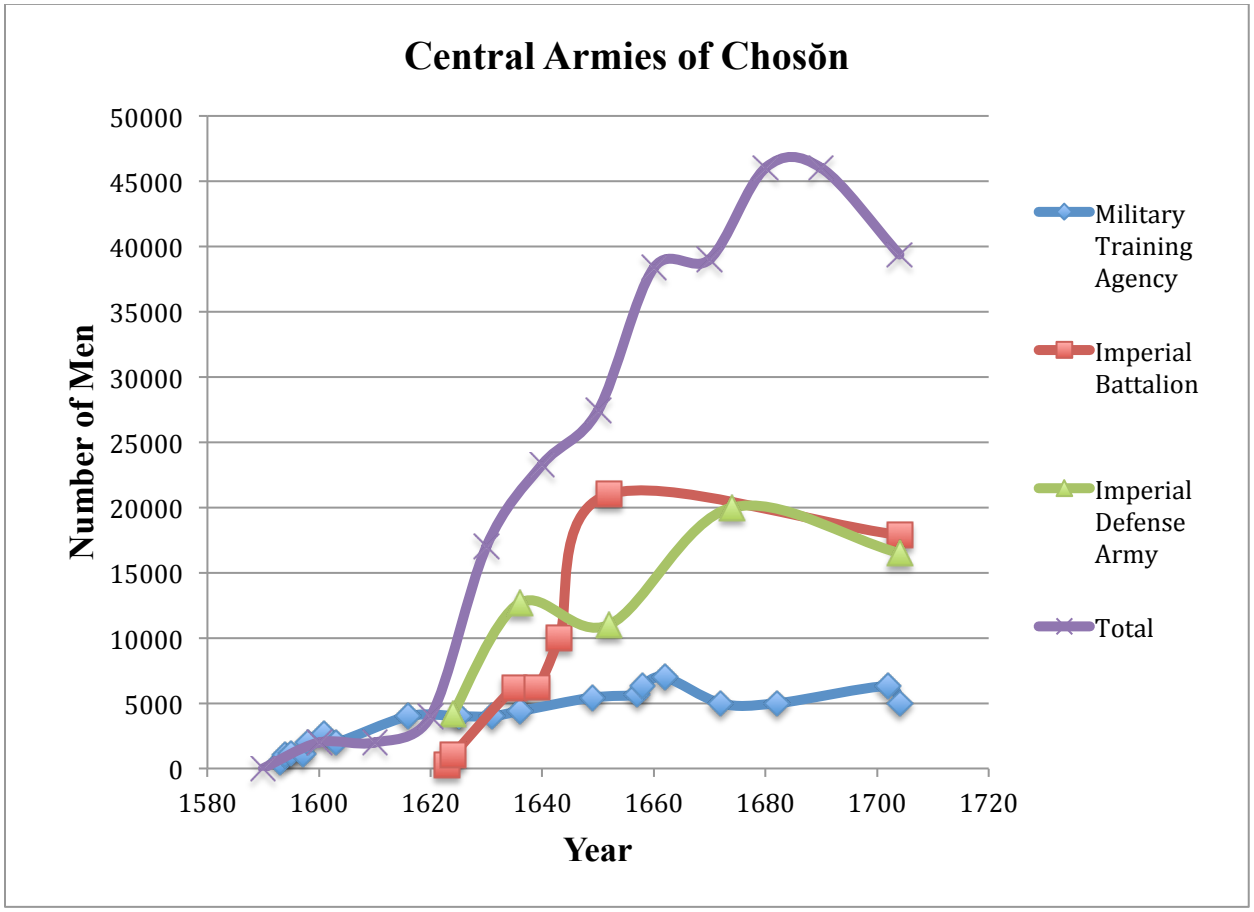

Figure 2. Central Armies of Chosŏn. This graph shows the dramatic increase in army size from 1595 to 1704 in three central armies of Chosŏn –Military Training Agency, Imperial Battalion and Imperial Defense Army. The total number of men, calculated at intervals of ten years.[68]

[68] See corresponding table and citation for each data point in the Appendix section.

Army (禁衛營) – in seventeenth century Chosŏn, data are impossibly sparse and unreliable. Nonetheless, the three central armies shown here underwent sustained growth throughout much of seventeenth century.

Managing a growing army, which was increasingly composed of musketeers, was dauntingly expensive. As the Battle of Sarhu in 1619 demonstrated, poorly organized musketeers were easy prey to heavy cavalry, which made a professionally drilled infantry imperative.[69] Such venture would encumber the state with unprecedented levels of fiscal difficulties because it required standardized drilling regimes, competent officer corps, reliable firearms, regular supply of gunpowder and military manuals. For instance, Military Training Agency, the first professional standing army established in Chosŏn Korea in 1593, employed salaried men, manufactured firearms and provided its soldiers with food and clothing with its own fiscal means. Unlike other soldiers in the Korean military of temporary service during non-farming seasons, those of the Military Training Agency were permanent forces living in the capital. Sustaining this army, which grew over the seventeenth century, used one fourth of the Ministry of Finance's budget in 1595[70] and as much as two-thirds by the late seventeenth century.[71] This was extraordinary and unprecedented in Korean standards but was slightly lower than France's 75% during Louis XIV's reign. In 1650s, the English Republic spent "no less than 90%" in military expenditures but this seems to have been an extreme anomaly.[72] In 1602, King Sonjo also adopted a supplementary tax to fund the Military Training Agency. Known as the "three

[69] No, "Injocho," 181.
[70] Song Yangsŏp, *Chosŏn hugi tunjŏn yŏn'gu* (Sŏul T'ŭkpyŏlsi: Kyŏngin Munhwasa. 2006), 26.
[71] Kim Jongsu, 149.
[72] Parker, *Military Revolution*, 62.

military skills rice tax" or *samsumi* (三手米), this supplementary surtax was paid in *mal* per *kyol* in five provinces, a practice that was approved permanently in 1606.[73]

Chosŏn's economic reforms of the mid-seventeenth century are noteworthy examples of how changes in military tactics transformed institutions. The Korean court responded to the new fiscal challenges with institutional reforms, most notably the Taedong tax reforms. In the aftermath of the Imjin war and the Manchu invasions, King Hyojong first promulgated Taedong reforms, which standardized method of paying taxes in rice rather than other regional goods and consequently lessened the likelihood of embezzlement at regional posts. These tax reforms were profoundly related to King Hyojong's ambitious plans of raising an elite army of 10,000 musketeers in the 1650s. To ensure regular taxation, Hyojong also reinforced census-taking at large, which resulted in dramatic increases in the number of registered households from 15,760 to 23,899 in Sŏul alone and from 658,771 to 1,313,453 in total.[74] Although these tax reforms seemed to have yielded positive results, tax revenues were never enough for the ever-increasing military expenditures.

The Chosŏn military, thus, searched for many different ways to supply the military and accommodate capital armies. All Korean central armies managed several garrison farms within and outside the capital,[75] which produced agricultural products and tradable goods. The profits from these farms were then sent to the armies for fiscal support. In addition, the Military Training Agency promoted numerous other commercial activities such as manuscript printing[76] and shipping business as its independent fiscal means. The Korean court also granted its capital soldiers special permission and privileges to engage in commercial activities throughout the

[73] Palais, 86.
[74] Atwell, 681.
[75] Song Yangsŏp, 21-37.
[76] Song Jungsook, "17segi Hullyon Togam'ui yinsheoi chulpan hwaldong [Printing and Publishing of Hunryondogam in the 17th Century]," *Sojihak Yonggu* 42, (June., 2009).

seventeenth century. Particularly, soldiers of the Military Training Agency actively engaged in commerce to make up for their insufficient salary during times of famine and fiscal difficulties.[77] Having moved to the capital with their entire families, these men established marketplaces in areas of Sŏul such as one in the region of Chilpae that they had considerable control over and developed highly competitive businesses. Whether these activities significantly bolstered the central armies' treasury is not clear, but they were certainly potent accelerators of commercialization in the capital.

But if reforms were effective, why did firearms development slow down eventually in Korea and in other regions of East Asia? How did Korea succumb to isolationism and military atrophy that left it susceptible to the intrusion of Western powers in the modern era? There has yet been a systematic study of why Korean military innovations did not persist into the nineteenth century. However, historians of China and Japan - Gubota Masashi,[78] Kenneth Chase[79] and Peter Lorge[80] – have pinpointed possible divergences between East Asian and European ways of firearms warfare, which might also have important implications for Korea.

Japanese scholar Gubota Masashi has advanced an intriguing argument about a divergence in military aptitude regarding drill.[81] He argues that a fundamental difference between Western Europe and East Asia was in the execution of the volley technique, which had implications for drill patterns and war-making at large. They argue that differences in musket design –whether fired from the cheek or the shoulder – was a technological determinant of the form and the extent of drill. Because the Japanese used fowling pieces, which were slow-firing

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[77] Kim, 126-136.
[78] Gubota Masashi, *Ilbon ui Kunsa Hyeokmyung* [Military Revolution in Japan], trans. by Hŏ Jinngyŏng, Park Hongbae and Shim Hosŏp (Sŏul: Yangsokgak, 2010).
[79] Kenneth Chase, *Firearms: a global history to 1700* (Cambridge, UK: Cambridge University Press, 2003).
[80] See above. Lorge, "Asian Military Revolution."
[81] Masashi, 44-61.

but accurate, they focused on individual marksmanship and valued accuracy over the quantity of volleys. On the contrary, because their European counterparts used shoulder firearms, which were quick-firing but dreadfully inaccurate, they concentrated on developing a form of blanket volley fire that valued fire density over accuracy.[82] This difference purportedly led to Japan's relative lack of standing armies and of *en masse* infantry tactics that characterized European warfare. Masashi's argument seems to hold a modicum of truth but evidence from this thesis, particularly Chapter 2, will complicate its implications. Not only were Chinese drillmasters such as Qi Jiguang very systematic and rigorous like the Europeans, Koreans who adopted both Qi's methods and Japanese style fowling pieces, were sort of a hybrid: they were both excellent marksmen and rigorously drilled infantrymen.

While Masashi focused on drill, Chase sees the point of divergence in the domineering presence of nomadic cavalry in Northeast China. He argues that East Asians lagged behind Europeans because the investment return of developing firearms was severely diminished by their inefficacy against nomadic cavalry.[83] The fulcrum of Chase's argument lies in the proposition that early firearms, due to their slow rate of fire, were purportedly not effective against cavalry charges. However, as I will argue, the threat of Manchu cavalry actually stimulated Korean development of firearms. While Koreans faltered against the Manchu cavalry, they did not question the fundamental efficacy of firearms against nomads but rather challenged their drill methods and tactics to better harness the firearms against the nomads. Thus, as I will elaborate in Chapter 3, nomadic forces were a constant source of challenge for improvement and its impediment to the development of firearms cannot be exaggerated.

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[82] Ibid., 53.
[83] Chase, 23-27, 207-210.

Lastly, Peter Lorge approaches the debate from a macrohistorical perspective and shows compellingly that there was an early Asian Military Revolution during the twelfth and thirteen centuries.[84] Stressing the Asian origins of modern warfare, he explains that the re-adoption of European firearms in sixteenth century did not lead to revolutionary effects in East Asia because "the social, institutional, military and political frameworks that Europe developed in order to take advantage of guns either already existed in Asia or had proved unnecessary in exploiting the military potential of guns."[85] While Lorge's argument seems to hold for the Chinese military context, which was already highly advanced and adapted to firearms warfare by the sixteenth century, it cannot speak for the broader East Asian experience and Korea in particular. Koreans were early participants of the Chinese Military Revolution in the thirteenth century as they adopted Chinese gunpowder technology and developed their own varieties of cannon and handguns by the fifteenth and sixteenth century. Nonetheless, the Korean fiscal-military bureaucracy was not nearly as advanced as that of the Chinese, which posed logistical challenges to the Korean Military Revolution. Thus, as shown earlier in this chapter, Korean military and institutional frameworks required major re-working in the sixteenth and seventeenth century in order to better harness the power of more advanced European firearms.

More discussion on these differences and the possible causes that eventually impeded the Korean military revolution need not concern us until later but suffice to say, in many aspects, firearms did not elicit the same experiences in Korea as they did in Europe. The rough terrain of the Korean peninsula rendered mobile artillery difficult to maneuver, which left the Korean army susceptible to foreign invasions until advanced battlewagons were made in the eighteenth century. The powerful Manchu cavalry in the north also posed formidable challenges to the

[84] Lorge, 180
[85] Lorge, 20-21

development of Chosŏn miltiary by its destructive impact on the Korean infantry. Further, differences in geopolitics - the presence of China as a stabilizing super-power - inhibited firearms development in Korea as the Qing dynasty was particularly oppressive of Korean military strengthening. Nonetheless, despite that the Korean Military Revolution did not persist into the nineteenth century for reasons we will return to in the conclusion, guns wrought deep changes in Chosŏn Korea during the seventeenth century.

Chapter 2: The Korean Drill Ethos

> Military art is just like ritual music. Ritual is when affairs are ordered; music is when material things acquire harmony. Lack of order leads astray, which then disrupts harmony. A million men being commanded in divisions are like the mesh of a fishing net being subordinated to the head rope, isn't this disciplined order? What is, but harmony, an army of one million men that is of one heart, leaving no crevice for vulnerability? If no affair under heaven exists without ritual music, how could military art, an affair of paramount importance, be devoid of ritual music?[86]

When Yu Sŏngnyong, Prime Minister of Chosŏn dynasty during the Imjin War, was asked of what the military art was, he replied it was commensurate with ritual music. To the Koreans, the ideology of the military art indeed sat on an intricate nexus of Neo-Confucian concepts such as social harmony, disciplined order and ritual. Yu envisioned a fluid, stratified line of command that expanded and contracted like the mesh of a fishing net when the head rope, a metaphorical command, is pulled up. Rich tropes of cultural and philosophical significance underpin this passage. But what leaps out of Yu's eloquent descriptions is a Korean emphasis on drill and a profound understanding of the importance of military discipline.

Drill was central to the late Chosŏn military and its quest to raise musketeers. Training commoners with little military knowledge to form a cohesive unit of musketeers was an arduous task. Muskets were powerful and relatively easy to use but required enormous discipline to employ them effectively in battle. In the face of a ground-shaking cavalry charge, musketeers had to stand their ground, tamp the barrel and pour gunpowder while juggling a lit match. With lack of sufficient drill, chaos could easily break loose amongst ranks, as Chinese general Qi Jiguang outlines and Koreans duly noted:

> Mutinous soldiers, lacking anger and hatred against the enemy, shoots towards the

[86] Yu Sŏngnyong 柳成龍, *Sŏae Sŏnsaeng munjip* 西厓先生文集, in *Han'guk munjip ch'onggan,* vol. 52 (Sŏul: Minjok Munhwa Ch'ujinhoe 民族文化推進, 1894 [originally published in 1633]), 89.

> sky instead of using lead bullets properly during the drill. In cases of emergency, their mind and hands play separately. They only shout thunderously in panic and their bullets do not reach the enemy. When the enemy encroaches, they shoot with neither bullets nor gunpowder, only thinking of retreating first. Some even discard unused gunpowder and ammunition on the floor, paint their faces black with gunpowder and screech they have run out of ammunition, wreaking havoc amongst the ranks. Hearing the clamor, the enemy charges fast and our battle is lost.[87]

How could one make musket units hold their positions under attack, patiently loading their guns and waiting their turn to fire? Discipline.

To instill such military discipline, an art of soldiering was required, one that deeply entrenched itself in the notion that men were made, not born. As British Colonel William Barriffe wrote in 1616, regular and repeated practice of drill patterns was crucial in shaping a soldier.

> No man is born a Souldier, nor can attain to any excellency in the Art Military without practice: But by practice is gained knoledge; knoledge begets courage and confidence; few or none being fearful to execute what by frequent practice they have thoroughly learned.[88]

More than three hundred years later, French philosopher Michel de Foucault reflected on the European disciplinary ethos that made soldiers, describing the body of the soldier as

> Something that can be made; out of a formless clay, an inapt body, the machine required can be constructed; posture is gradually corrected; a calculated constraint runs slowly through each part of the body, mastering it, making it pliable, ready at all times, turning silently into the automatism of habit.[89]

As shown, Europeans perceived the soldier as a controllable unit that, through cycles of

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[87] Sŏ Inhan, *Sin'gi pigyŏl* 神器秘訣 [Secret of the Divine Weapon] (Sŏul-si: Kukpangbu Kunsa P'yŏnch'an Yŏn'guso, 2011), 36.

[88] Colonel William Barriffe, *Militarie Discipline: Or the Young Artillery-Man, Wherein is discoursed and Shown the Postures both of Musket and Pike, the Exactest way, &c. Together with the Exercise of the Foot in their Motions, with much variety: As also, diverse and several Formes for the Embatteling small or greater bodies, demonstrated by the Number of a single Company, with the Reducements: Very necessary for all such as are Studious in the Art Military. Whereunto is also added, the Postures and Beneficial Use of the Half-Pike joined with the Musket. With the way to draw-up the Swedish Brigade. As also, Mars his Triumph. And in this last Edition is added, Some brief Instructions for the Exercising of the Cavalry, or Horse-Troopes* (London: Gartrude Dawson, 1661), p. 1.

[89] Foucault, 135.

repetition and drill, could act like an automaton in battle. And these individuals were put side by side to form ranks, battalions and entire armies. Imbued with a sense of *espirit de corps*, they were, through rigorous drill, bound into a cohesive unit that could "keep together in time."[90]

As in Europe, the Koreans also had a pronounced disciplinary ethos, one that could transform commoners with no prior military training into effective soldiers in battle. In a famous Korean manual known as *Orientation to the Military Arts* (*Pyŏnghakchinam* 兵學指南), Koreans adopted Chinese Qi Jiguang's "Control-the-Ranks Method" (*Sogobŏp* 束伍法) to organize an infantry army based around commoners. The method outlines clearly stratified troop divisions that were designed to facilitate the recruitment and training of commoners. The basic unit was the squad (*dae* 隊), which consisted of eleven men. Three squads made up a banner (*ki* 旗); three banners made up a platoon (*cho* 哨); five platoons made up a company (*sa* 司); and five companies made up the largest unit, a battalion (*yŏng* 營). A direct line of command thus linked the higher officers to the closely-knit squads of eleven. Koreans revamped their line-of-command after Qi's model, replacing the traditional model which "was less stratified and thus, less conducive to efficient relaying of command."[91]

One of Qi Jiguang's formation that fascinated the Koreans is the Mandarin Duck Formation (鴛鴦陣), which proved to be particularly effective against the Japanese. It contained no firearm units but was remarkable for its tight, multi-supportive nature, one that created a feeling of connectedness and bounded the squads into cohesive units that were not unlike those in the

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[90] William H. McNeill, *Keeping Together in Time: Dance and Drill in Human History* (Cambridge, USA: Harvard University Press, 1997).

[91] Kim Donggyŏng 金東慶, "Chosŏn ch'ogi chinbŏp-ui paljŏn-gwa kunsa kinŭng [Development of the Jinbup (Military Formation) and Military Functions in the Early Chosun Dynasty]," Ph.D. Dissertation, Korean University of National Defense, 37 as cited in Tonio Andrade, Kirsten Cooper, Hyeok Hweon Kang, 12.

Spanish tercios or Gustav Adolph's infantry. The Mandarin Duck Formation consisted of several mutually-reinforcing types of soldiers, each of which had particular abilities that complemented the others: two men with sabers and rattan shields (盾牌手), two men with multiple tip bamboo spears (狼筅手), four men with long lances (長槍手), and two men with tridents or swords (短兵手). They were led by a squad leader (队长) and supported by a cook or porter who also coordinated logistical support (负责伙食的火兵). The squad was drilled carefully in various maneuvers in which the specialists – the shield-men, the spearmen, and the swordsmen – played carefully defined roles. Commoners were chosen for the various tasks depending upon their abilities. Training and drilling were methodical and exhaustive.

Another aspect of Qi's infantry drill that Koreans admired and included in their own military manuals was the use of draconian rules to reinforce discipline. As Korean statesman Han Hyosun underscores in his manual, *Secret of the Divine Weapon* (*shingi bigyeol* 神器秘訣), unforgiving castigation was the key:

> Musketeers are excellent in reducing fiercely charging enemies. But if they don't follow the dictated methods in battle and intentionally aim higher, lower or askew, or shake in fear and turn their heads back, decapitate them. During the heat of the battle, the squad leader of the proper musketeers or that of the "killer" squad is allowed to cut their ears first and upon return to base, investigate and punish.[92]

The passage above is Han's rephrasing of Qi Jiguang's "warning against musketeers" in his second manual – *Lian bing shi ji*. As shown, Koreans, like the Chinese, used severe punitive mechanisms to counter the fear of mutilation that musketeers faced in battle with a tantamount fear of punishment by their own leaders. In this way, they were indoctrinated to think that the best survival mechanism in field battle was to deliver effective fire lest face fatal punishment.

Efficiency in battle depended as much on unforgiving discipline as it did on operational

[92] Sŏ, 43.

signaling and communication methods. The first chapter of *Pyŏnghakchinam*, for instance, explains the use of flags and drums (旗鼓正法) in military drill.

> When making a certain command, the signaling-cannon must be fired first to capture the attention of the soldiers. Then, use items such as gong, drum, flags and banners to execute the order. At the sound of the signaling-cannon, all soldiers and officers must immediately become of one heart and discern which color banners are raised and which gong or drum pattern is played.[93]

Further, Koreans employed an intricate system of visual and auditory commands that included flags, signal cannon-shots, horns, and conches. In Korea, a regular and essential part of the army was the blowing and drumming musicians (*chwigosu* 吹鼓手), who were trained in the performance of musical instruments used to give bugle calls and facilitate military exercises.[94] For example, the *Pyŏnghakchinam* outlines *a particular drilling exercise* for musketeer squads:

> The company leader (*pachong* 把摠) waves the flag of a color similar to that of the musketeer squad, which is then acknowledged by the platoon leader (ch'ogwan 哨官), responded by a banner leader (*kichong* 旗總) who waves his spear-flag, and by a squad leader (*taejang* 隊長) who also waves his spear-flag… At the first signal-fire and trumpet blowing, the squad stands in a single rank. Then, followed by the sound of the gong (*na* 鑼), the squad sits down and rests. With another signal-fire and blowing of the conch (*bara* 哱囉), the squad rises. The soldiers shoot simultaneously once when a signal-fire is shot and a single, drawn-out note is blown by a double-reed (*ch'ŏnasŏng* 天鵝聲). Then, the soldiers immediately re-organize into five ranks and with each signal-fire and blowing of the double-reed (*ch'ŏnasŏng* 天鵝聲), two soldiers fire by turns five times. When the victory-drum is struck, the squad returns to the open space behind the banner leader (*kichong* 旗總), and sits down to rest with the sound of the gong (*na* 鑼).[95]

As shown, Koreans derived drilling techniques from Qi Jiguang's manuals and laid the foundation of their infantry tactics, one rigorous and elaborate enough to appropriate muskets

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[93] Yi Sangjŏng 李象鼎, Pyŏnghak chinam yŏnŭi: Chosŏn hugi kunsa kyobŏm 兵學指南演義 : 朝鮮後期軍事教範 (Sŏul T'ŭkpyŏlsi: Kukpang Kunsa Yŏn'guso, 1995), *j.*1, 23-24.
[94] Yi Sukhŭi, *Chosŏn hugi kunyŏng aktae: ch'wigosu, seaksu, naech'wi* 朝鮮後期軍營樂隊: 吹鼓手, 細樂手, 內吹 (Kyŏnggi-do, P'aju-si: T'aehaks, 2007).
[95] Yi Sangjŏng., *j.*1, 123.

and employ them effectively in field battle. But did Koreans reach European levels of coordination and discipline that enabled their musketeer squads to move in robotic synchronization and deliver continuous hail of fire in a timely, organized fashion? Was there a Korean way of musketry volley fire?

Musketry Volley Fire in Chosŏn Korea

> Two Ranks must always make ready together, and advance ten paces forward before the body, at which distance, a Sergeant (or when the body is great some other officer) must stand, to whom the Musketeers are to come up before they present and give fire, first the first rank. And whilst the first gives fire, the second Rank keep their Muskets close to their Rests, and their pans guarded, and as soon as the first are fallen away, the second presently present, and give fire, and fall after them. Now as soon as the first two Ranks do move from their places in the front: The two Ranks next them must unshoulder their Muskets, and make ready, so as they may advance forward ten paces as before as soon as ever the two first ranks are fallen away; and are to do in all points as the former. And all the other Ranks through the whole division must do the same by twos, one after another.[96]

Musketry volley fire, as outlined above by British Colonel William Barriffe in 1616, was a hallmark of early modern infantry field warfare, one that Geoffrey Parker underscores as a milestone in the development of the Military Revolution. In Western Europe, increasing emphasis on musketry drill transformed soldiers into automatons that could act with mechanic precision and synchronization in battle. By the eighteenth century Europe, a lethal army was no longer a group of brawny warriors or men-at-arms but a cohesive unit of professionally drilled infantrymen that could act with an "unthinking readiness" in battle, carrying out musketry volley

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[96] Bingham, Captain John Bingham,. ""The Exercise of the English in the Service of the High and mighty Lords, the Lords the Estates of the United Provinces in the Low Countries." ," In *The Tactiks of Aelian or Art of Embattailing an Army after Ye Grecian manner Englished & Illustrated with Figures Throughout: & Notes upon Ye Chapters of Ye Ordinary Motions of Ye Phalange by J.B. The Exercise Military of Ye English by Ye Order of That Great Generall Maurice of Nassau Prince of Orange &c Governer & Generall of Ye United Provinces Is Added, by Aegidius Gelius Aelianus,* (London, 1616), pp. 153-59. London: eliot's Court, 1616, p. 156.

fire with composure in the field.[97]

European infantries excelled at musketry drill but their East Asian counterparts were just as competent. The notion of volley fire has deep roots in Korean and Chinese military tradition. Its first appearance in Korea was as early as 1447 when King Sejong paid devised new methods in the use of fire-barrels. His personal instruction to the "fire-emitters" revealed an early Korean concept of volley technique using firearms.

> Divide into squads of five and have four men shoot fire-barrels while one soldier swiftly reloads the barrels with gunpowder. Using varieties of fire-barrels such as the two-gun-barrel, three-gun-barrel, eight-arrow-gun-barrel, four-arrow-gun-barrel and the thin-gun-barrel confounds the army because each type of fire-barrel uses varying methods of reloading. Thus, all five members of a squad should carry the same type of fire-barrel to be effective in actual battle. This should be the regular drill regime.[98]

These fire-barrels had no lock mechanisms for controlled fire but the difficulty involved in reloading firearms seemed to have sparked interest in forms of volley fire as early as mid-fifteenth century.

Similarly, volley fire was applicable to archery and consequently had deeper roots in East Asian military tactics before the invention of firearms. The precedents of cross-bow volley tactics that two Chinese brothers (Wu Lin and Wu Jie) used when fighting against the Jurchens in 1131 was an important inspiration for statesman Chŏng On's new military formation in 1636. In a proposal to King Injo (1595-1649), Chŏng advocated for a new formation called the "Three Layer Formation" (*samch'ŏpjin* 三疊陣), which employed volley fire techniques for both musketeers and archers.[99]

During battle, even if the enemy charges towards our troops with the crane

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[97] William H. McNeill, *Keeping Together in Time: Dance and Drill in Human History* (Cambridge, USA: Harvard University Press, 1997).
[98] *Sejong sillok*, *j. 118* (世宗 29:11: 甲辰 [1447/11/15]).
[99] Chŏng On, 305.

> formation, the first layer of one thousand musketeers should fire, sit down to reload while the rear layer of another thousand musketeers fires next. If the sound of fire does not cease and arrows fall like rain, even a well-armoured cavalry of steel-horses would be obliterated.[100]

Whether Chŏng On's reference to the Wu brothers and their legendary cross-bow tactics was a legitimate source of inspiration is contestable because classical examples were often used to merely bolster the rhetoric.

Nonetheless, the long-standing tradition of archery in Korea undoubtedly intersected with early Korean developments in musketry volley fire. Despite the ascendancy of musketeers, archers continued to be significant forces in the Chosŏn military during and after the Imjin War. Not only was the tradition of archery deeply entrenched in the Korean military but the unusually rainy climate of the seventeenth century,[101] which made matchlocks useless, and the fiscal challenges of supplying firearms in the midst of war posed obstacles. Further, the excellence of Korean archers, especially their "thin-arrows" (片箭), still proved lethal during the Imjin War. Thus, it is no scant wonder that Yu Songnyong, while recognizing the importance of adopting musketeers, continued to develop Korean archery to create a unique edge in battle.

> If everyone fires at once, then although some of the bandits will be hit, the other bandits will be able to charge before they are able to draw another arrow. Volley fire is a way to prevent them from charging and to make the bandits unable to take advantage of our pause [in shooting]. If there are 100 archers, then they will be divided into 10 squads, with 10 men making up one squad. All of them will draw their boows, but in one squad three men will shoot first, then three men will shoot next, then four men will shoot next, so that the arrow nocks will follow one another without any gaps. Among 100 men there will always be 30 or 40 arrows fired in succession."[102]

As shown, the concept of volley fire and the partitioning of continuous fire did not emerge solely

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[100] Ibid., 304

[101] Kim Yŏnok 金蓮玉, *Han'guk-ŭi kihu-wa munhwa: Han'guk kihu-ŭi munhwa yŏksajŏk yŏn'gu* [Climate and Culture of Korea: Cultural-Historical Study on Korean Climate] (Sŏul T'ŭkpyŏlsi: Ihwa Yŏja Taehakkyo Ch'ulp'anbu, 1985), 384.

[102] Yu Sŏngnyong, 16 as cited in Chase, 189.

within the context of using muskets but in archery as well, before and after the advent of firearms.

The combination of archery and musketry shot was in fact considered one of the unique advantages of the Korean army. Chŏng On (鄭蘊 1569–1641), the same Confucian scholar that proposed the "Three Layer Formation," proudly remarked that Koreans have indomitable musketeers and skilled archers and that their combination surpassed the Japanese and the Manchus. "The Japanese," he wrote, "are capable of employing firearms but lack skills in archery … [while] the Manchus are competent archers but are incapable with firearms."[103] Although archers were mostly supplanted by musketeers by the end of the seventeenth century, the high cultural status of Korean archery persisted well into the eighteenth century.

Drawing from a rich tradition of drill and archery, Koreans adopted the musketry volley technique with surprising alacrity. The first mention of Korean musketry volley fire occurs in a drill manual that was used in 1607 to train new musketeer recruits in P'yŏngan, a Korean province in the northwest bordering Manchuria. The text reads: "every musketeer squad should either divide into two musketeers per layer or one and deliver fire in five volleys or in ten."[104] This brief mention shows that Koreans had already been employing volley fire in 1607.

Records get clear in the next few decades. In *Pyŏnghakchinam,* which dates back to 1649, descriptions of musketry formation are more elaborate, focusing on squads (隊) of eleven men.

> When the enemy enters within hundred steps of range, fire the signaling cannon and blow the conch (bara 哱囉) to command the soldiers to rise and be poised for action. Next, play the gong (鉦, notated as 企 in the manuscript)

[103] Chŏng On, 303-304.
[104] Nŏ Yŏnggu, "16~17segi chochong-ui doip-gua Chŏson-ui gunsa-jŏk byŏnhwa" [The Introduction of Musket and Joseon's Military Change from 16th to 17th Century], *Hanguk Munha* 韓國文化 58 (November 2012), 124.

> to halt the sound of the conch (bara 哱囉) while blowing the double-reed trumpet (ch'ŏnasŏng 天鵝聲) to command the musketeers to shoot simultaneously (齊放). Either fire all at once or divide in five shots.[105]

The most important term in this description is the last word, "*chebang"* (齊放) which literally translates to "firing together." This concept is further expounded in a diagram found in the same manual titled "Continuous Fire Musket Shot" (*Choch'ong yunbangdo* 鳥銃輪放圖), which make clear how the musketry squads were organized.

The Korean musketry squad (隊) consisted of a squad leader and ten musketeers. The musketeers were drawn up into five ranks, each rank consisting of two men placed next to each other, with the squad leader standing in front of the foremost pair. This is quite similar to many European formations. In the Korean diagram (see Figure 3), all the musketeers are kneeling in the initial position with their muskets held against their chest. The squad leader blows his conch, at which the first pair of musketeers stands, advances just beyond the squad leader, and then fires. At this point, however, there is a divergence from European practice. Whereas the European musketeers go to the back of their file after firing, the Korean musketeers return to their original position. As they do, the squad leader blows his conch again and the second pair rises, advances just beyond him, and fires. It returns, and the third pair takes its turn, then the fourth and the fifth, thus sustaining a constant hail of fire. By the time the fifth pair fires, the first pair has reloaded and the volley continues.[106]

The two circles shown in Figure 3 indicate the original position of the third pair, which has, in this snapshot, just advanced to fire. The third pair, now standing front of the squad leader

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[105] *Pyŏnghakchinam* 兵學指南,「場操程式」(鳥銃鈀弓齊方), KDCP692, p. 184, The National Library of Korea, Sŏul, South Korea. The original text is as follows: 賊在百步之內舉號砲吹哱囉各兵起立鳴金哱囉止舉號砲吹天鵝聲鳥銃齊放或一次盡擧或分五擧.

[106] This description is based on the diagrams and the text found in *Pyŏnghakchinam*.

firing is, thus, noted by the term “shooting together” (擧放). The first pair (behind the squad leader), is labeled “reloading” (方裝). That first pair has just fired and returned to its original position and is in the process of loading powder, adding a pellet, tamping, etc. The second pair is labeled “empty” (空者) because it has just fired and returned to its position, barrels empty. The third pair, as discussed above, is marked by two circles, signifying that that pair is no longer there. The pair just behind the two circles – the fourth rank – is labeled “full” (飽者), because its muskets are loaded and ready to fire. The fifth rank is also labeled “full.”

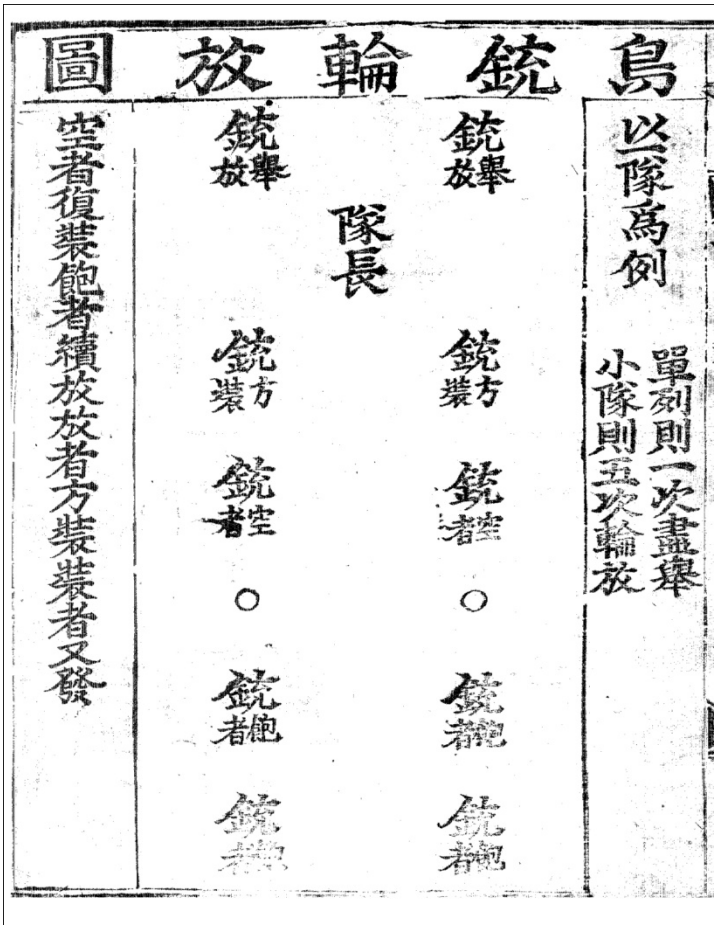

Figure 3. *Pyŏnghakchinam* 兵學指南, KDCP692, p. 122, The National Library of Korea, Sŏul, South Korea. Titled “Continuous Fire Musket Shot” (*Choch‘ong yunbangdo* 鳥銃輪放圖), this diagram shows the Korean method of musketry volley fire.

The diagram also suggests that the Korean appropriation of Qi’s tactics went beyond mere

imitation. In the process of learning and transcribing, drillmasters of Chosŏn addressed confusions in the original manuals and clarified concepts with detailed diagrams. The phrase in Figure 3. that explains the perpetuating sequence of "reloading" (方裝), "empty" (空者), "shooting together" (擧放) and "full" (飽者) can be found in a rather marginal section in Qi's *New book of effective techniques*. The Korean edition, presumably in response to the increasing importance of musketry tactics, draws out a clear diagram that shows the distribution of the troops and the position of each musketeer, labeled with the respective military commands they are carrying out. As opposed to a strictly verbal description in Qi Jiguang's manual that would have been inaccessible to the unlearned, the Korean way of visually arranging the volley technique must have facilitated its rapid distribution amongst Korean armies.

Similar process of elaboration occurs in Korean drillmaster Han Kyo's *Illustrated Manual of Martial Arts* (*Muye Chebo* 武藝諸譜).[107] Commissioned by King Sŏnjo in 1597 and published the following year, this manual expounded on important concepts from Qi's *New Book of Effective Techniques* and fine-tuned them for Korean armies. Han Kyo focused on six of Qi's close-combat weapons such as sabers, lances and rattan shields and drew out the sequence of each move. Qi included gestures (勢) in his manuals but left the sequence of each move only in words, but Koreans, hoping to clarify and teach more efficiently, partitioned the martial arts drill into multiple diagrams and connected them using a sequential chart with illustrations (譜).[108] As manifest in the elaboration on the technique of musketry volley fire and martial arts, Koreans were concerned with organizing and arranging minute steps in their drill, thereby further

[107] Na Yŏng-il, *Chosŏn chunggi muyesŏ yŏn'gu: "Muye chebo", "Muye chebo pŏnyŏk sokchip" yŏkchu* (Sŏul: Sŏul Taehakkyo Ch'ulp'anbu, 2006).
[108] Hŏ Daeyŏng, "Imjinwaeran chŏnhu chŏson-ŭi chŏnsŭl byŏnhwa-wa Kunsa hullyŏn-ŭi chŏnmunhwa 壬辰倭亂前後朝鮮戰術變化와軍事訓練의專門化" [Changes in Chŏson Tactics and Specialization of Military Training Around Imjin War]" (M.A. Dissertation, Sŏul National University, 2012), 42-43.

specializing and specifiing Qi's tactics. Thus, if one of the hallmarks of modern discipline in Foucault's parlance was "the codification that partitions as closely as possible time, space and movement," Korean drill manuals were significant developments beyond Qi's original works.[109]

Koreans also adopted the Chinese method of song and recitation to reinforce musketry drill. Qi Jiguang used *chongge*, or "gun songs" to convey the procedures of reloading and firing a musket effectively to the soldiers.[110] These soldiers were made to sing collectively and to practice the routine until it became second nature to them. In 1603, Chosŏn statesman Han Hyosun (韓孝純, 1543-1621) paid particular attention to these songs and included eighteen different Korean variations of Qi's original song in his military treatise – *Secret of the Divine Weapon* (*shingi bigyeol* 神器秘訣).[111] In the Korean "gun song" for training the use of musket, there are a total of fourteen steps, which is three more steps than the Qi's original gun song. While the difference is little and the Koreans were highlighting implicit steps in Qi's dill, Han Hyosun, like Han Kyo, was again concerned with see the details, which Foucault stresses, is the basis of disciplinary methods. Also, this trend of further partitioning the musketry drill resembles the evolution of Dutch musketry positions laid out by John of Nassau, the brother of William Louis Nassau. Founder of a Dutch military academy, John of Nassau laid out 20 steps in firing and reloading a musket, which grew to become 32 steps with greater detail and illustration through later editions.[112] Although it is unclear whether the Dutch actually employed 32 steps in their drill, this trend in elaboration and ever more specific partitioning of time and movement, as paralleled in the Korean case, is a manifestation of an aggregating emphasis on drill.

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[109] Foucault, 137.
[110] Hŏ, 41. The Chinese text from Qi Jiguang's original manual is as follows: 一洗铳，二下药，三送药实，四下铅子，五送铅子，六下纸，七送纸，八开火门，九下药线，十仍开火门，安火绳，十一听令开火门，照准贼人举发.
[111] So, 17-46.
[112] Parker, *Military Revolution*, 21.

But how did these musketeers organize themselves in formations and engage the enemy in tandem with other military units? One of the hallmarks of European drill is the focus on training soldiers to morph into a bewildering variety of formations, each designed for different contingencies. East Asian drill manuals also contained similar arrays of patterns, and at the core of these formations is a principle that Korean scholars have begun referring to as the "layer formation" (*Ch'ŭngjin* 層陣).[113] The basic idea, which goes back to Qi Jiguang and beyond, is that the soldiers were organized in layers, with different layers specializing in different types of weapon.

The *Pyŏnghakchinam* (兵學指南), for example, lays out in detail a series of formation patterns designed to make use of the strength of musketeers, which is to say the power and range of their projectiles, while also compensating for their weakness, most notably their inability to persevere in close combat. Consider, for example, the following diagrams outlining the "Make War" drill, variations of which seem to have been used successfully in some field battles during the Manchu invasion of 1636. This drill was one of the manifestations of the "layer formation" and made use three distinct types of infantry: the musketeer (*chongsu* 砲手), the archer (*sasu* 射手), and the swordsman or spearman (*salsu* 殺手 [literally, the "killing unit"]), according to

[113] Kim Pyŏngnyun first coined the term *Ch'ŭngjin* (層陣), referring to the concept of manipulating soldiers in "layers" which recurs in Qi Jiguang's manuals such as Ji xiao xin shu and in the Korean adaptations - *Pyŏnghakchinam* (兵學指南) and *Pyŏnghakt'ong* (兵學通). It must be noted that the term is Kim's interpretation based on diagrams of late Chosŏn battle formations and that it is not an official nomenclature used in the original manuals. Further explanation can be found in Kim's article, "Han'guksa-e issŏsŏ-ŭi kibyŏng pyŏngjong – changgibyŏng-kwa gunggibyŏng-ŭl chungsim-ŭro" [Cavalry in Korean history: Focusing on Spear-cavalry and Cavalry-archers], Yukkun Pangmulgwan Hagyejip 陸軍博物館學藝集 17, No. 0 (2010): 1-71. Also see Kim Pyŏngnyun, "Chosŏn sidae sugun chinhyŏng-kwa hamjae mugi unyong" [Naval Battle Formations and Weapon Use in Chosŏn], Kunsa 軍史 74, No. 0 (2010), 1-20; and Kim Pyŏngnyun, "Chosŏn sidae hwayak mugi unyongsul" [Strategic Use of Gunpowder Weapons in Chosŏn Dynasty], Yukkun Pangmulgwan Hagyejip 陸軍博物館學藝集 13, No. 0 (3, 2006): 1-43. There is also a plethora of information on Korean military tactics and system in Kim's blog <http://lyuen.egloos.com>, which has been immensely useful for writing this article.

Qi's "Three-Unit-Technique (*Samsu kibŏp* 三手技法).[114] The formation places musketeers at the forefront of the battle and dictates the other two layers to move organically around them, at times interjecting archery volleys to supplement the musketry fire and other times providing close-combat cover against encroaching enemies.

The pattern starts at the point when the enemy is a hundred paces away. When the musketeers exhaust their fire, archers of the "front layer" step before the musketeer squads, shooting fire arrows and normal arrows (see Figure 4).

Figure 4. *Pyŏnghakchinam* 兵學指南, KDCP692, p. 128, The National Library of Korea, Sŏul, South Korea. Titled "Front Layer Go To War" (前層出戰圖), this diagram shows the front layer advancing before the musketeer layer and the rear layer of "Kill Units" (殺手) drawing up behind the musketeers waiting their turn.

[114] Eugene Park, 51-52.

If this missile assault fails to rout the enemy and he approaches too close, another command summons the rear layer of “Kill Units” (salsu or 殺手), i.e., swordsmen and spearmen. They march swiftly to the front to protect the musketeers and engage in close combat (Figure 5).

Figure 5. *Pyŏnghakchinam* 兵學指南, KDCP692, p. 124, The National Library of Korea, Sŏul, South Korea. Titled "Rear Layer Go To War" (後層出戰圖), this diagram shows how the rear layer of “Kill Units” (殺手) advances to the front of the formation to engage in close-combat with the encroaching enemy.

If they succeed in driving the enemy back, they withdraw, still facing the enemy, and allow the musketeers to once again give fire (Figure 6).

Figure 6. *Pyŏnghakchinam* 兵學指南, KDCP692, p. 127, The National Library of Korea, Sŏul, South Korea. The "Musketeer Hurriedly Advance and Retreat"(鳥銃急出退回層前圖) diagram shows the rear layer retreating and the musketeer layer advancing once again to the front of the formation.

This type of “layer formation,” as elaborated in the *Pyŏnghakchinam* (兵學指南) and other military manuals, shows that in Korea, just as in Western Europe, musketeers were increasingly the core of the army. Not only is the labeling of front and rear relative to the musketeer layer but tactical organization at large is focused on maximizing the effectiveness of the musket layer by providing protection and reloading time for the musketeers. In Europe, armies increasingly focused on pikemen and musketeers, with pikemen eventually being used primarily as support troops for musketeers. The same development occurred in East Asia, particularly in Korea, except with “Kill Units” filling the roll of support troops. The “layer formation” made efficient

use of the Korean infantry organization around the "Three-Unit-Technique" and discussions in Chapter 3 will make clear the outcome of their application in battle against the mighty Manchu cavalry.

Divergence in Drill: Volley, Tactics and Formations

If musketry drill was enforced rigorously in both Western Europe and East Asia, how do we account for the accelerating divergence in their military aptitude in the eighteenth century? Japanese scholar Gubota Masashi argues that there was a fundamental difference between East and West in the execution of the volley technique because of the different musket designs they used.[115] Using fowling pieces, the Japanese valued accuracy over quantity of volleys whereas Europeans, using shoulder arms, concentrated on developing a form of blanket volley fire that valued fire density over accuracy. Further, European drill was designed "not to minimize its [the musket] limitations of accuracy, but to maximize its advantages as a quick-firing weapon," focusing on arraying soldiers in "sufficient mass to provide a virtual blanket of missiles over a short range," rather than expecting them to function as individual marksmen and hit selected targets.[116] This difference purportedly led to Japan's relative lack of standing armies and of *en masse* infantry tactics that characterized European warfare.

Korean sources further indicate that such divergence existed between European and East Asian musketry drill. In Chosŏn Korea, marksmanship was noticeably upheld. Koreans, like the Japanese, used fowling pieces and strove to raise an army of deadeyes. While they paid great attention to continuous fire, their drill was less concerned with turning soldiers into automatons that could pour indiscriminate, synchronized volleys into the enemy. One of many ways this

[115] Masashi, 44-61.
[116] Hall, 139

distinction is manifest is in how Europeans and Koreans differed in measuring their musketeers' competence. Following Qi's paradigm, Koreans standardized their shooting evaluation by placing targets that were 7 feet tall and 2 feet wide 120 meters away from the point of fire. Further, the Korean musketeer was rigorously trained to have consistent postures for shooting and his marksmanship was disqualified if he "moves his hand or turn his head while firing," as explained in Han Hyosun's *Secret of the Divine Weapon*.[117] If fired with correct posture, qualification for elite musketeers was to hit the target twice out of three times, which was a surprisingly high standard of marksmanship, considering limitations in the ballistic performance of smoothbores.

On the contrary, eighteenth century trials from Prussian, Bavarian and French sources indicate that European marksmanship was measured using a significantly larger target – about 100 feet long by 7 feet high, which was roughly "equal to the frontal area presented by an enemy battalion."[118] According to Moritz Thierbach's analysis in 1886, these men, firing 60 times *en masse*, averaged 36 hits (60%) from 75 meters; 24 hits (40%) from 150 meters; 15 hits (25%) from 225 meters and 12 hits (20%) from 300 meters.[119] Thus, while Koreans evaluated musketry competence with individual marksmanship, Europeans focused on how many bullets fired *en masse* would hit a target significantly larger.

Perception of the musket itself was starkly different between East Asia and Western Europe, precision being a major trait in the former. In East Asia, the musket came to be known as "bird gun," an appellation it gained for its deadly precision.

> The musket hits the target eight out of ten times, which is why it can even shoot down birds amongst the trees. The musket is a precise and deadly weapon because

[117] Sŏ, 40.
[118] Thierbach, *Handfeuerwaffen*, 1:115. Cf. Kalaus, "Schie ßversuche," 67 as cited in Hall, 139.
[119] Hall, 134-143.

> its accuracy is even superior to that of the bow and its bullet can penetrate multiple coats of mail. The precision of this weapon is ten times more accurate than the cannon and five times more so than the bow.[120]

As described by Qi Jiguang's manual, the musket was dubbed a divine weapon (神器) for its unprecedented precision that could shoot birds and go as far as hitting the "middle of a coin."[121] Quite the reverse, handguns used in European armies were generally made to enhance reloading time rather than accuracy. For instance, the Prussian infantry musket of 1785 was "deliberately made with extreme large tolerances to facilitate rapid reloading."[122]

Emphasis on marksmanship is also manifest in Korean explanations of tactics. In one of the later commentaries on *Pyonghakchinam*, the musketeer is instructed to "place the musket on his cheek, match the sight of the gun with the bead, and aim the bead towards the enemy."[123] Another passage from the *Annotation on Military Formations* (*Chinbŏp ŏnhae* 陣法諺解), written in 1693 by general Choi Suk, further shows the Korean concern for precision.

> Aim the musket barrel at the chest of the enemy and at the head of the horse if the enemy is mounted. Even if the enemy were to charge all together, aim at one of them instead of shooting in the general direction.[124]

As shown, discriminate shooting was the key to Korean musketry shot. This is antithetical to the British command for fire, which was to "level," not "aim" the gun. The British allegedly used such instruction as late as the battle of Waterloo in 1815.[125] Further, considering Choi wrote during a time when the Chosŏn military was highly conscious of mounted Manchus, the passage

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[120] Sŏ, 37-38.
[121] Ibid.
[122] Hall, 141.
[123] *Pyŏnghakchinam juhe* 兵學指南註解, 76-57, 鳥銃放法, The National Library of Korea, Sŏul, South Korea.
[124] Ch'oe Suk 崔橚, *Chinbŏp ŏnhae* 陣法諺解 [*Annotation on Military Formations*] (The Hamgyŏng Provincial Headquarters 咸鏡監營, 1693). Accessed in the National Library of Korea, Sŏul, South Korea, 古 698-15.
[125] Hall, 140.

also suggests that Koreans sought to counter cavalry charges by improving marksmanship unlike Europeans who obsessed with creating an impenetrable blanket of musketry fire.

Korean musketeers were indeed supreme marksmen, hence their reputation as Big Heads in Northeast China. In musketry practice during the Amur campaign of 1658, they were far superior to those of the Manchu army. In the commander Sin Yu's diary, they implemented three musketry drills using a surprisingly narrow target (1.6 m tall and 10 cm wide), placed 72 m from the point of fire. During the first drill, forty out of two hundred Korean musketeers hit the mark. They showed improvement in the second drill with sixty-five hitting the target. The Koreans shot three rounds during the third practice, 123 hits in total with two musketeers scoring all three times and thirteen scoring twice. Including two other drills during the expedition, the Koreans scored an average of 25% accuracy, with the highest rate being 32.5% and the lowest 20%.[126] These numbers might not seem impressive at first but they were results of shooting an incredibly narrow target, a feat that seems to defy the principles of smoothbore ballistics and that would have been virtually impossible by a contemporaneous European shooter. Further, using standard deviation to extrapolate on ballistic performance, these men would have scored an average accuracy of 66.2% with a roughly man-sized target (1.6 m tall and 30 cm wide) from the same distance and the best of them (those who scored 32.5%) would have had a staggering marksmanship of 79.8% within 72 m of range. Both narrative and quantitative data suggest that Korean musketeers were indeed exceptionally lethal in battle.

Since Korean musketeers valued quality over quantity, they also seemed to have used less ammunition in battle. During the battle of Jinzhou castle (錦州城) between the Ming and the Manchus, Korean musketeers who served as aid troops for the latter, used a total of 53,200

[126] Ibid., 73-75.

bullets. Split amongst 1,500 musketeers, each soldier would have fired only thirty-five shots during the battle. Despite the low number of shots fired per soldier, every one of them seems to have been a carefully aimed one because Korean bullets purportedly inflicted 70%-80% of Ming casualties[127] In stark contrast, European musketeers fired indiscriminately and incessantly, using as many as 650,000 rounds at a single battle. According a record in 1862, "the number of cartridges expended for each person disabled in previous European wars has been variously stated to be from 3,000 to 10,000."[128] Due to lack of better data, the comparisons offered above need to be more commensurate. However, the contrast between Korean and European approach to musketry fire still seems striking.

Nonetheless, not all Europeans were clumsy shooters and nor were Koreans perpetually slow-firing. As explained in the section above, Korean musketry squads had an intricate method of volley fire to sustain a constant hail of fire, as expounded in the "Continuous Fire Musket Shot" diagram (*Choch'ong yunbangdo* 鳥銃輪放圖). On the other hand, the Spanish army placed exceptional emphasis on marksmanship. In a military manual written in 1586, Spanish commander Martin de Equiluz outlines the harquebusier's aim in the following way: "With the left eye closed, [he should] look through and above the sight, and a bit above the enemy, but straight and ready, which is very secure."[129] It is difficult to pinpoint to what extent these harquebusiers influenced Spanish drill patterns and whether these harquebusiers were regular gunners or specialist troops in the Spanish army. However, absence of evidence is not evidence of absence. The Spanish case cautions us from painting comparisons with broad, generalist brushstrokes.

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[127] *Injo sillok*, *j. 42* (19:9 *kyeongjin* [1641/9/7])
[128] Hall, 140.
[129] Martin de Equiluz, *Milicia Discurso, y Regla Militar, del Capitan Martin de Eguiluz, Bizcayno* (Antwerp: Casa Pedro Bellero, 1595 [originally written 1586]), 69. Translation provided by Tonio Andrade.

In both European and East Asian musketry drill, rate of fire and accuracy were undoubtedly important. Differences in the degree of trade-off between the two, however, are discernible in the available sources. Then, weighing the current comparative data, a small but perhaps accelerating divergence existed between the European and East Asian way of musketry drill. With this tentative conclusion, we may ask what this divergence in musketry practice would signify in the context of the Military Revolution model? Does it offer any insight about East Asia's relative military aptitude vis-à-vis the Europeans in the seventeenth century? Answers are elusive because these questions get us into the quantity over quality debate. However, other noteworthy speculations can be drawn.

Firstly, one could argue that the technological difference meant less drill in East Asia. However, in the absence of comparative data on the frequency and rigor of European drill vis-à-vis Korean drill, such causal relationship is difficult to establish, especially with abundant evidence that drill was systematic and rigorous in China and Korea. In fact, one could argue the reverse. If East Asian musketeers were using slow-firing guns, they would have needed to compensate for the technological shortcoming and create more reloading time through ever more efficient drill. Further, while the Japanese musketry volley technique was presumably largely unchanged after the Imjin War, that of Chosŏn evolved in the face of constant threats by nomadic cavalry, which were arguably more powerful than the European cavalry. By the late seventeenth century, Korean musketeers organized themselves in three volley lines, rather than the standard five (as outlined in *Pyŏnghakchinam*). This change, which indicates an increase in the Korean rate of volley fire, was enabled by technological improvements in the musket's reliability and firing speed. Further, Korean state records indeed show that Chosŏn armies sought new ways to resist cavalry charges and that drill was undoubtedly important.

Secondly, the difference in the type of volley seems to have influenced the trajectory of technological innovation. After witnessing the lethality of flintlocks, Koreans copied Dutch designs and manufactured them in substantial quantities but their interest was surprisingly short-lived. The difficulty to procure flints might have been important but flintlocks were also more aligned with European ways of firing that valued fire density more than accuracy. This may explain why Chosŏn Korea had more sustained interest in developing accurate muskets with longer barrels. Case in point is the Korean "thousand-step-gun," a matchlock wall gun that could allegedly reach as far as 1 km -1.2 km.[130] It is unclear whether Koreans rifled these guns and developed their precision manufacturing further. But in the absence of such technique, the Korean trajectory of innovation might have hit a technological cul-de-sac, unable to overcome the ballistic limitations inherent in smoothbores.

Lastly, war-making might have been more expensive in Europe due to the uneconomic nature of blanket-fire volleys. European emphasis on fire density led to a greater necessity for standardized arms manufacturing industry that allowed for cheap weapons. A mass production of gunpowder and munitions also became necessary to sustain the high consumption rate during European wars. The Koreans were initially just as encumbered with these fiscal and logistical challenges and they invested heavily in their manufacturing sectors to develop standardized muskets and artillery. Nonetheless, the greater need for standardization in Europe might have contributed to a divergence in the fiscal consequences of firearms manufacture.

Further research will illuminate whether these speculations hold true. Meanwhile, available sources strongly indicate that there was a discernible divergence in musketry drill between the Europeans and the East Asians. As Historian Bert Hall writes with confidence:

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[130] *Yŏngjo sillok*, *j.* 8 (英祖 1:12:乙巳 [1725/12/26]). Also see Ibid., *j.* 24 (英祖 5:9:己酉 [1729/9/12]) and Ibid., *j.* 24 (英祖 5:9:甲申 [1729/9/13]).

"because of the stark trade-off between accuracy and loading time, early modern battle tactics [in Europe] always favored volume of fire over accuracy. There was no middle ground."[131] Nonetheless, this divergence, at its best, is small and is certainly not sufficient to offer a conclusive explanation for the increasing asymmetry in military aptitude between Europeans and East Asians, and less so specifically for the Korean case. As discussed earlier in this chapter, Koreans, who combined Qi's rigorous drill ethos with the use of Japanese-style fowling pieces, were sort of a hybrid: they were both excellent marksmen and rigorously drilled infantrymen.

[131] Hall, 148.

Chapter 3: The Manchu Juggernaut: Reading Lost Battles

During the invasion of 1636, the formidable Manchu leader Hong Taiji who then commanded one of the mightiest armies in the world praised the Korean infantry, saying:

> The Koreans are incapable on horseback but do not transgress the principles of the military arts. They excel in infantry fighting, especially in musketeer tactics, and would be of great use when storming a fortress.[132]

Although the Manchu juggernaut crushed Korean resistance, Hong Taiji had healthy respect for the capabilities of the Chosŏn infantry and especially its musketeers. How did Korean musketeers stand up against Manchu cavalry? In most battles during the invasion of 1636, Manchu cavalry prevailed due to their swift and timely charges that ripped through Korean defenses. But were firearms fundamentally inefficacious against nomadic horsemen?

The Manchu cavalry was deadly against both Ming Chinese and Korean forces due to its fast mobility and logistical advantages. They also fought in loose and dynamic formations with remarkable suppleness, nullifying the effects of concentrated musketry fire. Particularly, the Manchus would fire arrows with a huge arch from a distance and create disorder amongst the musketeers before charging with full force.[133] In the open field, a slow-moving infantry could not deliver enough concentrated fire against the Manchus, let alone the difficulties of pinning down a nomadic army in the Manchurian steppes.

For these reasons, Historian Kenneth Chase argues that East Asians lagged behind Europeans in firearms development. The presence of powerful nomadic cavalry in Northeast Asia supposedly diminished the investment return of firearms because firearms, due to their slow

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[132] *Qingshilu* 清實錄 [Veritable records of the Qing dynasty], *Qingtaizong shilu* 清太宗實錄, *j.* 37, p. 27 (崇德 2:7:*renchen* 壬辰 [1638:2]) as cited in Liu Jia-Ju 劉家駒, "Qingchu zhengbing chaoxian shimo" 清初徵兵朝鮮始末, *Shi huo yue kan: Zhongguo li shi she hui ke xue za zhi* 食貨月刊: 中國歷史社會科學雜誌 1, No.2 (1971): 382.
[133] No, "Injocho," 179-180.

rate of fire and unreliability, were purportedly not effective against cavalry charges. On the contrary, European firearms, Chase argues, had immediate efficacy because they were fired against infantry armies. They were thus widely adopted and improved upon in Europe but not in East Asia.[134]

Chase is right about the transformative power of nomadic cavalry, that it pressured its opponents to make significant adjustments to their ways of war. However, this challenge made East Asians adapt but not abandon their firearms. While the Manchu cavalry was indeed the nemesis of Korean musketeers, the Koreans did not question the fundamental efficacy of firearms against nomads but rather challenged their drill methods and tactics to better harness the power of gunpowder against the nomads. The key was to provide protection for the musketeers while maintaining mobility and logistical advantage in the steppes.

During the Manchu invasions of 1627 and 1636, Koreans certainly faced no typical cavalry, but perhaps the most lethal cavalry in the world at the time. The Manchu army, superior in number and experienced in field battle, was an unparalleled juggernaut of war at the time. Its cavalry trampled Ming China, the world's first gunpowder empire,[135] and erected a new empire in its place, a realm that would bring the vast Central Eurasian steppes under sustained control for the first time in history.[136] The Manchu military campaigns defeated the mighty Zunghar Mongols and other Mongol steppes people in the late seventeenth and early eighteenth century, a legacy of territorial expansion and consolidation that is still manifest in the current Chinese borders.[137]

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[134] Chase, 1-23, 207-210.
[135] Sun Laichen, "Ming-Southeast," p. 75.
[136] Peter Perdue, *China marches west: the Qing conquest of Central Eurasia* (Cambridge, Mass: Belknap Press of Harvard University Press, 2005).
[137] Ibid., 45.

The Korean case was no exception. Chosŏn failed to rebuff the Manchu invasions of 1627 and 1636 and suffered a particularly shameful defeat in 1636 when the Korean King Injo surrendered and kowtowed three times to Hong Taiji. However, the Manchu victory was hard won, and with important contingencies that debilitated the Korean resistance. To sharpen our point of inquiry, which is to test the efficacy of firearms against nomads, we must isolate circumstantial and logistical factors that favored the Manchus. For instance, the invasion of 1627 was preceded by General Yi Gwal's insurgence, which left Chosŏn's most crucial northwestern defenses at shambles. In the invasion of 1636, numerous battles were lost due to logistical disparities such as the overwhelming number of Manchu armies and the Korean lack of gunpowder and munitions or accidents caused by firearms. This chapter will discuss the Korean preparations in the early seventeenth century against the imminent Manchu intrusions and delve into the nitty-gritty of battle in which the musketeers were put to supreme test. It will ultimately re-read the Manchu invasions, particularly the second one, by analyzing the battles that featured direct confrontations between Manchu cavalry and Korean infantry and argue that muskets were efficacious and consequently continued to be widely used during and after the Manchu invasions.

Prince Kwanghae's Military Strategy: Firearms and Fortifications

Anti-Manchu tactics loomed large in the Chosŏn court during Prince Kwanghae's reign from 1608 to 1623, the crucial period between the Imjin War and the Manchu invasions. During his rule, shifting power differences between the Ming and the emerging Manchus posed political difficulties in the Korean court as it was torn between keeping loyalty with the Ming and minimizing possibilities of collision with the Manchus. Kwanghae was brilliant in diplomacy and slowly increased Korean military strength while keeping both parties at bay, at least until the

Korean participation in the Battle of Sarhu in 1621.[138] During nearly two decades, Kwanghae focused on the development of firearms and fortresses. He bolstered firearms units by raising more musketeer troops[139] and activated munitions manufacturing while reinforcing fortresses in the northern regions.[140] His policies, however, were unsuccessful in the long run because he, like the Ming Chinese, underestimated Manchu abilities in siege warfare and field battle. Kwanghae relied entirely on firearms and fortifications and less on field battle, where the Koreans would have to face the Manchus in the invasions of 1627 and 1636.

Kwanghae's military strategy was to reinforce northern defenses and fight Manchus from within fortresses. As a proposal from one of his officials outlines, Chosŏn's best method of defense was to build a chain of strongholds along the Yalu River and garrison them with as many firearms as possible.

> The only weapon that the barbarians fear is firearms. We must send many musketeers to both the upper and lower regions of the Yalu River in P'yŏngan Province and have them garrison each fortress there to stop the Manchus at their tracks. If they cross the river, they will gallop fiercely through plains with their numerous cavalry, which is their talent. Our method of defense is thus to avoid their forte and build fortresses and stand guard. If the barbarians encroach upon our strongholds, we must employ our firearms altogether to crush their vanguard. Then, since their cavalry's shortcoming is in siege warfare, we may be able to emerge victorious.[141]

As shown, the Chosŏn court upheld firearms as the key to thwarting Manchu encroachment. However, while Koreans might have resisted for longer if the Manchus had marched headlong

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[138] Kye Sŭngbŏm, *Chosŏn sidae haeoe p'abyŏng kwa Han-Chung kwan'gye: Chosŏn chibaech'ŭng ŭi Chungguk insik* (Sŏul: P'urŭn Yŏksa, 2009), 162-189.

[139] Chŏng Sŏngjŏn, "Kwanghaegun shidae kukbangjeongcheok yonggu" [A Study on National Defense Policy of the King Kwanghaegun in the Joseon Dynasty] (M.A. Dissertation, Korean National Defense University, 2008), 55-58, 61-62, 83-86.

[140] Yi Wangmu, "Kwanghaegun dae hwagidogam e daehan yonggu," *Minjok Munha* 21 (December, 1998): 226-244.

[141] *Kwanghaegun Ilgi*, *j.* 129 (光海君 0:6:庚辰 [1608/6/23]).

into these fortresses, they circumvented the defense lines during the invasions of 1627 and 1636 and drove straight into the heartland of Korea.

Shrewd in military matters, Kwanghae was not unaware of this possibility. He had gone as far as attempting adopt wagon warfare as laid out in Qi Jiguang's second manual – *Lian bing shi ji* – which was designed to fight nomadic cavalry in the field. However, adopting a whole new way of war, which required effective wagons and cavalry, was unfeasible in the face of imminent conflict, not to mention the difficulties of employing wagons in the rough Korean landscape.[142] His choice of defensive strategy using fortifications and firearms was thus a reasonable decision, one that then considered his best generals' advice. In 1612, Kwanghae discussed with generals Yi Hangpok (李恒福) and Chŏng Yŏp (鄭曄) who were torn about whether Chosŏn should focus its energy on fortifying castles and fighting behind walls or preparing for field battle against cavalry.[143] In the end, Kwanghae adopted Yi's proposal to focus on fortress fortification, because it was also more aligned with the suggestions of the famous Yu Sŏngnyong, whom we discussed earlier in Chapter 2. The predominant military strategy, then, was to identify and concentrate resources in strategic regions in the northwestern borders where the Koreans had tactical advantage.[144]

Fortification of castles was, thus, widely implemented during Kwanghae's reign. He paid particular attention to the P'yŏngan Province and the northwestern regions adjacent to the Yalu River, where Manchus were most likely to pass through. As soon as Kwanghae rose to power in 1608, he commissioned eight fortresses in the province to be fortified. The Nŭnghan Fortress, a vital stronghold in Northern P'yŏngan Province that stretched across five different prefectures,

[142] No, "Chosŏn hugi pyŏngsŏ," 179.
[143] *Kwanghaegun Ilgi, j.* 50 (光海君 0:6:庚辰 [1612/2/6]).
[144] Chŏng Sŏngjŏn, 24.

was also fortified in 1609. Drillmaster Han Kyo who had partaken in the editing of Qi's works for Korean also established five prefectural armies in the region and devised a multi-supportive defense system.[145] Kwanghae also strengthened other regions that lay in the potential path of Manchu invasion such as Hamhŭng and Hwanghae Province via fortress fortifications and the procurement of commoners as reserve armies.[146] Kwanghae rebuilt these regional armies by reorganizing prefectural armies through Qi's "Control-the-Ranks" method, which included drilling commoners once three months, and by increasing soldiers known as *abyŏng* (牙兵) who directly served the provincial military governors.[147]

Firearms manufacturing was also most active during the rule of Prince Kwanghae. Recognizing firearms as an essential repellant against the Manchus, he activated manufacture by expanding the previously established Armory of Muskets (鳥銃廳) into Firearms Manufacturing Agency (火器都監). The specialization and arranging of manufacture in the Firearms Manufacturing Agency (hwagi dogam 火器都監), which was the largest and most fiscally sound in Korean history, was highly coordinated and specialized into multiple sectors of production. They operated with strict production goals for each artisan each day.[148] Firearms were also regularly produced regionally through a monthly production quota levied on the province and some private manufacturing seems to have contributed to meeting these quotas in the regional level.[149]

During Kwanghae's rule, the state's capacity to raise musketeers also saw improvement. In the Sarhu Battle (薩爾滸之戰) of 1619, when the Ming requested Korean musketeers to fight

[145] Ibid.
[146] Ibid.
[147] Ibid., 29-32.
[148] Yi Wangmu, "Kwanghaegun," 26-33.
[149] Ibid.

the Manchus, Chosŏn was able to muster as many as 10,000 musketeers.[150] How he armed all these musketeers is still unclear because the Firearms Manufacturing Agency produced different varieties of small firearms except muskets. Further, records show that Chosŏn suffered from shortages of muskets and that they sometimes resorted to importing good-quality muskets from Japan.[151] Regardless, at the Ming's urging, 10,000 musketeers were indeed mustered and dispatched to battle.

Nonetheless, despite Kwanghae's endeavors, his strategy came under revision due to changing circumstances in Northeast China. Particularly, the experience of Korean musketeers in the Sarhu battle (薩爾滸之戰) of 1619 was crucial. Starting in 1618, the Manchus became ever more belligerent and conquered strategic Ming defensive points such as Fushun of Liaoning and its vicinity. As a response, the Ming Chinese schemed a full-fledged attack on Nurhaci and his Jurchen army's home base in Fushan, China. They sent a forceful request to Chosŏn Korea to aid their attack, specifically asking for 7,000 elite musketeers. Interestingly, Kwanghae was adamant against sending Korean troops because he foresaw with remarkable clarity that the Ming had no chance with their plans. Kwanghae thought that, considering the state of Ming forces in the Liaodong region, the best way to counter the Manchu cavalry was to shore up defenses, not to infiltrate deep into Manchurian territory.[152] However, Korean officials supported the dispatchment of troops, emphasizing how Ming was Chosŏn's patron state and how it had aided Korea during the Imjin War.[153] Although Kwanghae actively sought ways to decline Ming's request, he eventually gave in, sending as many as 13,000 Korean troops to the Battle of Sarhu.

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[150] No, "Chosŏn hugi pyŏngsŏ," 108-109.
[151] Ibid., 122.
[152] Kye, 168
[153] Ibid., 162-189.

Recognizing the excellence of Korean musketeers, the Ming made clear that musketeers constituted the majority of the Korean aid troops. In February of 1619, Ming general Liu Ting (劉綎) urged Korea once again to first send 5,000 musketeers.[154] In deference to Ming's requests, P'yŏngan Provincial Governor Kang Hong-rip led an expedition of 13,000 men who were mostly composed of musketeers. According to Yi Minhwan (李民寏), who served as Chief Administrative Officer of the Korean expedition, Chosŏn sent a total of 10,000 musketeers.[155] The Korean troops were indeed heavily composed of musketeers and lacked other types of military units that could play supporting roles for the musketeers, an element that ultimately leads to the failure of Korean infantry in the battle.

The Sarhu Battle was a six-day long altercation between Sino-Korean allies and the Manchus. In 1619, responding to Nurhaci's provocative attack last year, the Wanli Emperor of China dispatched a forceful expedition to besiege Hetu Ala, Nurhaci's home. The allies attacked from four fronts and significantly outnumbered the defenders. But Manchu horsemen crushed Ming forces equipped with matchlocks and cannons using swift cavalry attack that disabled artillery fire. In the Northern front, Korean musketeer failed to deliver organized fire due to unfavorable wind blowing against the allies and were slaughtered only after firing one salvo. In stark contrast, on the eastern front, 500 Korean musketeers fought effectively as vanguard forces against the Manchus. Led by Ming officer Du Song, the Koreans were shooting in volleys and taking down many Manchus before their Chinese allies surrendered and obstructed their chain of

[154] No, "Chosŏn hugi pyŏngsŏ," 109.
[155] Ibid., 108-109.

fire. In the end, the Manchus prevailed and Korean general Kang Honglip surrendered to the Manchus with the majority of Korean troops.[156]

Since then, Korean participation in the Sarhu Battle served as a barometer to redirect Chosŏn military policies after 1619. First, as Chief Administrative Officer Yi Minhwan (李民寏) reflects, muskets were no longer considered invariably effective in field battle, at least not without proper protection.

> The musket is a military skill that allows shooting from great distances but is very slow to reload gunpowder and fire. If its use does not rely on a fortress or rough geography, the musket is never something to be tested against cavalry in the plains. Last year, our military bore the brunt of cavalry charges by only relying on musketeers and the enemy cavalry dashed into the heart of our formation even before our musketeers finished reloading.[157]

Yi's proposition seems to support Historian Chase's argument that early firearms, due to their slow rate of fire, were inefficacious against nomads. However, curiously, Koreans did not challenge the fundamental efficacy of firearms. As shown above, Yi's argument is conditional in that it fails in an open field without reliance upon "fortress or rough geography."[158] Instead of giving up the guns, Koreans stuck even more stubbornly to them and devised methods of supplementing and protecting musketeers with close combat units and cavalry, and, as battles in the invasion of 1636 show, to use fortresses and advantageous geography to face the Manchu cavalry. Hence, musketeers continued to be the mainstay of Korean army in late Chosŏn.

While the battle of 1619 demonstrated that single-minded emphasis on musketeers in field battle was unadvisable, it was also a stimulus for further development of firearms in Chosŏn.

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[156] Ibid. See also No, "Injocho," 178-180 and Sun Joo Kim, "Culture of Remembrance in Late Chosŏn Korea: Bringing an Unknown War Hero Back into History," *Journal of Social History* 44, no. 2 (Winter 2010): 563–85.
[157] Yi Minhwan 李民寏,「建州聞見錄」 as cited in No, "Chosŏn hugi pyŏngsŏ," 111.
[158] Ibid.

From the measured success of the 500 troops fighting against Du Song, Chosŏn military recognized that coordinated fire with rigorously trained musketeers could hold reasonably well against the Manchu cavalry.[159] They became increasingly aware of the importance of regular drill and professional standing armies to train elite musketeers. Koreans realized that facing a formidable nomadic cavalry in an open field battle required more than just musketeers firing in volleys.[160] They recognized the importance of archers, spearmen, and cavalrymen in playing supplementary roles to protect the musketeers who are vulnerable at close combat. Accordingly, during the last years of Kwanghae's rule and his successor King Injo's reign, Chosŏn armies trained close-combat tactics and cavalry to increase their versatility in the field.

After a coup in the Korean court, King Injo replaced Prince Kwanghae and took a more pugnacious stance against the Manchus, which eventually incited the invasions of 1627 and 1636. From the beginning, Injo made extensive preparations in anticipation of an open war with the Manchus. He strengthened northern defense lines in P'yŏngan Province by making new appointments and increasing its regular forces.[161] General Yi Gwal, second in command of the provincial army, was given a total of 15,000 strong reserve army and a major defense line was formed around 30,000 elite soldiers. In 1625, when the Manchus were temporarily debilitated, statesman Chŏng Choong-shin even proposed to conquer the Manchu-held Liadong region with 10,000 musketeers by training 3,000 elite musketeers in each of the three central armies.[162] Nonetheless, these efforts were thwarted by General Yi Gwal's rebellion in 1624.

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[159] No, "Injocho," 180.
[160] Ibid.
[161] No, "Injocho," 186.
[162] Chŏng Kyŏngse 鄭經世, *Ubokchip* 愚伏集, Oktangron simuch'a 玉堂論時務箚, in *Han'guk munjip ch'onggan,* vol. 68 (Sŏul: Minjok Munhwa Ch'ujinhoe 民族文化推進, 2003 [originally written in 1657]).

Yi Gwal's rebellion was a frustrating obstacle to Korean military strengthening before the Manchu invasions. He was the commander of special anti-Manchu forces that the Korean government had devoted much investment in anticipation of an imminent Manchu attack.[163] Yi rebelled because he thought his participation in the 1624 coup that crowned King Injo were not sufficiently compensated for. Within twenty days, he swiftly drove his cavalry down to the capital and captured it. His vanguard, composed of 700 elite men-at-arms, could charge through Korean infantry lines before they organized themselves and outwit them with superior mobility.[164] Government troops eventually quelled the upheaval but the loss of Yi's forces was a setback to Korean efforts to building cavalry and other close-combat units that had been recognized after the battle of Sarhu as instrumental to supplementing Korean musketeers. The Korean military was again reminded of its vulnerability against cavalry attacks, this time, by their own mutinous men.

The Manchus found Chosŏn in this weakened state during the invasion of 1626. The northwestern defense system was the key to deflecting the Manchus but it had been severely disrupted by Yi Gwal whose insurgent forces were designated reserve armies to counter the possible invasion. Further, remnants of Yi Gwal's insurgent group, notably Han Yoon and Han Taek, defected to the Manchus and urged them to strike Korea, revealing Korean military weaknesses. At the time, the Manchus had just recently been defeated in the Battle of Ningyuan in 1626 from which their leader Nurhaci died. Consequently, they reined back on campaigns into mainland China and turned to their hinterlands to eliminate complications in the borders with Chosŏn. On 14 January 1627, the new Manchu leader Hong Taiji sent 30,000 strong Manchu

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[163] No, "Injocho," 186-187. Also see Hanminjok Chŏnjaeng Tongsa 韓民族戰爭通史 [Comprehensive History of Korean Wars] (Sŏul T'ŭkpyŏlsi, Kukpang Kunsa Yŏn'guso, 1994), Vol. 3, 300-301.
[164] Ibid.

cavalry led by Amin (阿敏) on the grounds of revenging the death of Kwanghae. The region of Ŭiju, a crucial strategic defense point comparable to the Shanhai Pass of China, was penetrated and the Qing quickly galloped southwards, overtaking the Nŭnghan Fortress in 21 January and P'yŏngang in 24 January. The Korean King then fled to take cover in Kanghwa province but the Manchus eventually grew weary as Korean resistance grew steadily and the Ming were making advances in the Liaoning region. The two belligerents hurriedly made peace negotiations and the Manchus returned north. The invaders achieved their ends through the campaign, forcing Chosŏn to give up its allegiance to the Ming and to refrain from assisting the Ming against the Manchus.[165]

The Invasion of 1637 and The Siege of Namhan Fortress

In 1636, Manchu leader Hong Taiji launched the second invasion of Chosŏn, leading a formidable army more than 100,000 strong. The Qing army was predominantly cavalrymen but also composed of Han Chinese infantry and artillery divisions such as that of Kong Youde.[166] In early December, Qing departed from Shenyang and launched a three-pronged attack. As dictated before the invasion, Korean regional armies of the northwestern border entered designated fortresses and reinforced defenses. This tactic was initially effective as their forbidding defensive fire repelled the Manchus. For instance, Prince Dodo's western division of 30,000 men struggled to overtake a stronghold garrisoned by 3,000 defenders in the region of Uiju and decided to march past it instead.[167] Hong Taiji and his main division also avoided engaging directly with the Koreans in the Anju castle held by General Yu Lim, a shrewd Korean commander who later

[165] Hanminjok Chŏnjaeng Tongsa, 306-335.
[166] Hanminjok Chŏnjaeng Tongsa, 344.
[167] Ibid.

defeats Manchus in the battle of Kimhwa.[168] Lastly, Prince Dorgon and Qing's eastern division also met fierce Korean defensive fire in the mountain fortress of C'hilong, which the Qing besieged unsuccessfully for six days.[169] However, when Qing feigned retreat and the Korean defenders hastily pursued them, the Manchus caught them by surprise and captured the fortress.[170] Thus, the Korean strategy of using a chain of strongholds in the northwestern border was mildly successful but fell short of thwarting Qing advances southward.

Once the Manchus circumvented the northwestern defense lines, they galloped at a fearful speed into the heartland of Chosŏn. Their vanguard cavalry arrived at the vicinity of Sŏul on 14 December, only six days after crossing the Yalu River. Qing military's judgment to place these troops between Sŏul and the province of Kanghwa was a brilliant maneuver as it thwarted King Injo's plans of capital defense.[171] Receiving the news of the Manchu invasion five days after its outbreak, Injo had issued an emergency decree to form a defense line connecting three military strategic points – Sŏul, the Namhan Mountain Fortress and the highly militarized Kanghwa province. However, Injo was obstructed by the Manchu vanguard on his way to Gangwha and had to flee to the Nanham Fortress, which had meager supplies.

Rushed out of the capital, central armies of Chosŏn escorted Injo to the fortress. Total number of defenders in the fortress amounted to 13,800 soldiers, composed of three capital armies – the Military Training Agency, Imperial Defense Battalion and the Anti-Manchu Division – and five prefectural armies.[172] However, when Injo entered the fortress, it only contained enough grains to feed an army of 10,000 for a month, which was insufficient for the

[168] Ibid., 345-346.
[169] Ibid., 345.
[170] Ibid., 346.
[171] Ibid., 357-359.
[172] Ibid., 350-351.

14,300 total inhabitants in the fortress.[173] Injo's plan was, therefore, to hold out as long as possible with the best of his men in the Nanham fortress while waiting for provincial armies of his dynasty to break the Qing's siege.[174]

However, the provincial armies never made it to the Namhan castle while the Manchu main division led by Hong Taiji arrived at its vicinity with 70,000 men. The Qing armies, then, commenced an impenetrable siege in 29 December. However, the defenders of Namhan fortress resisted admirably. Except for one failed sortie, Koreans successfully repelled Manchu attacks in most, if not all, other altercations with their effective use of muskets and cannon. The Manchus soon recoiled and limited their offensive to small-scale confrontations.[175] Cutting off all communication and aid from outside, Hong Taiji and his men chose to wait until the quickly diminishing resources in the fortress would demoralize and debilitate their enemies. Indeed, as resources were being depleted, many Chosŏn soldiers and horses either starved or frozen to death. Many others suffered from severe frostbites and even King Injo had to skip meals.[176]

In January, the Manchus increased their frequency and intensity of attacks against the starving defenders. Employing elaborate siege machines, the Manchus attacked the fortress from multiple fronts. However, Korean sorties based on cannon fire and effective infantry tactics again invariably thwarted Manchu attacks. Particularly, on 24 January, the Manchus attacked the Eastern Gate multiple times with their artillery. In the break of dawn, the Qing brought many cannon and fired fiercely at the walls. However, the Eastern Gate was garrisoned by the soldiers of the Military Training Agency who responded with effective counterfire.[177] Frustrated, Qing retreated further away from the fortress and commenced another round of artillery attack, making

[173] Ibid., 351-352
[174] Ibid., 350-354.
[175] Ibid., 355-367.
[176] Ibid., 360.
[177] Ibid., 363.

considerable damage on the walls. Nonetheless, the Chosŏn military again returned concentrated fire against the Manchu artillery platform and managed to blow up the gunpowder that the Manchus had stored there.[178] Ensuing was a large explosion that killed dozens of Manchus and a Qing general, after which the Manchus retreated. Similarly, outside the South Gate, the Manchus set up about eight cannon to attack Korean walls on the same day. While this caused about ten Korean casualties, the defenders' counterfire inflicted greater losses in the Qing, prompting their retreat. Planning to weaken the walls and further demoralize Koreans, the Qing employed their artillery multiple times. Some Korean walls indeed crumbled under repeated artillery attacks but overnight repairs made by the defenders only further frustrated the Manchus.

Despite Korean resistance, Injo's hold out in Namhan Fortress soon came to a close. On 27 January, Kanghwa Province was conquered by the Manchus and Injo's two princes were made Manchu captives. This, together with famine, illnesses and continued Manchu attacks, seriously demoralized the defenders of the fortress. The next day, urged by pro-Qing factions in his court, Injo surrendered dishonorably to the Manchus, kowtowing his head three times to Hong Taiji. Numerous concessions were made and the centuries-long relationship with Ming China was replaced with a new patron-client relationship with the Manchus.[179]

The Supreme Test of Battle: Musketeers Versus Cavalry

When Korean King Injo entered the Nanham Fortress in 1637, he had put hope in the provincial armies of Chosŏn to break the impending Manchu siege. In his emergency decree, he had requested each provincial governor to brace up for battle and bring respective armies to repel the intruders from the capital. Seven provincial armies were mustered and they marched at

[178] Ibid.
[179] Ibid., 367.

different rates towards the Namhan Fortress, encountering Manchu forces in the path. The ensuing field battles, in which Korean forces faced the Manchu cavalry, provide important case studies in which Korean musketeers were put to supreme test against. In several battles such as the Battle of Kimhwa and the Battle of Kwanggyo, the Korean infantry performed successfully against Manchu cavalry charges as long as supplies of gunpowder and munitions did not run out. The Chosŏn armies, following the "Three-Skills-Unit" method, employed three main military units – musketeer, archer and swordsmen/spearmen – and delivered controlled, sustained fire, which in most cases inflicted heavy casualties on Manchu horsemen.

The moderate success of Korean infantry is indebted to efforts of Korean military to supplement musketeers with other military units. Between the invasion of 1627 and 1636, Chosŏn recommenced military reforms that had been identified crucial since the Battle of Sarhu in 1619, which highlighted the importance of providing musketeers protection. While the proportion of musketeers was still large, development of close-combat units, archers and cavalry were greatly promoted. Such efforts to increase tactical variety and versatility are manifest in statesman Chŏng On's proposal of a new military formation in 1626, the year when the Manchurian juggernaut devastated Korea for the second time. Known as "Three Layer Formation" (*samch'ŏpjin* 三疊陣), Chong outlined:

> "The creation of an elite army division of 11,000 soldiers. Of them, 4000 would be elite musketeers, 3000 would be elite archers on foot, 2000 would be mounted archers, 1000 would be close-combat cavalry units armed with flails and glaives, and, finally, 1000 would be swordsmen/spearmen. Thus, numerically speaking, musketeers were to be the most important unit. Musketeers were also to march at the front of the formation, followed by the foot-soldier archers, the close-combat cavalry, and the swordsmen/spearmen, mounted archers bringing up the rear."[180]

[180] Chŏng On, 304 as cited in Tonio Andrade, Hyeok Hweon Kang and Kirsten Cooper, "A Korean Military Revolution? Parallel Military Innovations in East Asia and Europe," forthcoming in the *Journal of World History*.

Chŏng On's proposal attests to the Chosŏn military's experimentations to face mounted Manchu in the field and the variegated military units that had specialized roles in a flexible battle against the Manchus. But, Chŏng's formation still upheld long rang attack and concentrated firepower at the forefront of the paper.

> During battle, even if the enemy charges towards our troops with the crane formation, the first layer of one thousand musketeers should fire, sit down to reload while the rear layer of another thousand musketeers fires next. If the sound of fire does not cease and arrows fall like rain, even a well-armoured cavalry of steel-horses would be obliterated.[181]

Claiming that "the musketeers and archers of our [Korean] country are peerless under heaven," Chŏng's statement reveals growing Korean confidence and willingness to face the Manchus in field battle.[182]

As shown, despite the presence of other units, musketeers still remained central to the Korean military. They were divided into different layers to coordinate volley fire and served as vanguard, the axis around which other units were rotated. We do not know if Chŏng On's proposal was implemented during the Manchu invasions but the Korean army fought in similar ways, like the "layer formation" outlined in Chapter 2, dividing into echelons and facing cavalry with audacity in the field.

The Battle of Kimhwa is a key example that shows that elite Korean musketeers under firm leadership could stand their ground against Manchu cavalry charges. This battle pitted Chosŏn's best provincial army from P'yŏngan, a region known to produce excellent marksmen, against Qing's western division. The Korean forces were the very same ones that the Manchus chose to avoid upon crossing the Yalu River because their defensive fire in the fortresses of the

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[181] Ibid.

[182] *Zeungbo munheon bigo* 增補文獻備考, *j.* 115 as cited in No, "Chosŏn hugi pyŏngsŏ," 123-124.

northwestern border were fierce. Led by governor Hong Myonggu and vice-governor Yu Lim, the provincial army from P'yŏngan marched south to counter the Manchu siege on the Namhan castle. On 26 January, the Chosŏn army reached Kimhwa, a mountainous county belonging to Kangwan province, and, two days later, encountered 6,000 Manchu cavalry belonging to Hong Taiji's eastern division.[183]

The Chosŏn army lined up for battle and waited the Manchus in two separate formations, one led by Hong Myonggu in the open field and the other led by Yu Lim in a mountainous region. A total of 5,000 soldiers, the P'yŏngan forces, like other provincial armies, composed of three types of infantrymen – musketeer, archer and swordsman/spearman. Commander Hong's battalion was resolved to face the Manchu cavalry in the open field and organized his army into three echelons, respectively, in the order of musketeer, archer and close-combat units.[184] On the other hand, Yu, preferring to establish his base on higher grounds, placed his infantry to the right of Hong's battalion on a hill that resembled "the bee's back," with a narrow middle section and secluded on three sides by the mountain.[185] Interestingly, Yu organized his echelons in reverse order, respectively, swordsmen/spearmen, archers and musketeers. Both battalions made extensive use of wooden blockades to enclose their defensive area and to obstruct the cavalry.[186]

In early morning of 28 January, 6,000 Manchu cavalry commenced attack on Hong's battalion. Manchu cavalry of about 1,000, together with an infantry of 3,000, attacked the Korean battalion with their cannon and bows, advancing and retreating three or four times.[187] But Hong's musketeers resisted well initially, crushing the Manchu advances. Only when a large contingent of a few thousand Manchu cavalry ambushed the battalion from the rear, Hong's

[183] Hanminjok Chŏnjaeng Tongsa, 380-382.
[184] Ibid.
[185] Yakcheonjip 藥泉集, *j.* 17, 統制使柳公神道碑銘, a132/213a.
[186] Hanminjok Chŏnjaeng Tongsa, 380-382.
[187] Ibid.

musketeers were crushed. Having circumvented the mountain, the enemy cavalry caught Hong by surprise and obliterated the Korean battalion.

Meanwhile, overlooking the altercation below, Yu Lim failed to lend support to Hong due to other Manchu contingents obstructing the path between the two Korean battalions. Instead, Yu, a shrewd and composed commander, braced his army up for battle. Around early afternoon, as the Manchus charged towards Yu's forces, remnants of Hong's defeated army was fleeing towards Yu's direction with the enemy cavalry chasing fast from behind. Yu was resolved not to make an opening for the defeated Korean forces and risk the enemy infiltration and decided instead to fire indiscriminately onto all encroaching forces, killing both Hong's soldiers and Manchu forces.[188]

Korean musketeers played a crucial role in this altercation as their controlled fire at close distance devastated the Manchu cavalry. After the initial confrontation, the Manchus attacked Yu's men multiple times throughout the day but were repelled by the defensive fire every time. The success of Yu's tactics was in the excellence of his musketeers, the favorable location, and the carefully controlled volley fire of muskets and bows. Here, the difference in Yu's order of layers, which I mentioned earlier – swordsman/spearman, archer and musketeer – comes into play. Surprisingly, Yu ordered his musketeers and archers to hold fire until the Manchu cavalry were within ten steps. Guarded by the forest and close-combat units in the forefront of the battle, Yu's long-range military units would then fire full force within ten steps of range.[189] At this deadly close range, the musketeers supposedly killed two or three with one bullet (丸輒貫數三

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[188] Song Siyŏl 宋時烈, *Songjadaejŏn* 宋子大全 (Sŏul-si: Minjok Munhwa Ch'ujinhoe 民族文化推進會, 2003), *j*. 136. 記金化戰場事實, a112/509d. The Chinese text is as follows: 兵使先已斫倒柏樹以爲柵。其前營之在柵外者已躪於初。監司餘兵。與賊相雜。突至柵外。兵使之砲矢亂發。賊與我軍俱殲焉。時則日已未矣。

[189] Ibid. The Chinese text is as follows: 賊又衝突兵使陣。直抵柵外十餘步。然後衆砲竝發。賊一時如掃。一無遺者。

人),[190] obliterating the encroaching enemies in an instance like "the sweep of rain."[191] The Manchu continued their attack throughout the day, dividing into four alternating groups and constantly engaging the Koreans. Every time, they retreated with heavy casualties and Yu's parsimonious usage of munitions lasted the Korean defensive fire for the entire day. In the last Manchu attack in the evening, ten elite musketeers on a special mission devised by Yu killed a Manchu general. Hiding in the forest outside the battalion's blockades, they opened fired on the enemy general mounted on a white horse and killed him.[192]

In the end, the Manchus were reduced to less than one tenth of their original force and retreated around sunset.[193] According to a Korean witness hiding in the vicinity, it took more than three days to burn their dead bodies.[194] However, despite having secured a decisive victory, Yu Lim's men could not linger in the same place. Yu and the remainder of the P'yŏngan provincial army resumed their march towards the Namhan castle. He arrived in its vicinity on 3 February but the Korean King Injo had already submitted to Hong Taiji then.

Another notable example of Korean musketry efficacy during the Manchu invasion is the Battle of Kwanggyo. Fought between the Cholla Provincial army and the Qing army led by the famous general Ah Gula, Hong Taiji's brother-in-law, this battle pitted 2,000 Korean infantry against 5,000 Manchu cavalry.[195] The military provincial commander of Cholla, Kim Chunryong (金俊龍) established his battalion around the Kwanggyo Mountain and organized his infantry into three echelons in the standard order of musketeer, archer and swordsmen/spearmen. On 5

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[190] Yakcheonjip, *j*. 17, 統制使柳公神道碑銘, a132/213a.
[191] *Songja Daejeon, j*. 136. 記金化戰場事實, a112/509d.
[192] Ibid.
[193] Park, T'ae-bo 朴泰輔, and Yi Hyŏn-jo 李玄祚, *Chŏngjae chip* 定齋集 (Sŏul-si: chŏjakkwŏn cha Minjok Munhwa Ch'ujinhoe, 1995), 記金化柏田之戰, 168_86.
[194] Ibid.
[195] Hanminjok Chŏnjaeng Tongsa, 383-384.

January, the Qing army commenced artillery fire against the Korean forces and charged against them multiple times. Kim's army crushed cavalry charges with effective musketry fire and then also inflicted heavy casualties with their archers and close-combat units as they were made to ambush the retreating enemies.[196]

The next day, Ah Gula and his men launched a full-fledged attack on Kim's battalion. Assault from multiple fronts, the Cholla provincial army struggled more than the previous day but resisted admirably until around early evening when the Qing infiltrated the eastern defense line. At this point, commander Kim Chunryong and his main forces rushed to the point of intrusion and thwarted Manchu advances.[197] The musketeers again play a crucial role as their selective shooting found target again of the Manchu general. Ah Gula was shot and fell from his horse.[198] Taking advantage of the chaos in the Manchu line-of-command, Kim's forces struck back forcefully and the counterthrust annihilated more than half of the Manchu army, making them retreat more than 4 km. However, having exhausted their gunpowder and grain supply, Kim's army had to eventually retreat from battle and was consequently unsuccessful in making further advances toward the Namhan Fortress.[199]

Despite the numerical disadvantage, the Korean infantry was no easy foe, as echoed in the words of the Manchu leader Hong Taiji. King Injo capitulated in the end but the situation could have been vastly different had the Manchus engaged directly with the strongholds in the northwestern border, had the Namhan Fortresss been well-stocked with supplies or had the provincial armies of Chosŏn made more successful advances to break the Manchu besiege. Possibilities abound but conjectures could only take us so far. Concrete comparisons from the

[196] Ibid.
[197] Ibid.
[198] Ibid.
[199] Ibid.

invasion of 1637 strongly suggest that the military reforms in seventeenth century Korea did render decisive leverage against the Manchu cavalry. Korean musketeers were put to supreme test in field battle and, with the aid of blockades and other supplementary military units, inflicted heavy casualties upon the enemy cavalry, killing two generals with selective marksmanship and crippling entire battalions in the battles of Kimhwa and Kwanggyo. As shown in their tactical patterns, the Korean army made use of the "layer formation" and delivered constant hail of death against the Manchus. Nonetheless, while their tactics were fundamentally sound, they suffered from an internal rebellion, accidents and most importantly, failures to supply munitions. In this way, beset with logistical and circumstantial difficulties, the Koreans were put to test too early against the Manchus before their firearms warfare matured sufficiently with stable supplies of guns and gunpowder.

Chapter 4: Giving Wings to the Manchu Tiger: Frustrated Dreams of Northern Conquest

> According to the Manchu interpreter, a few hundred Qing musketeers from Beijing and Ningguta are joining us in battle. Two days ago, a hundred of their men partook in our [Korean] musketry drill and more than half of them were unacquainted with gunnery. Only a few of the Qing musketeers hit the target. If the Manchus even had talent for gunnery (砲才), in addition to their existing military prowess, they would be powerful beyond measure, like a tiger with wings (虎而翼).[200]

Elite Korean musketeers gave wings to the Manchu tiger during the Northern Expeditions of 1654 and 1658. Their combined prowess stopped the Russians dead in their tracks, thwarting their intrusion into the inner reaches of the fertile Amur River valley of Manchuria. At the time, Russia was the most ferociously growing empire in the world, boosted by its successful appropriation of the Military Revolution.[201] The Russian formula of lethality was just as formidable as the winged tiger of continental East Asia, harnessing the synergy of firearms, riverine transportation and Cossack frontiersmen, which conferred a distinct technological and cultural edge in their eastward campaign against the Siberian natives. However, a few hundred Korean musketeers nicknamed Big Heads,[202] a reputation earned by their distinctive helmets and impressive marksmanship, played a decisive role in the Amur frontiers. They broke through Russian ranks with systematic musketry volley fire and struck terror in the Cossacks. The

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[200] Sin Yu, 30.

[201] Michael C. Paul, "The Military Revolution in Russia, 1550-1682," *The Journal of World History* 68, No. 1 (Jan. 2008): 9-45. Also see Carol B. Stevens, *Russia's Wars of Emergence, 1460-1730* (Harlow, England: Pearson Longman, 2007).

[202] The title Big Heads (*daeduyin* 大頭人) was given to the Koreans by the Nanais who served both the Qing and the Cossacks. Sin Yu, 71.

slightest mention of their name would make the Russians "expire every end of their sentence with fear."[203]

The Northern Expeditions of 1654 and 1658 provide an excellent forum for discussing such precious moments of connected history. They brought together in juxtaposition Russian experiences of firearms warfare, naval maneuvering and Siberian expansion; Chinese abilities for shipbuilding, siege warfare and military mobilization; and Korean tradition of musketry volley fire and its power projection into Manchuria. The current scholarship on the Russian-Manchu conflicts in the Amur, however, treats these conflicts as mere prologues to later crises and diplomatic interactions.[204] It also fails to recognize Korean participation and to examine Korean sources such as *Diaries of the Northern Expedition* (北征日記), a detailed chronicle of the 1658 expedition by General Sin Yu (1619-1680).[205]

The Amur conflicts also present an important case study to assess Europe's relative military aptitude vis-à-vis Asians and the global implications of the Military Revolution model. The rapid pace of military innovations in the West conferred a decisive edge in Russia's eastward expansion but fell short of outgunning continental East Asians who had achieved a tantamount level of firearms-based bellicosity. As the Amur conflicts continued into the late seventeenth century, Qing emperor Kangxi launched extensive campaigns that settled the dispute with the Treaty of Nerchinsk in 1689, an agreement with the Muscovites to concede Amuria to the Manchus and to engage in trade instead. Borders were drawn and *pax manjurica* prevailed, creating 'breathing space' for the Manchus while frustrating Korea's dreams of northern

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[203] Ibid., 29.
[204] Ernst G. Ravenstein, *The Russians on the Amur; Its Discovery, Conquest, and Colonisation, with a Description of the Country, its Inhabitants, Productions, and Commercial Capabilities* (London: Trübner and Co, 1861); Mark Mancall, *Russia and China; Their Diplomatic Relations to 1728* (Cambridge: Harvard University Press, 1971); and Putnam B.L. Weale, *Manchu and Muscovite* (London: Macmillan, 1907).
[205] Sin, see above.

conquest. In this way, the Amur conflicts mark both the pinnacle and the denouement of the Military Revolution in continental East Asia.

The stories of Big Heads, Buddhist Demons, and Qing Bannnermen are also worth being retold. The accounts abound with details about peculiar individuals and extraordinary meetings between different ethnic groups. Sin Yu is depicted as a keen, judicious general who comes across as someone of upright Confucian morality. His values conflicted with the uncouth, cunning individuals of the Manchu army such as the Qing commander Sarhuda. The Manchu army also composed of multiple ethnic groups, including the agrarian Daurs, whose fertile soil and well-fed crops made the Cossacks salivate, and the Juchers, who disliked boiled rice and soy sauce[206] and threw themselves to the ground at the sound of gunfire.[207] Messengers between the Cossacks and the Qing were the quick-tempered and duplicitous Nanais, or Fishskin Tartars (鱼皮鞑子), who served both parties in self-interest. It was they who named the Koreans "Big Heads" and walked around butchering Cossack corpses after the battle of 1658.[208] Lastly, there were the Cossacks, who were intrepid, free-spirited explorers, experienced in battle and unpredictable in their allegiance to the Muscovite state. These intractable men were unified under charismatic leaders, tough and astute officials sent from Muscovy, who brought a team of clerks and assistants to facilitate their duties of leading military expeditions, building fortresses, and managing civil affairs.[209]

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[206] Ibid.,129.
[207] *Hyojong sillok, j.* 14 (孝宗 6:4:丁丑 [1655/4/23])
[208] Sin, 98.
[209] Mancall, 14.

Buddhist Demons Salivate For Amuria

Throughout the latter half of the seventeenth century, the Russians and the Manchus quarreled over the Amur region. In pursuit of fur and provisions, the Cossacks, Russian frontiersmen, advanced eastward over the Ural Mountains and reached the Amur by the mid-seventeenth century. They plundered through Mongol-Tungusic tribes along the river belonging to the Daurs,[210] the Juchers[211] and the Nanais[212] and gained notoriety as Buddhist Demons (*luocha* 羅刹), a title given by the natives that evoked man-eating monsters in Buddhist mythology.[213] When the Manchus heard the clamor, they sent troops to repel the intruders. However, occupied at multiple fronts and lacking firearms, Qing initially had little success until the Big Heads joined their battle.s

By 1643, when Vasily Poyarkov and his fellow Cossacks were voyaging southward to the Amur, extravagant tales of riches and wonders about the land of the Daurs had been circulating amongst the Siberian Cossacks.[214] These tales painted the Amur valley as an agricultural paradise, overflowing with food and resources. The Amur valley was indeed fertile and its most prominent inhabitants, the Daurs, cultivated the soil, herded cattle, and engaged in active trade with Chinese merchants.[215] In stark contrast, the Russian frontiersmen were trapped in the

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[210] Daurs (or Dahurs), a group of 'Mongolized Tungus," were agrarian settlers in the upper Amur and Zeya who spoke a Mongolian language. James Forsyth, *A History of the Peoples of Siberia: Russia's North Asian Colony, 1581-1990* (Cambridge: Cambridge University Press, 1992), 104-105.

[211] Juchers, also known as Ducher by the Russians, *Waerka* (瓦爾喀*)* or *Huerha* (虎爾哈) by the Qing and *Walga* (日可) by the Koreans were Tungusic people who lived in the middle and lower Amur, including the lower reaches of the Sungari river. Sin, 55.

[212] The Nanais, also known as Goldi or Olcha by the Russians, Heijin (黑斤) by the Qing and *Gyeon Burak* (犬部落) by Koreans, were semi-nomadic people living in the lower Amur who subsisted mainly on fishing.

[213] Guo Wenshen 郭文深, "Eluosi guojia mingcheng bianqian kao – cong 'luocha' dao 'eluosi'" 俄罗斯国家名称变迁考－从"罗刹"到"俄罗斯," *Jianghuai Tribune* 江淮论坛 20, No. 3 (2010): 105–108.

[214] Weale, 14-15.

[215] Forsyth, 104-105.

permafrost and were constantly beset by the harsh living conditions. As subsequent expeditions revealed the value of the Amur to the Cossacks, the hungry conquerors raided native villages along the river. Although the Cossack incursions initially seemed like mindless razing, they had a clear purpose, which was to subjugate the native peoples to the Russian czar and to collect regular tribute from them. With mounting pressures from the Manchu military, the Russians eventually shifted towards more forceful forms of colonization and established permanent settlements.

Poyarkov made the first Russian advance into the Amur in 1643. He was an audacious adventurer and a newly appointed Muscovite official in Yakutsk, the vibrant Russian town northeast of Lake Baikal. Sponsored by his voevoda ("military commander" or "governor"), Peter Golovin, Poyarkov departed on 15 June with 132 Cossacks armed with flintlock muskets and a half-pounder iron gun.[216] He initially made slow progress navigating the Aldan River and its tributaries, hampered by the shallows and rapids. After eleven weeks, he still had not reached the Amur and was compelled to establish winter quarters. When spring came and the river thawed, Poyarkov continued his journey southward, eventually reaching a small Daur village on the Zeya River.[217] The Daurs welcomed the Cossacks, but their relationship quickly disintegrated as provisions ran out. Poyarkov coerced resources out of another nearby fortified Daur village, which led to a violent backlash from the natives.[218] Avoiding further conflicts, Poyarkov and his men sailed further south and continued to explore the middle and lower reaches of the Amur before returning to Yakutsk in 1646.[219]

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[216] Mancall, 21.
[217] Raventstein, 10.
[218] Ibid., 10-11.
[219] Weale, 18.

As Poyarkov's first incursion set the tone, later Cossack expeditions in the Amur were characterized by forceful tribute collection and constant peregrination. The Cossack control over the region therefore remained minimal and fleeting in nature. However, this pattern of activities was born out of necessity more so than will. Due to the constant mobility of the natives, especially after Poyarkov's initial plundering, the Cossacks had to shift their positions accordingly lest they run out of provisions and starve in the winter. The Cossacks eventually wanted to colonize and build permanent settlements. While dwindling resources and truculent natives posed great obstacles, they built ostrogs, or fortresses, at strategic points in the Amur to effectively project their influence. They were often, if not always, outnumbered in battle but their superior firearms and military engineering skills conferred advantage when protected by defensive structures. Thus, they relied on their ostrogs as temporary bases for wintering, storing provisions and further raiding. The next Cossack explorer, Yerofey Khabarov was the first to establish effective strongholds in the Amur, which proved indispensable in their first encounter with the Manchus.

Khabarov replaced Poyarkov as the next leader of Cossack expeditions to the Amur. During his first expedition in 1649, Khabarov reached the upper Amur region, originally inhabited by the Daurians, but found that the natives had deserted their villages to avoid contact with the Cossacks. The first exploration did not yield profits but still served as a reconnoitering mission. Khabarov discovered more convenient river routes and recognized the need to sail further down with larger forces. Buoyed by the growing Muscovite interest in the Amur, he set off again in 1650 from Yakutsk. The Cossacks eventually reached the fortified Daur village of

Yakesa where they established the first Russian settlement on the Amur River. This village, renamed Albazin, became a focal point of Russo-Qing relations later in the century.[220]

The next year, using Albazin as the new base for expansion, Khabarov sailed down the Amur with over two hundred men and three large cannons.[221] On 8 October, his ships reached the Guigudar village, which was fortified by a triple line of defensive structures and garrisoned by a Nanai-Jucher army of more than eight hundred, in addition to fifty Manchu cavalrymen.[222] The Russian advantage in firearms was salient. One volley killed twenty Amurian tribesmen, causing the Manchu to flee inland, while the rest of the natives retreated within their fortresses.[223] Khabarov's men penetrated the defenses and killed mercilessly, leaving 661 natives dead in their wake, as opposed to fifty-five Russians killed or wounded. They took 243 women and 118 children as prisoners and the war booty included 350 horses and cattle and rich stores of grain.[224]

After the battle at Guigudar, Khabarov sailed further down, continuing his brutal conquests against other tribes until reaching a large settlement of Nanai in Achansk (烏扎拉).[225] The Nanai, as described in Sin Yu's account, were "quick-tempered savages who did not even know the calendar and aimed their arrows easily against anybody, even slashing at their family members."[226] The Russians suppressed these unruly people and built a formidable fort at Achansk.[227]

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[220] Mancall, 24.
[221] Ibid.
[222] Weale, 20.
[223] Ibid.
[224] Ibid.
[225] Ibid., 21-22.
[226] Sin, 72.
[227] Weale, 21-22.

The Manchus were aware of Russian encroachments in the Amur region as early as 1643, when Poyarkov wreaked havoc scrambling for resources in the winter. This time, however, the natives pleaded with the Manchus in the Ningguta, a wealthy Qing garrison town in the Mudan River valley, for protection. Commander-in-chief of the Ningguta, General Haise mustered a large force of approximately 2,000 armed with bows and muskets. At dawn on 3 April of 1652, Haise attacked Fort Achansk, breaching its walls with siege guns and storming the fortress. The Russians retaliated fiercely with their cannons and rebuffed the Chinese charge.[228] Then, a Russian sortie delivered a fatal blow to the bannermen, supposedly killing seven hundred at a cost of ten according to Khabarov's report.[229] While the Qing army greatly outnumbered the Cossacks, Manchus suffered a shameful defeat. The capability of Russians to employ their firearms efficiently and systematically proved decisive against the Manchus. The Manchus, on the other hand, were over-confident in their numbers, attempting to capture the Russians alive.

These Manchu defeats were a wakeup call. Haise was executed for his incompetence. Sarhuda, a formidable general with abundant battle experience and cunning acumen, took his place. Sarhuda was a prized general in the Qing army, having served Nurhaci, Hong Taiji, and the Shunzi Emperor in battles against the Ming forces and during the Manchu invasion of Korea in 1636.[230] Sarhuda's appointment to Ningguta started an aggressive projection of Manchu power against the Russians. Over the Amur River, shadows of war were looming large as Sarhuda reinforced his troops in Ningguta and sent word to request Korean musketeer troops.

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[228] Ibid.
[229] Mancall, 25.
[230] Arthur W. Hummel, *Eminent Chinese of the Ch'ing Period (1644- 1912)* (U.S. Government Printing Office, 1943), 632.

The Northern Expeditions of 1654 and 1658

The Qing request for Korean musketeers coincided with the reign of Korean King Hyojong, a militant ruler who was determined to take revenge of the Qing when opportunities emerged. Hyojong was one of two princes who were taken captive by Hong Taiji during the Manchu invasion of 1636. Upon his return to Chosŏn in 1649, he rekindled hopes of avenging the Manchus and conceived of grand schemes for *pukpŏl* ("northern conquest") to reclaim the Manchurian territories that had belonged to Korean ancestors.[231]

> The prospects of the barbarian are undeniably headed towards destruction… many subjects suggest I not deal with military matters, but I will persevere because there is no telling when heaven-sent opportunities might present themselves. I will raise 100,000 gunners, whom I will cherish and care for as if they were my children, to make them fearless before death. If, after waiting for a breach in their defenses, we attack swiftly and march through the Manchurian plains, how could righteous heroes in the central plains not rise up and join our ranks?[232]

Hyojong was a martial king. He championed the military over the civil and had a knack for martial arts, frequently riding horses and practicing the sword and the bow.[233] Hyojong took extensive measures to reinforce the Imperial Defense Army (御營廳), another central army equipped with firearms that was founded by his father, King Injo, in 1624. He designated the Imperial Defense Army as the main army division for his northern conquest campaign and increased its numbers to 21,000.[234] Created with emphasis on having superior firepower, the Imperial Defense Army consisted mostly, if not entirely, of musketeer units since its inception.[235]

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[231] Yi Gyŏngchan 李京燦, "Chosŏn hyojongchoui pukpŏl undong," *Ch'onggye sahak* 清溪史學, No. 5 (1988): 177-259.
[232] *Songseo seupyu* 宋書拾遺, *j.* 7, p. 574 as cited in Yi, 195.
[233] Yi Gyŏngchan, 177-259.
[234] *Hyojong sillok*, *j.*8 (孝宗 3:6:己巳 [1652/6/29]).
[235] No, "Military Revolution," 42-43.

In 1655, he boasted the prowess of his growing army by publicly drilling it on the beach of the Han River. In attendance were his crowned prince and other *pukpŏl*-supportive officials, as well as a large multitude of spectators.[236] Hyojong also aimed to increase soldier numbers in the Military Training Agency to 10,000.[237] Although finances did not allow him to meet this objective, Military Training Agency did reach its pinnacle in 1658 with 6,350 soldiers, most of whom were musketeers.

During his reign, Korean firearms development continued with the unexpected aid of shipwrecked Dutch sailors. Jan Jansz Weltevree, who was captured in 1626, served as military advisor to Hyojong and transmitted methods of manufacturing cannons. Hendrick Hamel and his fellow Dutchmen who arrived in Chosŏn in 1653 also served in Military Training Agency and imparted their knowledge of musketry tactics and firearms manufacture to the Koreans.[238] In 1656, with Hyojong's encouragement, blacksmiths in the Military Training Agency reproduced the muskets that the shipwrecked Dutchmen brought.[239] Although the records do not elaborate on the details of this enhanced musket, it was most likely a flintlock, an upgrade from the matchlock, which was then widespread in East Asia.[240]

During this buildup of military strengthening, the Qing sent their first request for aid to fight the Cossacks in 1654. Although the Korean Court was initially reluctant, Hyojong sent one hundred musketeers along with fifty logistics personnel to Ningguta. Led by Pyŏn Kŭp, the second-in-command of the Hamgyŏng province, Korean musketeers departed from Hoeryŏng and joined Manchu forces on 21 April.[241] By the time the Koreans arrived, the Qing dynasty had

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[236] *Hyojong sillok*, *j.*15 (孝宗 6:9: 戊申 [1655/9/27]).
[237] Kim Jongsu, 108-111.
[238] No, "Military Tactical Manuals and Military Strategies," 156, 168.
[239] *Hyojong sillok*, *j.* 17 (孝宗 7:7:甲子 [1656/7/18]).
[240] No, "Military Tactical Manuals and Military Strategies," 147.
[241] *Hyojong sillok*, *j.* 12 (孝宗 5:2:癸亥 [1654/2/2])

flexed its muscles and reinforced defenses in Ningguta, a wealthy Qing garrison town in the Mudan River valley.[242] Meanwhile, Cossack conqueror Onifrey Stepanov resumed pilfering native villages in the Amur to gather provisions.[243] Nonetheless, the Manchus' active policy to relocate Daur villages to the valley of the Sungari River, a tributary of the Amur stretching south into inner Manchuria, was critical. This deprived the Russians of provisions and frustrated their efforts to establish permanent settlements.[244] Driven by pangs of hunger, the Cossacks had to abandon the security of their fortresses and venture into the inner reaches of the Amur, which is when they skirmished with the Sino-Korean allies in 1654.

Stepanov and his men sailed southward, down the Amur to the mouth of Sungari, where the natives had migrated.[245] On 28 April 1654, Stepanov and 370 Cossacks entered the Sungari River and, after sailing upstream for three days, encountered a Sino-Korean fleet carrying about 1,000 men. Led by Sarhuda, the Sino-Korean fleet consisted of twenty large ships that could carry seventeen people and of one hundred and forty small boats that could carry five. The Russians brought thirty-nine ships, thirteen of which were substantially larger and more robust than any Chinese ship.[246] Stepanov was greatly outnumbered but the Cossacks were used to this numerical disadvantage, for they had suppressed the vast Qing forces before with their firearms. The records of this battle are not very clear but the Russian fleet, owing to their large size and superior firepower, initially overwhelmed the Sino-Korean allies on the water.

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[242] *Ping ding luo-cha fang lue: 4 juan* 平定羅刹方略 **[4 卷]** (Taibei: I wen, 1967), 3. Fanglue (方略)was a genre of officially commissioned records of military history that emerged in Qing China. This particular text recorded the conquests of the *Luocha* (羅刹) during the reign of Kangxi Emperor.
[243] Mancall, 26.
[244] Perdue, 88.
[245] Ibid., 27.
[246] Park Taegeun 朴泰根, "Han-reo in ui cheot mannam gua Chosŏngun ui heokryonggang chulbyeong," 韓露人의첫만남과朝鮮軍　黑龍江出兵, *Chayu* 自由 17-7, No. 137 (1984): 27. Also see Park Taegeun 朴泰根, "Heokryonggangsang ui daecheop 'naseon jungbul'"黑龍江上의大捷羅禪征伐, *Chayu* 自由 4, No. 102 (1981): 62.

However, with Pyŏn Kŭp's astute initiative, the Big Heads secured a victory for the allies. Pyŏn Kŭp had suggested to Sarhuda that he set up trenches on the riverbanks to fire at the Russians from higher grounds. Agreeing to Pyŏn Kŭp's idea, Sarhuda gave him 300 Daurs and 300 Qing soldiers for support. Pouring volley after volley into Cossacks who attempted to besiege the trenches, Pyŏn Kŭp's forces inflicted heavy losses on the Russians who eventually retreated. The allies pursued Stepanov for the next three days, driving him past the Zeya River, where he had initially planned to establish a permanent fortress. The Korean troops then helped the Qing build an earthen fort and returned to Chosŏn via Ningguta, completing an expedition of eighty-four days.[247] This first clash, however, was not a conclusive victory as Stepanov's forces were still alive and continued to exert their influences in the Amur for the next few years.

In the Northern Expedition of 1654, the Korean musketeers proved their mettle and gained the appellation of the Big Heads.[248] Pyŏn Kŭp brought back a sample of Russian gunpowder to Chosŏn and presented it as gift to Hyojong who was pleased of his men.[249] Upon their return, Hyojong rewarded Pyŏn Kŭp generously and inquired enthusiastically about his travels, particularly about the geography of Amur and the military capabilities of the Russians and the Qing.[250]

After the battle of 1654, Stepanov established winter quarters on the Kumar River where they fortified an old fortress called Kumarsk, founded by his predecessor Khabarov.[251] Anticipating Qing attacks in the spring, Stepanov fortified Kumarsk with earthen walls that could endure heavy artillery and four bulwarks reinforced by a "double row of palisades," that could

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[247] Park Taegun, "Han-reo in ui cheot mannam," 28.
[248] Sin, 71.
[249] *Hyojong sillok, j.* 13 (孝宗 5:7:庚寅 [1654/7/3])
[250] Ibid.*, j.* 14 (Hyojong 孝宗 6:4:丁丑 [1655/4/23])
[251] Mancall, 27.

deliver defensive fire from raised platforms.[252] The fortress was "enclosed by a ditch six feet deep and twelve wide" and "iron spikes and spike traps."[253] Although descriptions are not clear enough to tell how similar this fortress was to the *trace italienne*,[254] it had walls impenetrable to artillery fire and fortified bastions that allowed effective defensive firepower, a fort that probably did not pale in comparison to the Italianate designs.

Stepanov's meticulous preparations paid off in 1655 when a powerful Qing army of 10,000 men led by Mingandali besieged Kumarsk.[255] On March 13, the Manchus fired at its forbidding walls with fifteen large cannon and many matchlocks.[256] Despite their nomadic origins, the Qing excelled at siege warfare. They employed elaborate storming apparatus and erected layers of batteries to assault the Russians from multiple vantage points. However, the Cossacks resisted admirably and their defensive structures, together with effective use of firearms, seem to have repulsed the Manchu assaults. After days of fierce fighting that led to no clear victory on either side, the Qing army retreated because their provisions had run out.[257]

After receiving the news of siege operations in Kumarsk, Sarhuda probably realized that fighting Russians behind their fortified walls was futile. He decided to meet the Russians again on the river, as he had done during the battle of 1654. To reinforce his flotilla, Sarhuda established shipyards in the upper Sungari River in 1657 and embarked on a massive

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[252] Ravenstein, 29.
[253] Ibid.
[254] Also known as star fort, the *trace italienne* was a hallmark of the European military revolution. Its polygonal bulwarks eliminated dead zones in defensive fire and its low, earthen walls could stand against heavy artillery fire.
[255] *Ping ding luo-cha fang lue,* 5-10.
[256] Ravenstein, 28-29.
[257] Mancall, 27

shipbuilding project. Request for musketeers were sent to Korea once more, this time asking for two hundred musketeers and self-sufficient provisions.[258]

General Sin Yu was appointed the leader of the second expedition. An erudite man from a family of elite military status, Sin Yu was a keen, judicious general whose temperament drew a stark contrast with Sarhuda, who comes across as cunning and avaricious. Throughout the expedition, Sin Yu lamented over the loss of his men and took care to record the names of every injured and perished soldier. Diplomatic and circumspect, he also sought the best interest of his state when Qing officers attempted to unjustly appropriate Chosŏn's provisions or extend their stay in Ningguta after the battle of 1658. Upon his return to Korea in 1658, Sin Yu managed to minimize the costs of the expedition and to bring back a Russian flintlock as war booty, which he obtained only after pleading with Sahurda for weeks.

Sin Yu and his two hundred musketeers arrived at Ningguta on 9 May and set sail the next day under the orders of Sarhuda. The allies journeyed towards the mouth of the Sungari river with the help of the Juchers who provided large, well-crafted ships and navigational directions.[259] After six days of voyage, the Sino-Korean allies arrived at the mouth of the Sungari River, where villages covered the landscape. Here Sarhuda waited for fifty warships with reinforcements from Beijing and Shenyang.[260]

These new warships were fruits of Sarhuda's scheme of naval strengthening. Through the experience of the 1654 battle, Sarhuda probably realized he needed larger and more robust ships to face the formidable Russian flotilla. He orchestrated an extensive shipbuilding initiative for eight months in the upper Sungari, the modern day city of Jilin where lumber resources are bountiful. Employing six hundred Han Chinese craftsmen and carpenters, the Manchus produced

[258] Sin, 14-15.
[259] Ibid., 67.
[260] Ibid., 70.

a flotilla of fifty-two ships, forty of which were large and made of thick planks and twelve of which were smaller but of the same design. The Qing fleet was navigated by the shipbuilders themselves and mounted fifty cannons of various sizes.[261] Nonetheless, despite Sarhuda's undertaking, Sin Yu seemed convinced of Russian naval superiority until the end. According to his investigation of captured Russian ships, the Russian fleet had enormous bodies with decks made out of thick planks and enclosed by layers of dense logwood, which was so robust that even the *Hongyipao* ("Red Barbarian Cannon" 紅夷炮), a powerful cannon based on English and Dutch models, would not have penetrated them.[262]

The long-awaited reinforcements arrived on 2 June. The combined Sino-Korean forces amounted to 1,400 soldiers, composed of a thousand infantry units including swordsmen, spearmen and archers, and four hundred gunners employing cannons or matchlocks.[263] After two days of re-organization, the flotilla set sail at daybreak on 5 June. Propelled by an auspicious wind, the allies advanced swiftly towards the junction between the Amur and the Sungari.[264] On 10 June, they sighted Stepanov and his fleet after passing the mouth of the Amur.[265]

The allies pursued the Russians as soon as they came into sight. Stepanov's fleet raised the sail and swiftly retreated 5 km to line up on the riverbank. The Cossacks were roused to action and watched the Qing fleet's movement attentively. When the allies approached within 500 meters, both sides exchanged fierce cannon fire. Then, the Qing-Korean allies launched a three-pronged attack, pouring volley after volley of musket balls and arrows upon the Russian fleet as they closed in. The Cossacks who would also have been firing their flintlocks in volleys were soon overpowered and broke formation. Some hid in the ships and others went ashore and

[261] Ibid.,82.
[262] Ibid., 94.
[263] Ibid., 83.
[264] Ibid., 84-85.
[265] Ibid., 87.

fled inland. When Sin Yu's ship and the rest of the vanguard fleet surrounded the Russian vessels, the musketeers threw their hooks on the enemy ships and jumped over to set fire to them.

However, Sarhuda halted this at once and ordered the Russian ships to be captured as booty in the heat of the battle.[266] The musketeers who had boarded the enemy ships came under immediate peril as the Cossacks who had been hiding took advantage of the allies' hesitation and retaliated. The rapid succession of Russian musketry fire caused a number of casualties in the Qing forces, killing seven Korean musketeers and many Qing infantrymen and mariners. As the Russians recoiled furiously, Sarhuda had no choice but to use fire-arrows on the Russian fleet, burning seven vessels to ashes. Meanwhile, forty Cossacks who had abandoned the ship and fled inland reclaimed one of the Qing ships that had been deserted and escaped the encirclement. The Qing fleet pursued the fleeing enemies, Sin Yu's ship being the first, and slaughtered them all. Before long, darkness fell and few Cossacks managed to escape with a ship.[267] The battle of 1658 left two hundred and twenty Cossacks, including Stepanov, their commander-in-chief, dead. Qing casualties numbered one hundred and ten deaths and two hundred wounded. Eight Korean musketeers were killed and twenty-five wounded.[268]

Despite their small numbers, Korean musketeers undeniably played a decisive role in leading the allies to victory. During the expedition of 1654, Pyŏn Kŭp's astute placement of musketeers on the riverbank devastated Stepanov's flotilla and earned the Korean musketeers the redoubtable reputation of Big Heads. Further, the allies' superior firepower in the battle of 1658 can be mostly attributed to the Korean musketeers. Out of the four hundred men employing firearms, excluding one hundred Beijing gunners who were firing cannons, Koreans had twice as

[266] Ibid., 87-90.
[267] Ibid.
[268] Ibid., 95, 100

many musketeers as the vast Qing army. In addition, Manchu musketeers lacked proficiency in musketry techniques and paled in comparison to the highly disciplined Korean musketeers.[269]

To judge relative military superiority amongst the three belligerents is difficult because of several factors. We must remember that neither the Cossacks nor the Korean troops who engaged in these battles were the most disciplined central army from their respective countries. Although the Big Heads were elite musketeers from regional armies, they paled in comparison to professional musketeers serving in the central armies such as Military Training Agency and the Imperial Defense Army. Similarly, the Cossacks were hired mercenaries for their steppe skills, not rigorously drilled infantry sent directly from the Muscovite government. They were semi-independent frontiersmen who served the Muscovite authorities only when their demands were met and their autonomy respected. Although their experiences of conquest in eastern Siberia have made them adept at war and raiding, they paled in comparison to the central Muscovite army, which boasted salaried infantry regiments and arquebusiers called *streltsy* (literally, "shooters") by the sixteenth century. Comparable to the soldiers of the Korean Military Training Agency, the *streltsy* were Russian guardsmen who performed guard duties and were known for their musketry tactics. They used a mobile wooden platform known as "gulai gorod" (literally, "walking fort") and shot in volleys using this platform as a way of mobile fortification.[270] While at least 500 *streltsy* served the municipal administration of Feodor Golovin in Nerchinsk, they did not take part in the Cossack expeditions in the mid-seventeenth century. If the Muscovite government were to dispatch these *streltsy* in battle, which it did only later during the siege of Albazin (1685-1688), the allies would have faced a more significant foe. Likewise, the Qing army could also exert more power had it not been for Zheng Chenggong in the Southern

[269] Ibid., 82-83.
[270] Stevens, 25, 47.

battlefront where most of the Qing elite troops armed with firearms fought. Consequently, Sarhuda had poorly skilled musketeers and also had to borrow ammunition from the Koreans due to delays in their supply.

Weather also played a significant role in determining the outcome of these conflicts. The Big Heads were armed with matchlocks, which were deficient, if not useless, in adverse weather because the humidity can interfere with the trigger. On the other hand, the Russians employed flintlocks, which were superior not only in its rate of fire but also in its unhindered performance in the presence of humidity. During both battles, the Sino-Korean allies were lucky to have good weather. Further, the direction in which the wind blew during the battle of 1658 was another contributing factor to the allies' success. According to Sin Yu's account, the Russian fleet raised the sail and retreated to the east to establish defense lines along the riverbank, indicating that wind blew from west to east and that the allies had wind behind their backs. This probably aided the allies' artillery fire, especially the fire arrows that destroyed the Russian vessels.

Better leadership on both sides could also have changed the outcome of the battles. After the battle of 1658, Sin Yu observed that if the Russians had relied on the impenetrability of their robust ships and resisted their enemies without abandoning the ships, the allies would have had a much more difficult time securing victory. Stepanov also failed to organize a united front against the Sino-Korean allies in 1658. Approximately half of his troops mutinied and left him the day before the decisive battle and his forces were demoralized and significantly reduced. Similarly, the Qing commanders made poor decisions that engendered unnecessary casualties in battle. Overconfident in the number of their troops and driven by avarice, both Haise and Sarhuda, insisted that the Cossacks should be captured alive. This led Haise to failure in 1652 and Sarhuda to demur in completely destroying the enemy fleet in 1658.

With these contingencies in mind, the history of the Northern Expeditions could have been utterly different if any of those factors had worked in favor of either side. While this obscures a direct comparison of military capabilities amongst the belligerents, the implications of these encounters for the military revolution are clear: the Big Heads proved their mettle in battle with their superior accuracy and tactics in musketry fire.

The Northern Expeditions, though fought under the Qing flag, profoundly impacted Chosŏn and its reputation in East Asia. For one, the expeditions reassured the Koreans of their excellence in musketry tactics. Fictional editions of Sin Yu's diaries were widely circulated in late Chosŏn and contributed to a lasting, prideful historical consciousness about the Big Heads. Secondly, the expeditions allowed Hyojong to send troops to survey Manchuria, which would otherwise have been construed as challenging to the Qing hegemony. This brought in valuable information about the geography of the Amur, the belligerents' military power, and the habits and martial capabilities of other ethnic peoples living in the Amur. Finally, clashing with the Muscovite empire – which had superior firearms, siege tactics, and fortress designs – led to transcultural transfers of military technology. Pyŏn Kŭp brought back the gunpowder of the Russians and Sin Yu returned with a European flintlock.[271]

In light of the encounters at the Amur frontiers, Chosŏn emerges as an active gunpowder state in the seventeenth century. Although the Korean Court was initially reluctant, Hyojong was probably aware that sending troops to aid the Qing would benefit his *pukbol* campaign in the long term. These expeditions provided important battle experiences and informed the Koreans about international relations at the Amur frontiers, the conditions of the belligerents' military power, and the habits and military capabilities of other ethnic peoples living in the Amur River

[271] Yi Kangchil 李康七, "Chosŏn hyojongcho naseonjungbulgua pi'a jochong'e daehan sogo" 朝鮮孝宗朝羅禪征伐과被我鳥銃에對한小考, *Komunhwa* 古文化 20, No. 20 (1982): 15-28.

valley. Thus, beneath the veil of obeying Qing orders, deployment of Korean musketeers can be revisited as an extension of Hyojong's *pukbol* movement.

Koreans had been looking for opportunities to step into Manchuria for decades before and after the Amur conflicts. Hyojong once said to an official who was concerned about the implausibility of his *pukbol* movement:

> Once a grand scheme has been drawn, the devotion to implement it becomes naturally more sincere. If your devotion becomes more sincere, your capabilities will accordingly improve. This is why I have steadfastly advocated for *pukbol*… if heaven allows me to live ten more years, I will, success or failure, certainly stage an uprising.[272]

Hyojong did not live long enough to implement his plans. When he died unexpectedly of unknown cause in 1659, *pukbol* lost its momentum. Nonetheless, it re-surfaced in 1674 when the Qing state faltered under the Revolt of the Three Feudatories (1673-1681). Hyojong's grandson, King Sukjong, assigned a special government ministry for *pukbol*, fortified northern defense lines, and increased the size of the standing army. Nonetheless, the Qing successfully suppressed the revolt in 1681 and established itself firmly on the Dragon Throne by the late seventeenth century. Ensuing was a *pax manjurica*, which stifled Korean military innovations and eventually extinguished the last of Korean dreams for northern conquest. Nonetheless, as evident in the story of the Big Heads in the Amur, seventeenth century Chosŏn was clearly an active military force and made consistent efforts to find holes in Manchu defenses throughout the latter half of the seventeenth century.

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[272] *Songseo seupyu* 宋書拾遺, *j.* 7, p. 574 as cited in Yi Kangchil, 194.

Unfinished Stories: Siege of Albazin (1685-1688) and the Treaty of Nerchinsk (1689)

The battle of 1658 concludes the tale of the Big Heads in the Amur frontiers. However, the story cannot be sealed without discussing later encounters at fort Albazin. As the battle of 1654 was raging, a baby boy who will later be known as Kangxi Emperor was born. Kangxi grew to become an emperor of great fortitude and secured Qing control at the Amur frontiers with renewed vigor and hostility. In the late seventeenth century, the Cossacks still lurked in the northern regions of Manchuria, in settlements such as Yakutsk and Nerchinsk, and maintained a formidable stronghold in Albazin, where a group of Polish exiles and renegade Cossacks re-occupied the abandoned site in 1665.[273] From this base, the Cossacks continued to raid the natives of the Amur region. To settle the matters for good, Kangxi launched two expeditions in 1685 and 1686.

Kangxi made extensive preparations for his campaigns. He strengthened his grip on the Amur by appointing Sabsu (薩布素) to the deputy lieutenant-governor (副都統) of Ninggu Tower, and two other generals, Langtan and Pengcun, to assist him. They were ordered to survey distances of land routes to major Cossack settlements, the shape of the Amur river, and the activities of the Cossacks in Albazin. Later that year, Kangxi drilled 1,500 soldiers in Ninggu Tower and reinforced his forces by manufacturing warships, *hong yi pao* ("Red Barbarian Cannon" 紅夷炮), and muskets.[274]

Kangxi's procurement of firearms and ships provided his army a clear edge in the first expedition. On 12 June 1685, the Qing army, led by General Sabsu and Pengchun, arrived at

[273] Originally named Yakesa, Albazin was a fortified village of the Daur people, which Khabarov conquered in 1645. The exact location of Albazin is still disputed but the most credible estimation places in the upper Amur region, further down from the Zeya tributary.
[274] Ibid., *j*. 106, p. 82.2 – 83.1 (康熙 21:12:庚子[1682/12])

Albazin. The Qing mobilized an army of 15,000 men and 200 pieces of artillery of varying sizes, including "fifteen guns, from five to –eight-pounders of European manufacture."[275] The Albazin Cossacks, led by the newly appointed voevoda, Akekesay Tolbuzin, garrisoned the fortress with four hundred and fifty men and three small cannons. Though the vast majority of the Qing army was armed with bows and arrows, the Manchus held the numerical advantage and employed powerful land artillery and gunboats that dwarfed Russian firepower. Within a few days, General Sabsu and his men demolished the wooden walls of the fort and forced their enemies to surrender.[276]

After the lifting of the siege, Sabsu, in a gesture of generosity, allowed Tolbuzin and the rest of his men to retreat to Nerchinsk. He also left Albazin uninhabited and the crops in the vicinity undestroyed.[277] Before long, Tolbuzin returned in October with a larger force, approximately 1,000 men and 12 cannon,[278] including new reinforcements from Siberia and Moscow.[279] The Cossacks harvested the grain fields and established an even more formidable defensive in Albazin. New fortifications were erected under the guidance of Afanase Baiton, an experienced Prussian engineer and the fort was "well stocked with food and gunpowder."[280]

Kangxi reacted swiftly and forcefully with a second expedition. On 7 July 1686, Sabsu and his army of 2,000 men armed with bows and arrows and forty cannon arrived in Albazin. Besieging Albazin for the second time was no easy task. Baiton's new fortifications were mounted with guns and reinforced with protruding polygonal bulwarks that allowed for crossfire.

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[275] Hsu, 690.
[276] Ravenstein, 46-51.
[277] Chris Peers and Christa Hook, *Late imperial Chinese armies 1520-1840* (London: Osprey, 1997), 44.
[278] Ibid.
[279] Frank Golder, *Russian Expansion on the Pacific, 1641-1850; An Account of the Earliest and Later Expeditions made by the Russians along the Pacific Coast of Asia and North America; including some Related Expeditions to the Arctic Regions* (Gloucester, Mass: P. Smith, 1914), 60.
[280] Peers and Hook, 44.

Together with effective use of hand grenades, the forbidding walls of Albazin repulsed the Manchu besiegers.[281] The Albazin Cossacks persevered admirably for five months, even after their leader Tolbuzin was killed in combat. Worse yet, infectious diseases broke out, inflicting significant losses on both sides. When the Qing lifted the siege on 6 May and withdrew from the vicinity of the fort, only sixty-six Cossack defenders were left in Albazin.[282]

The siege was interrupted by diplomatic communications between Moscow and Beijing. The czar had sent envoy to Kangxi to request the cessation of military action in Albazin and to state his wish for peace talks. Kangxi welcomed this and showed magnanimity towards the Cossacks. He ordered Sabsu to lift the siege and to share provisions and doctors with the Albazin Cossacks. Final agreement was reached on 27 August 1689.[283] Establishing the Stanovoi Mountains and the Argun River as the border, the Russians ceded the Amur region and agreed to demolish Albazin while the Chinese granted the trans-Baikal region and allowed Russians to trade in Beijing.

Both parties achieved their ends. The Russians received lucrative trade opportunities and the Chinese resolved the anxiety of Russo-Zunghar alliance and terminated decades of Cossack disturbance in the Amur region. Encounters on the Amur culminated with amiability and diplomacy. After the peace treaty in 1689, the Russians traded freely in Beijing and the Qing incorporated Cossacks captured from the siege of Albazin into their army as part of the Manchu Bordered Yellow Banner. Kangxi even allowed the Russians to build St. Nicholas, an Orthodox church of their own, which the Chinese called Temple of the Buddhist Demons (羅刹廟).

Guns ushered in a new threshold of transcultural encounters at the Amur frontiers.

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[281] Golder, 63.
[282] Hsu, 691.
[283] Felix M. Wassrmann, "Latin as a World Language: The Treaty of Nerchinsk," *The Classical Weekly* 46, No. 6 (1953), 83-84.

European firearms provided the Russians a clear edge against the nomadic tribesmen of Siberia and enabled them to expand eastward with unprecedented alacrity. When the Cossacks brought their refined gunnery to the Amur, the Qing alone could not meet the challenge until the Big Heads, bolstered by a Korean Military Revolution, joined forces with the Manchus in 1654 and 1658. Few decades later, Kangxi launched forceful campaigns against Albazin in the 1680s and settled the matter for good. Kangxi and his men have the lion's share of credit for culminating the dispute but the Big Heads were just as crucial in the 1650s. Their joint counterthrust, that of a mighty "tiger with wings," effectively suppressed the Muscovite challenge and attests to the East Asian competence in firearms warfare.

Conclusions

Gunpowder technology was an intractable contagion in the early modern era, indiscriminately latching on to cultures and persistently demanding change from its hosts. Those that adopted it grew immunity and survived while those that did not and lagged behind coughed their last breath. In the sixteenth and seventeenth century, the technology spread widely and deeply, bridging the most distant edges of the Eurasian continent and molding the recalcitrant societies to succumb to its power. Koreans gave in during the Imjin War. Licking its wounds from repeated foreign invasions, they adopted guns with unprecedented alacrity and eagerness. During the seventeenth century, military systems were revolutionized around firearms. Armies grew larger and more professional. Changes were deep and wide across the Korean state and society.

But we must now return to the questions posed in our introductory chapter: why did firearms development slow down eventually in Korea and in other regions of East Asia? How did Korea succumb to isolationism and military atrophy that left it susceptible to the intrusion of Western powers in the modern era? As discussed in the previous chapters, the explanations proposed by Gubota Masashi and Kenneth Chase hold a modicum of truth but are not sufficient to account for the obstacles that lay in the Korean Military Revolution during and after the seventeenth century.

Masashi's argument that using fowling pieces led to improvements in individual marksmanship but not in *en masse* infantry tactics is problematized in the Korean case. Although Chosŏn armies seem to have highly valued marksmanship, their musketeers were more than just a group of individual sharpshooters: they functioned in cohesive squads, each imbued with a sense of *espirit de corps* that aimed at increasing the rate of fire as well as accuracy. Their

versatility was a result of the Imjin War and the ensuing transcultural borrowing in techniques of violence as Koreans combined both Japanese musketry technology and Chinese general Qi Jiguang's rigorous infantry tactics. Further, as Korean historian No Yŏnggu conjectures, the Dutch castaways that served in the Military Training Agency seem to have helped Korean musketeer squads increase their rate of fire in the early seventeenth century.

Further, Korean experiences of facing Manchu cavalry multiple times in field battle made clear that single-minded emphasis on marksmanship alone would be catastrophic. As Masashi discusses in his book, Japanese musketeers seldom faced a foe like Manchu horsemen because cavalry within their borders were severely limited due to their small physique. The challenge that Korean musketeers faced during the Sarhu Battle of 1619 and the Manchu invasions of 1627 and 1636 was fundamentally different. But, as shown in Chapter 3 and the discussions therein, Korean musketeers performed admirably against the world's perhaps most powerful cavalry at the time. Throughout their interactions with the Manchu cavalry, Koreans did not give up their guns but rather challenged their drill methods and tactics to raise elite musketeers and to provide better protection for musketeers.

Manchu cavalry was a constant source of military challenge, rather than an impediment to the development of firearms. As a strategy to fight the Manchus, both Prince Kwanghae and King Injo stressed the importance of developing firearms. Their musketeers could often stand their ground against Manchu cavalry, as demonstrated in the battles of Kimhwa and Gwangkyo. Unless they ran out of munitions, had accidents with gunpowder explosion or were outwitted by experienced Manchu commanders, Korean musketeers were increasingly efficacious against the Manchus. Further, it was the Qing consolidation in the late seventeenth century, which is heavily indebted to firearms units, that eventually repressed Korean firearms development, not the

presence of their cavalry per se. To wit, it was an indirect consequence of Qing supremacy not a direct result of the inefficacy of firearms against Qing cavalry.

The consolidation of Qing hegemony, however, is an important geopolitical factor that eventually repressed Korean firearms development. Throughout East Asian history, behemoth dynasties that hold the central plains of China had overwhelming military and economic prowess and discouraged their neighbors from challenging the Sino-centric world order. Especially when the Manchus sat on the Dragon throne, their knack for military expansion and aptitude for nomadic skills greatly expanded the boundaries of their empire.[284] After the invasion of 1636 and its consolidation in the late seventeenth century,[285] the Manchus closely monitored Korean firearms development and inhibited their firearms manufacture.[286] Further, as the Qing dynasty settled into its place and erected themselves firmly upon the ashes of the Ming dynasty, it propagated a *pax manjurica*, creating a lull and an eventual rusting of East Asian military aptitude. Koreans, for instance, experienced no sustained armed conflicts after the Manchu invasions until the twentieth century, with a few exceptions of internal rebellions.

As much as geopolitics drove history, I argue that the Korean Military Revolution decelerated due to its perpetual fiscal ineptitude. Throughout the seventeenth century, the Korean court focused enormous fiscal and logistical resources to maintain large central armies. To an extent, institutional adjustments such as tax reforms, increase of household registers, commercial activities of capital soldiers and the expansion of garrison farms responded to these needs. However, Korean fiscal-military reforms ultimately failed, leading to military atrophy and a wide array of fiscal problems that stay unresolved into the nineteenth century. Reasons are both

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[284] **Perdue, 56-64.**
[285] Qing's successes against the Ming and its campaigns against Korea (1627, 1636) and the Zunghar (1690-1697) were heavily indebted to their firearms units.
[286] Palais, 521.

external and internal. Externally, despite that Chosŏn invested immensely, as much as two-thirds of its state budget in seventeenth century, in developing firearms and that it engaged its armies in multiple international conflicts, Chosŏn received little, if no, gains of conquest or colonies. In stark contrast, early modern European maritime expansion yielded riches that fed back into their economy and enabled further military spending.

Internally, Chosŏn Korea never broke through the threshold of fiscal efficacy to sustain army growth beyond the seventeenth century. Supplying incessant war and the ever-escalating expenses of firearms warfare posed serious fiscal difficulties in many early modern gunpowder states, including those of Europe throughout much of the seventeenth century. However, with time, the European practice, which in Parker's parlance included "a complicated scheme of military finance" and "private contractors"[287] emerged successful in the 1690s when the Dutch accomplished a "fiscal revolution."[288] This model involved a form of "administrative devolution" that passed the burden of supplying standing armies to private contractors and entrepreneurs.[289] It replaced the "traditional system of paying each soldier his due in person"[290] and proved to be a highly efficacious model.[291] While the European strategy of privatization and devolution was a contingency without any immediate benefit during the seventeenth century, it was likely a "small but accelerating divergence"[292] that eventually made large differences.

Koreans had a successful musketry revolution but adjustments in the fiscal system faltered in comparison, which seems to be a major divergence between the two respective

[287] Parker, 64-65.
[288] Ibid., 64.
[289] Ibid., 64-65.
[290] Ibid.
[291] Ibid., 64.
[292] Tonio Andrade, "An Accelerating Divergence? The Revisionist Model of World History and the Question of Eurasian Military Parity: Data from East Asia," *Canadian Journal of Sociology* 36, No. 2 (2011), 185-203.

trajectories of Military Revolution. The Korean military finance suffered from chronic deficiencies in its taxation system. Since early Chosŏn, Korean armies depended on support taxpayers for every soldier, which was supposed to make the system self-sustainable and lessen the burden of the central government. However, unlike the European practice of privitization and administrative devolution, the Korean scheme of military finance was heavily centralized and tightly controlled by the state. But the Korean taxpayer system seems to have chronically suffered from under-registration of the adult male population for service and the exemption of slaves and yangban from military duty. The system was deficient due to the diminishing base of taxable commoners in late Chosŏn society and "the ever-expanding pool of tax-exempt men [that] had gone far beyond any narrow group of hereditary yangban aristocrats."[293] As Historian James Palais writes:

> "It was certainly no secret to anyone at the time that the main reason why the financial support system for the military was in such terrible condition in the seventeenth and eighteenth centuries was because the tax base was shrinking as both bona fide yangban and commoner tax shirkers successfully gained exemption from tax payments"[294]

The biggest impediment to military reform was indeed the yangban aristocrats and the "impregnable barrier [they posed] against kings and reforms."[295] Fundamentally, they had deep-seated cultural bias against the military and single-mindedly valued "knowledge and mastery of the Confucian canon." They considered soldiers of all ranks as of lowly profession.[296] Throughout early modern Korea, these yangban families "had come to believe so firmly that their high status entailed exemption from military service, and that service itself demeaned one's personal and family dignity so much that service for them was out of the question." Case in point

[293] Palais, 568.
[294] Ibid., 570.
[295] Ibid., 568.
[296] Ibid., 575.

is the conservative yangban faction's immediate opposition to a 1711 reform that aimed at promulgating a "capitation tax on all adults (men and women)," including the yangban class. Conservative yangban aristocrats and their lobbyists in the court effectively repressed the idea at its inception. Korean kings had little power over these yangban aristocrats and their exemption from military service and taxation, together with increasing military expenditures and diminishing base of taxable commoners, drove Chosŏn off the fiscal cliff.

Revolution is a change that stays and takes root, one that spreads its influence to broad reaches of its host society and state. Despite its financial shortcomings, the Korean Military Revolution orchestrated a permanent change in the Korean military apparatus around firearms, which had ramifications such as increase of army size, rigorous infantry drill, proliferation of military manuals, firearms manufacturing and new military-fiscal initiatives. Strikingly similar to European developments, Chosŏn was particularly successful in its musketry revolution, replacing the traditional cavalry-based system with new forms of *en masse* infantry tactics. Further, the growing fiscal and logistical demands of sustaining this way of war challenged the late Chosŏn state to adapt institutionally through new military surtaxes and centralized methods of census-taking. Nonetheless, despite this radical shift following the adoption of muskets, a subsequent 'fiscal revolution' did not follow.

The Korean Military Revolution then fell short of culminating because excessive military spending without proper fiscal and logistical backing reined back on impetuses that were driving military reforms in Korea. This trend in reducing military expenditures was reinforced by the combination of yangban resistance to tax reforms, diminishing base of taxable commoners, consolidation of the *pax manjurica* and the lack of interstate warfare in eighteenth and nineteenth century East Asia. Nonetheless, bolstered by the Korean Military Revolution, Chosŏn was

clearly an active gunpowder state during the seventeenth century. The Korean variation on the theme of gunpowder revolution produced professional bodies of firearms military units, innovations in military tactics and vibrant commercial and manufacturing activities, contributing to cumulative processes of political integration and consolidation in Korea.

Appendix: Tables

Table 1 Size of Regional Armies in Chosŏn, 1600-1778

Year	Size of the *Sog'o* Army
1600	95,226
Before 1626	75,000
1628	~100,000
1633	90,070
1640	101,914
1641	110,000
1681 (August)	200,000
1681 (December)	200,000
1698	200,000
1702	188,800
1711	200,000
1778 (June)	210,000
1778 (September)	190,000

Source: Kim Uch'ŏl, *Chosŏn hugi chibang kunjesa* 朝鮮後期地方軍制史 [History of Late Chŏson Regional Armies] (Sŏul-si: Kyŏngin Munhwasa, 2001), 127.

Table 2 Size of Central Armies in Chosŏn, 1590-1704

	Military Training Agency	Imperial Battalion	Imperial Defense Army	Total (10-year intervals)
1590				0
1593	500			
1594	1,000			
1595	1,146			
1597	1,100			
1598	2,000			
1599				
1600				2,000
1601	2,650			
1603	2,000			
1610				2,000
1616	4,000			

1620				4,000
1623		260		
1624		1000	4,205	
1625	4000			
1627				
1630				17,000
1631	4000			
1635		6170		
1636	4400		12700	
1639		6194		
1640				23,294
1643		10,000		
1649	5,440			
1650				27,440
1652		21,000	11,009	
1657	5,650			
1658	6,350			
1660				38,359
1662	7,000			
1663				
1668				
1670				39,009
1672	5,000			
1674			20,000	
1680				46,000
1682	5,000			
1690				46,000
1702	6314			
1704	5000	17875	16,500	39,375

Source: See respective tables of individual armies below for citations.

Table 3 Size of the Military Training Agency, 1593-1704

Year	Number of Men
1593	1,000
1598	2,000
1616	4,000
1649	5,440
1657	5,650
1658	6,350
1662	7,000
1672	5,000
1682	5,000
1702	6,314
1704	5,000

Source: Kim Jongsu 金鍾洙, *Chosŏn hugi chungang kunje yŏn'gu: Hullyŏn Togam ŭi sŏllip kwa sahoe pyŏndong* 朝鮮後期中央軍制研究 : 訓鍊都監設立의社會變動 [*A Study on the Central Military System in the Late Joseon Dynasty*] (Sŏul: Haean, 2003), 105.

Table 4 Size of the Imperial Battalion, 1623-1704

Year	Number of Men	Source
1623	260	*Injo sillok*, j. 4 (仁祖 2:1:丁卯 [1624/1/12])
1624	1,000	*Hyŏnjong kaesu sillok*, j. 10 (顯宗 4:11 戊寅 [1663/11/14]). Also see *Injo sillok, j.* 4 (仁祖 2:2: 壬辰 [1624/2/8]).
1635	6,170	*Injo sillok*, *j. 31* (仁祖 13:10 乙未 [1635/10/18])
1639	6,194	*Injo sillok, j. 39* (仁祖 17:7: 丙子[1639/7/21])
1643	10,000	*Hyŏnjong kaesu sillok*, j. 10 (顯宗 4:11 戊寅 [1663/11/14])
1652	21,000	*Hyŏnjong kaesu sillok*, j. 10 (顯宗 4:11 戊寅 [1663/11/14])
1704	17,875	*Sukchong sillok*, *j.* 40 (肅宗 30:12 甲午 [1704/12/28])

Table 5 Size of the Imperial Defense Army, 1624-1704

Year	Number of Men	Source
1624	4,205	*Injo sillok*, *j.* 7 (仁祖 2:11 己未 [1624/11/9])
1636	12,700	*Injo sillok*, *j.* 32 (仁祖 14:7 丁巳 [1636/7/15])
1652	11,009	*Hyŏnjong kaesu sillok*, j. 10 (顯宗 4:11 戊寅 [1663/11/14])
1674	20,000	*Hyŏnjong kaesu sillok*, j. 10 (顯宗 4:11 戊寅 [1663/11/14])
1704	16,500	*Sukchong sillok*, *j.* 40 (肅宗 30:12 甲午 [1704/12/28])

Bibliography

Andrade, Tonio. "An Accelerating Divergence? The Revisionist Model of World History and the Question of Eurasian Military Parity: Data from East Asia." *Canadian Journal of Sociology* 36, No. 2 (2011): 185-203.

———. *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the Seventeenth Century*. New York: Columbia University Press, 2008.

———., Kang Hyeok Hweon., and Cooper, Kirsten. "A Korean Military Revolution? Parallel Military Innovations in East Asia and Europe." Forthcoming in the *Journal of World History*.

———. *Lost Colony: The Untold Story of China's First Great Victory over the West* New Jersey: Princeton University Press, 2011.

Atwell, William S. "A Seventeenth-Century 'General Crisis' in East Asia?" *Modern Asian Studies* 24, No. 4 (Oct., 1990).

Barriffe, Colonel William. Militarie Discipline: Or the Young Artillery-Man, Wherein is discoursed and Shown the Postures both of Musket and Pike, the Exactest way, &c. Together with the Exercise of the Foot in their MOtions, with much variety: As also, diverse and several Formes for the Embatteling fmall or greater bodies, demonstrated by the Number of a single Company, with the Reducements: Very necessary for all such as are Studious in the Art Military. Whereunto is also added, the Postures and Beneficial Use of the Half-Pike joined with the Musket. With the way to draw-up the Swedish Brigade. As also, Mars his Triumph. And in this last Edition is added, Some brief Instructions for the Exercising of the Cavalry, or Horse-Troopes. London: Gartrude Dawson, 1661.

Bingham, Captain John. ""“The Exercise of the English in the Service of the High and mighty Lords, the Lords the Estates of the United Provinces in the Low Countries." ," In *The Tactiks of Aelian or Art of Embattailing an Army after Ye Grecian manner Englished & Illustrated with Figures Throughout: & Notes upon Ye Chapters of Ye Ordinary Motions of Ye Phalange by J.B. The Exercise Military of Ye English by Ye Order of That Great Generall Maurice of Nassau Prince of Orange &c Governer & Generall of Ye United Provinces Is Added, by Aegidius Gelius Aelianus,* (London, 1616), pp. 153-59. London: eliot's Court, 1616.

Chase, Kenneth. *Firearms: a global history to 1700*. Cambridge, UK: Cambridge University Press, 2003.

Ch‘oe Suk 崔橚. *Chinbŏp ŏnhae*陣法諺解 [*Annotation on Military Formations*]. Hamgyŏng Provincial Headquarters 咸鏡監營, 1693. The National Library of Korea, Sŏul, South Korea, 古698-15.

Chosŏn wangjo sillok 朝鮮王朝實錄 [Annals of Chŏson Dynasty]. Kyŏnggi-do Kwach‘ŏn-si: Kuksa P‘yŏnch‘an Wiwŏnhoe [National Institute of Korean History], http://sillok.history.go.kr (accessed November 15, 2011).

Chŏng On 鄭蘊. *Tonggyejip 東溪集*. Translated by Cho Donggyŏng. Sŏul-si: Minjok Munhwa Ch‘ujinhoe, 2000.

Chŏng Sŏngjŏn. “Kwanghaegun sidae Kukpang chŏngch‘aek yŏn’gu” 光海君時代國防政策研究 [A Study on National Defense Policy of the King Kwanghaegun in the Chŏson Dynasty]. MA diss., Korean National Defense University, 2008.

Chŏng Kyŏngse 鄭經世. *Ubokchip* 愚伏集, Oktangron simuch'a 玉堂論時務箚. In *Han'guk munjip ch'onggan,* vol. 68. Sŏul: Minjok Munhwa Ch'ujinhoe 民族文化推進, 2003 (originally written in 1657).

Equiluz, Martin de. *Milicia Discurso, y Regla Militar, del Capitan Martin de Eguiluz, Bizcayno*. Antwerp: Casa Pedro Bellero, 1595 [originally written 1586].

Forsyth, James. *A History of the Peoples of Siberia: Russia's North Asian Colony, 1581-1990*. Cambridge: Cambridge University Press, 1992.

Foucault, Michel. *Discipline and punish: the birth of the prison*. New York: Pantheon Books, 1977.

Golder, Frank A. *Russian Expansion on the Pacific, 1641-1850; An Account of the Earliest and Later Expeditions made by the Russians along the Pacific Coast of Asia and North America; including some Related Expeditions to the Arctic Regions*. Gloucester, Mass: P. Smith, 1914.

Guo Wenshen 郭文深. "Eluosi guojia mingcheng bianqian kao – cong 'luocha' dao 'eluosi'" 俄罗斯国家名称变迁考－从"罗刹"到"俄罗斯." *Jianghuai Tribune* 江淮论坛 20, No. 3 (2010): 105–108.

Hall, Bert S. *Weapons and warfare in renaissance Europe: gunpowder, technology, and tactics*. Baltimore, Md: Johns Hopkins University Press, 1997.

Han'guk Chŏngsin Munhwa Yŏn'guwŏn. *Chŭngbo munhŏn pigo saegin* 增補文獻備考, *j.* 115 *Pyŏngsŏ* 兵書. Kyŏnggi-do Sŏngnam-si: Han'guk Chŏngsin Munhwa Yŏn'guwŏn, 1983.

Han'guk Yŏksa Yŏn'guhoe 韓國歷史研究會. *Chosŏn chunggi chŏngch'i wa chŏngch'aek* 朝鮮中期政治와政策 [Politics and policy in the middle Chŏson period]. Sŏul: Ak'anet, 2003.

Hanminjok Chŏnjaeng Tongsa 韓民族戰爭通史 [Comprehensive History of Korean Wars]. Sŏul T'ŭkpyŏlsi, Kukpang Kunsa Yŏn'guso, 1994.

Han Ugŭn, Lee Kyung-Shik, and Grafton K. Mintz. *The History of Korea*. Sŏul: Eul-Yoo Publishing Company, 1970.

He Qiutao 何秋燾., ed. Shuo-fang pei-sheng 朔方備乘. ("A Manual of Northern Places"). Taibei Shi: Laogu wenhua shiye gongsi, Minguo 台北市 : 老古文化事業公司, 民國 76, 1987.

Hŏ Daeyŏng. "Imjinwaeran chŏnhu chŏson-ŭi chŏnsŭl byŏnhwa-wa Kunsa hullyŏn-ŭi chŏnmunhwa 壬辰倭亂前後朝鮮의戰術變化와軍事訓練의專門化" [Changes in Chŏson Tactics and Specialization of Military Training Around Imjin War]. MA diss., Sŏul National University, 2012.

———., and Cha Inhan. *Minjok Jeonlansa: Imjinwaeransa* 民族戰亂史: 壬辰倭亂史. Sŏul: Kukpangbu Chŏnsa P'yŏnch'an Wiwŏnhoe 國防部戰史編纂委員會, 1987.

Hsu, Immanuel C. Y. "Russia's Special Position in China during the Early Ch'ing Period." *Slavic Review* 23, No. 4 (Dec., 1964): 688-700.

Hummel, Arthur W. *Eminent Chinese of the Ch'ing period (1644-1912)*. Taipei: Cheng Wen Pub. Co, 1970.

Hyojong sillok 孝宗實錄 (The veritable record of Hyojong's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). Sŏul: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Hyŏnjong sillok 顯宗實錄, Hyŏnjong kaesu sillok 顯宗改修實錄 (The revised veritable record of Hyonjong's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of

the Chosŏn dynasty). Sŏul: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Injo sillok 仁祖實錄 (The veritable record of Injo's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). Sŏul: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Kim Chongsu 金鍾洙. *Chosŏn hugi chungang kunje yŏn'gu: Hullyŏn Togam ŭi sŏllip kwa sahoe pyŏndong* 朝鮮後期中央軍制研究：訓鍊都監設立의社會變動[*A Study on the Central Military System in the Late Chŏson Dynasty*]. Sŏul: Haean, 2003.

Kim Donggyŏng 金東慶. "Chosŏn ch'ogi chinbŏp-ui paljŏn-gwa kunsa kinŭng [Development of the Chinbŏp (Military Formation) and Military Functions in the Early Chosŏn Dynasty]." PhD diss., Korean University of National Defense.

Kim Sun Joo. "Culture of Remembrance in Late Chosŏn Korea: Bringing an Unknown War Hero Back into History." *Journal of Social History* 44, No. 2 (Winter 2010): 563–85.

Kim Pyŏngnyun. "Han'guksa-e issŏsŏ-ŭi kibyŏng pyŏngjong – changgibyŏng-kwa gunggibyŏng-ŭl chungsim-ŭro" [Cavalry in Korean history: Focusing on Spear-cavalry and Cavalry-archers]. Yukkun Pangmulgwan Hagyejip 陸軍博物館學藝集 17 (2010): 1-71.

———. "Chosŏn sidae sugun chinhyŏng-kwa hamjae mugi unyong" [Naval Battle Formations and Weapon Use in Chosŏn]. Kunsa 軍史 74 (2010), 1-20.

———. "Chosŏn sidae hwayak mugi unyongsul" [Strategic Use of Gunpowder Weapons in Chosŏn Dynasty], Yukkun Pangmulgwan Hagyejip 陸軍博物館學藝集 13 (2006): 1-43.

Kim Uch'ŏl. *Chosŏn hugi chibang kunjesa* 朝鮮後期地方軍制史 [History of Late Chŏson Regional Armies]. Sŏul-si: Kyŏngin Munhwasa, 2001.

Kim Yŏnok 金蓮玉. Han'guk-ŭi kihu-wa munhwa: Han'guk kihu-ŭi munhwa yŏksajŏk yŏn'gu [Climate and Culture of Korea: Cultural-Historical Study on Korean Climate]. Sŏul T'ŭkpyŏlsi: Ihwa Yŏja Taehakkyo Ch'ulp'anbu, 1985.

Kuksa p'yŏnch'an wiwŏnhoe, ed. Chosŏn wangjo sillok [The Annals of the Chosŏn Dynasty] 48 vols.

Kwanghaegun ilgi [chŏngjoksan pon] 光海君日記 [鼎足山本] (The daily record of Prince Kwanghae [Chŏngjok Mountain version]). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). [Sŏul]: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Kye Sŭngbŏm . *Chosŏn sidae haeoe p'abyŏng kwa Han-Chung kwan'gye: Chosŏn chibaech'ŭng ŭi Chungguk insik* 朝鮮時代海外派兵과韓中關係:朝鮮支配層의中國認識. Sŏul: P'urŭn Yŏksa, 2009.

Lorge, Peter Allan. *The Asian Military Revolution: from Gunpowder to the Bomb*. Cambridge: Cambridge University Press, 2008.

Lowell, Percival. *Chosön, the land of the morning calm; a sketch of Korea.* Boston: Ticknor and company, 1885.

Liu Jiaju 劉家駒. "Qingchu zhengbing chaoxian shimo" 清初徵兵朝鮮始末. *Shi huo yue kan: Zhongguo li shi she hui ke xue za zhi* 食貨月刊: 中國歷史社會科學雜誌 1, No.2 (1971): 382.

Mancall, Mark. *Russia and China; Their Diplomatic Relations to 1728*. Cambridge: Harvard University Press, 1971.

Masashi, Gubota 久保田将至. *Ilbon-ui kunsa hyeokmyŏng* [Military Revolution in Japan]. Translated by Ho Chinnyŏng, Park Hongbae and Shim Hosŏp, Sŏul: Yangsŏgak, 2010.

McNeill, William H. *Keeping Together in Time: Dance and Drill in Human History.* Cambridge, USA: Harvard University Press, 1997.

Morillo, Stephen. "Guns and Government: A Comparative Study of Europe and Japan," *Journal of World History* 6, No. 1 (Spring, 1995): 75-106.

Na Yŏngil. *Chosŏn chunggi muyesŏ yŏn'gu: "Muye chebo", "Muye chebo pŏnyŏk sokchip" yŏkchu*. Sŏul: Sŏul Taehakkyo Ch'ulp'anbu, 2006.

Nam Kuman 南九萬. *Akch'ŏnjip* 藥泉集. Kyujanggak Tosŏgwan 奎章閣圖書館, Sŏul, South Korea, M/F85-16-165-172.

No Yŏnggu. "Kihoek nonmun: chŏnjaeng-ui sidaejeok yangsang; 'kunsa hyŏngmyŏngron (Military Revolution)'-gua 17~18 saegi chosŏn-ui kunsajeok byŏnhwa" [Featured Articles: The Historical Aspects of Warfare; "Military Revolution" and Chŏson Dynasty's Military Reforms in the 17th and 18th Centuries]. Sŏyangsa yŏngu 西洋史研究 5, No. 5 (2007): 39-43.

———. "Chosŏn hugi pyŏngsŏ-wa chŏnpŏp-ŭi yŏn'gu" 朝鮮後期兵書戰法研究 [Military Tactical Manuals and Military Strategies Written and Devised in the Late Chosŏn Dynasty]. PhD diss., Sŏul National University, 2002.

———., "Chŏson hugi sŏngjae byŏnhwa-wa hwasŏng-ui sŏnggwaksa-jeok uimi" [Change in late Chŏson fortress design and its significance], Chindan hakbo 88, No.0 (December 1999): 291-320.

———. “Injocho ~ byungja horan sigi chŏnsul chŏn’gae” 仁祖～丙子胡亂時期戰術轉開 [Chŏson’s Military Tactics from the Early Years of King Injo through the Second Manchu Invasion of 1636].” Han’guk sahakbo 韓國史學報 41 (2010): 175-207.

———. “16~17segi chochong-ui doip-gua Chŏson-ui gunsa-jŏk byŏnhwa” [The Introduction of Musket and Joseon’s Military Change from 16th to 17th Century]. *Hanguk Munha* 韓國文化 58 (November 2012):111-137.

Paek Chongo, Kim Pyŏnghŭi, and Sin Yŏngmun. *Han'guk sŏnggwak yŏn'gu nonjŏ ch'ongnam* 韓國城郭研究論著. *Han'guk sŏnggwak yŏn'gu nonjŏ ch'ongnam*. Sŏul: Sŏgyŏng Munhwasa, 2004.

Palais, James B. *Confucian Statecraft and Korean Institutions: Yu Hyongwon and the late Chŏson Dynasty*. University of Washington Press: Seattle, 1996.

Park T'aebo 朴泰輔, and Yi Hyŏn-jo 李玄祚. *Chŏngjae chip* 定齋集. Sŏul-si: chŏjakkwŏn cha Minjok Munhwa Ch'ujinhoe, 1995.

Park Taegeun 朴泰根, trans., *Kugyok Pukchong ilgi* 國譯北征日記. Kyŏnggi-do, Sŏngnam-si: Han’guk Chŏngsin Munhwa Yŏn’guwŏn, 1980.

———. “Han-reo in ui cheot mannam gua Chosŏngun ui heokryonggang chulbyeong,” 韓露人朝鮮軍黑龍江出兵. *Chayu* 自由 17-7, No. 137 (1984): 27.

———. “Heokryonggangsang ui daecheop 'naseon jungbul'”黑龍江上의大捷羅禪征伐. *Chayu* 自由 4, No. 102 (1981): 62.

Parker, Geoffrey. *The Military Revolution: Military Innovation and the Rise of the West* (Cambridge: Cambridge University Press, 1996)

———."*Artillery Fortress as an Engine* of European Overseas Expansion, 1480-1750," in James Tracy, Ed., *City Walls: The Urban Enceinte in Global Perspective* (Cambridge: Cambridge University Press, 2000), 387.

Paul, Michael C. "The Military Revolution in Russia, 1550-1682." *The Journal of World History* 68, No. 1 (Jan. 2008): 9-45.

Peers, Chris and Hook, Christa. *Late imperial Chinese armies 1520-1840*. London: Osprey, 1997.

Perdue, Peter C. *China marches west: the Qing conquest of Central Eurasia*. Cambridge, Mass: Belknap Press of Harvard University Press, 2005.

Ping ding luo-cha fang lue: 4 juan 平定羅刹方略 [4 卷] (Taibei: I wen, 1967), 3.

Pyŏnghakchinam 兵學指南 [*Orientation to the Military Arts*], KDCP692. The National Library of Korea, Sŏul, South Korea.

Pyŏnghakchinam juhe 兵學指南註解. The National Library of Korea, Sŏul, South Korea.

Qi Jiguang 戚繼光. Qi Jiguang Bing Fa: Shi si juan ben 'Ji xiao xin shu' zhu zhi 戚继光兵法：一一十四卷本《纪效新书》注释. Edited by Fan Zhongyi 范中义, Xu Daji 余大吉, Yuan Zhenlan 哀镇澜, and Liu Qing 刘庆. Beijing: Shi shi chu ban she 时事出版社, 1998.

———. Ji xiao xin shu: 18 juan ben 紀效新書 : 18 卷本. Edited by Cao Wenming 曹文明 and Lü Yinghui 吕穎慧. Beijing : Zhong hua shu ju 中華書局, 2001.

———. *Lian bing shi ji* is Qi Jiguang 戚繼光, Lian bing shi ji 練兵實紀, edited by Qiu Xintian 邱心田 (Beijing: Zhong hua shu ju 中華書局, 2001).

Qingshilu 清實錄 [Veritable records of the Qing dynasty]. Scripta Sinica 漢籍全文資料庫 Taiwan: Academia Sinica, 1984. http://hanchi.ihp.sinica.edu.tw.

Ravenstein, Ernst G. *The Russians on the Amur; Its Discovery, Conquest, and Colonisation, with a Description of the Country, its Inhabitants, Productions, and Commercial Capabilities*. London: Trübner and Co, 1861.

Rogers, Clifford J., ed. *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe*. Boulder, Colorado: Westview Press, 1995.

Sejong sillok 世宗實錄 (The veritable record of Sejong's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). Sŏul: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Sin Yu 申瀏. *Kugyok Pukchong ilgi* 國譯北征日記. Translated by Park Taegeun 朴泰根. Kyŏnggi-do, Sŏngnam-si: Han'guk Chŏngsin Munhwa Yŏn'guwŏn, 1980.

Sŏ Inhan. *Sin'gi pigyŏl* 神器秘訣 [Secret of the Divine Weapon]. Sŏul-si: Kukpangbu Kunsa P'yŏnch'an Yŏn'guso 國防部軍史編研究所, 2011.

Song Chŏngsuk. "17segi Hullyŏn Togam-ui inswoe ch'ulp'an hwaltong [Printing and Publishing of Hullyŏn Togam in the 17th Century]." *Sojihak Yonggu* 書誌學研究 42, (June 2009): 267-298.

Song Siyŏl 宋時烈. Songjadaejŏn 宋子大全. Sŏul-si: Minjok Munhwa Ch'ujinhoe 民族文化推進會, 2003.

———. *Songseo sŭpyu* 宋書拾遺. Taejŏn: Namganjŏngsa 大田: 南澗精舍, 1927. Kyujanggak Tosŏgwan 奎章閣圖書館, Sŏul, South Korea, M/F85-16-79-B.

Song Yangsŏp 宋亮燮. *Chosŏn hugi tunjŏn yŏn'gu* 朝鮮後期屯田研究. Sŏul T'ŭkpyŏlsi: Kyŏngin Munhwasa. 2006.

Song Yingchang 宋應唱. *Jing lüe fu guo yao bian* 經略復國要編*: [14 juan, fu 2 juan]*. Taipei: Hua wen shu ju 華文書局, 1968.

Sŏnjo sillok 宣祖實錄 (The veritable record of Sŏnjo's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). [Sŏul]: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Stevens, Carol B. *Russia's Wars of Emergence, 1460-1730*. Harlow, England: Pearson Longman, 2007.

Sun Laichen. "Ming-Southeast Asian Overland Interactions, 1368-1644," PhD diss., University of Michigan Department of History, 2000.

———. "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.

Swope, Kenneth. *A Dragon's Head and a Serpent's Tail: Ming China and the First Great East Asian War, 1592-1598.* Norman: University of Oklahoma Press, 2009.

———. "Crouching Tigers, Secret Weapons: Military Technology Employed during the Sino-Japanese-Korean War, 1592-1598." *The Journal of Military History* 69, No. 1 (2005): 13-14.

Thierbach, *Handfeuerwaffen*, 1:115. Cf. Kalaus, "Schie ßversuche."

Wassermann, Felix M. "Latin as a World Langauge: The Treaty of Nerchinsk." *The Classical Weekly* 46, No. 6 (1953): 83-84.

Weale, Putnam B. L. *Manchu and Muscovite*. London: Macmillan, 1907.

Yerxa, Donald A., ed. *Recent Themes in Military History: Historians in Conversation*. Columbia, S.C.: University of South Carolina Press, 2008.

Yi Gyŏngchan 李京燦. "Chosŏn hyojongchoui pukpŏl undong." *Ch'onggye sahak* 清溪史學, No. 5 (1988): 177-259.

Yi Kangchil 李康七. "Chosŏn hyojongcho naseonjungbulgua pi'a jochong'e daehan sogo" 朝鮮孝宗朝羅禪征伐과被我鳥銃에對한小考. *Komunhwa* 古文化 20, No. 20 (1982): 15-28.

Yi Sangjŏng 李象鼎. Pyŏnghak chinam yŏnŭi: Chosŏn hugi kunsa kyobŏm 兵學指南演義 : 朝鮮後期軍事教範. Sŏul T'ŭkpyŏlsi: Kukpang Kunsa Yŏn'guso, 1995.

Yi Sukhŭi. *Chosŏn hugi kunyŏng aktae: ch'wigosu, seaksu, naech'wi.* 朝鮮後期軍營樂隊: 吹鼓手, 細樂手, 內吹. Kyŏnggi-do, P'aju-si: T'aehaks, 2007.

Yi Wangmu. "Kwanghaegun-dae hwagitogam-e daehan yŏngu" 光海君代火器都監대한研究. *Minjok Munha* 21 (December, 1998): 226-244.

Yi Minhwan 李民寏. Chaamjip 紫巖集, *j.* 6「建州聞見錄」. In *Han'guk munjip ch'onggan,* vol. 82. Sŏul : Minjok Munhwa Ch'ujinhoe 民族 文化 推進會, 1992 (originally written in 1706).

Yi Yŏ. *Yŏndo kihaeng* 燕途紀行. Trans. by Yi Minsu. Sŏul: Minjok Munhwa Ch'ujinhoe.

Yŏngjo sillok 英祖實錄 (The veritable record of Yŏngjo's reign). In *Chosŏn wangjo sillok* 朝鮮王朝實錄 (The veritable records of the Chosŏn dynasty). [Sŏul]: Kuksa p'yŏnch'an wiwŏnhoe, Tan'gi 4288–4291 [1955–1958].

Yu Sŏngnyong 柳成龍. *Sŏae Sŏnsaeng munjip* 西厓先生文集. In *Han'guk munjip ch'onggan,* vol. 52. Sŏul: Minjok Munhwa Ch'ujinhoe 民族文化推進, 1894 (originally published in 1633).

Yu Hyŏngwŏn. *Pan'gye surok* 磻溪隨錄. Edited by Kojŏn kanhaenghoe古典刊行會. Sŏul: Tongguk munhwasa, 1958.

Yun Haengim 尹行恁. *Seokjaego* 碩齋稿, *j.* 9 *Haedong waesa* 海東外史. In *Han'guk munjip ch'onggan,* vol. 287~288. Sŏul: Minjok Munhwa Ch'ujinhoe 民族文化推進, 2002.