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Strong Horses and Strong Expertise: Missing Elements in China's Mid-Ming Border Enterprise

> I have learned that the fate of a state lies in its personnel. To choose the right persons leads to a state's rise, but to select the wrong ones leads to its fall. Everything in the world is like this; [even] the Horse Administration 馬政 is no exception.
>
> Yang Yiqing (1454–1530)

ABSTRACT:
Horses were a critical asset in premodern warfare; they significantly shaped the military capacity of states. Rulers and officials of Ming China were dedicated to breeding strong horses. After the watershed Tumu Crisis in 1449, a Ming official named Yang Yiqing (1454–1530) in order to strengthen the Ming's border defenses was tasked with revitalizing the depleted horse ranches along the border. Yang's writings reveal that the very borders intended to keep the Mongols at bay inadvertently impeded the Ming state's acquisition of equine knowledge. With limited horses and limited expertise at its disposal, the Ming court found itself in a predicament of its own making – a result of its border defense structure. Ultimately, the Ming resorted to a complex tea–horse trade scheme, which permitted horses to cross its borders. This study is an interdisciplinary exploration of the role of animals in matters of statecraft and warfare; it offers a fresh perspective on broader borderlands issues and transcends the constraints of environmental determinism and anthropocentrism in late-imperial China and Inner Asia.

KEYWORDS:
war logistics, statecraft, animal history, environmental history, Ming institutional history

In the early fall of 1502, an official named Yang Yiqing 楊一清 (1454–1530) inspected horse ranches along the Ming state's (1368–1644) northwestern border region of Shaanxi. He was dismayed by the state of these stables, which he believed were "as bad as they could get."[1] This report was one of dozens Yang submitted to the Ming court concerning its reserves of military horses. What went so wrong in the century after establishing the stables that caused such deterioration? After all,

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[1] Yang Yiqing 楊一清, annot. Tang Jingshen 唐景紳, Xie Yujie 謝玉傑, *Yang Yiqing ji* 楊一清集 (Beijing: Zhonghua shuju, 2001; hereafter, cited as *Yang*), p. 2.

Yang wondered, the locations remained the same, and the Yongle 永樂 emperor (r. 1402–1424) had raised an impressive equine force in the border areas of more than three-quarters of a million.[2]

Yang Yiqing noted three conditions that could make or break a functional horse-rearing enterprise: ideal habitat, uncorrupted officials, and proper equine knowledge.[3] He offered a diagnosis that pointed to a more effective choice of personnel, as seen in the epigraph given above.[4] Thus, he attributed the problem to human error – something best fixed by bureaucratic reform measures.

On several levels, Yang was right: matching one's ability to the call of a specific duty is a unique asset for effective governance. Finding the right person is half the job when managing human resources. But human society does not operate in a vacuum; other living beings and the natural world that share the world with humans complicate the seemingly straightforward algorithm: select the "right persons" and this brings about a "rise of the state." But human errors are unavoidable, and not all of them can be fixed through bureaucratic reforms. To raise enough strong horses to defend the Ming state at the turn of the sixteenth century presented a challenge to talented and capable officials like Yang Yiqing, who were already fairly confident about the state's ability to manage all kinds of products, resources, and natural forces. Could bureaucratic reforms in fact do enough to restore the lost headcounts in the Ming's border ranches? Was it all about getting enough expert managers, as Yang suggested, or was it something else? Could a state with limited pastureland ever compete with equestrian nomads, given that horses were a crucial military asset in premodern warfare? These questions are central in recent studies of the Ming, and have often been explored from different angles: horse administration, border trade markets, and the Ming's relationship with the Mongols and Tibetans, who herded, maintained, and sold their horses at these border markets.[5]

2 Noa Grass, "A Million Horses: Raising Government Horses in Early Ming China," in Rotem Kowner et al., eds., *Animals and Human Society in Asia: Historical, Cultural and Ethical Perspectives*, Palgrave Macmillan Animal Ethics Series (Cham, Switzerland: Springer International Publishing, 2019), pp. 299–328.

3 *Yang*, p. 4.

4 Ibid.

5 Exemplary studies on the horse administration include Tani Mitsutaka 谷光隆, *Mindai basei no kenkyū* 明代馬政の研究 (Kyoto: Tōyōshi kenkyūkai, 1972); Liu Liping 劉利平, *Cong mazheng dao caizheng: Mingdai zhonghouqi Taipusi de caizheng gongneng he yingxiang* 從馬政到財政, 明代中後期太僕寺的財政功能和影響 (Beijing: Zhonghua shuju, 2021), pp. 34–36; Henry Serruys, *Trade Relations: The Horse Fairs (1400–1600)*, vol. 17 of *Mélanges Chinois et Bouddhiques* (Bruxelles: Institut belge des hautes études chinoises, 1975); Morris Rossabi, "The

In the studies just mentioned, horses seem ubiquitous, yet static, numerical, and textual; all in all, they were merely subjects for the Ming state to manage and for modern scholars to inquire into to address questions about Ming statecraft. The horse's biological traits and ecological demands become sidelined in all but a few studies.[6] Nevertheless, the biological body of the horse serves as the physical and material basis for humanly engineered technologies utilized in transport, war, and communication. It became quite important to keep the equine body alive and strong. In the long 5,000 years since humans domesticated horse breeds, animal handlers developed a keen understanding of equine biology, only some of which was transmitted through texts.[7] The ability to manipulate the horse's physical attributes was knowledge embodied and mostly transmitted through process and improvisation, which Yang's bureaucratic shakeups and managerial logistics could not solve for the ranches.

The Ming state maintained horses in a complex bureaucratic system with several innovations and historical precedents. The Shaanxi ranches were one such composite practice. The Ming's founder Zhu Yuanzhang 朱元璋 (the Hongwu 洪武 emperor; r. 1368–1398) and his fifteenth-century successors found that the demand for horses and the employment of increasingly aggressive defense strategies grew constantly. For over fifty years after 1373, the Ming increased the num-

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Tea and Horse Trade with Inner Asia During the Ming," *Journal of Asian History* 4.2 (1970), pp. 136–68; Marnyi Gyatso, "Horse Power: An Economic Explanation of the Geluk Monastic Growth on the Tibetan, Chinese, Mongolian, and Manchu Frontier, 1570–1770" (paper presented at Association for Asian Studies Annual Conference, Boston, March 28, 2023).

6 E.g., Aaron Molnar, "An Equine Metric for Climate Change? Using Horse Records to Understand the Medieval Climate Anomaly-Little Ice Age Transition in Inner Asian Borderlands" (2024–25 Inner Asian and Altaic Studies Lecture Series, Harvard University, February 5, 2025).

7 Writings on equine health featured in Chinese agricultural treatises under sections on animal husbandry. Even though the horses often appeared along with other draft animals (mules, donkeys, cattle), they stood out because of close association with elite tastes and usages beyond farm labor-input. See Francesca Bray, "Where Did the Animals Go? Presence and Absence of Livestock in Chinese Agricultural Treaties," in Roel Sterckx, Martina Siebert, and Dagmar Schäfer, eds., *Animals through Chinese History: Earliest Times to 1911* (Cambridge: Cambridge U.P., 2019), p. 130; Ruth I. Meserve, "Chinese Hippology and Hippiatry: Government Bureaucracy and Inner Asian Influence," *ZDMG* 148.2 (1998), pp. 277–314. Regarding veterinary texts specifically, see Ruth I. Meserve, "Early Turkic Contributions on Veterinary Medicine," *International Journal of Central Asian Studies* 1 (1996), pp. 127–39; idem, "The Expanded Role of Mongolian Domestic Livestock Classification," *AOASH* 53.1–2 (2000), pp. 23–45. For Dunhuang texts on equine health, see Petra Maurer, "Humanizing Horses: Transitions in Perception and Perspective," *Religions* 10.6 (June 2019), pp. 1–8. Medical treatises produced in Dunhuang also include equine medical treatments; see Ronit Yoeli-Tlalim, *Re-Orienting Histories of Medicine: Encounters along the Silk Road* (1st edn.; London, New York, Oxford, New Delhi, Sydney: Bloomsbury Academic, 2021).

ber of state-run horse pastures and expanded them toward the border regions. The ranches Yang inspected in Shaanxi were mainly established in 1406 under the Yongle emperor's rule. But they were not the first institution that the Ming established to procure horses. The Yongle emperor's father, the Hongwu emperor, had set up a "Court of Imperial Stables 太僕寺" in the capital to manage the horses reserved for state use. Branches under this managerial office were established along the Ming's northern border, as well as the Tea–Horse Trade Office 茶馬司 to manage border markets. Subsequently, there came the Directorate of Imperial Horses 御馬監 that handled horses reserved for the imperial household. Each administrative unit served in its own way to meet the Ming state's demands for horses in various contexts.[8]

Among the composite state-administered horse-rearing institutions, the pastures in the northwestern Shaanxi region were primarily used for breeding war horses. By design in the early Ming, the *Shaanxi yuanma si* 陝西苑馬寺 managed 6 stables and 24 ranches, which were categorized by size: an Upper Ranch 上苑 was designated to manage 10,000 horses, a Middle Ranch 中苑 7,000, and a Lower Ranch 下苑 4,000.[9] By the time Yang Yiqing inspected the ranches and attempted to revive the horse-rearing enterprise, the actual number of ranches was fewer than prescribed: only two stables and five ranches – a fraction of the previous size. Yang Yiqing therefore lobbied to add two more ranches. He considered that the decrease in ranches had been consequential because ranches were where "all the horses used in border defense were reared and cared for."[10]

Even though the Ming state continued to acquire horses through trade or tribute offerings from its neighbors, the anxiety felt because of the state's inability to raise horses domestically loomed large.[11] After all, these neighbors were not always allies, and their internal conflicts sometimes spilled over, threatening the Ming's border security. By the

[8] Liu Liping, "Ming Hongwu zhi Chenghua chao liangjing Taipu si guanma shuliang lice" 明洪武至成化朝兩京太僕寺官馬數量蠡測, *Zhongguo jingjishi yanjiu* 中國經濟史研究 41.2 (2022), pp. 111–12. After the Tumu Incident in 1449, the Ming state also created a new system whereby the civilian households in northern provinces were required to raise government-owned horses for wartime needs. These "horses on fosterage 寄養馬" were intended to deliver horses to frontline areas more efficiently.

[9] In 1406, the Yongle emperor founded four Pasturage Offices 苑馬寺 along the northern border, and in 1408 he added Gansu and Pingliang (present-day eastern Gansu, bordering Shaanxi and Ningxia), with each overseeing six Directorates 監 and 24 pastures 苑.

[10] *Yang,* p. 2. Yang did not specify which stables and ranches he inspected, and it seemed that he toured the existing total of two stables and five ranches, with responsible officials being posted within the Shaanxi Yuanma si.

[11] The practice of tribute was complex and ranged from gifts from the Mongols and outright demands from the Chŏson Korea.

turn of the sixteenth century, the Ming state was more invested in border defensive infrastructure than in the capacity for military expeditions.[12] But walls or no walls, a sizable equine force was indispensable. Fixing the ranches was thus crucial to the Ming's elaborate and costly border defense structure. When Liu Daxia 劉大夏 (1436–1516) assumed the highest office in the Ministry of War 兵部 in 1501, he tasked Yang Yiqing with overhauling the ranches so that Liu could establish a border defense enterprise to safeguard the vulnerable northern borders. Yang was an ideal candidate. He was an astute career official with strong and suitable credentials concerning border issues, which encompassed many of state-run horse ranches on the border since 1406. These ranches were important to early-Ming rulers, who launched military campaigns against the remnants of the Mongol empire after the collapse of the Yuan dynasty (1279–1368). Yang spent most of his career on posts along the Ming's northern and northwestern border regions in present-day Shanxi and Shaanxi provinces.

Throughout history since the Han dynasty, the Chinese state often confronted the looming power of organized and sophisticated steppe peoples to the north and west. Imperial rulers recognized the paramount importance of horses to the extent that the equine headcounts became a measure of military strength. Fewer or weaker horses would render an army vulnerable to these equestrian steppe nomads. As early as the third century BC, horse-mounted fighters proved decisive for warfare in China. Throughout China's imperial history, each dynasty meticulously recorded the counts of horses reserved exclusively for warfare. This figure, taken as a broad average, seems to have hovered around 500,000 horses for most of China's imperial history.[13] The Ming dynasty was no exception. It emphatically needed horses because the Mongols had retreated northward after the downfall of the Yuan in 1368 but continued to frequent the borders.

At a time during the Ming when horses were indispensable to military operations, those who possessed the requisite skills had the upper hand. Yang Yiqing and his peers knew this and made it their mission

12 The most well-known Ming border defense system is the Nine Border-Defense Areas 九邊, an elaboration of the military-administrative system named for the nine garrisons defending the Ming's northern borders. Descriptions of the border crossings and defensive points are identified in maps, such as the Da Ming jiubian wanguo renji lucheng quantu 大明九邊萬國人跡路程全圖, made by Wang Jufu 王君甫 (active 15th c.). Digital map provided by Ancient East Asian Maps, The Hong Kong University of Science and Technology <https://lbezone.hkust.edu.hk/bib/9910131465154034l2> accessed January 18, 2026.

13 The figure is based on Paul Jakov Smith, *Taxing Heaven's Storehouse: Horses, Bureaucrats, and the Destruction of the Sichuan Tea Industry, 1074–1224* (1st edn.; Cambridge, Mass: Harvard University Asia Center, 1991), p. 16. I thank Jonathan Skaff for directing me to this source.

to procure the necessary but elusive equine fighting forces. This daunting task shed light on how the Ming state's approach to managing the horse population on its ranches would ultimately fail because it lacked sufficient equine knowledge on the ground. Finding horses was indeed subject to human errors, but mere bureaucratic reforms missed the point: the anthropocentric process could not handle the management of the natural world. It shows a disdain for embodied expertise in veterinary care. These were errors that officials like Yang did not perceive, so they missed the goal in their effort to find the right person.

Yang Yiqing and the Ming state knew well that without war-ready, in effect, strong horses, the Ming could not withstand Mongol raids. To strengthen the Ming's defense infrastructure, Yang proposed a series of reforms to rectify the problems at the ranches, which were integral to his efforts to extend and connect border walls. The walls were central to the holistic border defense scheme that the state outlined in the mid- to late-Ming period, but walls alone fell short without enough strong horses in reserve. After all, the walls were fixed, immobile, and they could neither move nor chase the Mongols away from the border regions, whereas cavalry could. Therefore, functional cavalry and infantry troops, along with the day-to-day management of the multilayered defense apparatus, communication, and transportation, commanded the Ming's resources year-round, and horses were a significant part of a functional defense arrangement.

Understanding the importance of horses did not necessarily translate into effective policies to procure strong horses. Most areas of China south of the Great Wall are not ideal habitats for many horse breeds, and selenium deficiency in the soil does not support raising strong horses.[14] But animal bio-geography is only one side of the coin; humans domesticated horses and bred them to adapt to different climates or complete a range of tasks. Through the domestication of horses, humans traveled farther, less constrained by environmental conditions. The downside of relying on horses for long-distance movement is that human legs became weaker, so in a way, horses domesticated humans, too.

Then, the issue of using animals in war became even more intricate. Their bio-geographical traits determine where they live, the conditions

[14] The connection between selenium deficiency and equine nutrition was established in the 20th c. It is probably a contributing factor to China's struggle to raise strong horses. War horses were not always ready for the tasks, and they possessed a variety of physical attributes. Many died while en route to or on the battlefield. See Johan Elverskog, *Buddhism and Islam on the Silk Road* (Philadelphia: U. Penn. P., 2010), p. 196; Susan Whitfield, "Selenium and Horses in China: A Missing Link," *Silk Road Digressions* (blog), April 16, 2021. <https://silkroaddigressions.com/2021/04/16/selenium-and-horses-in-china-a-missing-link/>

they thrive in, and what drives them to extinction. The ideal habitats for horses might be far from the places where human communities have set out boundaries, and trespassed, regulated, patrolled, and redrawn them over time. Balancing the need of horses for survival with humans' desire to protect these "borders" is therefore a political challenge. The dynamic relationship between animals and humans adds complexity to the usual divide between humans and the environment, as both animals and plants do not exist in isolation. Humans often remove animals from their native places or transport them to new locations. Among other things, human history is a story of working with animals.[15] The Ming state, its northern neighbors, and the horses caught in between all constituted an intricate matrix that illustrates the complexity of the multifaceted connections between human society and the natural world. Yang Yiqing and his contemporaries had no choice but to collaborate with horses to safeguard the Ming state.

PRE-TUMU OFFENSIVE/MOBILE WAR

The issue of securing the Ming borders sparked intense debate during the approximately three centuries of the Ming. The Yuan–Mongol rulers and some of their followers retreated north in 1368, and tried to maintain a Yuan government on the steppe. Various groups fought for political supremacy or economic resources, often both, because political realignments often led to the reallocation of pasturelands and relocation of human bodies. They were by no means a united polity with the singular objective of recapturing Ming territory. They sometimes coordinated their attacks on the borders; but at other times, their skirmishes created opportunities for the Ming troops to push them farther north. Still, at other times, their large-scale movements and eventual settlements led to significant geopolitical shakeups for centuries to come.[16] The relationship between the Ming state and Mongol groups varied according to events and policies. The Ming court followed two military strategies for their border defense: offensive long-range military expeditions and defensive border fortifications. The early-Ming rulers, like the Hongwu and Yongle emperors, favored the former. This approach ended with the Zhengtong 正統 emperor (Zhu Qizhen 朱祁鎮; r. 1435–1449), who

[15] Alfred W. Crosby, *The Columbian Exchange* (Westport: Greenwood Publishing Group, 2003); Virginia DeJohn Anderson, *Creatures of Empire: How Domestic Animals Transformed Early America* (Oxford, New York: Oxford U.P., 2004). Alan Mikhail, *The Animal in Ottoman Egypt* (Oxford, New York: Oxford U.P., 2016)

[16] Li Wenjun 李文君, *Mingdai Xihai Menggushi yanjiu* 明代西海蒙古史研究 (Beijing: Zhongyang minzu daxue chubanshe, 2008), pp. 20–71.

was abducted by the Oirat ruler Esen (1407–1454) in Tumu in 1449, in an event known as the Tumu Crisis.[17] This incident profoundly altered the Ming state's approach to defensive border protection.

The town of Tumu was over fifty miles northwest of Beijing and approximately halfway between Beijing and Zhangjiakou 張家口, one of the main entry points along the border between the nomadic groups and Ming territory. The shock caused by a sitting emperor's capture had both immediate and long-term political consequences.[18] The Ming central court promptly replaced the captured emperor with his regent and younger half-brother in order to resolve what Timothy Brook calls a "constitutional crisis."[19] The Jingtai 景泰 emperor would reign for eight years before the captured and deposed emperor returned to the throne for nine more years but under a new reign name, Tianshun 天順 (r. 1457–1464). This crisis of imperial authority, along with continuing confrontations on the border, caused distress among Ming subjects living along the northern borders. Moreover, false information about border safety and defense continued to stir panic for many more decades.[20]

Geographically, the remaining Mongol armies loomed large, and their southward intrusion into Ming territories seemed to many observers to have the potential to overwhelm the Ming's border walls. Extending and connecting these walls during the second half of the fifteenth century was crucial to agricultural and nomadic modes of economic production. The wall prevented nomads from pouring in and conquering China, thus the Ming strategically opened horse markets in garrison towns to purchase horses, which I consider indispensable "weapons." However, to import horses from military opponents was risky, as Yang Yiqing and many other Ming officials recognized. Yang's unsuccessful attempts to salvage the border horse-ranches show how those horses could indeed fare across the border, but veterinary practices and animal husbandry remained beyond the Ming's institutional grasp. Officials like Yang and their imperial rulers were not as fortunate as their predecessors in the early Ming, when Mongols at court or on ranches

[17] Johan Elverskog, "Sagang Sechen on the Tumu Incident," in Morris Rossabi, ed., *How Mongolia Matters: War, Law, and Society* (Leiden: Brill, 2017), pp. 6–17; John W. Dardess, *More than the Great Wall: The Northern Frontier and Ming National Security, 1368–1644* (Lanham, Md.: Rowman & Littlefield, 2022).

[18] David M. Robinson, *Ming China and Its Allies: Imperial Rule in Eurasia* (Cambridge: Cambridge U.P., 2020), esp. pp. 131–35 of chap. 4, "The Struggle for the Chinggisid Legacy."

[19] Timothy Brook, *The Confusions of Pleasure: Commerce and Culture in Ming China* (Berkeley, Los Angeles, London: U. California P., 1999), p. 87.

[20] Ibid., p. 172.

were raising strong horses.[21] The dependable equine forces were one factor on which the Hongwu and Yongle emperors based their offensive strategies, recognizing their previous usefulness to the Yuan rulers.[22]

Yang Yiqing was born five years after the removal of the Zhengtong emperor, an event that impacted the careers of many young officials. It is widely recognized that Yang's dedication to the state and the court was invaluable. During his youth, he absorbed the Confucian canonical texts, and in adulthood he worked to bring about an ideal of a society based on Confucian principles. For Yang and his contemporaries, statecraft was textual, literal, and historical; in many cases, it was also formed by networks of family and region. Yang was born in Guangzhou when his father was the vice-magistrate in Huazhou subprefecture 化州.[23] He aspired to follow in his father's footsteps, a path to officialdom that many prominent men in China had pursued for centuries. Yang passed the provincial-level civil service exam at age fourteen and received the degree of Provincial Scholar 舉人 in 1469. Four years later, he passed the metropolitan exam and obtained the degree of Presented Scholar 進士 in 1473. A few years later, Yang began to rise in the Ming's bureaucratic ladder and was appointed to various posts, mostly in Shanxi and Shaanxi, along the northern border.

By 1487, he was about to begin an eight-year tenure as the vice-censor of the Shaanxi Education Intendancy 陝西提學副使, even though the assignment was customarily for a three-year term.[24] While in office, he founded the Zhengxue Academy 正學書院, where he cultivated a network of scholars with whom he maintained epistolary relationships.

One such figure was Li Mengyang 李夢陽 (1475–1531), who likely spent part of his later life in his native Henan. In 1493, Li was the top graduate in Shaanxi's provincial civil service exam. He then passed the metropolitan exam the following year, which earned him an appointment to the Ming administration. He was outspoken, and thus his candid writings and comments on corruption led to demotion and imprisonment. However, none of this deterred him from making further critiques once he had been reappointed or released from jail. After several ups and downs, he retired to private life and died in January

[21] Grass, "A Million Horses"; David M. Robinson, *In the Shadow of the Mongol Empire: Ming China and Eurasia* (Cambridge: Cambridge U.P., 2019).

[22] Robinson, *In the Shadow of the Mongol Empire.*

[23] Rank 6b in the Ming bureaucracy. Charles O. Hucker, *A Dictionary of Official Titles in Imperial China* (Stanford: Stanford U.P., 1985), p. 553, item 7471.

[24] Ibid., p. 496, item 6452.

1530.[25] Scholars of this type in Yang Yiqing's milieu often expressed concerns about the Ming's border issues. Like the academy's founder, they likewise voiced their frustration with factional politics and the state's inability to repel the invading Mongols. They clearly attributed the latter to the former.

Yang Yiqing has long been lauded for his talents: his reforms are featured in almost all surviving documents on Ming horse administration. The consensus about him also holds that the long-running, divisive politics impeded his reforms. Had it not been for the factional struggles and rampant corruption of the eunuchs, he would have revived the Ming's horse administration. But more relevant is the fact that his life and career were formed in the time of the Ming court's post-Tumu tendency towards a defensive posture in its relationship with the Mongols. No Ming rulers after the Zhengtong emperor ever led military expeditions. The early-Ming's military operations meant to push the Mongols farther north came to an end. This also meant much less need for horse-rearing. Yet, the borders were still there, and still susceptible to attacks. The Ming had to act.

POST-TUMU DEFENSIVE/STATIC WAR

The period during which Yang Yiqing promoted policies devoted to safeguarding the state was often perceived as a time of weak military capacity, and Yang probably would not have disagreed. Even though he looked back to the Yongle reign for inspiration, he understood it was not possible to match the Yongle emperor's million-horse reserve. At the turn of the sixteenth century, he argued, the Ming now needed something more limited for defensive measures, not the earlier type of extensive and frequent campaigns to drive the Mongols northward. But horses were still needed, walls or no walls. Yang believed that the ranches occupied the same habitats as in the early Ming, and even as in the glorious Tang dynasty many centuries previously. However, with our modern data from climate studies, we know that habitats changed from Tang times to Song times, and then to the Ming, even though the locations remained the same. Ming-era horses under Yang's consideration had less vegetation on which to graze, and they were more likely to die from hypothermia due to the much colder nights during what is now known as the Little Ice Age.[26] The only way horses keep their

[25] Li Mengyang 李夢陽 mentioned Yang in one of his anthologies (*Kongtongzi ji* 空同子集, 2 vols., 1506), but I have not been able to examine further Li Mengyang's writings to establish their social interactions.

[26] Molnar, "Equine Metric for Climate Change," who argues that the Ming rulers shifted

body temperature is to munch on fodder if stabled, or graze if pastorally managed. Colder nights drastically increased the equine mortality rate when horses were stabled but not sufficiently fed. Either way, keeping the horses alive required deep equine and pastoral knowledge that was not transmitted through texts but through practice and hands-on experience that most of the animal handlers on the state ranches did not possess. Unfortunately, Yang Yiqing's managerial knowledge was far from useful in keeping the horses alive and maintaining the headcounts of the equine population at the state's disposal.

Yang Yiqing's concerns lay elsewhere. He reasoned that all he needed was to find the right people and equine knowledge to replenish the depleted ranches. Yang was right in many respects; ideal habitats and effective management could go a long way. The mismatch occurred with the notion of the "right persons." To Yang, the managerial officials – not animal handlers – were pivotal. To be sure, officials whose expertise matched their assignments would be ideal, but Yang's considerations often went as far as officials like himself with appointments to the border regions. Excellence in pragmatic statecraft might fall short of keeping horses alive, let alone raising strong war-ready horses. In other words, a "right person" in Yang's mind was a question of statecraft, not of the embodied knowledge gained through day-to-day management of horses. Of course, the more foundational issue was that those who knew how to care for horses were the Mongol enemy that the post-Tumu Ming state tried to keep out. Some were once allies to the early-Ming rulers and became part of the ruling elites later on, during the succeeding Qing dynasty (1644–1911). However, the static borders constructed post-Tumu drew a firm line that was meant to prevent animal handlers from crossing over. The only persons left for Yang to conscript were the unwilling and unskilled convicts-turned-soldiers 恩軍 (*enjun*) who were preoccupied with escaping their harsh environment and difficult living conditions. Winter habitats were hard on horses but were bearable for humans.

The mere total number of horses could distort an analysis of the military capacity of a state, as not all horses were militarily ready or available when and where needed; additionally, most of the horses kept on ranches were mares for breeding, not stallions for fighting. The availability and readiness of horses in critical moments became a key military consideration. The Ming state was not the first to pri-

the location of the pastureland and continued to acquire horses through trade and other diplomatic channels.

oritize making an increase in horse population for military purposes. In fact, it shared many similarities with the Northern Song dynasty (960–1127), which faced similar pressure from the equestrian steppe nomads. Wang Anshi 王安石 (1021–1086) implemented a series of reforms under Northern Song emperor Shenzong 神宗 (Zhao Xu 趙頊; r. 1069–1076). Among the many initiatives enshrined in Wang's "New Policies," the Song state tapped into the preexisting merchant network in Shaanxi and Sichuan that had profoundly shaped regional trade. This merchant trading scheme persisted despite the financial strain on the central government. The state came to rely on merchants to bring goods for trading with nomads for horses, and they received the coveted salt licenses in return. The exclusive right of the government to monopolize salt helped ease the financial burden, but the horse shortage remained unresolved. Strong and battle-ready horses were simply out of reach of both the state and merchants. Wang recognized the state's need to limit if not eliminate its dependence on horse trading. Thus he recruited reliable, meritorious officials to salvage the failing horse ranches along the Song borders.[27] To Wang Anshi, statesmanship was the solution to all problems, a unique attitude toward the natural world that now we call "anthropocentric." From the standpoint of humans, animals share the world with us and therefore ought to be managed by and for the benefit of humans. Centuries later, Yang Yiqing faced a similar dilemma and adopted a similar approach. Yang and Wang, centuries apart, similarly saw the issue of horse supply as political, and human managerial skills were expected to triumph over the biological and environmental limitations of the equine population.

In a way, it is hard to judge Yang Yiqing poorly for his misplaced confidence in his fellow officials: his life was thoroughly enmeshed in the bureaucracy. In 1502, Yang Yiqing took office in Shaanxi, where he had accrued extensive experience. Despite his practical approach and effective policies, Yang's efforts there were hindered by destructive factional politics, as is shown in both Ming accounts and modern historiography. As Yang's career demonstrates, factional conflicts destabilized Ming governance on multiple levels and in various regions, not solely within the central court. Yang's and his associates' concerns about this were vital, a viewpoint shared by many historians studying Ming horse administration.[28] To be sure, human politics exacerbated

[27] Smith, *Taxing Heaven's Storehouse*, pp. 21, 39.

[28] Discussions of Yang Yiqing are often seen in modern scholarship on the Ming Horse Administration. E.g., Morris Rossabi, "The Tea and Horse Trade with Inner Asia during the Ming," *Journal of Asian History* 4.2 (1970), pp. 155–59; Liu, *Cong mazheng dao caizheng*, pp.

the problem and consequently caused the vulnerable horse population to suffer increasingly from state mismanagement. Ultimately, Yang turned his focus toward the problem of managerial negligence so as to improve struggling ranches and increase horse breeding. Yang made it clear, as we see in the following memorial by him, that this required immediate attention and resources.

> I announced the imperial edict [of inspection] to the two stables and six pastures. I found that the pastures were designed with a total size of 13,377 *qing* 頃 60, *mu* 畝, but the actual size was 66,888 *qing,* 80 *mu*, and the rest were occupied. 1,220 prisoner-turned-soldiers (*enjun*) were assigned to raise all the horses. But [I] saw only 745 of them herding horses. Other herdsmen were drafted from standing-in 代役 or hereditary military households; 99 [in this category] were not apprehended. Other escaped herdsmen still at large numbered 376. There were 2,280 horses, including stallions, geldings, mares, and newborns. From 1493 to September-October 1500, Li Kegong 李克恭 (dates unknown), the chief minister of the Court of the Imperial Stable 寺卿, requested funds to purchase 7,800 horses, but none materialized. 3,283 horses died, were stolen, or wandered away, and 3,073 young horses were unaccounted between October 1500 and January 1504. The negligence of the Horse Administration was as bad as it could get.[29]

From this, we see that more than half of the horse pastures were being misused for farming, over a third of the herdsmen had abandoned their posts, and most of the horses were missing.[30]

Although these observations were thorough, still, in this memorial and elsewhere in his collected writings, he tended to focus on sheer numbers of horses and tried to match that number with the headcounts on record. Yang did make a few comments presumably on horse breeds, but these are questionable. His inspection took place sometime in midsummer, when horses were expected to be strong. But Yang did not mention this in his writings about the physical appearance and strength of these horses; he did however observe that pastures were lush, spacious, and close to water 土地廣衍, 水草便利. He implies that he expected the horses to be stronger than they appeared, considering the excellent environment.

33, 79, 190.

29 *Yang*, p. 2.

30 One *mu* in the mid-Ming was about 0.14–0.15 acres; and 100 *mu* equaled 1 *qing*, which was equivalent to 14.3 to 15.1 acres.

Yang possessed a wealth of expertise in governance, but he was unable to revive the struggling horse-rearing business. Instead, like Wang Anshi in the Northern Song, Yang tapped into the existing merchant border network to buy horses. However, the Ming faced a more challenging reality owing to the shifting Tibetan dynamics in Amdo in the northwest, as well as to fierce competition within various Mongol groups in the north, and the growing strength of the Jurchens in the northeast. These geopolitical undercurrents increased pressure on the Ming to buy more horses quickly from those who posed a threat.

To comprehend the challenges Yang Yiqing and the Ming state encountered in maintaining horses, it is crucial to consider how a horse's life-cycle and varying demands arose in this sixteenth-century, Ming–Mongol context. Horses can live up to thirty years, but only ten could realistically be used by humans for their economic, political, or cultural needs. The biological and ecological characteristics of horses played a pivotal role in determining the quality and quantity of them available to the state, which consequently conditioned how humans managed them. Yang's institutional reforms and the state's financial commitments were extensive. However, what was lacking was not managerial skills but knowledge of equine care. Yang was a man of his time, and even modern historians have only begun to see the human-animal relationship slightly more broadly. As a result, scholarship on the institution, policies, or key historical figures like Yang Yiqing, has tended to see the matter in Yang's own terms, namely the mere tabulation of the numbers of horses at the state's disposal, overlooking their readiness for war, their health, and their biological and environmental needs.

STATECRAFT: MANAGEMENT OF HORSES IN MID-MING

Yang Yiqing reasoned that if the habitats were adequate, then any missing horses must be attributed to the officials, not recognizing that horses might die from many causes or just flee. He believed that the number of horses at the stables and pastures would multiply with good management and proper care. He also found reassurance in learning that most of the horses in the Anding 安定 and Wan'an 萬安 pastures were imported or purchased from "the west" (possibly referring to nomads), though he seemed to contradict himself in later writings on the horse-breeding issue. Yang believed that if the natural habitat and horse breed were conducive to horse-rearing, there should be enough strong horses at the state's disposal. If not, then it was not the system's fault; the problem lay in management 非法之過, 乃人之罪也.

Yang Yiqing labored to overhaul operations, which meant reforming the grazing areas, increasing personnel, building garrisons, and reinstating the tea–horse trade regime.[31] From Yang's perspective, investing human and financial resources should solve all problems, as with most governance practices. Indeed, these resources were essential to any functional government. But his concerted efforts to overhaul operations were disrupted by the Mongols' raid on Ningxia 寧夏, Yangchi county 仰池, in 1504. However, he continued to monitor changes in Shaanxi horse administration. In the winter of 1505, the defenses were overwhelmed by invading Mongols, who broke through the defense system and approached Jingning 景寧, Longde 隆德, and Huining 會寧, south of Ningxia, inching closer to Shaanxi 陝西. Yang asked the court for permission to resign from his post, citing his failure to defend the border. In his resignation request, he complained that officials in Ningxia, Gansu 甘肅, and Yansui 延綏 had not coordinated their efforts when the border crisis intensified. Yang urged the court to impose emergency measures and send officials to the northwestern border regions. Instead of accepting his resignation, minister of war Liu Daxia appointed Yang to oversee border issues across the three regions.

To set his reforms in motion, Yang Yiqing first requested the Ministry of Personnel to remove incompetent officials in order to fix the horse administration in Shaanxi. In doing so, Yang laid the blame for the failure to rear strong horses squarely on the officials overseeing the Ming's imperial stables in the northwest. Yang's recommendations seemed to gain support from the court; shortly thereafter, Li Kegong, the chief minister of Shaanxi Stables and Pastures 陝西苑馬寺卿, was dismissed and sent home to reflect upon his malfeasance (yet retaining his official title 冠帶閒住); and the same fate awaited his two subordinates.[32] This was Yang's first step in reviving the stables and pastures in the critical regions. However, he was once again disappointed, this time by the new chief minister appointed to this same provincial branch of the Imperial Stables. But at Yang Yiqing's request, he was quickly removed and reappointed to other posts. The Ming state might have acted swiftly to save the faltering border horse farm system, as evi-

[31] On tea-horse trading, see Peter C. Perdue, *China Marches West: The Qing Conquest of Central Eurasia* (Cambridge, Mass: Belknap Press of Harvard U.P., 2005); Henry Serruys, *Sino-Mongol Relations during the Ming* (Brussels: Institut belge des hautes études chinoises, 1959); Rossabi, "Tea and Horse Trade"; Johan Elverskog, "Fuzzy Pluralism: The Case of Buddhism and Islam," *Common Knowledge* 19.3 (2013), p. 204; Liping Wang and Geng Tian, "Breaking the Containment: Horse Trade between the Ming Empire and Its Northern Neighbors, 1368–1570," *Journal of World History* 33.1 (2022), p. 42.

[32] *Yang,* pp. 6–7.

denced by the speedy turnover. Alternatively, factional politics had infiltrated the Ming bureaucracy such that even lower-ranking officials were not immune.

What kinds of officials would be capable of salvaging the deteriorating horse business? Yang Yiqing identified three qualities: diligence, incorruptibility, and expertise – the qualities of an ideal government official. Yang himself was an assiduous official with appointments in Shanxi and Shaanxi, and he sought to place people with similar qualities in the administration. His confidence in the ideals of statecraft reflected his acceptance of the long tradition of Confucian learning that was the basis of Chinese governance. In China the emphasis on righteous officials guaranteed proficient governance; and expertise was secondary to learning. Built on the Confucian value system, society granted more agency to men of letters who could perform well as writers and therefore defined the historical narrative.[33]

Yang Yiqing's proposals should not come as a surprise. He supported his reasoning with what many Ming officials might have done in the situation. He had studied history, because the past offered wisdom for the present. Like the Yongle emperor, Yang found great inspiration in the Tang dynasty:

> The early-Tang state was left with only 2,000 damaged horses, including mares (*pin* 牝) and stallions (*mu* 牡). From the Zhenguan 貞觀 reign to the Linde 麟德 reign, the number of horses grew to more than 700,000. The Tang state lost more than half of them after [the time of] emperor Ruizong 睿宗 (r. 684–690; 710–712). The number of horses was restored slightly in the early days of the Kaiyuan 開元 reign (713–741) and reached 240,000. By 726, the number rose to 430,000. Commentators said the Tang state found the right pastures, appointed the right officials, and raised the horses in the right way. Now (referring to the Ming), the pastures are still in Shaanxi, but the persons in charge during Tang were Zhang Wansui 張萬歲 and Wang Maozhong 王毛仲, and the like 之流. I think the Ming is prosperous, which means that scholars today must have done something right [that has contributed to this prosperity]. How could they possibly be less capable than Zhang Wansui or Wang Maozhong?"[34]

33 Dorothy Ko, "Stone, Scissors, Paper: Thinking Through Things in Chinese History," *Journal of Chinese History* 3.2 (July 2019), p. 194.

34 *Yang,* pp. 8–9.

Yang reasoned that the Ming's pasturelands were located where the Tang's had been, but they were smaller in size. However, size was just one dimension in evaluating pastures: living organisms, climate change, and human alterations all could change pasture lands. The same place 700 years apart was not necessarily the same place. The Tang was gone, and so were the pastures that had nurtured so many horses.

Yang's approach to functional ranches involved finding the right individuals with the necessary expertise to raise horses in historically proven locations. The choice of locations was questionable, as we have seen. Moreover, he had already removed two rounds of derelict officials. Why then did the problems persist? Because he seemingly forgot the importance of proper equine knowledge in his policy proposals and discussions. Either he did not know exactly the tasks performed by Zhang Wansui or Wang Maozhong, or he thought that any scholar could quickly master equine knowledge; after all, they did not call themselves scholars for nothing. But Zhang was credited for raising many horses for the Taizong emperor, ensuring a strong army in the early-Tang dynasty; Wang Maozhong was a trusted bodyguard of Li Longji 李隆基 and managed his animals when he ascended to become the crown prince (later, emperor Xuanzong 玄宗; r. 712–756).[35] They were not known as men of letters and therefore received the perhaps disdainful "and the like 之流" comment from Yang. But they made their names through expertise and might have been well respected by their contemporaries. Yang Yiqing's misplaced confidence in scholar-officials shows his ignorance of equine knowledge, which certainly attests to the limits of written words as a medium of knowledge production and transmission, both in the past and present. The proficiency of these two men was based on embodied knowledge and daily bodily practice of handling animals, not reading books about animals. The Tang's close connection with the steppe powers was simply unavailable to Yang Yiqing and his cohorts in the Ming court.

During the later Chinese dynasties, rulers often looked to the Tang for inspiration and hope. One such ruler was the early-Ming emperor Yongle, who wished to emulate the Tang's greatness. Yongle established a horse-ranch system in the northwest, complete with prescribed pasture sizes and staffing quotas. Although the system deteriorated over time, Yang's reports reveal that he shared Yongle's ambition to revive the ranches. The Tang dynasty's successful use of a similar system only

[35] Jonathan Karam Skaff, *Sui-Tang China and Its Turko-Mongol Neighbors: Culture, Power and Connections, 580–800*, Oxford Studies in Early Empires (Oxford, New York: Oxford U.P., 2012), p. 276.

strengthened Yang's case. While the Tang did not create the border ranch system, it inherited it from earlier powers; for Ming and Song officials and rulers, the Tang was a more recent and relevant source of inspiration.[36]

The Tang's legendary border ranches undoubtedly aided statesmen in the Song and Ming in their advocating for state-sanctioned ranches, although the legend might have gone too far. Mare fertility is a topic that Yang Yiqing did not discuss. Mares have a long gestation period of eleven months within a relatively short lifespan of twenty to thirty years. A mare's reproductive life begins at age four and continues into her early twenties, although it starts to decline after age fifteen. Twins are rarely carried to term, and even more rarely survive. On average, a mare can birth twelve to fifteen foals in her lifetime without modern technological enhancements, which introduce various ethical, biological, and economic complications. In natural breeding conditions, even with careful veterinary management, many mares miscarry their foals because of stress and malnutrition.[37] Yang Yiqing's reference to the success of Tang's horse-rearing business indicated significant fluctuations within a relatively short time frame. Within a decade, the number of horses could either double or be halved. How was that possible? It was unclear how many were mares and how many were stallions in the group of 2,000 tired and injured horses in the Tang's account. If the number is to be trusted, the horses in the Tang state-run stables grew from 2,000 to 700,000 in 38 years. After plunging by half under Wu Zetian's 武則天 rule (690–705), the number quickly rebounded by 55% in 13 years. It would have been a miracle if the Tang, even with the superb knowledge possessed by Mao and Wang, were able to breed all the horses as accounted by the record. However, it is also likely that the Tang rulers bought horses, a fact that Yang probably did not know or did not mention in his plea to improve the finances and management of the breeding ranches.

36 Ibid., pp. 259–62.

37 The veterinary and biological studies of mare reproduction often focus on modern advances in assisted reproduction, but information on historical and natural breeding is seldom found in these publications. On the impact of age upon mare fertility, see Jeffrey A. Fawcett et al., "Effect of Advancing Age on the Reproductive Performance of Japanese Thoroughbred Broodmares," *Journal of Equine Science* 32.2 (June 2021), pp. 31–37 <https://doi.org/10.1294/jes.32.31>. On twin gestation, see L. B. Jeffcott and Katherine E. Whitwell, "Twinning as a Cause of Foetal and Neonatal Loss in the Thoroughbred Mare," *Journal of Comparative Pathology* 83.1 (January 1, 1973), pp. 91–106 <https://doi.org/10.10/0021-9975(73)90032-7>. On mares' lifetime limit of foal production, see J. B. Thomas, M. C. G. Davies Morel, and B. Lancaster, "The Effect of Age on D20, D40 and Live Foal Rates in the Clydesdale Mare," *Animal-Open Space* 3 (December 1, 2024): 100082 <https://doi.org/10.1016/j.anopes.2024.100082>.

Horse breeding was a risky and costly business, especially since horses suffered a relatively high mortality rate; about a third of war horses in the Qing period (1644–1911) needed to be replaced annually to maintain military operations.[38] Historical records noted the headcounts but did not distinguish between horses (including both studs and the relatively more populous mares) used for breeding and those for fighting (presumably mostly gelding stallions). Nonetheless, Yang Yiqing was confident that the Ming could procure horses as fast and plentifully as had the Tang. He calculated that Shaanxi's total pastureland capacity could support 32,500 horses, which was apparently sufficient for border defense in the northwest. Even though he did not explain how he came up with the numbers, he believed they surpassed the horse population in the early Ming.[39] The number was indeed tremendous but smaller than that documented in Ming records for any given year. The closest year it could measure up to was 1385, when the Ming count was as high as 32,644 horses for war.[40]

Yang Yiqing then proposed a bewildering solution to the diminished horse population, advocating in multiple memorials to increase the number of studs in order to breed more horses. Yang continued to report that more than 1,300 of the 2,280 horses on the pastures were studs. In 1503, the stables would likely have had 3,000 studs after purchasing some using the tea–horse trade system. Even then, Yang proposed that the stables had to purchase 7,000 studs to increase the number to 10,000. They would produce one foal every two years, and the total number of horses would reach the estimated ideal number of 32,500 within five years. This curious calculation is feasible only if studs are capable of reproduction on a tight schedule, which is not realistically possible.

The best-case scenario for a herd of 980 (that is, 2,280–1,300) mares and 10,000 studs in five years would be to reach 16,860. It assumes no horses die in those five years, and that each mare produce one foal per year, all foals being fillies, and all the 4,900 fillies by the fifth year begin to carry their foals.[41] Yang Yiqing conjured up a promising image of stables with abundant horses: in a few years, the horses would multiply, and the stables would have several hundred thousand horses. His blind optimism might have been driven by

[38] David Bello provided the estimate of annual replacement of horses in the Qing, for which I am grateful. Private email communication, March 24, 2024.

[39] Grass, "A Million Horses," pp. 299–328.

[40] Ibid., p. 301.

[41] *Yang*, p. 11.

the state's urgent need to procure horses, regardless of their strength. To Yang, the sheer number was perhaps his most pressing task because nomads were repeatedly breaching the northwestern border. In 1501, the Mongols "達賊" raided the stables, stole 3,962 horses and mules, and reduced the number of horses in the stables to 4,199, all of which were not in good shape. They were small, skinny, or injured, and none could be used for breeding or training for war.[42]

Yang made a peculiar comment in his extensive discussion of obtaining breed studs. The horses purchased from Xining 西寧, Taozhou 洮州, and Hezhou 河州 (Gansu) by the tea–horse system were raised in a different natural environment. They were suitable for riding and military purposes, but useless for breeding. He then proposed purchasing horses from China proper 內地 for breeding.[43] He did not explain this statement, seeming to forget that proper equine knowledge was key to obtaining and maintaining a solid number of horses.

Yang also exhibited his misunderstanding of horses when he tried to increase the number of herdsmen, calculating that 3,000 herdsmen were needed to match the increase in the horse population. One herdsman was designated to care for ten horses. Once the herdsmen were in place, the 30,000 horses would grow to several hundred thousand in ten years.[44] Yang's inspection tours found about 745 herdsmen present and 475 absent. He was sympathetic to those who escaped; after all, the pastures had "cold climates, high elevations, stony and dry soils, resulting in limited vegetation and few lodgings. [As a result, many of them] stayed in cave dwellings by the cliffs. The unwelcoming lodging arrangement," Yang Yiqing reasoned, "did not attract the prisoner-turned-soldiers, who watched for their chance to run away."[45] It was out of the question to draft more from the hereditary military households who typically staffed the garrisons, as Yang was keenly aware of the depleted military households in Shaanxi.

Instead of improving the living conditions, Yang aimed to compel vulnerable individuals to stay and work in the pastures. Yang identified two sources to staff the pastures. He believed that these pastures and stables harbored many vagrants who were evading military service. If they stayed there long enough, they must have found something to cling to and severed ties with their home regions. If left unsupervised, they

[42] *Yang*, p. 5.
[43] *Yang*, p. 11.
[44] *Yang*, pp. 12–14.
[45] *Yang*, p. 12.

could unsettle the local society, but if the government tried to capture them, they would flee. Neither solution was optimal.

Yang recommended that the emperor decree that those who reported to the government would be exempt from punishment. They would receive pastures appropriate to their household size, raise state-owned horses as officially registered herdsmen, and be allowed to breed horses. It was unclear when the imperial decree was issued, but Yang reported that over one hundred evaders had reported to the local government. Next, Yang suggested that the state crack down on officials who sheltered evaders and used them as domestic servants. It was unclear how many such vagabonds Yang estimated and how many he intended to enlist in handling the horses.

Finally, Yang drew from the conventional practice established in the Yongle reign when the pastures were founded. Convicts from Zhili 直隸, Shandong 山東, Henan 河南, Shanxi, and Shaanxi were escorted to Shaanxi and distributed to pastures, where they would remain permanently as horse handlers. He insisted that the state use all available channels to bring the total number of herdsmen to the desired 3,000.[46]

Yang Yiqing's decisions on horses and their handlers were a perfect recipe for disaster. The functional horse-herdsman ratio of 10:1 was premised upon the herdsmen's expertise and experience, but those desperate fugitives or transplanted convicts might have little experience handling horses, let alone breeding them. They, too, would wait for their opportunity to flee. Like many domesticated animals, horses are susceptible to disease, can die from mistreatment, or simply wander off. Yang might have found the incorruptible officials and just enough herdsmen, but his lack of equine knowledge most likely wrecked his chances of raising any horses, strong or weak, for the Ming.

BODILY MOVEMENT AND EMBODIED KNOWLEDGE

Equine knowledge and day-to-day care of horses were not something that Yang and most people in his circle learned. Their focus on statecraft came from a longstanding tradition in Chinese history of valuing statecraft over craft. This "mind-over-hand" paradigm has broad historical implications. Prevailing investigations of how scholar-officials managed state affairs have thus assumed a central place in historical studies. Research on literati culture and life commands significant at-

[46] *Yang*, pp. 12–13.

tention among historians of the Ming and Qing dynasties, leading to decreased studies of military expertise and institutions.

Maintaining the Ming's military capacity absorbed significant financial and human resources that came at the expense of the Ming's economic growth. Even when Ming-era expansion is considered, the early-Ming rulers (such as Hongwu and Yongle) were often deemed more ambitious and more involved in the state's ongoing incessant fights against the composite equestrian groups north of the Ming's borders. However, with the Mongol defeat of Ming troops led by the Zhengtong emperor in the early fall of 1449, the state shifted from offense to defense. The change in strategy did not lighten the financial burden. The storyline seemed to shift to a period of the irreversible decline of the Ming's military strength and its eventual demise, as David Robinson astutely puts it.[47]

Another historiographical pitfall of the emphasis on official texts and narratives is the neglect of embodied knowledge and the transmission of practical expertise. Officials' impeccable integrity and deep knowledge of history and statecraft could not cure ailing horses or successfully breed healthy ones. The well-being and health of the horses were only truly understood by those with embodied equine knowledge.

However, these horsemen were the ones that the Ming labored to keep out. The Ming's northern border issues were driven by the Ming ruler's varying understandings of how to keep the Mongols at bay, who retreated north after the fall of the Yuan and remained divided throughout Ming history. This was a turning point in the Ming's consideration of border defense. Early-Ming rulers such as Yongle aimed to raise a million horses to outperform the equestrian Mongols. Yang Yiqing grew up in a time when Ming rulers were shifting their strategy from offense to defense in hopes of countering the looming threats after the Tumu crisis.

Officials could not agree on how to negotiate with the Mongols. Some argued that border trade could reduce tensions, while others did not want to make any concessions. Regardless of the circumstances, both the Mongols and Tibetans skilled in horsemanship were barred from crossing the border walls, and regulated border markets were closely monitored. This resulted in the Chinese side of the wall in a sense missing the all-important equine knowledge. Consequently, the

47 David Robinson, "Why Military Institutions Matter for Ming History?" *Journal of Chinese History* 1.2 (July 2017), p. 299.

Ming dynasty had to import more horses from neighboring equestrian communities because their officials and institutions lacked the necessary expertise to properly care for the horses. Officials like Yang were proficient in allocating human resources and improving bureaucratic practices, but the necessary equine knowledge was missing. Such misinformed statecraft had serious consequences for which the Ming state paid a steep price.

CONCLUSION: STATECRAFT AND CRAFT

In the first decade of the sixteenth century, Ming officials were mired in factional politics, causing divisions within the ruling class and impedance in governance. However, political maneuvering alone cannot account for the state's inability to breed robust horses, nor does it provide practical solutions to related problems. Even though the Ming state shifted its border strategies and policies from offensive to defensive in the fifteenth century, officials like Yang Yiqing continued to advocate raising horses through a system of ranches. In Yang's view, the institutionalized practice ensured favorable results if the state chose the appropriate candidates. His trust in the officials' abilities was not naïve; it was based on the belief that scholar-officials like himself were essential to effective governance in late-imperial China. Yang's misplaced confidence in institutions and statecraft hampered the raising of strong horses in the mid-Ming. His administrative and institutional reforms ultimately fell short of his lofty goal of readying hundreds of thousands of horses to defend Ming's porous northern borders.

The Ming could not afford to let the borders remain vulnerable. The Yuan state had fallen apart, but the Mongols had not disappeared. Mongol leaders continued to dominate the steppes, fighting for political supremacy and economic resources. Other nascent powers also expanded and moved closer to the Ming's borders: the Oirat grew and eventually split, and one of its subgroups moved to the pastures near the Kokonuur Lake, not far from Shaanxi.[48] The Mongols south of the Gobi Desert competed with another Oirat subgroup, forcing the Mongols to move west. Farther afield to Lhasa, intense contests for patrons led some Tibetan Buddhists to move closer to the eastern edge of the Tibetan plateau. As a result, the Ming was forced to maintain

[48] Hosung Shim, "The Dörböd Aristocracy, Four Oirad Confederation, and Zunghar Empire in the Early Modern Central Asian Steppe" (presentation at the Research Seminar, Mongolia and Inner Asia Studies Unit, University of Cambridge, June 15, 2021).

a wartime economy even when there were no immediate threats from neighboring powers.

As factional as they were, Ming officials after the dramatic Tumu Incident agreed that the Ming state's defense enterprise needed horses. Their difference lay in how many, how strong, and where to keep them, whether to adopt offensive tactics like the Hongwu and Yongle emperors, or to scale back military expeditions and divert resources to the building of fortifications. Walls or no walls, the cost was high, and the return was uncertain. Nonetheless the Ming state soldiered on. In due course, the rise of the Manchu power in Manchuria would change the course of history after the Manchus crossed the Shanhai Pass and overthrew the Ming. Even though skilled animal handlers were not widely celebrated in the Qing, the Qing state expanded its territories and created a manifold system to maintain a sizable equine fighting force. The state established state ranches north of the Great Wall, which was a better habitat for horses, and they were under the care of more knowledgeable handlers, many of whom were Mongols, and the managerial posts were mostly occupied by those with expertise and experience in Inner Asia.

The state also outsourced horse care to expert equestrian groups among the Mongols and Tibetans. They were required to deliver fine horses for transportation, bureaucratic travel, and warfare at designated times and locations. Finally, Inner Asian communities routinely offered fine horses to the Qing dynasty as part of the tributary exchange. The diverse practices significantly reduced the cost of raising horses, which had strained state revenue for many China-based polities. The Qing state believed that the right pastures should be used by those with the appropriate equine skills. Therefore, instead of strictly guarding state borders and preventing border crossing, the Qing focused on safeguarding pastures and preventing unwanted intrusion into their horses' ideal habitats. In so doing, the Qing had access to war-ready horses at the right place and time, which in turn helped the state expand its territory.

The Ming's demand for horses and inability to raise enough strong war-ready horses incentivized their equestrian neighbors – Tibetans and Mongols – closer to the Great Wall zone, which was the opposite of what early-Ming rulers intended. This zone of contact was well suited to horses and kept the cost of delivering them low. To maintain minimal equine forces for the Ming's border defense structure, the state eventually reinstituted the horse-tea trade scheme. The intensely

regulated horse-trade system allowed the horses but not their handlers to cross the border, which resulted in the Ming relying on a volatile market where horse supplies and prices fluctuated, and the Ming state struggled to stabilize them. The border trade system reveals the dilemmas that the Ming faced: how could the Ming protect themselves from the equestrian Mongols outside the border walls with horses from outside the walls? The Ming borders were a space coproduced by humans and horses.

The state poured sizeable financial and human resources into building and maintaining border walls and garrisons; and finally, it still hoped to raise usable (albeit not strong) horses along the borders, which commanded bureaucratic and financial attention. The Great Wall was often seen as a barrier, and still can be a blockade even if its original function ceased. One headline in September 2023 was that a pair of workers widened the gap on the rammed-earth wall with an excavator to short-circuit their route.[49] Other human alterations to the walls – or natural erosions from climate change – did not make it into the news, but they changed the walls. What was designed to obstruct the movements of humans or animals only reminds us that the areas were a zone of contact, no matter how much political energy each side brought to denying it.

LIST OF ABBREVIATIONS

Yang Yang Yiqing, *Yang Yiqing ji* 楊一清集

[49] Livia Albeck-Ripka, "Workers Plow Through Great Wall of China, Leaving a Hole," *The New York Times*, September 5, 2023 <https://www.nytimes.com/2023/09/05/world/asia/great-wall-china-excavator-damage.html>.