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Military Technology Transfers from Ming China and the Emergence of Northern Mainland Southeast Asia (*c.* 1390–1527)

Sun Laichen

Abstract: During the late fourteenth and early fifteenth centuries, Chinese gunpowder technology spread to the whole of Southeast Asia via both the overland and maritime routes, long before the arrival of European firearms. The impact of Chinese firearms on northern mainland Southeast Asia in terms of warfare and territorial expansion was profound.

Scholars of Southeast Asian history and Sino-Southeast Asian relations need to make a significant shift from a maritime to an overland perspective. Around 60 years ago, attacking the Eurocentric approach to Southeast Asia history, J. C. van Leur wrote the following famous words: 'The Indies are observed from the deck of the ship, the ramparts of the fortress, the high gallery of the trading-house.'[1] From that time onward, especially since the publication of the late John Smail's important essay on 'autonomous history', many historians of Southeast Asia – to borrow a phrase from Smail – have 'gotten ashore'[2] and approached the history of the region from a non-Eurocentric perspective. However, the colonial legacy of looking from a maritime perspective remains the same: when looking for external factors affecting Southeast Asian history, scholars have overwhelmingly studied elements coming from China, India and Europe via the sea. This 'maritime mentality', as I term it, is reflected in numerous overt remarks and covert implications made by scholars. For example, 'Throughout the course

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1 J. C. van Leur, *Indonesian trade and society: Essays in Asian social and economic history* (The Hague: W. van Hoeve, 1955), p. 261.

2 John Smail, 'On the possibility of an autonomous history of modern Southeast Asia', reprinted in *Autonomous history, particular truths: Essays in honor of John R. W. Smail*, ed. Laurie Sears (Madison: University of Wisconsin Center for Southeast Asian Studies, 1993), pp. 39–70; quotation from p. 46.

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of its cultural evolution, Southeast Asia's circle of trade progressively expanded, stimulated by contacts with India, China, and West Asia. By the time of the Melaka sultanate, the region was linked by maritime routes with the outer limits of long-distance trade, stretching from Venice in the west to Canton in the east.'[3]

These comments ignore the fact that while sailors and ships were plying the waters of the region, caravans were also busy traversing the overland routes between modern southern China and northern parts of mainland Southeast Asia. In other words, they see only the sea, not the land. Contrary to that view, this article argues that the overland impact from China – especially on mainland Southeast Asia – was profound, and Chinese gunpowder technology is a case in point. Scholars have associated the spread of modern metal-barrelled firearms to Southeast Asia with the sack of Melaka by the Portuguese in 1511; thus we see important research being done on the transfer of European military technology and its implications for Southeast Asian history.[4] Though more and more scholars have come to realise that firearms of Chinese and Muslim origins had already spread to Lower Burma and maritime Southeast Asia before that date, the dissemination of weapons from Ming China to those areas from the late fourteenth to early fifteenth centuries and its far-reaching implications have so far been ignored. Even Joseph Needham in his *magnum opus* on *Science and civilisation in China*, which treats the spread of Chinese firearms to Europe and other parts of Asia such as Korea and Japan, has left out Southeast Asia entirely.[5]

This erroneous view is caused by a failure to pay close attention to the development of firearms in China and to consult the important contemporary and near-contemporary Chinese and Southeast Asian sources, particularly Vietnamese, Burmese and Tai (Tai Lu, Tai Yuan, etc.). This article makes a detailed and critical examination of these accounts in order to show that long before the appearance of the Europeans in Southeast Asian waters, Chinese firearms – including rockets, hand-guns and cannon – had already

3 Jeyamalar Kathirithamby-Wells, 'Restraints on the development of merchant capitalism in Southeast Asia before *c.* 1800', in *Southeast Asia in the early modern era: Trade, power, and belief*, ed. Anthony Reid (Ithaca, NY: Cornell University Press, 1993), pp. 123–4. For a similar comment, see Leonard Y. Andaya, 'Interactions with the outside world and adaptation in Southeast Asian society, 1500–1800', in *The Cambridge history of Southeast Asia*, ed. Nicholas Tarling, vol. I (Cambridge: Cambridge University Press, 1992), p. 372.

4 The two seminal studies are Victor Lieberman, 'Europeans, trade, and the unification of Burma, *c.* 1540–1620', *Oriens Extremus*, 27, 2 (1980): 203–26 and Anthony Reid, *Europe and Southeast Asia: The military balance* (Townsville, Queensland: James Cook University Centre for Southeast Asian Studies, 1982). Almost all the works written in the twentieth century, which are too numerous to be listed here, have emphasised the importance of 1511. Charles R. Boxer, in his 'Asian potentates and European artillery in the 16th–18th centuries: A footnote to Gibson-Hill', *Journal of the Malayan Branch of the Royal Asiatic Society*, 38, 2 (1965): 168, however, correctly speculated that the Vietnamese had used cannon before the arrival of the Portuguese, but failed to provide any evidence. Li Tana only mentions the possible transfer from China to Vietnam in passing in her *Nguyễn Cochinchina: Southern Vietnam in the seventeenth and eighteenth centuries* (Ithaca, NY: Cornell University Southeast Asia Program, 1998), pp. 43–4.

5 Joseph Needham, *Science and civilisation in China* (Cambridge: Cambridge University Press, 1986), vol. V, pt. 7 (*Chemistry and chemical technology: Military technology; the gunpowder epic*), p. 569; all citations for *Science and civilisation* refer to this particular volume unless otherwise indicated. Wang Zhaochun, *Zhongguo huoqishi* [A history of firearms in China] (Beijing: Junshi Kexue Chubanshe, 1991), which represents the culmination of Chinese scholarship over the past several decades, also mentions only Korea and Japan (pp. 449–50). For references to the Southeast Asian context, see M. A. P. Meilink-Roelofsz, *Asian trade and European influence in the Indonesian archipelago between 1500 and about 1630* (The Hague: Martinus Nijhoff, 1962), p. 123; Lieberman, 'Europeans', pp. 207, 211; Reid, *Europe and Southeast Asia*, p. 3; and Anthony Reid, *Southeast Asia in the Age of Commerce*, vol. II (*Expansion and crisis*) (New Haven: Yale University Press, 1993), pp 220–1.

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started to spread to northern mainland Southeast Asia (here including southern Yunnan and northeastern India), with significant implications for the history of the region. Though sources in this regard are still very imperfect, they do suggest that Southeast Asian rulers in Đại Việt, Lan Na and Luchuan (the land of the Maw Shan in present-day southwestern Yunnan) lost no time in acquiring and employing this new Chinese technology for their benefit, while those who adopted it on a smaller scale or not at all (such as Champa and Ayutthaya) suffered the consequences.

The early Ming (1368–1450) as a military superpower

The Mongols' conquest of the vast territories of Eurasia spread gunpowder technology and some early forms of firearms such as fire-lances and bombs (but not metal-barrelled weapons such as hand-guns and cannon) from China proper to the regions further west, including the Middle East, Europe and northwestern India. This is because during the heyday of the Mongols true firearms such as guns and cannon had not been made yet, and their primary weapons were crossbows; on the whole, even trebuchets or catapults were little used.[6] Scholars have long asserted that the Yuan used metal-barrelled cannon in their invasions of Japan and Java in 1281 and 1293, but this was actually not the case. The weapon the Yuan armies employed in these campaigns, as well as the earlier war against Japan in 1274, was a counterweighted trebuchet hurling powerful explosive iron bomb-shells, called a *tiehuopao* 鐵火砲.[7] Both the traditional Chinese and the advanced Muslim types of trebuchet played a big role in the early Mongol conquests. Archaeological finds suggest that true metal-barrelled hand-guns (*huotong* 火筒 or *huochong* 火銃) did not appear until 1288; and the earliest metal-barrelled artillery, so far as we know, was made around the first half of the fourteenth century and was not called *pao* 礮 or 砲 until the early and especially the middle Ming.[8]

The really important turning point was the founding of the Ming dynasty in 1368, which started what may be termed a 'military revolution' not only in Chinese but also

6 Feng Jiasheng, *Huoyao de faming he Xichuan* [The invention of gunpowder and its spread to the West] (Hong Kong: Rixin Shudian, 1956), pp. 45–65; Iqtidar Alam Khan, 'Origin and development of gunpowder technology in India: A. D. 1250–1500', *The Indian Historical Review*, 4, 1 (1977): 20–9; Khan, 'Coming of gunpowder to the Islamic world and North India: Spotlight on the role of the Mongols', *Journal of Asian History*, 30, 1 (1996): 27–45; Khan, 'The role of the Mongols in the introduction of gunpowder and firearms in South Asia', in *Gunpowder: The history of an international technology*, ed. Brenda J. Buchanan (Bath: Bath University Press, 1996), pp. 33–44; Needham, *Science and civilisation*, pp. 568–79.

7 Feng Jiasheng, *Huoyao*, p. 45; Needham, *Science and civilisation*, pp. 176–8, 294–5 and vol. V, pt. 6 (*Chemistry and chemical technology: Military technology, missiles*), p. 226; Wang, *Zhongguo*, p. 39. The confusion over the word *pao* extends from the fact that it referred to cannon from Ming times onward, but in its early usage meant either 'catapult' or the stones and explosives projected by one (Needham, *Science and civilisation*, p. 11 note c.) An example of assertions regarding the thirteenth-century campaigns is Geoffrey Parker, *The military revolution: Military innovation and the rise of the West, 1500–1800* (Cambridge: Cambridge University Press, 1988), p. 83. For the original Chinese record of Yuan military campaigns in Java, see Su Tianjue, *Yuan wenlei* [Collection of the literary works of the Yuan] (Nanjing: Jiangsu Shuju, 1889 reprint), vol. XLI, p. 20b.

8 Needham, *Science and civilisation*, pp. 276–341, 569; Liu Xu, *Zhongguo gudai huopaoshi* [A history of cannon in ancient China] (Shanghai: Shanghai Renmin Chubanshe, 1989), pp. 33–41; Shi Weimin, *Yuandai junshishi* [A military history of the Yuan dynasty], vol. XIV of the *Zhongguo junshi tongshi* (Beijing: Junshi Kexue Chubanshe, 1998), pp. 353–5; Zhong Shaoyi, 'Chong, pao, qiangdeng huoqi mingcheng de youlai he yanbian' [The origins and evolution of *Chong, pao, qiang* and other firearms], in *Zhongguo gudai huoyao huoqishi yanjiu* [Studies in the history of gunpowder and firearms in ancient China] [Beijing: Zhongguo Shehui Kexue Chubanshe, 1995); Wang, *Zhongguo*, pp. 50–3. I follow Needham in translating *huochong* as 'hand-gun' according to the British usage.

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in world history.[9] Firearms helped Zhu Yuanzhang (r. 1368–98) defeat the Mongols and his other rivals and establish a new dynasty. This is also indicated in a comment made around 1561 by the writer of a military treatise: 'Our first emperor Taizu (Zhu Yuanzhang), because of his remarkable military accomplishments, gained control of the whole Middle Kingdom. He possessed every sort of fire-weapon in existence from past to present, and kept them in his armouries.'[10] After the establishment of the Ming, great attention was attached to the production of firearms. Contemporary statistics are lacking, but the following information should be sufficient to demonstrate the scale of production. The size of the Ming army during the reign of the founding emperor was between 1.2 and 1.8 million men, and about 10 per cent of them were armed with hand-guns. From 1380 to 1488, there were two main weapon-manufacturing bureaus in the capitals; the first one – the *Junqiju* – was required to produce 3,000 'bowl-sized muzzle cannon' (*wankouchong* 碗口銃), 3,000 hand-guns, 90,000 arrowheads and 3,000 signal-guns every three years, while the *Bingzhangju* manufactured an unspecified number of many other kinds of cannon and hand-guns. In addition, the *Baoyuan Bureau*, whose main task was to manufacture coins, made some hand-guns. Finally, firearms were manufactured outside the capitals by both provincial armies and local military units.[11] Based on the serial numbers of the hand-guns unearthed so far, it is estimated that at least 160,106 such arms were made during the period 1403–1521. In 1462, 1,200 gun-carriages, including those for the 'large bronze cannon' (*datongchong* 大銅銃), were made, while in 1465, 300 different 'great general cannon' (*dajiangjunchong* 大將軍銃) and 500 cannon carriages were manufactured.[12]

Under these circumstances, it is not surprising that the proportion of firearms among the Ming armies increased, particularly as they strengthened their frontiers in the fifteenth century. By 1450 50 per cent of some military units on the northern frontier were equipped with cannon, and by 1466 one-third of the Ming troops may have been carrying firearms.[13] In comparison to the hand-guns of the late Yuan, the early Ming weapons were improved in several aspects, and they were supplied to both the infantry and the navy. Chinese firearms were first used in naval battles in 1363. A decade later 'bowl-sized muzzle cannon' were being installed on warships, and in 1393

9 This 'military revolution' still merits further study using the criteria set up by military historians of Europe (see Parker, *Military revolution*), but there is no doubt that especially during the early Ming, firearms were increasingly produced and employed and had a dramatic impact on China's warfare and foreign relations; Wang, *Zhongguo*, terms this a 'great transformation' (*da biange*) (p. 111).

10 Quoted in Needham, *Science and civilisation*, p. 431; I have slightly modified Needham's translation. On firearms and the defeat of the Mongols see Mao Yuanyi, *Wubeizhi* [Treatise on military defense] (1621) (Beijing & Shenyang: Jiefangjun Chubanshe & Liaoshen Shushe, 1987 reprint), vol. VI, p. 5072; Feng Yingjing, *Huang Ming jingshi shiyongbian* [Imperial Ming handbook of practical statesmanship] (1603) (Taibei: Chenwen Chubanshe, 1967 reprint), book 3, p. 1248; and Edward L. Dreyer, '1363: Inland naval warfare in the founding of the Ming dynasty', in *Chinese ways in warfare*, ed. Frank A. Kierman, Jr. and John K. Fairbank (Cambridge, MA: Harvard University Press, 1974), pp. 221, 358 n. 36.

11 Information on manufacturing is from Wang, *Zhongguo*, pp. 75–6; Needham, *Science and civilisation*, p. 292 note h.; *Ming shi* [History of the Ming dynasty] [henceforth *MS*] (Beijing: Zhonghua Shuju, 1974), vol. XCII, p. 2265; and Fan Zhongyi *et al.*, *Mingdai junshishi* [A military history of the Ming dynasty] (Beijing: Junshi Kexue Chubanshe, 1998), vol. I, p. 201. Statistics on the size of the army are in Wang, *Zhongguo*, p. 103.

12 Needham, *Science and civilisation*, p. 337 (cannon); the figure for 1403–1521 is from Wang, *Zhongguo*, pp. 101–2.

13 Ibid., pp. 106–8; on the strengthening of the borders, see *Ming shi*, vol. 92, p. 2264 and Needham, *Science and civilisation*, pp. 313–14.

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it was stipulated that each large vessel should be equipped with sixteen hand-guns, four 'bowl-sized muzzle cannon', twenty fire-lances (*huoqiang* 火槍), twenty rockets (*huojian* 火箭) and other firearms.[14]

The military campaigns of the early Ming were overwhelmingly successful. One of the reasons was presumably the effective employment of firearms, as seen from the comments of contemporaries. Qiu Jun (1421–95), a great Ming statesman, remarked: 'Ever since the appearance of these [firearms] weapons, China has been able to defeat the barbarians in the four directions.' The author of an important military treatise written in 1598 observed that 'Chengzu [the Yongle Emperor, r. 1403–24] ... established at his court the Firearms and other battalions which specialised in hand-guns and cannon ... Therefore, his military achievements surpassed all the previous emperors.'[15]

Chinese military technology transfers to northern mainland Southeast Asia

The Maw Shan (Luchuan)

Luchuan was a Tai polity based in the Maw (Shweli or Ruili, or Luchuan) River valley, thus its people are called the Maw or Maw Shan in Burmese records. (In this article the term 'Tai' will be used along with 'Maw Shan' to refer to this group, who were called by different names in different languages.) In the late fourteenth century, the Maw Shan in southwestern Yunnan were still armed only with elephants, spears and crossbows.[16] However, the arrival of firearms from the interior of China changed this picture. As early as 1378, firearms including small 'bowl-sized muzzle cannon' manufactured in Yongning (modern Xuyong), Sichuan were probably used by Ming foot soldiers in the Yunnan campaigns. Before entering Yunnan, on 26 December 1381, Ming troops under Generals Fu Youde, Lan Yu, and Mu Ying took Puding in northwestern Guizhou, and firearms appear to have been used in this battle.[17] These weapons may have played a decisive role in the Ming defeat of 100,000-strong Mongol forces at Qujing in northeastern Yunnan on 31 December 1381; one source informs us that 'the sound of drums and cannon shook the sky (鼓砲震天)'. As a result, Mongol rule in Yunnan collapsed. In late 1383, Ming firearms helped defeat 40,000 local Yunnan troops who had besieged Tonghai for over a month.[18] On 13 April 1387, the Ming Emperor issued orders to Mu Ying and other generals in Yunnan:

14 Wang, *Zhongguo*, pp. 57, 74, 104; Needham, *Science and civilisation*, p. 292 n.h.

15 Qiu Jun, *Daxue*, vol. 122, p. 12b; quoted in Wang, *Zhongguo*, p. 106.

16 Jiang Yingliang, *Baiyizhuan jiaozhu* [Annotation of the *Baiyizhuan*] (Kunming: Yunnan Renmin Chubanshe, 1980), pp. 85–6; *Ming shilu youguan Yunnan lishi ziliao zaichao* [Historical records on Yunnan in the *Ming shilu*] [henceforth *MSL*] (Kunming: Yunnan Renmin Chubanshe, 1959), vol. I, pp. 97–8, 130, 154.

17 *MSL*, vol. I, p. 23; *MS*, vol. CXLIV, p. 4074. According to the latter, *pao* 礮 were fired specifically as a signal, but it can be inferred that other firearms were used as well; see also Wang, *Zhongguo*, pp. 83–5. Place names of Ming China can be identified in *Zhongguo lishi dituji* [Historical maps of China], ed. Tan Qixiang (Beijing: Ditu Chubanshe, 1982), vol. VII and *Yunnansheng dituce* [Maps of Yunnan province] (Beijing: Zhongguo Ditu Chubanshe, 1999).

18 On these events, see *[Jingtai] Yunnan tujing zhi shu*, ed. Chen Wen *et al.* (Shanghai: Shanghai Guji Chubanshe, 1995), vol. X, p. 160; *Zhengde Yunnanzhi* (Shanghai: Shanghai Shudian, 1990), vol. XIX, pt. 1, 3b and pt. 2, p. 2b (the quotation about drums and cannon is found in both these sources); *MSL*, vol. I, p. 24; *The Cambridge History of China*, ed. Frederic F. Mote and Denis Twitchett, vol. VII (*Ming China, 1368–1644*), pt. 1 (Cambridge: Cambridge University Press, 1988), pp. 144–6. All dates are converted with reference to Keith Hazelton, *A synchronic Chinese–Western daily calendar, 1341–1661 A.D.* (Minneapolis: University of Minnesota History Department, 1984).

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> These barbarians [Luchuan Baiyi, or the Maw Shan] really planned to spy on [Yunnan], and sooner or later will certainly become a worry by disturbing the frontier. Upon receiving this edict, [you should] build fortifications in Jinchi (Baoshan), Chuxiong, Pindian, and the middle section of the Lancang [Mekong] River. [You must] make sure that the city walls are high and moats deep, stakes thick and big. Each place should have one to two thousand or several thousand or hundred hand-guns. The gunpowder-manufacturing places [should] work day and night, in order to defend [the city].

The next year, the Emperor again ordered 107 component catapults to be made (*qishaopao* 七稍礮) for attacking the stockades of the Maw Shan.[19]

On 6 May 1388, 150,000 Maw Shan with over 100 elephants attacked Dingbian (modern Nanjian in Yunnan), while 15,000 Ming troops marched 15 days to combat them. In the beginning, Shan elephants routed Ming horses; later on, the Ming side employed hand-guns, cannon, fire-arrows (*shenjijian* 神機箭or *huojian* 火箭) and rocket arrows including 'nine-dragon baskets' (*jiulongtong* 九龍筒) which shot nine arrows at a time.[20] In particular, the Ming army implemented volley firing to combat the Shan elephantry effectively. The Chinese soldiers holding firearms were divided into three rows. The first row would shoot first at the approaching elephants; if the elephants still did not turn back, the second row would follow, and then the third row. Thus, the Ming soldiers 'shot arrows and stone [balls from the cannon] together, and the noise shook the mountain valley, all the [Shan] elephants trembled and turned back'. According to the *Ming shilu* (the Ming chronicles), 30,000 Maw Shan soldiers were killed while 10,000 men and 37 elephants were captured. Overwhelmed by the Ming military power, the Maw Shan submitted by sending tribute. This was the first contest between the two forces; the battle, which lasted two days, was rather swift.[21] Apparently, firearms and new military strategy played a crucial role in routing the Shan elephantry and eventually in the Ming victory. Later the same year (1388), Ming troops fought against the Yi people in Dongchuan, northeastern Yunnan; firearms must have been used in the campaign as well though only signal guns (*xinpao*, 信砲) are recorded.[22]

19 Zhang Dan, *Yunnan jiwu chaohuang* [Documents of Yunnan affairs] (1387) (Changsha: Shangwu Yinshuguan, 1937 reprint), pp. 35–6, 44–5; Wang Shizhen, *Yanshantang bieji* [Other writings at the Yanshantang] (Beijing: Zhonghua Shuju, 1985), vol. IV, p. 1669; *MSL*, vol. I, p. 84.

20 Hui Lu, *Pingpi baijin fang* [The washerman's precious salve] (Reprint, *c.* 1844), vol. IV, pp. 23b–24a, 26b; vol. XIII, pp. 29a–30a. Due to its effectiveness in the campaigns against the Maw Shan, this 'nine-dragon basket' was widely used on the Ming frontiers from 1464 onward (*MS*, vol. XCII, p. 2264). A Ming account written in the early years of the Wanli reign (1573–1619) mentions cannon (*huopao* or *pao*); Yan Congjian, *Shuyu zhouzilu* [A comprehensive record of foreign countries] (Beijing: Zhonghua Shuju, 1993), pp. 326–7.

21 Zhang Hong, *Nanyishu* [Book of the southern barbarians], in the *Siku Quanshu cunmu congshu* series (Tainan, Taiwan: Zhuangyan Wenhua Shiye Youxian Gongsi, 1997), book 255, p. 199; *MSL*, vol. I, pp. 98, 110–11, 130; Yan, *Shuyu zhouzi lu*, pp. 326–7; *Huang Ming mingchen yanxinglu xinbian* [New compilation of the biographies of the eminent officials of the imperial Ming], ed. Wang Guonan (Taibei: Mingwen Shuju, 1991), book 1, vol. I, p. 16b; Wang Sitong, *Ming shi*, in the *Xuxiu Siku quanshu* series (Shanghai: Shanghai Guji Chubanshe, 1995), vol. 162, pp. 240–1; *MS*, vol. 92, p. 2264 and vol. 126, p. 3758. The figures of both the Chinese and Shan armies in the *Ming shilu* are inflated: 30,000 and 300,000 respectively. The *Nanyishu* cuts these figures by exactly half, which is at least closer to the truth. Wei Yuan has challenged the figures for armies in Ming records in his *Shenwu ji* [Account of the military affairs of the Qing dynasty] (Beijing: Zhonghua Shuju, 1984), vol. II, p. 492.

22 Zhang, *Nanyishu*, p. 199; *MSL*, vol. I, pp. 101–4.

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However, the Chinese monopoly of gunpowder technology did not last long. In 1397, Han Chinese soldiers from Jinchi (modern Baoshan, Yunnan) deserted to the Maw Shan and helped them manufacture cannon and hand-guns. Their skills were so cherished by Silunfa (r. 1381–99), Chief of the Maw Shan, that these soldiers were permitted to wear gold belts and were better treated than were the monks from interior Yunnan. This special treatment even antagonised Silunfa's subordinate Dao Ganmeng, who revolted and expelled him. The Han deserters were numerous; as a memorial of 1442 pointed out, during the reign of Hongwu (1368–98) more than 20,000 Han soldiers were stationed in Jinchi, but many had fled. By 1442 only 3,000 of them remained, making the desertion rate as high as 85 per cent.[23]

These data substantiate a memorial by Wang Ji, Minister of War and commander-in-chief of the campaigns against the Maw Shan, written in 1444:

> In the past Luchuan rebelled primarily because profit-seekers on the frontier, carrying weapons and other goods illegally, sneaked into Mubang (Hsenwi), Miandian (Ava), Cheli (Sipsong Panna), Babai (Lan Na), etc., and communicated with the aboriginal chieftains and exchanged goods. There were also those who taught them to make weapons, liked [their] women and remained there.

A Dai oral tradition of the twentieth century also confirms this transfer of gunpowder technology from the Han Chinese.[24]

The Kingdom of Ava

Burmese and Mon historical records refer rather frequently to hand-guns (*mibok* and *senat*) and cannon (*nat amrok* or *amrok*, *pron* or *cinpron*, and *mratapu*), employed primarily in Central and Lower Burma prior to the arrival of European firearms in the early sixteenth century.[25]

23 Ibid., vol. II, p. 614. On the Dao Ganmeng rebellion, see vol. I, p. 162 and Zhang, *Nanyishu*, pp. 67–8; the latter gives a different reason for the revolt.

24 Wang Ji's memorial is in *MSL*, vol. II, p. 642. For the Tai perspective, see Sang Yaohua, 'Luelun Song Yuan Ming shiqi Daizhu zhi beiqian' [On the Dai northward migration during Song, Yuan and Ming times], *Yunnansheng lishi yanjiusuo yanjiu jikan*, 2 (1982): 465. A Tai source records that the Ming court granted firearms to the Maw Shan, but this is unlikely given the consistently strict Ming ban on the proliferation of gunpowder technology; Song Zigao, *Meng Meng tusi shixi* [The genealogy of the Meng Meng *tusi*] (Kunming: Yunnan Minzu Chubanshe, 1990), p. 74.

25 These references are drawn from a variety of sources: U Kala, *Maha rajavan kri* [The great chronicle] (Yangon: Hanthawaddy Ponnhipdaik, 1960-1), vol. I, pp. 183, 366–7, 395, 406; vol. II, pp. 3, 6, 11, 16, 42–3, 45, 72, 104, 107, 117, 123, 125–7; *Aretopum (6) con tvai suimahut Mranma manmya aretopum* [Six *Aretopum* or historical accounts of Burmese kings] (Yangon: Nanmran Cape, 1970), pp. 156, 165, 222, 224, 229, 232, 268, 276, 310, 328–9; H. L. Shorto, *Nidana Ramadhipati-katha* (*Rajawamsa Dhammaceti Mahapitakadhara*), ed. Phra Candakanto (Pak Lat, 1912), p. 10; Tvansantuikvan Mahacansu, *Tvansan Mranma rajavan sac* or *Maha rajavan sac* [A new chronicle of Burma] (Yangon: Mingala Pumnhip Tuik, 1968), vol. 1, pp. 90, 223, 289, 407, 409–10; *Mhannan maha rajavan to kri* [The glass palace chronicle] (Yangon & Mandalay: Pitakat Cauptuikchuin, 1955–67), vol. 1, pp. 248, 419, 447, 457; vol. 2, pp. 3, 5, 9–10, 48–50, 51, 116, 126, 132, 134–6; Arthur P. Phayre, *History of Burma, including Burma Proper, Pegu, Taungu, Tenasserim, and Arakan from the earliest time to the end of the first war with British India* (Bangkok: Orchid Press, 1998 reprint), pp. 69–70, 74; G. E. Harvey, *History of Burma, from the earliest times to 1824: The beginning of the English conquest* (London: Frank Cass & Co., 1967 reprint), p. 340.

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TABLE 1:
Appearances of firearms in Burmese and Mon records

Year	Location	Type of weapon	Possessed by
1057	Thaton	*amrok, senat*	Mon
1287	Pegu	*senat*	Indians & *Bharangyi*
Prior to 1333	Arakan	*mibok,*	Arakanese
Prior to 1333	Chittagon	*amrok,* gunpowder pot	Arakanese
1293-1349	Martaban	*mibok, senat, amrok*	Mon *vs.* Chiang Mai
1386	Chin	*senat*	Indians fighting for the Mon
c. 1388	Martaban	unspecified weapons/*senat*	Indians fighting for the Mon
c. 1389	Arakan	*nat amrok*	Arakanese
1404	Prome	*pron, senat, amrok, mratapu*	Ava (*vs.* Pegu)
1404	Myete	*pron, senat*	Ava (*vs.* Pegu)
1404	Pegu	unspecified weapons	Indians & *Bharangyi*
1405	Hlaing	*pron, senat*	Ava (*vs.* Pegu)
1405	Prome	*pron, senat*	Ava (*vs.* Pegu)
1408	Prome	*mibok*	Ava (*vs.* Pegu)
1409	Pegu	*amrok, senat, cinpron, mratapu*	Ava (*vs.* Mon)
1409	Bassein	*pron, senat*	Pegu (*vs.* Ava)
1411/12	Prome	*pron, senat, amrok, mratapu, mibok*	Ava
1415	Bassein	*amrok, senat*	Pegu
c. 1415	Dala	*cinpron, amrok, mibok, senat*	Pegu
1416	Bassein	*amrok, senat, cinpron*	Indians & *Bharangyi*
1418	Mawbi	*amrok, senat*	Ava
1440	Pinle	unspecified weapons	Pinle (*vs.* Ava)
c. 1466	Ava	cannon & muskets	Ava (*vs.* Pegu)
1481	Yamethin	*pron, senat*	Yamethin (*vs.* Ava)
1485	Yamethin	*pron, senat*	Yamethin (*vs.* Ava)
1511	Myedu	*pron, senat*	Shan *vs.* Ava
1524	Kyauktalon	*amrok, senat*	Ava (*vs.* Shan)
1524	Tonbilu	*senat*	Shan *vs.* Ava
1524	Toungoo	*pron, senat*	Toungoo (*vs.* Ava)
c. 1525	Ava	*mibok* granted to Onbuang	Ava
1526	Ava	*amrok, senat*	Ava (*vs.* Shan)
1527	Ava	*amrok/cinpron*	Shan (*vs.* Ava)

Note: guns (mibok *or* senat)*; cannons* (nat amrok/amrok, pron/cinpron, *or* mratapu)
These terms have been compiled from the various sources cited in footnote 25.

A cursory glance at these accounts (see Table 1) appears to show a pattern of dissemination from the maritime route to Lower Burma and then to Upper Burma. Victor Lieberman, based on the numerous Burmese references to the close association of the Indians (*Kala*) with firearms in Lower Burma and modern research on the history of

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firearms in India, has suggested that the latter were introduced from India beginning in the late 1300s. However, this issue merits a closer look for at least two reasons. First, anachronisms certainly occur in these records, as first pointed out by G. E. Harvey and seconded by Lieberman.[26] In addition to the too early and obviously impossible dates (for example, 1057) for the appearance of firearms in Lower Burma, it should be added that words such as *Bharangyi* (*Farangi* from 'Frank', meaning Europeans in general) and *senat* (from the Dutch word *snaphaan*), cannot be traced in Burma earlier than the arrival of the Portuguese in the sixteenth and the Dutch in the seventeenth centuries.[27] Second, recent and more careful research on firearms in India has shown that cannon and muskets were not used on the subcontinent until the mid-fifteenth century.[28]

Given the spread of Chinese firearms and cannon to the Maw Shan by the 1390s (see above), Đại Việt and Lan Na (see below); Ava's frequent contacts with the Ming, especially via the frontier trade; and its heavy involvement in the fighting against the Maw Shan, one has good reason to posit a Chinese and overland origin for firearms in Burma.[29] The appearance of terms for cannon and hand-guns in a fifteenth-century Burmese–Chinese dictionary implies that the Burmese must have known of and even possessed them. The word for cannon (*pao*) is *mibok nye*, meaning a small firearm, while the word for hand-gun (*chong*) is *mibok kyi*, a big firearm. It goes against common sense, of course, that cannon would be smaller than hand-guns. One explanation for the dictionary's strange glosses is that the two were not clearly distinguished during late Yuan and Ming times, and in some places *pao* were called *chong*, and in others *chong* were called *pao*. Interestingly, the word *mibok* – literally 'flame/fire-spurting' – reminds one of the close Chinese association of primitive and true firearms with flame or fire (typically 'flame-spurting lance' or *tuhuoqiang* 突火槍).[30] Thus, one is compelled to consider the possibility of a Burmese linguistic debt to the Chinese for this word.

A cautious reading of Burmese and Mon records reveals a north-to-south pattern for the spread of firearms in Burma. The references shown in the table for the period 1057–1389 must be pure anachronisms, but 1404 is an important date to consider. Thus

26 Ibid., p. 340; Lieberman, 'Europeans', p. 224 n. 61 (anachronisms) and 207, 211 (fourteenth century).

27 On '*Bharangi*', see Henry Yule and A.C. Burnell, *Hobson-Jobson: A glossary of colloquial Anglo-Indian words and phrases, and of kindred terms, etymological, historical, geographical and discursive* (New Delhi: Rupa & Co, 1994 reprint), pp. 352–4. For '*senat*', see *Mranma-Anglip abhidhan* [Myanmar–English dictionary] (Yangon: Department of the Myanmar Language Commission, Ministry of Education, 1993), p. 500 and C. A. Gibson-Hill, 'Notes on the old cannon found in Malaya, and known to be of Dutch origin', *Journal of the Malayan Branch of the Royal Asiatic Society*, 26, 1 (1953): 170 n. 9.

28 Iqtidar Alam Khan, 'Early use of cannon and musket in India: A. D. 1442–1526', *Journal of the Economic and Social History of the Orient*, 24, 2 (1981): 146–64. The association of the Indians as mercenaries with firearms in the Burmese and Mon records does imply they had mastered the military technology.

29 Wang Ji's memorial explicitly includes Ava among the destinations of the flow of firearms from Yunnan; *MSL*, vol. II, p. 642.

30 Needham, *Science and civilisation*, pp. 60, 62, 227, 230–2. On the question of terminology, see Nishida Tatsuo, *Mentenkan yakugo no kenkyu: Biruma gengogaku josetsu* [A study of the Burmese–Chinese vocabulary (text entitled) *Miandianguan yiyu*: An introduction to Burmese linguistics] (Kyoto: Shokado, 1972), pp. 8, 126. On *chong* vs. *pao* see Qiu, *Daxue*, vol. 122, p. 11b; p. 106; and Liu Xu, *Zhongguo gudai huopaoshi* [A history of cannon in ancient China] (Shanghai: Shanghai Renmin Chubanshe, 1989), pp. 6, 80. The apparently illogical usage may have been simply a copying error.

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from 1404 to 1527, it was the cities under Ava's control, especially Prome, that employed firearms. One imagines that Ava, seeing Prome as the crucial stronghold against Pegu, armed it with Chinese-style weapons. Pegu, however, learned the technology quickly and by 1409 was using *pron* and *senat* against Ava. In 1445, according to a Burmese account, a Chinese army marched as far as Yamethin in central Burma, driving away the old chief and putting a new one in power while providing him with unspecified types of weapons.[31]

With or even before the spread of gunpowder technology, fireworks and rockets for war and entertainment purposes must have travelled from Yunnan to Burma. Sources are very scanty in this regard, but fireworks are known to have been displayed in 1491 at the Mon King Dhammazedi's (r. 1472–91) funeral in Pegu. The original account is worth quoting here: 'All the district governors and feoffees tooled fireworks and set them off outside the pavilions: some "mighty elephants", some "hand diamonds", others *li krok bhum* and *le' ga*, "stars" and "moons", *Chinese crackers* and hangers, double stars and double moons.' Numerous travelogues of the late eighteenth to early twentieth centuries in Burma record the launching of fireworks and especially large rockets (*dum* in Burmese) for both entertainment and especially monks' funerals. It is also very interesting to note that Chinese at Bassein on the Burmese coast manufactured gunpowder and fireworks for the Burmese during the First Anglo-Burmese War (1824–6).[32]

Northeast India

Northeast India, primarily Assam, may also have received gunpowder technology from China via Burma. The conventional view is that firearms were first introduced into Assam in 1527 or 1532 by the Muslims from Bengal, but this is no longer tenable. Some Ahom (Assamese) chronicles (*buranji*) suggest that firearms were employed before this time. In 1505 or 1523, after having subdued the Chutiya, who dwelled in the region between Tibet and Assam, the Ahom acquired cannon from them.[33] The Chutiya may have received gunpowder technology from Tibet as well. More sources reinforce the possibility of firearms being employed by the Ahom prior to the spread of firearms of Muslim origin. Jean-Baptiste Tavernier, who travelled in India in the seventeenth century, has left interesting information on gunpowder and firearms including rockets in Assam:

31 Tvansantuikvan Mahacansu, *Tvansan Mranma*, vol. I, pp. 361–2.

32 John Crawfurd, *Journal of an embassy from the Governor General of India to the Court of Ava* (London: R. Bentley, 1834), vol. II, p. 169. The funeral account is in Shorto, *Nidana Ramadhipati-katha*, pp. 26–7; emphasis added. Examples of references to fireworks in visitors' accounts include Father Sangermano, *A description of the Burmese Empire* (New York: Augustus M Kelley, 1969 reprint), pp. 123–4 and William Carey, 'An account of the funeral ceremony of a Burman priest', *Asiatic Researches*, 12 (1818): 187–90.

33 Lila Gogoi, *The* Buranjis*, historical literature of Assam: A critical survey* (New Delhi: Omsons Publication, 1986), p. 215; S. L. Baruah, *A comprehensive history of Assam* (New Delhi: Munshiram Manoharlal Publishers, 1985), pp. 230, 397; and Padmeswar Gogoi, *The Tai and the Tai kingdoms; with a fuller treatment of the Tai-Ahom kingdom in the Brahmaputra Valley* (Gauhati: Gauhati University, 1968), p. 289. The traditional view is found, for example, in Golap Chandra Barua, Ahom-buranji *(with parallel English translation) from the earliest time to the end of Ahom rule* (Guwahati: Spectrum Publications, 1985), pp. 61–8.

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> It is believed that this people in ancient times first discovered gunpowder and guns, which passed from Assam to Pegu, and from Pegu to China; this is the reason why the discovery is generally ascribed to the Chinese. Mir Jumla [who invaded Assam in 1662–3 and had met Tavernier in 1651] brought back from this war numerous iron guns, and the gunpowder made in that country is excellent. Its grain is not long as in the Kingdom of Bhutan, but is round and small like ours, and is much more effective than the other powder . . . [H]e [the king of Assam] had many guns, and an abundance of fireworks, somewhat like our grenades, which are fixed at the end of a stick as long as a short pike . . . and carry more than 500 paces.[34]

One account from 1662 stated that the Assamese 'cast excellent matchlocks and *bachadar* artillery, and show great skill in this craft. They make first-rate gunpowder. . . ' Ram Singh, Governor of Bengal, who led the invasions of Assam in the 1660s and 1670s, commented that 'every Assamese soldier is expert in rowing boats, in shooting arrows, in digging trenches and *in wielding guns and cannons. I have not seen such specimens of versatility in any other part of India*'.[35]

These comments and observations imply that the Ahom knowledge of gunpowder prior to the arrival of Muslim firearms in the sixteenth century may have prepared them for their masterly employment of firearms. The Assamese did have their own way of manufacturing gunpowder, and the Khasi in western Assam were able to manufacture gunpowder before the arrival of the British.[36] In particular, the Meithei or Manipuri learned the art of manufacturing gunpowder from the Chinese merchants who visited Manipur around 1630 (and probably even earlier) and experimented with making metal guns of large size. From the Manipuri the Kuki acquired gunpowder technology, which they were still using in the early twentieth century. In this context it is also important to note that the Manipuri employed rockets (*meikappi*, meaning 'shooting fire') by

34 Jean-Baptiste Tavernier, *Travels in India by Jean-Baptiste Tavernier* (London: Oxford University Press, 1925), vol. I, p. xvi and vol. II, pp. 217–8; Jadunath Sarkar, 'Assam and the Ahom in 1660 A. D', *Journal of the Bihar and Orissa Research Society*, 1 (1915): 192. On another occasion, Tavernier (vol. II, p. 210) also records on Bhutan: 'It is long since the Bhutanese first acquired the use of the musket, iron cannon, and gunpowder, which is of long grain, and is very strong. I have been assured that on their gun figures and letters are visible which are more than 500 years old. . .By the characters on the gun, as those who were able to read assured me, it had been made 180 years.' Even discrediting the '500 years' figure, 180 years would still allow a date of around 1470. Tavernier's record is not far-fetched, as the possibility did exist for the spread of firearms from China to Tibet and then to Bhutan, where military weapons including muskets figure prominently in a New Year festival. The festival was introduced into Tibet in 1408 (from China?) and then into Bhutan in the seventeenth century; Michael Aris, '"The admonition of the thunderbolt cannon-ball" and its place in the Bhutanese New Year Festival', *Bulletin of the School of Oriental and African Studies*, 39 (1976): 608, 617, 632. The year 1408 would have been very good timing for the dissemination of Chinese firearms to Tibet.

35 Quoted in Edward Gait, *A history of Assam* (Calcutta: Thacker Spink & Col, 1963 reprint), p. 253; emphasis added. Tavernier's account supports this observation: 'The [Mughal] Emperor is also followed by 300 or 400 matchlock men, who are timid and unskillful in firing, and a number of cavalry of no greater merit. One hundred of our European soldiers would scarcely have any difficulty in vanquishing 1,000 of these Indian soldiers. . . ' (*Travels in India*, vol. I, p. 311). The 1662 account is quoted in Sarkar, 'Assam and the Ahom', p. 192.

36 Nirmal Kumar Basu, *Assam in the Ahom age 1228–1826: Being politico-economic and socio-cultural studies* (Calcutta: Sanskrit Pustak Bhandar, 1970), p. 178; P. R. Gordon, *The Khasis* (London: Macmillan and Co., 1914), p. 24.

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the early eighteenth century – a war technology that they had acquired long before. In addition, the Naga in Manipur made powdered charcoal and sold it as gunpowder.[37]

Firearms may have reached India proper either from Assam or from Lower Burma. Iqtidar Alam Khan maintains that muskets and cannon appeared for the first time in India from the mid-fifteenth century. According to Parshuram Krishna Gode, *bana* ('arrow' in Sanskrit) appears in the sense of a 'rocket' in Indian historical sources only after 1400. The definite mention of rockets used in wars as a weapon during the period 1435–67 substantiates Gode's view.[38] The timing is rather crucial for our purpose. As the period between 1390 and 1474/5 witnessed the dissemination of firearms, cannon and rocket technology from Ming China to Burma and other regions of northern mainland Southeast Asia, one can presume that such knowledge could very well have travelled to India. Rockets were said to have been first invented and used in Dakhin in the Bahamani kingdom. If so, the technology could have spread from that kingdom to the Delhi Sultanate, or from south to north, rather than the other way around, as Khan has suggested.[39] Irfan Habib holds that *ban* 'did not come through the Islamic world, but apparently oversea directly from China through the Deccan'.[40] It more probably came 'overland', however, from China via Yunnan.

Sipsong Panna, Lan Na, Lan Sang

According to the *Ming shilu*, on 27 December 1405, on the pretext that Lan Na had obstructed the Ming mission to Assam (Gula), the Chinese army invaded its territory with support from Sipsong Panna, Hsenwi, Keng Tung and Sukhothai. Several places including Chiang Saen (Zheng Xian) were taken, and Lan Na surrendered. The number of the troops on the Ming side is not recorded, and the *Ming shilu* only mentions 2,000 from Yunnan and perhaps 15,000 from Sipsong Panna. According to the *Chiang Mai chronicle*, the Ming troops attacked Lan Na twice, once in 1402/3, and again in 1405/6. During the first invasion the Ming had 'a large army', and Lan Na mobilised 52,000 troops; twice Chiang Saen was the main battlefield, and twice the Ming armies were defeated.[41] The Ming threat was also felt in Nan, where a chronicle says that between 1389 and 1405, the spirits of Nan frightened away invading Chinese armies from Yunnan. The

37 T. C. Hodson, *The Meitheis* (London: D. Nutt, 1908), p. 21; L. Joychandra Singh, *The lost kingdom: Royal chronicle of Manipur* (Imphal: Prajatantra Publishing House, 1995), p. 10; Jyotirmoy Roy, *History of Manipur* (Calcutta: Eastlight Book House, 1973), p. 161; Jhalajit Singh, *Short history of Manipur*, p. 158; and B. C. Allen, *Naga Hills and Manipur: Socio-economic history* (Delhi: Gian Publications, 1980 reprint), p. 60.

38 The 1435–67 dates are in Khan, 'Origin and development', p. 28 and 'Role of the Mongols', pp. 40–1; on this issue see also his 'Coming of gunpowder', p. 43. On *bana* see Parshuram Krishna Gode, 'The history of fireworks in India between A. D. 1400 and 1900', in P. K. Gode, *Studies in Indian cultural history* (Poona: Prof. P. K. Gode Collected Works Publication Committee, 1960), vol. II, p. 50.

39 William Irvine, *The army of the Indian Moghuls: Its organization and administration* (New Delhi: Eurasia Publishing House, 1962), p. 148; Khan, 'Origin and development', p. 27. See also Khan, 'Early use of cannon', p. 157 and Khan, 'Role of the Mongols', pp. 39–40.

40 Irfan Habib, 'Changes in technology in medieval India', *Studies in History*, 2, 1 (1980): 32.

41 *MSL*, vol. I, pp. 199–120, 204, 208, 219; David K. Wyatt and Aroonrut Wichienkeeo, *The Chiang Mai chronicle* [henceforth *CMC*] (Chiang Mai: Silkworm Books, 1995), pp. 72–4; David K. Wyatt, *Thailand: A short history* (New Haven: Yale University Press, 1984), pp. 76–7.

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Ming retreated from Lan Na to Muang Yong and Chiang Rung (Jinghong, capital of Sipsong Panna) and stayed there for three years, causing a great deal of disorder.[42]

It is not clear which types of weapons were employed by the Ming side, but it is beyond doubt that firearms were used. The *Chiang Mai chronicle* states that the Chinese soldiers wore iron, copper and leather armor that could withstand the spears, swords, guns and arrows of the Lan Na armies.[43] The Lan Na side, then, was using 'guns', which should refer to firearms. This is not surprising, as either traders or deserters from Yunnan could have already introduced gunpowder technology, as had happened among the Maw Shan; such a theory is also supported by the report by Wang Ji quoted above stating that weapons from Yunnan were traded to Lan Na.

More direct evidence comes from the records of Lan Na. Around 1411 the people of Phayao cast a cannon of copper to attack the Ayudhyan invading armies: 'They fired volleys at the tower. Two hundred of the Southern [Ayudhyan] men in the fort died.' This is the first time that cannons appear in Lan Na accounts, as it seems that it had taken some years for that kingdom to make effective use of firearms. In 1443, cannons helped Lan Na subdue Phrae.[44] In 1457/8, the troops of Lan Na 'fired [firearms?] at the Southerners, *who died in great numbers*'. Also in this battle, the prince of Ayudhya was killed by a bullet in the forehead. In 1461/2, the people of Plang Phon (Kamphaengphet) employed 'guns'. In 1462/3, the king of Lan Na provided 2 cannon and 200 matchlocks to each of the three Shan chiefs of Muang Nai, Muang Tuk Tu and Muang Chiang Thong.[45] Cannon also played a big role in Lan Na's capture of Nan in 1476: 'They set up cannon and bombarded the city gate, and then took the city.' In 1485 firearms (*huoqiang* 火槍 in the Chinese translation) were used by the Lan Na troops in their fighting with the Kha Wa (Lawa or Wa) people.[46]

Furthermore, a rather detailed description of cannon and their use in the *Chiang Mai chronicle* renders more credence to the existence of cannon in Lan Na:

> [In 1443], the king [Tilokarat] reached Nan, and sent a force headed by the queen-mother, to take Phrae . . . The officer said to the queen, 'We should fire the *pu cao* cannon [into the city] if he does not surrender'. The queen then asked, 'Who knows how to [so] use the *pu cao* cannon?' There was a Vietnamese named Pan Songkram, who was a chief of a thousand, who said to the queen, 'I know how to use a *pu cao*'. . . [Pan Songkram] said, 'I

42 Manich Jumsai, *History of Laos*, 2nd edn (Bangkok: Chalermnit, 1971), pp. 64–5; James George Scott and J. P. Hardiman, *Gazetteer of Upper Burma and the Shan States* (New York: AMS Press, 1983 reprint), vol. II, pt. 1, p. 401. The ghosts are mentioned in David K. Wyatt, 'Presidential address: Five voices from Southeast Asia's past', *Journal of Asian Studies*, 53, 4 (1994): 1079–80.

43 *CMC*, p. 73.

44 W. A. R. Wood, *History of Siam from the earliest times to the year A. D. 1781* (Bangkok: Chalermnit, 1959 reprint), p. 78; *CMC*, pp. 69–70 (Phayao attack), 80-1 (Phrae). Phraya Prachakitchakonrachak (Chaem), *Yongnajia jinian* [The Yonok chronicle or *Phongsawadan Yonok*] [henceforth *Yonok*] (Kunming: Yunnan Minzu Xueyuan and Yunnan Dongnanya Yanjiusuo, 1990), p. 176, says that the Sukhothai side used a kind of firearm which appears as *huoqiang* (hand-gun) in the Chinese translation.

45 The battle of 1457/8 is mentioned in *CMC*, p. 86 (emphasis added) and Wood, *History of Siam*, p. 89. See *CMC*, p. 89 on Plang Phon and p. 97 on the Shan chiefs. The weapon translated as 'matchlock' here should have been a kind of Chinese-style hand-gun, as the matchlock invented in Europe only arrived in Southeast Asia after the sixteenth century.

46 *Yonok*, p. 198; also see *CMC*, pp. 101–2. The capture of Nan appears in David K. Wyatt, *The Nan chronicle* (Ithaca, NY: Cornell University Southeast Asia Program, 1994), p. 53 and notes 3 & 4.

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> will shoot the top off a sugar-palm tree close to the city-gate. When [the king] sees this, he will be terrified, and will submit, owing to the power of the *pu cao* cannon'. Then Pan Songkram actually shot off the crown of the sugar-palm tree. Thao Maen Khun [still] did not surrender. Then Pan Songkram said, 'I'll fire the *pu cao* [cannon] and shoot the trunk of the sugar-palm tree so that it splits from crown to root'. So Pan Songkram shot the *pu cao* cannon at the sugar-palm tree as he had said. Thao Maen Khun saw that and was sore afraid, and surrendered. . . [47]

Although Lan Na had acquired gunpowder technology from China by the early fifteenth century, it is rather interesting that in this case a Vietnamese is explicitly identified as able to operate cannon. This demonstrates Vietnamese superiority (in comparison to other Southeast Asians) in grasping firearm technology as a result of the Ming invasion and suggests that they even transmitted it to kingdoms such as Lan Na.[48] The account also demonstrates the effectiveness, power and relative accuracy of cannon. Whether or not the story about shooting a sugar-palm tree is true, it does show that Phrae was subdued due to the employment of cannon. Interestingly, cannon are called *pu cao* in Lan Na accounts, a term which may be at least partially derived from the Chinese word *pao*. The borrowing of a Chinese new word is indirectly supported by the fact that Burmese terms for firearms (*amrok senat*) were used in the Chiang Mai and Nan chronicles as a result of the Burmese conquest and rule of Lan Na from the late sixteenth century.[49] More will be said below about the Northern Thai kingdom in a broader regional context.

Another type of gunpowder technology – rockets – also spread overland from Ming China to Sipsong Panna, Lan Na and Lan Sang, as well as Burma, India and Đại Việt. As a military weapon, rocket arrows were employed by the Ming armies in the Maw Shan region as early as 1388, as discussed above. Several Tai-speaking peoples learned how to make rockets by the mid-fifteenth century. Homemade rockets (*punfai* or *bangfai* in Tai Lu, Lao and Thai, and *nu phai* in Shan) were used as weapons in Sipsong Panna in 1465, when Meng Le defeated 'ten thousand' troops from Meng Lian with only 600 soldiers but with the help of rockets. In addition, hand-guns and cannon (*qiangnu*

47 *CMC*, pp. 80–1. The name 'Pan' must be 'Phan', a popular Vietnamese surname, while '*Songkhram*' means 'war' in Thai (Christopher Goscha, personal communication).

48 For details, see Sun Laichen, 'Chinese military technology and Dai Viet: *c.* 1390–1497', in *Viet Nam: Borderless histories*, ed. Nhung Tuyết Trần and Anthony Reid (Madison: University of Wisconsin Press, forthcoming).

49 *CMC*, p. 73; Wyatt, *Nan chronicle*, p. 53 and notes 3 & 4. In addition to Chinese and Burmese terms for firearms, indigenous Tai Yuan words also appear in the *CMC*, such as *lambu/labu, kongnaa*, etc.; Aroonrut Wichienkeeo, personal communication. Martha Ratliff (personal communication) gave the following explanation of the term *pu cao*: 'It looks like the first part, *pu*, may be from *pao*^{4}. The Hmong-Mien words for firearms are also from Chinese (both *pao*^{4} and *qiang*^{1}), so it seems likely that everybody borrowed the technology and the words together from Chinese. If so, the question is – what is "*cao*"? Perhaps it would be useful to look for native Thai augmentatives; in Xuyong Miao, for example, the word for "cannon" is "[*pao*^{4}]-mother", or "mother gun" where "mother" means "big"'. Aroonrut has informed me that the word *pu cao* appears only once in the Chiang Mai chronicles and is certainly not a Tai Yuan (Northern Thai) word, so that a borrowing from the Chinese was possible. Based on Ratliff's suggestion, Aroonrut points out that *cao* in Tai Yuan indeed means 'lord, king, big, powerful, high'; thus *pu cao* means 'powerful cannon'.

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paohuo 槍弩砲火 in the Chinese translation) were used in domestic fighting in 1470 in Sipsong Panna.[50] In 1568, the King of Lan Sang employed rockets to fight with the armies of Toungoo Burma. By the seventeenth century, the Phuan in Xiang Khwang (now in Laos), then under the loose rule of the Lê dynasty of Đại Việt, used rockets and other firearms for military purposes.[51]

Đại Việt

The important topic of Chinese transfers of military technology to the Vietnamese has been studied in detail elsewhere and will be only very briefly summarised here for comparative purposes.[52] Such transfers can be traced to the beginnings of Chinese rule before the Common Era, but a new wave took place under the early Ming. In the 1300s Đại Việt's main enemy was to the south – Champa – and sporadic warfare took place for most of the century, increasingly dramatically from around 1370 onward. In 1390, the powerful Cham ruler known to the Vietnamese as Chế Bồng Nga was killed in a navy battle. The Vietnamese records (written in Chinese) attribute his death to the weapon called *huochong* – long understood as referring to cannon but more probably a hand-gun. (By early Ming times the word *chong* could mean either one.)[53] The Vietnamese use of this new weapons technology helped to permanently shift the balance of power between the two kingdoms.

These weapons may have been obtained from Chinese traders or military deserters, but the subsequent Ming invasion occupation of Đại Việt (1406–27) brought a more systematic transfer of military technology. Chinese firearms were a key element in the Ming defeat of Vietnamese resistance; they were particularly effective in defeating elephants, a force which had been a formidable obstacle to the Chinese over the centuries in their Southeast Asian campaigns.

Over the course of their occupation, however, the Ming troops gradually lost their technological superiority, as resistance emerged under the leadership of Lê Lợi and increasing numbers of Chinese weapons and other military supplies were captured in major battles between 1418 and 1425. In addition, Ming captives and defectors also provided military technology which the Vietnamese were able to copy.[54] Eventually Lê

50 On the 1465 battle see Dao Yongming, *Cheli xuanweishi shixi jijie* [Annotation of the genealogy of the Cheli Pacification Commission] (Kunming: Yunnan Minzu Chubanshe, 1989), pp. 93, 335. The events of 1470 are mentioned in Li Foyi, *Leshi* [The chronicle of the Lu kingdom] (Taibei: Furen Shuwu, 1983 reprint), p. 20 and Chen Xujing, *Leshi manbi: Xishuang Banna lishi shibu* [Annotation of and supplement to the history of Xishuang Banna] (Guangzhou: Zhongshan Daxue Chubanshe, 1994), p. 96.

51 Shorto, *Nidana*, pp. 132–3 (Lan Sang); the Phuan are mentioned in Phan Huy Chú, *Lịch triều hiến chương loại chí* (*Lichao xianzhang leizhi*) [Categorised collection of official documents of the consecutive dynasties] (Saigon: Phủ Quốc vụkhanh Đặc trách Văn hoá, 1972), vol. I, p. 113.

52 See Sun, 'Chinese military technology' for a much more thorough analysis of this subject.

53 Ngô Sĩ Liên, *Đại Việt sử ký toàn thư* (*Dayue shiji quanshu*) [Complete book of the historical record of Đại Việt] [henceforth *TT*] (Tokyo: Tokyo Daigaku Toyo Bunka Kenkyujo, 1984–6), vol. I, p. 464. The nineteenth-century *Khâm định Việt sử thông giám cương mục* (*Qinding Yueshi tongjian gangmu*) [The text and commentary of the complete mirror of Vietnamese history as ordered by the emperor] (Taibei: Guoli Zhongyang Tushuguan, 1969), vol. XI, p. 12a, uses the word *huopao* (cannon), but this was a later alteration.

54 *TT*, vol. II, pp. 532–3; Lê Quý Đôn, *Đại Việt thông sử* (*Dayue tongshi*) [A general history of Đại Việt] (Saigon: Bộ Văn hoá Giáo dục và Thanh niên, 1973), p. 30a.

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Lợi and his forces defeated the Chinese, and he established the Lê dynasty in 1428. After the Ming withdrawal, an independent Đại Việt began to strengthen its navy and its arsenal of weapons. At the same time, Vietnamese rulers paid more attention to obtaining adequate supplies of materials such as saltpeter and copper. The Vietnamese had experienced their own 'military revolution' and become a 'gunpowder empire' in their own right.

The role of military technology in the emergence of northern mainland Southeast Asia

The period from the mid-fifteenth through the early sixteenth centuries witnessed the general emergence of northern mainland Southeast Asia as a geopolitically important region. Important developments during this time included the rise of the Maw Shan and their confrontation with the Ming in the 1430s and 1440s, the expansion of Lan Na (Chiang Mai) and especially of Đại Việt during the 1430s–80s, the rise of the Shan of Mong Mit and Mohnyin between the 1480s and 1527 and the expansion of the Ahom in the early sixteenth century.[55] The rise of these new powers in the region was due to several factors, including the growth of trade, agriculture and population, but the transfer of military technology from Ming China must have also played a part. Although available sources do not permit us to draw a clear picture of the connections between military technology and the rise of these forces, it would seem that the correlation cannot be easily denied.

The rise of the Maw Shan

Luchuan re-emerged soon after its temporary defeat by the Ming in 1388. In 1413, Sirenfa became Pacification Officer (a title conferred by the Chinese Court) after the deaths of his father Silunfa and elder brother Sixingfa (r. 1399–1413), but 'exceeded [them] in cunning' and 'determined to restore the old territories his father had lost'. After about ten years Luchuan must have accumulated enough strength to do so, and he embarked on a series of expansionist activities. In December 1422 Luchuan took some territories from Nandian and did not return them until 1430, when it also occupied Mengyang. In 1436 it made incursions into Mengding and Wandian, killing people and destroying stockades, and two years later it was reported to have repeatedly invaded Nandian and several other localities. Some time before 3 July 1439 it invaded or looted Jingdong, Mengding, Dahou and Menglian.[56] The expansion of Luchuan is also reflected in Dai accounts; one source vividly describes how the Maw Shan took advantage of their firearms – including home-made cannon and hand-guns – to expand from Meng Mao and conquer Meng Mian (modern Lincang) and other regions inhabited by non-Tai-speaking groups such as the Lahu, La and Men. One oral tradition has it that this particular Tai people migrated from Meng Mao to Geng Ma and that Han officers taught them to use copper hand-guns and cannon, enabling them to defeat the native Wa and drive them into the mountains.[57]

55 For details see Sun, 'Ming-Southeast Asian', ch. 7.

56 *MSL*, vol. I, pp. 377, 493–4 (Nandian), 495–6 (1430); vol. II, p. 538 (1436 and quotation), 550–2 (1438), 560, 574 (1439).

57 Sang, 'Luelun', p. 465. The Maw Shan campaigns are recounted in Zhandahunhong, *Jinggu tusi shixi* [The genealogy of the Jinggu *tusi*], trans. Dao Yongming *et al.* (Kunming: Yunnan Minzu Chubanshe, 1990), pp. 83–7.

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The Ming government issued reprimands and warnings, but the Maw Shan paid them no heed, and two military expeditions to Luchuan by Yunnan troops in 1439 and 1440 (with 6,000 and 50,000 men respectively) ended in total failure.[58] Eventually the Court decided to mobilise imperial troops to solve the problem, resulting in the well-known 'Three Expeditions against Luchuan', which began in 1441 and ended in 1449. In the campaigns between the Ming and Maw Shan both sides employed firearms. For example, around 12 September 1441 the Maw Shan invaded Jingdong and Weiyuan with 30,000 troops and 80 elephants. The Chinese armies fired hand-guns and fire-lances (銃矢俱發) to defeat them, killing 352 people and capturing many banners, drums, helmets, pieces of armor and especially hand-guns and cannon. From 14 to 23 November 1441, the two sides fought a series of battles around a Shan stronghold called Shangjiang near Jinchi; Ming soldiers numbering over 20,000 attacked from different directions, but Shan defenses were tight. The Shan fired firearms and crossbows, as described in the *Ming shilu*: 'The [bullets and arrows] and flying stones from the hand-guns and crossbows dropped alternatively like rain (銃弩飛石, 交下如雨)'. After about four days, the Ming side eventually succeeded in destroying stockades by setting them on fire following a strong favourable wind; altogether more than 50,000 Shan were allegedly killed.[59] During the second half of December 1441, 8,000 crack Ming troops fought more than 20,000 Shan on Shanmulong Mountain (between modern Lianghe and Longquan); the latter's seven connected stockades were broken and several hundred Shan died.

In early January 1442 the Ming and Shan fought their biggest battle at Meng Mao or Selan (modern Ruili), the Maw Shan capital. Initially the Shan mobilised elephants to rout the Ming troops, but without success; the Chinese forces eventually besieged the Shan capital and attacked from six different directions. Three different Tai sources, whose authors must have been impressed by Chinese firepower, emphasise that Ming cannon (including the one called 'ox-tail cannon' [牛尾砲] which blew off the roof of the palace) intensively bombarded Meng Mao, though the *Ming shilu* stresses that the imperial troops again employed fire in a favourable wind to burn buildings, killing 'countless' Shan. Sirenfa and his family fled to Meng Yang (Mohnyin), but several tens of thousands of his followers – one source says more than 100,000 – drowned in the Mao (Ruili) River. On 26 January 1442 the Ming troops withdrew after a battle at Meng Mao lasting about two weeks. Several years later, in March 1449, the last battle was waged on the Guiku (literally 'ghosts crying') Mountain along the west bank of the Irrawaddy; to break the Shan stockades, Ming troops employed logs, stones and firearms. In the words of the *Ming shilu*, '[the noise] of the logs and stones was like thunder, [the bullets and arrows] from the hand-guns and fire-lances (or rockets) dropped like rain' (木石如雷, 銃箭如雨).[60]

58 Sang, 'Luelun', pp. 557–8, 560, 568–70.

59 *MSL*, vol. II, pp. 600, 603–4; on the September 1441 campaign, see also Zhandahunhong, *Jinggu*, pp. 21–6.

60 *MSL*, vol. II, p. 697; accounts of the 1442 campaign are on pp. 605–6. On the latter campaign see also Gao Dai, *Hongyoulu* [A record of a great scheme] (Shanghai: Shanghai Guji Chubanshe, 1992 reprint), p. 213; Zhaopayatanmatie Kazhangjia, 'Hemeng gumeng: Meng Mao gudai zhuwangshi' [A history of the kings of Meng Mao], in *Meng Guozhanbi ji Meng Mao gudai zhuwangshi* [Histories of Kosampi and the kings of Meng Mao], trans. Gong Xiaozheng (Kunming: Yunnan Minzu Chubanshe, 1990), p. 102; Dao Paihan, *Meng Lian xuanfushi* [The history of the Meng Lian Pacification Office] (Kunming: Yunnan Minzu Chubanshe, 1986), p. 47; and Song, *Meng Meng*, pp. 88–9.

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Nevertheless, even this defeat did not bring an end to the Maw Shan cause. Silu, Silunfa's younger son, fled to Meng Yang (now in northern Burma) and took control of it. About three decades later, the Maw Shan at Meng Yang, though now in modern northern Burma, emerged for the third time and eventually sacked the Ava kingdom in 1527, beginning a brief 'Shan period' in Burmese history. So far as it can be traced, the rise of Meng Yang benefited from its gem trade with Ming China, but military technology may have played a role as well.[61] Actually the two factors may have been closely related, as increased economic strength could have allowed the Shan to mobilise more troops and produce or purchase more firearms. The Maw Shan who fled from Meng Mao to Meng Yang no doubt brought gunpowder technology with them. For example, between 1511 and 1527 the Shan from Meng Yang employed firearms in their fighting with the Burmans (see the terminology mentioned in Table 1).

The Maw Shan mastery of gunpowder technology at least partially explains their rapid expansion during the first half of the fifteenth century and the differences between their second contest with the Ming and their previous encounter. The second conflict was extremely prolonged, spanning nearly a decade from 1441 to 1449, and the Ming mobilised a much larger number of troops – between 50,000 and 150,000 for each campaign – along with another 500,000 responsible for logistics and a large number of Tai troops fighting on the Ming side. A Shan source acknowledges that the Ming finally crushed the Maw Shan due to their numerical and military supremacy, but only with stupendous efforts and certainly at an extremely high price. A contemporary historian commented that 'Wang Ji had mobilised the resources of the whole country, marshaled the armies of several provinces, and spent as long as over ten years, but eventually still failed to destroy its chief.'[62]

The 'golden age' of Chiang Mai

Lan Na entered a period of territorial expansion, economic prosperity and religious and cultural efflorescence, especially during the period of *c.* 1400–1525; this section will only deal with the expansion. During the reign of Tilokarat (r. 1441/2–87), Lan Na entered its golden age and the pace of its expansion accelerated. (In 1436, even before he took the throne, the Ming court received a report that in the previous year Lan Sang had been fighting against Lan Na.) Keng Tung became a vassal state of Lan Na around this time, as in 1443/4 its ruler received investiture from Chiang Mai.[63] War with Nan broke out in 1443/4, and that kingdom fell a few years later; in 1443, Phrae was subdued with the help of cannon operated by a Vietnamese, as mentioned above. In 1449, war with Luang Prabang took place, followed by nearly a decade of sporadic warfare with Sipsong Panna. Military expeditions to the Shan region were conducted between 1462 and 1471,

61 For details see Sun Laichen, 'Shan gems, Chinese silver, and the rise of Shan principalities in northern Burma, *c.* 1450–1527', in *Southeast Asia in the 15th century: The Ming factor*, ed. Geoff Wade and Sun Laichen (Singapore: Singapore University Press, forthcoming).

62 Gao, *Hongyoulu*, p. 215. The Shan comment is from Zhaopayatanmatie, 'Hemeng gumeng', p. 102.

63 A. B. Griswold and Prasert na Nagara, 'An inscription from Jengtung (1451)', *Journal of the Siam Society* [henceforth *JSS*], 66, 1 (1978): 71, 82. Also see Hans Penth, Jinakalamali *index: An annotated index to the Thailand part of Tatanapanna's chronicle* Jinakalamali (Oxford: Pali Text Society, 1994), pp. 51–2. The conflict between Lan Na and Lan Sang is mentioned in *MSL*, vol. II, p. 539.

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following which there were wars with the Lawa and again with Sipsong Panna, and in the 1520s Lan Na once again attacked Keng Tung. Under these circumstances, it is not surprising to read of Lao complaints to the Ming about Lan Na's incursions into Lan Sang's territory.[64]

In the prolonged wars between Lan Na and Ayudhya, especially during the reign of Tilok, the northern kingdom was at least equal in strength to its rival to the south. Several times Lan Na was on the offensive, and in 1463, facing the threat from Chiang Mai, Ayudhya moved its capital to Phitsanulok.[65] In the words of David Wyatt, 'For all the inconclusiveness of [Tilok's] warfare against Ayudhya, the Kingdom of Lan Na now was stronger than ever before. More than any of his predecessors, Tilok had made it a power to reckon with, a state whose influence extended hundreds of miles in every direction.' Keith Taylor is critical even of this idea of 'inconclusiveness', stating that 'Ayutthya-Lan Na warfare of this time is often labeled a stalemate, yet this is not true, for it was decisive in that Lan Na successfully repelled Ayutthyan armies and grew stronger and more cohesive in the process...'[66] Given that Ayudhya's territory and population were certainly much larger and its resources much richer than those of its rival, especially after the Siamese absorption of Sukhothai, Lan Na's success appears all the more impressive. In 1515, however, Ayudhyan forcec dealt Lan Na its 'most serious blow' for many years, which W. A. R. Wood attributed to military advice and assistance from the Portuguese.[67]

Lan Na's astonishing prosperity and its successful resistance against – and even victories over – Ayudhya greatly puzzled one Siamese ruler, who sent a spy to Chiang Mai in search of intelligence regarding his rival's success.[68] Indeed, the strength of Lan Na impressed both contemporary Siamese and modern scholars. Wyatt attributes Lan Na's 'all the more surprising' success to its administrative and strategic factors. Michael Vickery also points out that Chiang Saen became extremely wealthy and important judging by its architectural remains in the fifteenth and sixteenth centuries; he hypothesises that it must have gained wealth from trade along the river.[69] However, other factors such as Lan Na's utilisation of Chinese-style gunpowder technology should be also taken into account.

The southward and westward expansion of Đại Việt (c. 1470s–1480s)

The reign of Emperor Lê Thánh-tông (r. 1460–97) is often viewed as a 'golden age' in Vietnamese history; certainly it witnessed a phase of rapid and unprecedented internal

64 Izui Hisanosuke, 'Decipherment of the Pa-po vocabulary and epistles', *Kyoto Daigaku Bungakubu Kenkyu Kiyo*, 2 (1951): 77. Accounts of the fifteenth-century conflicts mentioned here are in *CMC*, pp. 80–90, 97–8, 101–2; Wyatt, *Nan chronicle*, pp. 55–63; and Li Foyi, *Leshi*, pp. 16–7. On the second attack on Keng Tung see *CMC*, p. 107 and Scott and Hardiman, *Gazetteer*, vol. II, pt. 1, p. 404.

65 Charnvit Kasetsiri, *The rise of Ayudhya: A history of Siam in the fourteenth and fifteenth centuries* (Kuala Lumpur: Oxford University Press, 1976), pp. 137–8; Wyatt, *Thailand*, pp. 77–80.

66 Ibid., p. 80; Keith W. Taylor, 'The early kingdoms', in Tarling ed., *Cambridge history*, vol. I, p. 171.

67 Wood, *History of Siam*, p. 99. One can get a rough idea on the territory of Lan Na and Ayuthya by glancing at the map in Wyatt, *Thailand*, p. 87. The population figures, however, are not available.

68 *CMC*, p. 84.

69 Michael Vickery, 'The Lion Prince and related remarks on Northern history', *JSS*, 64, 1 (1976): 369–70, 377. Wyatt's remark is in his *Thailand*, pp. 74–5; see also Lieberman, 'Europeans', p. 212. Siamese comments on the strength of their northern neighbors, specifically Phrae and Nan, are in Vickery, 'The 2/K.125 fragment, a lost chronicle of Ayutthya', *JSS*, 65, 1 (1977): 47.

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consolidation and external expansion which translated into permanent territorial acquisition. The most significant example of this expansion was Đại Việt's sack of Champa, which had taken advantage of the Ming occupation to reconquer some territory previously lost to its neighbour. By the mid-fifteenth century the two rivals were once again at war.[70] The Cham seem to have held their own until late 1470, when Thánh-tông personally led a major military campaign – apparently well supplied with firearms, as he composed a poem which claimed that 'the booming of the thunder-cannon shakes the earth'. In March 1471 the Cham capital Vijaya collapsed after four days of siege, during which the Vietnamese fired signal-guns and presumably used other forms of firearms as well, though the sources are not helpful on this subject. Đại Việt annexed about four-fifths of Champa's total territory, and Champa never recovered. There is no evidence that the Cham ever acquired firearms; a Chinese source reported in 1441 that their army was 'weak' and that the guards on the city walls were armed only with bamboo spears. There is certainly no reason to doubt Lê Thánh-tông's claim in his war proclamation to the King of Champa that Đại Việt possessed more troops and better weapons.[71]

The Vietnamese also began to take a more aggressive position toward the territories to the west. In the fall of 1479, Đại Việt, with a force claimed by Vietnamese sources to number 180,000, launched invasions into Muong Phuan (which they called Bồn Man) and Lan Sang. They went on to invade Nan (then under Lan Na's control) and then threaten Sipsong Panna.[72] Finally, Vietnamese troops penetrated as far as the Irrawaddy River in the Ava kingdom, an incursion confirmed by Chinese and Vietnamese sources. Ming warnings and resistance from Lan Na and Lan Sang forces eventually brought an end to Đại Việt's 'long march' throughout mainland Southeast Asia, and the Vietnamese withdrew in 1484.[73]

Conclusion

In the long run, within Southeast Asia the Vietnamese stood out for their impressive numbers and skillful use of firearms. Đại Việt – not Champa, Burma, Ayudhya or any other kingdom – impressed Tomé Pires at the very beginning of the sixteenth century

70 *MSL*, vol. I, pp. 244, 332.

71 *Thiên nam dư hạ tập* [*Tiannan yuxiaji*] [Collection of works written during leisure time in the south] (EFEO microfilm A. 334), 'poetry section', p. 102a, 'Champa section', p. 2b (quotation); Georges Maspéro, *The Champa kingdom: The history of an extinct Vietnamese culture* (Bangkok: White Lotus Press, 2002), p. 117. The Chinese report is in Wang Ao, *Zhenze jiwen* [Notes of Wang Ao], in *Ming Qing shiliao huibian* [Compilation of Ming and Qing historical documents], ed. Shen Yunlong (Taibei: Wenhai Chubanshe, 1967), vol. I, 26b; see also *MSL*, vol. II, p. 599. The fact that the terms for weapons in a fifteenth-century Cham–Chinese dictionary all designate traditional ones (spear, lance, etc.) supports the Chinese observation; C. O. Blagden and E. D. Edwards, 'A Chinese vocabulary of Cham words and phrases', *Bulletin of the School of Oriental and African Studies*, 10 (1940–2): 53–91.

72 On the Lao campaigns see *Tây nam biên tái lục* [Record of the frontier passes to the west and south] (microfilm of Société Asiatique manuscript), pp. 23a–33a; *TT*, vol. II, pp. 705–10; and Martin Stuart-Fox, *The Lao kingdom of Lan Xang: Rise and decline* (Bangkok: White Lotus, 1998), pp. 65–6. The attack on Nan is mentioned in *Nan chronicle*, p. 57 and *CMC*, pp. 98–9. On the threat to Sipsong Panna, see *MSL*, vol. II, pp. 813, 818, 828.

73 The incursion into Ava is mentioned in *Tây nam*, p. 31a and *TT*, vol. II, p. 710; for the Vietnamese withdrawal, see *MSL*, vol. II, p. 837.

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with its large-scale production of firearms, prior to the arrival of European weaponry. He observed:

> [H]e [the Lê ruler] has countless musketeers, and small bombards. A very great deal of [gun]powder is used in his country, both in war and in all his feasts and amusements by day and night. All the lords and important people in his kingdom employ it like this. Powder is used every day in rockets and all other pleasurable exercises. . . [74]

Gunpowder technology was not the exclusive preserve of the mainland; it had been introduced to maritime Southeast Asia via Zheng He's expeditions and maritime trade. A small bronze Chinese handgun dated in 1421 was found in Java, for example, and by the mid-fifteenth century cannon and fireworks were being manufactured by Chinese Muslims there.[75] Even so, modern historians have pointed out that maritime peoples – the Malays, Javanese and Achinese, for example – though they may have been familiar with firearms before 1511, never 'developed their artillery into a very effective arm'.[76] (This was of course true of the Siamese and Burmese as well, at least in comparison with the Vietnamese.) Equally importantly, in maritime Southeast Asia firearms were adopted more for their spiritual power than for practical value.[77]

Relatively abundant sources in several languages have shown convincingly that during the late fourteenth and early fifteenth centuries Chinese gunpowder technology spread throughout Southeast Asia via both the overland and maritime routes, long before the arrival of European firearms. Chinese firearms spread intensively to the northern mainland region via overland routes and had a much more profound impact on its history than Western weaponry. Partially as a result of Chinese technology, as this research has tried to argue, firearms played an important role in territorial expansion in Luchuan (Maw Shan), Lan Na, and especially Đại Việt. Taking advantage of Chinese-derived military technology, the Vietnamese could eventually defeat their old enemy Champa, whose disappearance became only a matter of time, and make a short-lived but unprecedented 'long march' as far the territory of the Ava kingdom.

Thus the political geography of eastern mainland Southeast Asia changed forever, and to some extent military technology paved the way for this change.[78] This research challenges the 'maritime mentality' which stresses the external stimuli via maritime

74 Pires, *Suma oriental*, vol. I, pp. 115, 203.

75 On the Zheng He expeditions and their export of military technology to maritime Southeast Asia, see J. R. Partington, *History of Greek fire and gunpowder* (Cambridge: W. Heffer, 1960), pp. 223, 275; *MSL*, vol. I; Jung-pang Lo, 'The termination of the early Ming naval expeditions', in *Papers in honor of Professor Woodbridge Bingham: A festschrift for his seventy-fifth birthday*, ed. James Bunyan Parsons (San Francisco: Chinese Materials Center, 1976), p. 137; Needham, *Science and civilisation*, vol. IV (*Physics and physical technology*), pt. 3 (*Civil engineering and nautics*), p. 516 note b. The Java examples are mentioned in H. J. de Graaf, *Chinese Muslims in Java in the 15th and 16th centuries: The Malay annals of Semarang and Cerbon*, ed. Merle C. Ricklefs and trans. H. J. de Graaf and Th. G. Th. Pigeaud (Melbourne: Monash University, 1984), pp. 18, 24, 32, 85, 198.

76 Boxer, 'Asian potentates', pp. 162 (quotation), 165–6; Li, *Nguyen Cochin China*, pp. 44–5.

77 Andaya, 'Interactions with the outside world', pp. 392–3, 395.

78 This research argues against technological determinism and for multifactoral interpretation of the downfall of Champa; see Sun, 'Chinese military technology and Dai Viet'.

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channels for Southeast Asian history but overlooks its overland counterparts. The transfers of Ming military technology to northern mainland Southeast Asia and the implications for the history of the region's overland connections with China were and have been significant and even crucial.

This research is also relevant to the studies of the 'early modern' period in Southeast Asian, and even world history. The spread or diffusion of technology, including gunpowder technology, has been identified as one of the markers of early modernity.[79] However, due to the lack of research on the dissemination of Chinese gunpowder technology to Southeast Asia from the late fourteenth century, the arrival of Portuguese firearms in the region in the 1500s has often been considered – understandably – as the starting point of revolutionary technological change in the early modern time.[80]

At a higher level this research can be tied into global or world history. Theoretically 'military history' is no longer 'European military history' and has now become 'global military history', but in practice it is still Eurocentric. Carlo M. Cipolla, Geoffrey Parker and William H. McNeil have all shown how superior European military technology led to the 'rise of the West' from 1450 on, and during the 'age of gunpowder empires' the latter (such as late Ming and Qing China) were born only as a result of the arrival of European firearms.[81] One gets an impression from these works that the Chinese only invented firearms but never or seldom put them into use, and that it was only after the Europeans improved them that the Chinese and other Asian people could effectively employ them and hence begin to affect history. The common view regarding the uselessness of early firearms, including European ones, was expressed as early as the 1520s:

> Before the year 1494, wars were protracted, battles bloodless, the methods followed in besieging towns slow and uncertain; and although artillery was already in use, it was managed with such lack skill that it caused little hurt.[82]

What these writers have missed is the dynamic pre-European era (roughly 1350–1450) in Asia when firearms were widely used. Efforts are needed to build statistics, but sources probably will allow us to say that early Ming China and early Đại Việt (as well as early Choson Korea) were the first gunpowder empires in world history. In addition

79 Fernand Braudel, *Civilization and capitalism, 15th–18th Century*, tr. Sian Reynolds (New York: Harper & Row, 1981), vol. I, ch. 6; Anthony Reid, 'Introduction: A time and a place', in Reid ed., *Southeast Asia in the early modern era*, pp. 12–4; John F. Richards, 'Early modern India and world history', *Journal of World History*, 8, 2 (1997): 197–209.

80 Reid, 'Introduction', pp. 12–14; Victor B. Lieberman, 'Transcending East–West dichotomies: State and culture formation in six ostensibly disparate areas', in *Beyond binary histories: Re-imagining Eurasia to c. 1830*, ed. Victor B. Lieberman (Ann Arbor, MI: University of Michigan Press, 1999), pp. 70–2.

81 Carlo M. Cipolla, *Guns, sails and empires: Technological innovation and the early phases of European expansion, 1400–1700* (New York , Pantheon, 1966); William H. McNeill, *The pursuit of power: Technology, armed force, and society since A.D. 1000* (Chicago: University of Chicago Press, 1982), ch. 2; McNeill, *The age of gunpowder empires, 1450–1800* (Washington, DC: American Historical Association, 1989); Parker, *Military revolution*. Jeremy Black has redressed with some success the Eurocentric treatment of military history by paying attention to the rest of the world and to wars fought without European weapons; see his *War and the world: Military power and the fate of continents, 1450–2000* (New Haven: Yale University Press, 1998) and *War in the early modern world, 1450–1815* (Boulder: Westview, 1999). However, by rigidly following the conventional periodisation of the early modern period, he has missed the very dynamic 100-year period in Asian history between *c.* 1350 and 1450.

82 Francesco Guicciardini, *Counsels and reflections* (1528), quoted in Parker, *Military revolution*, p. 10.

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to the several important dates related to the effective use and significant transfer of European firearms, such as 1453, when Constantinople collapsed before the Turks due to the help of Hungarian and German gunners and when the French finally drove out the English from Normandy using heavy artillery pieces, thus ending the Hundred Years War; 1511 (the fall of Melaka); and 1543 (the arrival of European firearms in Japan), other dates related to Asian (Chinese) firearms are equally important. Significant milestones would include 1368 (the founding of the Ming), 1388 (the defeat of the Maw Shans), 1406–27 (the Chinese invasion and occupation of Đại Việt) and 1471 (the collapse of the Cham capital Vijaya). All these should be attributed, at least partially, to the help of firearms.

The sources cited in this research demonstrate that Chinese and Chinese-derived firearms indeed killed large numbers of people. One has to admit that the improved European firearms when they arrived were much more effective and accurate, which is why they quickly superseded Chinese arms in the region. On the other hand, it must also be acknowledged that before the arrival of European weapons Chinese-style firearms could be also effective, especially when used against those who had none.

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