An Accelerating Divergence? The Revisionist Model of World History and the Question of Eurasian Military Parity: Data from East Asia

Tonio Andrade

Abstract. Over the past few years, this journal has hosted an important debate: Joseph M. Bryant's bold assault on the revisionist model of global history and the revisionists' equally trenchant defense. A key point of contention is Europeans' relative military modernization vis-à-vis Asians. This article adduces new data from East Asian military history to try to advance the debate. First, it argues that there was a Chinese Military Revolution in the 1300s, which compels us to place the European Military Revolution in a larger, Eurasian context. Second, it uses data from the Sino-Dutch War of 1661–8 to explicitly compare Chinese and European military technology. It concludes that the revisionists are correct that Asian societies were undergoing military modernization along the lines of those in western Europe and that the model Bryant defends is incorrect because it presumes that Asian societies are more stagnant than the evidence warrants. Yet counterrevisionists like Bryant are correct that military modernization was proceeding faster in Europe, which may indicate that they are correct that there was an early divergence — slight but accelerating — between the west and the rest of Eurasia.

Résumé. Au cours des dernières années, cette publication a été le siège d'un important débat : l'audacieuse atteinte de Joseph M. Bryant au modèle révisionniste de l'histoire globale et la défense tout aussi tranchante des révisionnistes. L'importante pomme de discorde est la relative modernisation militaire de l'Europe par rapport à celle de l'Asie. Cet article apporte de nouvelles données de l'histoire militaire de l'Asie de l'Est dans le but de faire avancer le débat. Premièrement, il fait valoir qu'il y avait une révolution militaire chinoise dans les années 1300 ce qui nous oblige à placer la révolution militaire européenne dans un contexte plus vaste, notamment eurasien. Deuxièmement, il utilise des données de la Guerre Sino-Hollandaise de 1661-8 pour comparer, en détail, les technologies militaires chinoise et européenne. Il conclut que les révisionnistes sont corrects, c'est-à-dire que les sociétés asiatiques modernisaient effective-

ment leurs armées en s'inspirant de l'Europe occidentale, et que le modèle que Bryant défend est incorrect parce qu'il présume que les sociétés asiatiques sont plus stagnantes que le preuve ne l'indique. Pourtant, des contre-révisionnistes comme Bryant sont corrects en disant que la modernisation militaire se déroulait plus rapidement en Europe, ce qui peut indiquer qu'ils sont effectivement corrects, qu'il y avait une divergence précoce – faible, mais avec un effet d'accélération – entre l'Ouest et le reste de l'Eurasie.

Over the past few years, this journal has hosted a debate central to the fields of world history and historical sociology: Joseph M. Bryant's bold assault on the revisionist model of global history and the revisionists' equally trenchant defense (Bryant 2006; 2008; Elvin 2008; Goldstone 2008; Langlois 2008).[1] According to the revisionist model, the most advanced societies of Asia were developing along paths similar to Western Europe, and the great divergence between Europe and Asia came much later than traditionally believed (Frank 1998; Goldstone 2000; Goody 2004; Pomeranz 2000; Wong 1997). It wasn't 1492, when Columbus sailed, or 1497, when da Gama sailed. It wasn't the Renaissance or the Scientific Revolution or the foundation of the English and Dutch East India Companies. It wasn't even 1757, when the Englishman Clive defeated a huge Bengali army at the famous battle at Plassey, inaugurating the British Empire in India. No, the revisionists argue, there was relative parity, both economically and technologically, between western Europe and developed regions of Asia until the late 18th century, when industrialization and its concomitant economic revolutions changed the game.

Bryant argues that "the revisionist position is both empirically suspect and analytically incoherent" (2006: 403).[2] He accuses the revisionists of distorting data and making ahistorical arguments, frustrated because he feels they are thinking ideologically, motivated not by a quest for knowledge but by political correctness, reacting to a perceived Eurocentrism (Bryant 2006:418). The revisionists, for their part, feel that the standard model of world history is indeed Eurocentric because it was formed during a time when we knew next to nothing about Asian history. They believe that the tremendous proliferation of data in Asian history over the past several decades must be reflected in new models and theories. Each side buttresses its position with impressive statistics and copious examples, but the argument seems no closer to resolution or even clarification today than when Bryant fired his first broadside in 2006.

1. The label "revisionist" is one that the revisionists seem to accept. See Goldstone 2008.
2. Bryant of course is not the only one attacking the revisionists. The relevant literature is huge and growing fast. A good place to start is Maddison 2003. See also Duchesne 2005; Vries 2005; and Broadberry and Gupta 2006.

One of the key points on which the two sides disagree has to do with a putative coercive advantage Bryant attributes to Europeans in the early modern period, the three centuries preceding the supposed great divergence between Europe and Asia. Bryant asks,

> If decisive European advantages in social capabilities only arose in the wake of industrialization, how are we to account for the preceding three centuries of European encroachment and conquest, and the increasingly manifest incapacity of the Asian powers to repulse the predatory intrusions of an unwelcome interloper? (2006:410)

Bryant feels that the revisionist model cannot answer this question, but revisionist Jack Goldstone offers compelling counterarguments (2008).

First, Goldstone argues that Bryant is wrong to suggest that Europeans were able to encroach significantly on Asian powers, many of which proved eminently capable of resisting European incursions. Second, Goldstone concedes that Europeans held a slight military advantage but denies that it was primarily a technological advantage. Instead, he compares Europeans to roving barbarian hordes whose victories over more powerful and advanced Asian states were due to the latters' internal weakness.

> The Europeans certainly had some striking tactical advantages in superior artillery and drill, but these did them absolutely no good against the Japanese (who developed superior firearms in the 16th century) or the Chinese…. They succeeded in India much as the Vandals had succeeded against Rome, or the Mongols had succeeded against China — relatively small groups of warriors, using superior battle-tactics and bent on plunder, have often conquered much larger, richer, and more sophisticated civilizations if those civilizations were undergoing their own processes of internal division and decay. (Goldstone 2008:128)

In a sharp rejoinder, Bryant insists that Europeans did possess a significant technological advantage over Asians, an advantage that was responsible for the west's "coercive advance" in Asia during the early modern period. "The European advance," he writes, "was made possible by a range of vastly superior power capacities based on rapidly improving technologies" (Bryant 2008:163). He offers some persuasive examples to make his point.

One of the literatures he cites is that of the Military Revolution Theory, which holds that Europeans' colonial success during the early modern period (1500–1800) is attributable to an advantage Europeans had in military practices, techniques, and technologies: broadside sailing ships, advanced guns, coordinated musket-firing techniques, and new types of fortresses (Parker 1996; 2000; Rogers 1995; Yerxa 2008a).

The Military Revolution is one of the most effective paradigms of world history, but what's odd is that not just Bryant but also the revisionists cite it to make their points. Bryant believes that Europeans' military advantages reflect a general lead European societies had over Asians, economically, politico-administratively, scientifically, and technologically (Bryant 2008:435, fn. 29). The revisionists admit that Europeans had a slight military advantage over other Eurasians but downplay the technological aspects of that advantage and deny that that military advantage reflects any general European superiority (Goldstone 2008:128).

Making the matter more complex, military historians themselves disagree about the relative efficacy of European and Asian arms and tactics. Whereas Geoffrey Parker and acolytes argue that Europeans held a significant technical advantage, largely in terms of naval power and effective fortification, his friend Jeremy Black argues back in pithy terms that any advantage Europeans might have had in the period before at least the end of the 17th century was slight and not due primarily to European military technology.[3]

So what are we to do? The evidence seems contradictory, pointing in opposite directions, and even specialists in military history don't agree about how to interpret it. Are we doomed to remain at an impasse?

No. There is cause for hope. The basic problem is that we have had little data about non-European military history. Military history itself has been severely neglected in an academy focused on social and cultural history. Most history departments in North America have no programs in military history. Equally importantly, military historians have generally focused on European wars, whose study makes up by two orders of magnitude the majority of their books and articles.

In the past several years, however, a coterie of younger scholars has vivified the study of non-western military history, and their conclusions are beginning to sweep the field and cause a sea change in our understanding of global military history (Lorge 2008; Gommans 2002; Gommans and Kolff 2001; Charney 2004; Sun 2000; 2003; Swope 2005; 2009; Chase 2003; and van de Ven 2000). One group argues that the military revolution began not in Europe but in China, specifically in the tumultuous warfare that attended the fall of the Yuan Dynasty and the start of the Ming (mid-1300s). "The founding of the Ming dynasty in 1368," writes historian Sun Laichen, "started the 'military revolution' not only in Chinese but also world history in the early modern period" (Sun 2000:31). He goes on to argue that "the 'military revolution' in China

3. Black's arguments against Geoffrey Parker can be found in various places in his voluminous oeuvre. Most important is perhaps Black 2000. See also Parker 2008 and Black 2008.

modernized its military forces and made it a military superpower and the first 'gunpowder' empire in the early modern world" (Sun 2000:75). Military technology allowed the Ming to expand rapidly, and that expansion spread handguns and cannons beyond its frontiers, with world historical consequences. Gunpowder states emerged at China's borders, expanding at the expense of their neighbours farther away from China.[4]

We must remember that the standard model that Bryant defends emerged at a time when many westerners still believed that gunpowder was invented in Europe (Needham 1987:62). Indeed, until the 1970s most historians in the west believed that the gun itself was a European invention (Chase 2003:xiii). Archaeological evidence has since then shown incontrovertibly that true guns — a gun being a metal tube that uses gunpowder to fire projectiles — were developed in China by no later than the mid 1200s. They became a mainstay of Chinese armies in the violent and extended wars at the end of the Yuan Dynasty (i.e., in the mid-1300s), wars that the Ming eventually won, thanks, in large part, to the fact that Ming troops were equipped with guns.

So what light does the Chinese Military Revolution Model shed on the revisionism debate? Goldstone says that the very fact that Chinese and Japanese arms were sufficient to resist Europeans supports the revisionist case. Bryant argues right back that East Asian forces were able to defeat Europeans only by adopting European technologies, which, he says, clearly demonstrates that Europeans had a significant technological lead already in the early modern period.

The Chinese Military Revolution theorists, for their part, freely admit that European guns in the post-1500 period were superior to Chinese guns. Indeed, they show that the Chinese adopted European guns with alacrity. Yet they interpret that alacrity as evidence not of China's relative backwardness but of China's relative modernization. The Chinese, they believe, saw European guns as variations on a theme, arguing that they were able to adopt them swiftly precisely because the military revolution had begun in China. Kenneth Swope, for example, shows in his outstanding work on the Sino-Japanese-Korean War of 1592–7, that "when Europeans brought their arms to Asia, they did not introduce the technology, but rather they supplemented and expanded the options already available to war-makers" (Swope 2005:20).

Swope and his colleagues show clearly how quickly, thoroughly, and effectively the Chinese incorporated European gun designs. The Ming had always taken firearms seriously, establishing bureaus to produce them and study them and train soldiers in their use. Ming army units —

4. This is a process Sun Laichen analyses compellingly for Southeast Asia. See Sun 2003, esp. p. 516).

for the whole of the nearly three centuries of Ming rule — were obliged to rotate periodically to the capital for gun training. When Portuguese guns arrived in the mid 16th century, the Ming quickly recognized their advantages, and the emperor established a special board to study them, produce them, and train soldiers in their use.

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

The case is by no means closed. Defenders of the standard model will point out that the Chinese Military Revolution argument doesn't challenge the basic point of the standard model. China may have developed guns first, but it was Europeans who perfected them, and this suggests that Europe was more dynamic than China, had more technological expertise, was more advanced. What we really need, then, is more data about the true military balance between East and West. How can we determine what kind of military lead Europeans had over Chinese and other East Asians?

The best way is to examine armed conflict between Europeans and East Asians, and one of the most illuminating wars is the Sino-Dutch War of 1661–1668, when a Chinese warlord named Koxinga defeated the Dutch and captured their colony of Taiwan, after which he then threatened the Spanish in the Philippines and increased his dominance of maritime shipping in East Asia. This was the most important conflagration between western European and Chinese forces before the Opium War two hundred years later. The Opium War, of course, was fought with industrial steamships, and China lost badly. The First Taiwan War was fought with the most advanced cannons and muskets and broadside warships of the time, and the Chinese won.

Both Goldstone and Bryant refer to this war explicitly, but, again, each takes a different lesson from it. Goldstone argues that Koxinga's victory over the Dutch and his overwhelming power vis-à-vis the Iber-

ians shows the limits of Europeans' coercive power in Asia. Bryant, citing my own work (Andrade 2004), fires back that Koxinga was victorious only by adopting European military technology.

I'm currently completing a large-scale study of this war, based on rich sources in Chinese and European languages. When I started the project, I was a partisan of the revisionist school that Bryant attacks. My first book addressed itself to precisely the question that Bryant raises in his first article, to wit, if the great divergence didn't occur until the 19th century, then how do we explain European colonialism in the three preceding centuries? My argument was orthodox by revisionist standards: the Dutch and Spanish were able to create colonies in East Asia (in Taiwan and the Philippines) for one main reason: because the main states in the region (China, Korea, and Japan) were uninterested in projecting maritime power. In contrast to western European states, China, Korea, and Japan either provided no support to their maritime merchants or actively forbade them to trade overseas. The rise of Koxinga changed the equation. He ruled a splittist government on the south China coast, and many of his revenues were gained from seaborne commerce. In contrast to most Chinese governments, his regime was focused on the seas. His ships clashed with Dutch and Spanish fleets, and eventually there was war. He ousted the Dutch from Taiwan and was making preparations to attack the Spanish in the Philippines when he died. I wrote in that book that Koxinga had little trouble defeating the Dutch in Taiwan and that he'd have defeated the Spanish in the Philippines if he'd actually launched an invasion (Andrade 2004; 2006; 2008b). This sort of reasoning wasn't unique to me. As another very careful historian — the redoubtable Jack Wills — wrote, "Nothing [the Dutch] could have done … would have enabled them to withstand the large and well-disciplined army with which [Koxinga] … landed on Taiwan" (1998:373).

As I delved deeper into the rich sources about Koxinga's invasion of Taiwan, I realized that I had been wrong. Although Koxinga had an enormous advantage over the Dutch in terms of numbers, he came much closer to losing the war than I'd expected (and than he'd expected, much to his frustration). The evidence suggests that European arms provided a clear advantage over Koxinga's, which explains how the Dutch were able to hold out for nine months against an army that was vastly larger, better trained, and more experienced. With a better strategy the Dutch might even have won the war.

I will be publishing the results of this research in a book-length study in 2011, and the full details of my arguments will be laid out there.[5] Here I will briefly adumbrate some of my most important findings.

5. The work will appear with Princeton University Press under a title yet to be determined.

One thing that may surprise both revisionists and counterrevisionists, although it won't surprise members of the Chinese Military Revolution school, is that European muskets and rationalized drilling techniques provided little if any advantage to the Dutch. Goldstone and Bryant both mention European muskets and modern drill, which are considered to form a key part of the military revolution. Muskets themselves were powerful guns, more accurate and effective than earlier handguns, but the key innovation that made them deadly on the battlefield was the famous musketry volley.

Developed in Holland in the late 1500s, the musketry volley was a coordinated firing technique. A company of musketmen lined up in several rows. The first row fired and then stepped back to reload, a time-consuming and sometimes dangerous process, while the second row fired, then, in turn, stepped back while the third row fired, and so on. In this way a trained company of musketeers could spew a constant spray of pellets. Pulling it off required enormous discipline, because the musketeers had to coordinate their actions precisely, firing in concert and, even more difficult, kneeling to load in the face of enemy attacks, trusting their comrades to cover them. To achieve this complex coordination, the Dutch developed rigorous drill regimens. This "revolution in drill" spread outward from Holland through Europe, with Dutch drilling manuals translated and reprinted and Dutch drill instructors sought after throughout Europe. It was, in the European context at least, a revolutionary change, but how did the musket company fare outside Europe?

In fact, volley fire was already known in Asia. Military historians have long known that the Japanese developed the volley fire technique before the Dutch did. It seems to have been an independent invention, which is one reason military historians have treated the Japanese as an exception in global military history, with warfare that resembled in many ways that in Europe, at least until Tokugawa unification stopped military innovation in the course of the 17th century. But military historians didn't know until very recently that the Chinese had developed volley fire as early as the 1380s, two centuries before anyone else.[6]

So how did Dutch musket companies fare against Koxinga's troops? Dutch muskets worked well in sniping, when hidden behind the crumbling walls of an abandoned hospital, for example, but Koxinga matched this efficacy with his own musket corps of freed African slaves, who sniped right back from the walls of an abandoned market.

It is in set battles — soldiers marching against other soldiers — that we might really judge the relative efficacy of European musket compan-

6. The first use of the technique is attested in a Chinese battle of the mid-1300s (Sun 2003:500).

ies. We have only two such engagements to draw on for data during the Sino-Dutch War. In both of them, the Dutch musketeers were utterly defeated. Although Koxinga's troops were armed primarily with nothing more than bow and arrows and saber-staves (a sort of slashing lance) and, indeed, presented an air of anachronism (one Dutchman described them as looking like ancient Roman centurions), they completely routed the Dutch, who, in each engagement, broke formation and ran in panic. There are many contingent factors, of course — leadership, odds, terrain, the relative experience of troops, etc. — so one must be cautious drawing large conclusions from two engagements. But one thing is clear. The Netherlands may have been the birthplace of the discipline and drilling techniques that swept Europe, but Koxinga's troops proved much, much better disciplined than the Dutch-trained forces they faced.

Members of the Chinese Military Revolution School discuss in detail the drilling techniques of Ming China. Just as drilling manuals were being published in Europe, with detailed descriptions of techniques and pictures of drilling patterns, so a similar thing was happening in China. The most famous of these manuals was that of the Ming military genius Qi Jiguang, but there were scores of such tracts published, and some were even published by Koxinga and his clan.[7] Koxinga drew on this tradition in developing his own drills, and all the evidence suggests that he took drilling extremely seriously. He built a special Pavilion of Military Arts that overlooked a dedicated drilling field, where he personally trained his troops, getting down on the ground and giving instructions. He held huge inspections, in which his more than hundred thousand troops paraded in formation before him and his generals, and when he found anything wrong — even slightly — with their drilling, he punished their officers (Chen 1981:112–119). He published his drilling methods — separately for land and naval forces — and made sure they were distributed among his men (Chen 1981:112).

So the idea that European drilling techniques and military discipline were more advanced than those elsewhere in Eurasia, and part of a uniquely "western way of war," must be reexamined (Hanson 2001:445–6; Parker 1995b:2; Yerxa 2008b:3). With it we must reexamine other suppositions, such as Michel Foucault's argument that the revolution in drilling — the coordination of multiple bodies in lockstep maneuvers — was a hallmark of impending modernity, one of a number of new techniques of power typical of modernity and, it is implied, unique to

7. A good edition of Qi Jiguang's famous *Lian bing shi ji* is Qi 2001. Koxinga's military manuals are referred to in his primary chronicle, of which the best edition is Chen 1981. See p. 112. Alas the only extant military tract published by the Zheng family is the fascinating *Jing guo xiong lüe* (Zheng: 1646; and Zheng 2009).

Europe (Foucault 1977; Smith 2008). Once again, we are thrown back on the idea of parallel developments in Asia and Europe because of new data from the exploding fields of Asian history.

To be sure, no one has yet made a systematic comparison of the drill manuals and instruction techniques that proliferated in China and Europe, and perhaps a comparison like this would still allow us to find some incipient modernity in Europe that is lacking in China, but for now we must recognize that when it comes to the issue of military drill, the revisionist perspective seems more able to account for the parallel developments of military techniques in China and the West than the standard model Bryant defends.

What about European cannon technology? Evidence from the Sino-Dutch war indicates that Dutch cannons were no better than Koxinga's. Of course, some of the cannons Koxinga used to finally batter the Dutch fortress into submission may have been made in the Portuguese colony of Macau, but he also used many Chinese-made cannons, to devastating effect. The words of Swiss artist-soldier Albrecht Herport, who fought on the Dutch side, encapsulate the general Dutch opinion about Koxinga's artillery. The Chinese, he wrote, "know how to make very effective [kunstreiche] guns and cannons [Fewrwerck], so that it's scarcely possible to find their equal elsewhere" (Herport 1930:28–30).[8] Equally importantly, Koxinga's gunners were so good that the Dutch commander wrote, shortly after a particularly shameful defeat by Koxinga, that "they [the Chinese] are able to handle their cannons so effectively … [that] [t]hey put our own soldiers to shame" (Blussé 2001:D:784). The many cannon battles of the war show conclusively that Dutch cannons were no better than Chinese ones.[9]

Thus, European muskets, discipline, and artillery provided no clear advantage to the Dutch. There were, however, two areas in which the Dutch demonstrated significant technical superiority: ships and forts.

World historians like to point out, in discussions of European maritime expansion, that China had the wherewithal to rule the seas. Nearly every world history textbook has a unit on the Chinese admiral Zheng He: his huge treasure ships; his expeditionary forces of 28,000 souls; the vast distances they sailed, much farther than anything Europeans were then undertaking. The lesson of these units is usually that China had naval technology that surpassed that of Europe, that it could have undertaken a great naval expansion as Europeans later did, that, indeed, it did

8. See also Schouten 2003: 84.

9. I should note, however, that the Dutch had considerable success with mortars that fired exploding shells, something that it seems caught Koxinga's troops unawares. I discuss mortars at some length in my upcoming book.

for a short period and then chose to withdraw from the seas, leaving the way open to the Europeans. The technology behind Chinese shipbuilding during that period — the early 15th century — is indeed impressive, and one can make a good case that Chinese maritime technology was the most advanced in the world.

To what extent did China maintain this edge in the centuries that followed? The Standard Model for the rise of the west holds that by the 16th century Europeans had outstripped other peoples in nautical technology.[10] Of course, evidence from Asia indicates that it wasn't so simple, and revisionists can draw on plenty of evidence to suggest that Asian states that wanted to contest European power on the seas were able to do so (Subrahmanyam 1995; Casale 2010; Marshall 1980; Andrade 2006). Even the Military Revolution School suggests — with plenty of nuance — that although European artillery ships had an advantage over Asian vessels, it was a slight one, and, in any case, Asians exerted control over Europeans by other means, such as withholding trading privileges (Parker 1996:82–114).

So what does the Sino-Dutch War tell us about the naval balance between Europe and China? By the time the Dutch arrived in East Asia two centuries after Zheng He, Chinese naval technology had changed, and some of the designs typical of earlier times were no longer extant (van Tilburg 2007). When we compare the ships that Koxinga had available to the Dutch ships they fought against, the Dutch ships come out as far superior in two ways that were vital to the war: deep water combat and ability to sail close to the wind.

In sea combat, an individual Dutch warship was able to contend with ten or more war-junks, thanks to the huge numbers of cannons it carried. Whereas a typical war-junk in Koxinga's period seems to have carried eight to ten cannons, a Dutch warship could carry thirty or more cannons. Koxinga had a few larger artillery-ships with many cannons, but those don't seem to have been employed against the Dutch, being usually reserved for bombarding land targets. A Spanish missionary who witnessed a battle between more than a hundred Zheng ships and a Dutch fleet of fifteen, wrote, "the Dutch ships equaled all the rest in strength, for the smallest Dutch vessel bore thirty-six pieces of heavy artillery" (Riccio 1673:618). The Dutch admiral at the time wrote, "on water … our own power is (with God's help) sufficient enough to withstand the entire

10. The classic statement, still compelling, is found in Cipolla (1965). A more nuanced version is Raudzens (1999). Any discussion of the issue must address the brilliant, careful work of John Guilmartin, particularly his classic and still deeply respected *Gunpowder and Galleys* (1974).

enemy fleet."[11] Even the Chinese commanders who faced off against the Dutch would have agreed with this. Indeed, they wrote a letter to the Dutch admiral before the battle saying that, despite the fact that they had more than a hundred ships and the Dutch only fifteen, "We cannot with our ships fight against your ships."[12]

Revisionists may be reluctant to make judgments about the relative superiority of European over Chinese technology, but Chinese observers at the time were not at all reticent. "Dutch ships are like mountains," one Chinese official quipped, "whereas ours are like anthills" (in Su 1980:60). A marvellous Chinese book that Koxinga's father published notes that

> The red-hairs build their ships tall as mountains and sturdy as an iron bucket, so solid that they can't be destroyed…. Ultimately, there's no way to stand up to them. With great ease they traverse the oceans without worry of being defeated or damaged. (Zheng 1646:22)

The official history of the Ming Dynasty, notes that

> the Dutch base their power on their huge ships and cannons. The ships are three hundred feet long, sixty feet wide, and more than two feet thick. They have five masts, and behind them they have a three-story tower. On the sides are small ports where they place brass cannons. And underneath the masts they have huge twenty-foot-long iron cannons, which, when fired, can blast holes into and destroy stone walls, their thunder resounding for ten miles (several dozen li).[13]

A governor of China's maritime Fujian Province wrote in frustration (he hated the Dutch and was tasked with removing them from the coast in the 1630s), "The Hollanders' ability to ravage the seas is based on their technology. Our own ships, when confronting Dutch ships, are smashed into powder."[14] My analyses of naval battles between Zheng and Dutch forces corroborates these contemporaries' observations: in deep water combat, Dutch fleets could take on Chinese fleets ten or twenty times larger.

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11. Daghregister gehouden in de oorlogs vloot bescheijden onder de vlagge van den heer admirael Balthasar Bort, op de cust van China, zedert 27en October anno 1663 tot 3en December daeraen volgende, VOC 1244: 2546–2624, fos. 2601–2601v
12. Letter from Summinpesiouw or Tsoubontjock (number two under Zheng Jing) to Bort, 19 November 1663 (Yongli 17 10th month 19th day), in Daghregister gehouden in de oorlogs vloot bescheijden onder de vlagge van den heer admirael Balthasar Bort, op de cust van China, zedert 27en October anno 1663 tot 3en December daeraen volgende, VOC 1244: 2546–2624, fos. 2597v–2598v, quotation at 2598–2598v.
13. Section on the Dutch, from the Ming shi, juan 325. Xin jiao ben Ming shi, 8437.
14. Zou Weilian, "Feng jiao Hong yi jie shu," from Zou Weilian *Guan lou ji,* V. 18, reprinted in Su 1980:34–42. This quote is from p. 40.

Of course, the Dutch couldn't always fight in deep water, and they were outmaneuvered on many occasions by Koxinga's shallower drawing junks and especially his agile "sand boats."[15] As a frustrated Dutch commander put it after being defeated by these sand boats,

> They're so fast, quick, and light, that they can venture easily into the shallowest waters, even two and a half or three feet deep. On each side they have two heavy oars, and one behind to serve as a rudder, and they use them to great effect, spinning and twirling like a top, so fast and able that they're a wonder to behold.[16]

Yet the Dutch generally held the naval advantage in the war, thanks to their powerful cannon ships.

Dutch ships also had another advantage: a surpassing ability to sail into the wind. This is a venerable argument about European nautical superiority, and some might well dispute it.[17] But evidence from the Sino-Dutch War suggests that Dutch ships were much better at sailing into the wind than were Chinese junks, an advantage that served them well on numerous occasions but particularly when they were able to send a dispatch yacht southwards against monsoon winds to seek reinforcements from their headquarters in Batavia. When that reinforcement fleet arrived three months later, Koxinga was shocked, and his new capital on Taiwan flew into a panic. He'd timed his invasion to coincide with the onset of the southern monsoon winds, believing thus that the Dutch wouldn't be able to send word of his invasion to their superiors in Java. But the speedy dispatch yacht took an unorthodox course southwards against the prevailing winds, a testament to Dutch navigational prowess. Even after the reinforcement fleet arrived, Koxinga had trouble believing it was intended to attack him, since, he said, there was no way the Dutch could have sent word southwards against monsoon winds (Jiang 2003:rear 38).

I'm aware that this argument about European vessels being better able to sail against the wind may be a contentious one, but I believe it to be true. I've received corroboration from a crewmember of a replica of a Ming junk that completed a round trip across the Pacific Ocean from Taiwan and back in 2008–9. I should say nearly completed, because the vessel was rammed by an oil tanker on its trip back from the USA, less than a hundred miles from Taiwan. He told me in clear terms that his

15. A great Chinese description of the sand boats can be found in Chen 1981:206. See also Zheng 1646, Wu bei kao juan zhi ba.

16. Daghregister gehouden bij den commandeur Cauw beginnende 5 Julij 1661 en eijndigende 3 Februarij 1662, VOC 1240:1–213, 149–50.

17. See the wonderful article by Brian Platt, a man who captained a Chinese junk across the Pacific (Platt 1960).

junk could only sail downwind. "I can," he said, "personally vouch to this from experience."[18] The owner and captain of that junk corroborated his view, although he cautions that there were many types of junks and we need much more data, and other experts on maritime history seem to agree.[19] Chinese scholars today make similar arguments. As one historian notes, "Dutch ships were large and tall and well-constructed … able to receive the wind from all directions, sailing fast" (Chen 2000:4). I have found further substantiation in other data from the Sino-Dutch war, the discussion of which would be too lengthy for this article.

It should come as no surprise that European ships might have been better designed for sailing close to the wind than Chinese ships, because they faced different sailing challenges. In Asia one could cover large distances by sailing with the wind, one direction in spring and another direction in the fall, but the Atlantic Ocean had much more complicated wind patterns. To get up and down the coasts of western Europe and, especially, to navigate around Africa, you had to contend with a bewildering and complex set of wind and current patterns (Thornton 1998:21–4; Pryor 1988). European ships and navigation techniques thus evolved to suit a great many different conditions (Seed 2001). Chinese junks — like most Asian vessels — didn't need to sail close to the wind as effectively as European ships.

Chinese observers attributed European ships' ability to sail into the wind to their bafflingly complicated rigging: "their rigging is all tangled, forming something that resembles silkworm's silk or a spider web" (Zheng 1646:22).

> They have sails that spiral like spider webs, receiving wind from eight directions, so there's nowhere they go that is not favorable. Compare this with Chinese sails and masts. When they encounter a contrary wind, they must bend over to the left and then to the right, leaning dangerously, and thus, winding and wending, they must slowly make their way dangerously forward. The two kinds of ships are as different as heaven and earth. (Yu 1959:64)

18. Larz Stewart, crewman on the Princess Taiping, personal communication, 27 April 2010. For more on Stewart, the Princess Taiping, and the ramming thereof by a tanker, see "Oregon native faces death when oil tanker hits boat," *The Oregonian,* 29 April 2009. Available online at http://www.oregonlive.com/news/index.ssf/2009/04/this_is_it_an_oregon_native_an.html (retrieved 5 May 2010).

19. Nelson Liu, owner and captain of the Princess Taiping, personal communication 13 May. Hans K. Van Tilburg, for example, suggests that Ming vessels, with their flat hulls, were likely less effective when sailing into the wind than pre-Ming Chinese ships, which had V-shaped hulls, although he points out that further research is needed, since so many factors can influence a ship's behaviour, and since we have no replicas of earlier Chinese ship designs. Hans K. van Tilburg, personal communication, 5 May 2010.

On the other hand, the Chinese also knew that Dutch ships were much slower when sailing with the wind than Chinese vessels. As one Chinese sea trader advised, if a Dutch ship tries to catch you, just sail away with the wind and you'll outrun it (Yu 1959:64). Dutch ships, with their sturdy construction, powerful broadsides, and ability to sail into the wind, proved a powerful advantage in the war, but even more important was European fortification design: the renaissance fortress.

The artillery fortress has become a star of the military revolution, thanks to the work of Geoffrey Parker. As cannons were increasingly used in European warfare in the 1400s, it became clear that medieval walls, tall and brittle, tended to shatter when bombarded.[20] It was Italians who first developed new fortification designs to cope with cannon warfare, building thicker walls, sloped to deflect cannon fire and filled with earth to absorb it. At the intersections of these walls, where there had once been round turrets, they built large angled bastions, which pointed out from the corners of the new forts like huge arrows. Cannon crews and musket units within these bastions could provide such intensive and comprehensive flanking fire, that anyone who tried to storm the fort or scale its walls would be shredded. Thus, the renaissance fort wasn't just difficult to bombard, its walls highly resistant to cannonfire. It was also, when fully manned and armed, extremely difficult to storm. The design spread rapidly outward from Italy in the early 1500s, with consequences that were monumental for Europe (Parker 1996; 2000).

The artillery fortress also spread beyond Europe. The Spanish and Portuguese began building them in overseas colonies in the mid-1500s, and then the Dutch, who were considered by then to be the masters of the latest fortification designs, brought them to their colonies in the early 1600s (Zandvliet 2002). According to Geoffrey Parker, these forts were extremely effective as instruments of European coercion abroad, serving as an "engine of European expansion" (Parker 2000). Other military historians are not so impressed. Jeremy Black, for example, suggests that Asians didn't have much trouble capturing European fortresses when they wanted to (Black 2004:23). It's been hard to resolve this debate because we know so little about Europeans' wars with non-Europeans.

Koxinga faced a powerful Dutch fort on Taiwan called Zeelandia Castle. It confounded him.[21] His first attempt to storm it resulted in a bloodbath, his troops shredded by lethal cannon and musket fire. The details of the battle indicate that he and his commanders didn't appreci-

20. There is some recent evidence that perhaps medieval walls were not as vulnerable to advanced cannons as Parker and others have claimed; see DeVries (2005).

21. Chinese historians who claim that Koxinga adopted a "surround-and-wait-for-surrender" strategy (e.g. Deng 2000), do not, I think, understand the full vehemence of his first attack against Zeelandia or its bloody effects.

ate the castle's capacity for crossfire, a conclusion one can draw from his cannon placements and the carrying out of the storming attempt, which would have suited a Chinese wall (huge, thick, impervious to cannons, but unable to provide such lethal flanking fire), but was useless against a renaissance fort. He made various, increasingly effective, attempts to attack the fort, but in each case, Dutch engineers built new fortifications, which stymied him. It wasn't until nine months after the start of the war, when as many as half of his troops had died of starvation and disease, that he managed to breach one of the castle's key defenses, and this was thanks to the defection from the Dutch side of a grandiose German alcoholic, who helped him design effective siegeworks (Andrade 2008b).

There are other battles to corroborate the idea that Zheng troops had great difficulty grappling with Dutch fortification designs, including an attack five years later that Koxinga's heirs tried to carry out against another renaissance fort that the Dutch built in northern Taiwan — and I'm confident that data from the Sino-Dutch War of 1661–8 offers resounding support to the idea that the renaissance fort was an engine of European expansion. It's not that Koxinga wasn't good at getting through walls. The walls he overcame in his decade and a half of warfare in China were much larger and thicker and taller than those of Zeelandia Castle. Chinese walls were the thickest in the world, impervious not just to early modern cannon but even to industrial-age cannon (Parker 1996:143). Yet Chinese fortifications didn't have a dedicated capacity for flanking fire like the renaissance fort. They did have outworks, square appurtenances that started studding Chinese walls after the appearance of cannons in Chinese warfare, but they weren't designed with such a focus on covering the angles. The renaissance fortress was indeed a key technology of European expansion.

In sum, the Sino-Dutch War of 1661–1668 corroborates the Military Revolution Model for the rise of the west, but with qualifications. Koxinga's soldiers were better drilled and more disciplined than their European foes. Although the Dutch invented modern musketry drilling techniques, and their manuals and drill inspectors were sought after throughout Europe, Dutch musket companies broke before Koxinga's troops. Dutch cannons similarly offered no advantage. Koxinga's were as good, and his gunners were, if anything, better than Dutch gunners. The Dutch advantage was, rather, in two areas: Dutch warships and, more importantly, renaissance fortification techniques.

I believe that if the Dutch had made adequate use of their naval advantage, they might have won the war. Koxinga had been supremely confident that he'd reduce Zeelandia Castle with ease, belittling its size. "All you have left," he wrote in a threatening letter to the Dutch, "is that

little fort, which is like a dead dried out tree and cannot stand for much longer."[22] When he was stymied by it, his careful plan for conquest went bad. Over the next eight months, his tens of thousands of troops began to starve in Taiwan, wracked by disease and lethal attacks by Taiwan's native peoples. When a Dutch relief fleet arrived in the late summer, to Koxinga's utter surprise and consternation, the war might have turned.

What the Dutch should have done is use the relief fleet to mount a blockade of the island, trying to prevent rice supplies from reaching Taiwan from Koxinga's bases in China. It wouldn't have been easy. It might not even have worked. After all, Chinese junks were faster sailing downwind and might have been able to evade a Dutch cordon. But Dutch ships were also terrifying to Chinese junk captains, and the fear factor itself would likely have kept rice junks away from Taiwan. At the very least, the Dutch could have disrupted rice supplies and further hurt Koxinga, and they might indeed have completely stopped Koxinga's rice supplies, particularly since he was having a hard time getting ships to come to Taiwan from China in the first place. But instead of mounting a blockade the Dutch risked their ships in a foolish attack in shallow water. They were badly defeated and lost ships, men, and the initiative. After this rout they began considering a blockade, but by then it was too late. A huge rice shipment arrived at a crucial time, saving Koxinga's troops from starvation and giving him another opportunity to attack Zeelandia Castle. His final assault came in January 1662, after nearly nine months of war. The Dutch surrendered the castle and all its treasures.

News of the defeat shocked people in the Netherlands, setting off a long debate about who was to blame. The man who surrendered to Koxinga, the governor of Taiwan, made a convenient scapegoat. He was stripped of his privileges, had his fortune confiscated, and was banished to a small island. Eventually he was released, after which he wrote a book blaming the loss of Taiwan on the directors of the Dutch East India Company. Thus, both sides in that bitter Dutch debate blamed each other, but they shared the preconception that the Dutch could have held on to the island against such seemingly overwhelming odds. Historians have recently wondered whether the Dutch at the time were deluded, feeling that there was no way the Dutch could have stood up to Koxinga's vastly superior army (Wills 1998:373). I once felt this way myself.

Not any more. Although I was once a dyed-in-the-wool revisionist, I've come now to a revised position. I believe that Europeans did indeed possess an advantage over Asians in warfare, an advantage that was due to technology, but it was a slight advantage, and the revisionists are right that other, nontechnological, factors also played a key role in Europeans'

22. Translation of Letter from Koxinga to Jacob Valentine, 2 May 1661, VOC 1235:906.

conquest overseas, most notably a maritime power vacuum in Asia and Europeans' unusual state support for overseas conquest. It wasn't until the Great Divergence in the 19th century that there was a great military divergence, brought about by industrial technology.

If we see this kind of slight divergence in military matters, then perhaps we might also consider the possibility that both Bryant and the revisionists are right about some larger issues as well. The revisionists and their critics lob data back and forth, arguing about living standards, agricultural productivity, etc., and neither side can convincingly win the argument. That's probably because there wasn't any great divergence between Asia and Europe in the early modern period, at least none that can show up decisively in the poor economic and demographic data available for the early modern period.

That doesn't mean there wasn't a little divergence. We don't have to see Asian societies as stagnant, as the standard model implied, a view that in any case a huge outpouring of data from Asian history over the past four decades has made clear is false. We can instead view both Asian and European societies as progressing along similar lines, towards greater specialization, greater commercialization, more effective agricultural techniques, more effective military technology, etc., but with European societies beginning to progress slightly more quickly, at least in certain areas.

What we may have, then, is not a sudden and late great divergence, but a small divergence that began in the early modern period. In some spheres that small divergence might have been absent or imperceptible, but as time passed, the divergence accelerated, and at the period of industrialization — the great take off — the divergence became so large and its acceleration so rapid that it appears to be a sudden rupture.

What might have caused this accelerating divergence? The Military Revolution Theory sees state conflict as the motive force for the rapid changes in European warcraft. Other variants of the standard model similarly note that sustained competition among a group of relatively evenly-balanced European polities provided selective pressures toward modernization (Weber 1927; McNeil 1982;1989; Tilly 1992; Diamond 1999). There's no doubt that Europe's Warring-States Period (to use a term from ancient Chinese historiography) lasted far longer than any such period in modern East Asian history, yet there were some periods of intense geopolitical conflict in East Asia. It turns out that it was precisely during those periods that there occurred rapid military modernization.

One such case is the pre-Ming warfare. The sustained fighting among Chinese states in the mid-1300s saw rapid improvements in cannons, bombs, and handguns, sparking the global military revolution. Another

is Japan's Warring-States Period, from 1467 to the late 16th century, when Japan perfected the arquebus musket and developed precocious infantry tactics and formations that were then exported to Korea in Hideyoshi's invasion of 1592–8. A third case is the Ming-Qing Transition (1644–1683), when not just Koxinga, but also other Ming loyalist commanders, as well as Manchus and Koreans, undertook rapid military adaptation and innovation. After 1683, however, the three core states of East Asia settled into a period of relative peace. There were, of course, Qing wars in Central Asia, but as Chase has argued, guns are much less useful in warfare against nomadic peoples, so those wars didn't result in the same type of military innovation that warfare between settled states produced (Chase 2003, esp. chs 1 and 8). East Asia's settled states stayed at peace for nearly two centuries, during which time European states kept fighting. That's why during the Opium War (1839–1842) Chinese forces fielded 17th century cannons against 19th century British arms. It's not that the Chinese were incapable of matching European armaments — it's just that they'd had no need to (Huang 1996). By the time China and Japan awoke to the need for military modernization, they found themselves far behind. Japan adapted quickly, but China failed to do so, not so much because of a profound backwardness but because political structures mitigated against reform.

The more data we have about Asia, the more we will deepen our understanding of Europe and what made it unique. The revisionists are not — or most of them are not — kneejerk ideologues railing against Eurocentrism for reasons of political correctness. They are scholars who recognize that the tremendous surge of new data about Asian history requires significant adjustments to a standard narrative that was developed at a time when we knew much, much less. Bryant's attack against the revisionists is salutary to the extent that it helps us sharpen our models. We'll likely end up with theories that recognize the many ways that European and Asian societies were developing along similar lines while at the same time honoring the truly exceptional developments that were occurring in Europe.

References

Andrade, Tonio. 2004. The company's Chinese pirates: How the Dutch East India Company tried to lead a coalition of pirates to war against China, 1621–1662. *Journal of World History* 15(4):415–444.

——— 2006. The rise and fall of Dutch Taiwan, 1624–1662: Cooperative colonization and the statist model of European expansion. *Journal of World History* 17(4):429–450.

——— 2008a. Did Zheng Chenggong need a drunk German's help to capture Dutch Taiwan? *Revista de Cultura* 26:56–76.
——— 2008b. *How Taiwan Became Chinese: Dutch, Spanish, and Han Colonization in the Seventeenth Century*. New York: Columbia University Press.

Black, Jeremy. 2000. *War: Past, Present, and Future*. New York: St. Martin's Press.
——— 2004. The western encounter with Islam. *Orbis* 48(1):19–28.
——— 2008. On diversity and military history. Pp. 22–25 in Donald A. Yerxa, ed., Recent Themes in Military History: Historians in Conversation. Columbia, SC: University of South Carolina Press.

Blussé, Leonard et al., eds., 2001. *De Dagregisters van het Kasteel Zeelandia, Taiwan, 1629–1662*. Vol 4. The Hague: Instituut voor Nederlandse Geschiedenis.

Broadberry, Stephen and Bishnupriya Gupta. 2006. The early modern great divergence: Wages, prices, and economic development in Europe and Asia, 1500–1800. *Economic History Review* 59(1):2–31.

Bryant, M. Joseph. 2006. The West and the rest revisited: Debating capitalist origins, European colonialism, and the advent of modernity. *Canadian Journal of Sociology* 31(4):403–444.
——— 2008. A new sociology for a new history? Further critical thoughts on the Eurasian similarity and great divergence theses. *Canadian Journal of Sociology* 33(1):149–167.

Casale, Giancarlo. 2010. *The Ottoman Age of Exploration*. New York: Oxford University Press.

Charney, Michael. 2004. *Southeast Asian Warfare, 1300–1900*. Leiden: Brill.

Chase, Kenneth. 2003. *Firearms: A Global History*. Cambridge: Cambridge University Press.

Chen, Bisheng, ed. 1981. *Xian wang shi lu jiao zhu*. Fuzhou: Fujian Renmin Chuban She.
——— 2000. Zheng Chenggong shou fu Taiwan zhan shi yan jiu. Pp. 1–24 in Chen Bisheng, ed., *Zheng Chenggong lishi yanjiu*. Beijing: Jiuzhou chu ban she.

Cipolla, Carlo. 1965. *Guns, Sails and Empires: Technological Innovation and the Early Phases of European Expansion 1400–1700*. New York: Pantheon Books.

Deng, Kongzhao. 2000. Zheng Chenggong shou fu Taiwan de zhan lüe yun chou. Pp. 1–18 in Deng Kongzhao, ed., Zheng Chenggong yu Ming Zheng Taiwan shi yan jiu. Beijing: Tai hai chu ban she.

DeVries, Kelly. 2005. 'The walls come tumbling down': The myth of fortification vulnerability to early gunpowder weapons. Pp. 429–46 in L.J. Andrew Villalon and Donald Kagay, eds., *The Hundred Years War*. Leiden: Brill.

Diamond, Jared. 1999. *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W.W. Norton.

Duchesne, Ricardo. 2005. Peer Vries, the great divergence, and the California School: Who's in and who's out? *World History Connected* 2(2).

Elvin, Mark. 2008. Defining the explicanda in the 'West and the rest' debate: Bryant's critique and its critics. *Canadian Journal of Sociology* 33(1):168–186.

Foucault, Michel. 1977. *Discipline and Punish: The Birth of the Prison*. New York: Vintage.

Frank, Andre Gunder. 1998. *ReOrient: Global Economy in the Asian Age*. Berkeley: University of California Press.

Goldstone, Jack. 2000. The rise of the West – or not? A revision to socioeconomic history. *Sociological Theory* 18(2):173–94.
——— 2008. Capitalist origins, the advent of modernity, and coherent explanation: A response to Joseph M. Bryant. *Canadian Journal of Sociology* 33(1):119–133.

Gommans, Jos and Dirk Kolff. 2001. *Warfare and Weaponry in South Asia, 1000–1800*. Oxford: Oxford University Press.

Gommans, Jos. 2002. *Mughal Warfare*. London: Routledge.

Goody, Jack. 2004. *Capitalism and Modernity: The Great Debate*. Cambridge: Polity Press.

Guilmartin, John. 1974. *Gunpowder and Galleys: Changing Technology and Mediterranean Warfare at Sea in the Sixteenth Century*. Cambridge: Cambridge University Press.

Hanson, Davis Victor. 2001. *Carnage and Culture: Landmark Battles in the Rise of Western Power*. New York: Doubleday.

Herport, Albrecht. 1930. *Reise nach Java, Formosa, Vorder-Indien und Ceylon, 1659–1668* Vol 5. *Reisebeschreibungen von deutschen Beamte und Kriegsleuten im Dienst der Niederländischen west- und ost-Indischen Kompagnien, 1602–1797*, edited by S. P. L'Honoré Naber. 13 vols. The Hague: Martinus Nijhoff.

Huang Yi-long. 1996. Hong yi da pao yu Ming Qingza zheng: yi huo pao ce zhun ji shu zhi yan bian wei li. *Qinghua xue bao*, 26(1):31–70.

Jiang, Shusheng, ed. and trans. 2003. *Mei shi ri ji: Helan tudi celiangshi kan Zheng Chenggong*. Taipei: Han Sheng Zazhi She Gufen Youxian Gongsi.

Langlois, Rosaire. 2008. The closing of the sociological mind? *Canadian Journal of Sociology* 33(1):134–148.

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

Maddison, Angus. 2003. *The World Economy: Historical Statistics*. Paris: Development Centre of the Organization for Economic Cooperation and Development.

Marshall, P.J. 1980. Western arms in maritime Asia in the early phases of expansion. *Modern Asian Studies* 14(1):13–28.

McNeil, William H. 1982. *The Pursuit of Power: Technology, Armed Force, and Society since AD 1000*. Chicago: University of Chicago Press.

McNeill, William. 1989. *The Age of Gunpowder Empires, 1450–1800*. Washington, DC: American Historical Association.

Needham, Joseph. 1987. *Science and Civilisation in China,* Part 7: *Military Technology, The Gunpowder Epic*. Cambridge: Cambridge University Press.

Parker, Geoffrey. 1995. *Cambridge Illustrated History of Warfare*. Cambridge: Cambridge University Press.

——— 1996. *The Military Revolution: Military Innovation and the Rise of the West*. Cambridge: Cambridge University Press.

——— 2000. The artillery fortress as an angine of European overseas axpansion, 1480–1750. Pp. 386–416 in *City Walls: The Urban Enceinte in Global Perspective.* Cambridge: Cambridge University Press.

——— 2008. Military revolutions, past and present. Pp. 11–21 in *Recent Themes in Military History: Historians in Conversation.* Columbia, SC: University of South Carolina Press, 2008.

Platt, Brian. 1960. The Chinese Sail. unpublished ms, available online: http://www.thecheappages.com/junk/platt/platt_chinese_sail.html Retrieved 2010-03-01.

Pomeranz, Kenneth. 2000. *The Great Divergence: China, Europe, and the Making of the Modern World Economy*. Princeton: Princeton University Press.

Pryor, H. John. 1988. *Geography, Technology, and War: Studies in the Maritime History of the Mediterranean, 649–1571*. Cambridge: Cambridge University Press.

Qi, Jiguang. 2001. *Lian bing shi ji*. Beijing: Zhong hua shu ju.

Raudzens, George. 1999. Military revolution or maritime evolution? Military superiorities or transportation advantages as main causes of European colonial conquests to 1788. *The Journal of Military History* 63(3):631–641.

Riccio, Victorio. 2002 [1673]. Hechos de la Orden de Predicadores en el Imperio de China. Pp. 586–627 in Eugenio Borao, ed., *Spaniards in Taiwan,* Vol. 2. Taipei: SMC Publishing Inc.

Rogers, J. Clifford, ed. 1995. *The Military Revolution Debate*. Boulder, CO: Westview Press.

Schouten, Wouter. 2003. *De Oost-Indische voyagie van Wouter Schouten*, Michael Breet and Marijke Barend-van Haeften, ed. Zutphen, Netherlands: Walburg.

Seed, Patricia. 2001. Jewish scientists and the origin of modern navigation. In *The Jews and the Expansion of Europe to the West, 1450 to 1800*. European Expansion and Global Interaction, number 2. New York: Berghahn Books.

Smith, Philip. 2008. Meaning and military power: Moving on from Foucault. *Journal of Power* 1(3):275–293.

Subrahmanyam, Sanjay. 1995. Of Imârat and Tijârat: Asian merchants and state power in the Western Indian Ocean, 1400 to 1750. *Comparative Studies in Society and History* 37(4):750–780.

Su, Tongbing. 1980. *Taiwan shi yanjiu ji*. Taipei: Guo li bian yi guan Zhong hua cong shu bian shen wei yuan hui.

Sun, Laichen. 2000. Ming-Southeast Asian overland interactions, 1368–1644. Ph.D. diss., University of Michigan.

——— 2003. Military technology transfers from Ming China and the emergence of northern mainland Southeast Asia (c. 1390–1527). *Journal of Southeast Asia Studies* 34(3):495–517.

Swope, Kenneth. 2005. Crouching tigers, secret weapons: Military technology employed during the Sino-Japanese-Korean War, 1592–1598. *The Journal of Military History* 69(1):11–41.

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

Thornton, John. 1998. *Africa and Africans in the Making of the Atlantic Worl*d. Cambridge: Cambridge University Press.

Tilly, Charles. 1992. *Coercion, Capital, and European States, AD 990–1992*. Cambridge: Blackwell.

van de Ven, Hans, ed. 2000. *Warfare in Chinese History*. Leiden: Brill.

van Tilburg, K. Hans. 2007. *Chinese Junks on the Pacific: Views from a Different Deck*. Gainesville: University Press of Florida.

Vries, Peer. 2005. Is California the measure of all things global? A rejoinder to Ricardo Duchesne, 'Peer Vries, the great divergence, and the California School: Who's in and who's out?' *World History Connected* 2(2).

Weber, Max. 1927. *General Economic History*. Trans. Frank H. Knight. New York: Greenberg.

Wills, Jack. 1998. Relations with maritime Europeans, 1514–1662. Pp. 333–375 in *Cambridge History of China*, Vol. 8. Cambridge and New York: Cambridge University Press.

Wong, R. Bin. 1997. *China Transformed: Historical Change and the Limits of European Experience*. Ithaca, NY: Cornell University Press.

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

——— 2008b. *The Curious State of Military History. Recent Themes in Military History: Historians in Conversation*. Columbia, SC: University of South Carolina Press.

Yu, Yonghe. 1959. Pi hai ji you, Taiwan wen xian cong kan, No. 44. Taipei

Xin jiao ben Ming shi. Han ji quan wen zi liao ku (Database of the full text of the twenty-five dynastic histories). Taipei: Institute of History and Philology, Academia Sinica, 1990-. Available online at http://hanji.sinica.edu.tw/index.html. [accessed 6 November, 2010]

Zandvliet, Kees. 2002. Vestingbouw in de Oost. Pp. 151–180 in Gerrit Knaap en Ger Teitler, eds., *De Verenigde Oost-Indische Compagnie: Tussen oorlog en diplomatie.* Leiden: KITLV Press.

Zheng, Dayu. 1646. Jing guo xiong lüe. Woodblock Print in Harbard Yenching Library.

——— 2009. Jing guo xiong lüe Fascimile edition. Mei guo Ha fo Da xue Ha fo Yan jing Tu shu guan cang Zhongwen shan ben cong kan. Guangxi Normal University Press, volumes 19 and 20.

Tonio Andrade (History, Ph.D., Yale University, 2001) specializes in the history of China and maritime Asia. His first book, *How Taiwan Became Chinese* (Columbia University Press, 2008; Chinese translation, The Yuanliu Press, 2007) focuses on the early history of Taiwan. His second, *Europe's First War with China* (Princeton University Press, in press, 2011), explores the European military revolution with data from East Asia. He has published in *The Journal of Asian Studies, Late Imperial China, Itinerario,* and *The Journal of World History,* among others. He is associate professor of history at Emory University.
tandrad@emory.edu