

The Ecology of Burman-Mon Warfare and the Premodern Agrarian State (1383-1425)¹

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Introduction: the Premodern State

Court ritual, political theory, the conduct of warfare, the interpretation of omens, sage advice from wise ministers to kings, as well as many other domains of indigenous knowledge are described in rich detail by the indigenous historical chronicles of Southeast Asia. Indigenous historical chronicles did many things besides chronicle history.

The narratives of Burmese and Mon historical chronicles have a strong fictional character. Plot enhancing story elements, often quite melodramatic, range from love, trickery, and chase scenes to supernatural interventions in history and are mixed freely with fact and enliven dry historical detail. The Pali Buddhist literary traditions of India found in story collections such as the *Jatakas*, the Dhammapada Commentary, or the *Mahavamsa Tika* are clearly an inspiration if not the source of these historical adornments, an influence made quite explicit in the later *Jataka*-based explanations of Burmese history in Shin Sandá-lin-ka's *The Treasured Precedents (Mani-yadana-poun)*, translated by Eun Bagshawe, 1981).

A modern historian would quite reasonably not accept these fictional portrayals as pure Rankean factual history. At the same time, the minutiae of military operations and court ritual, described in a precise and non-fictional manner, have the outward appearance of historical documentation. Dry technical military details disqualify much of the narrative as literature, one would think. Therefore, what exactly are these texts?

Is the "fiction" found within Burma's historical texts merely entertainment to be discarded by a serious historian or does it have some deeper significance as, for instance, an intellectual history of ideas that historians wove into the fabric of the history they were writing? And, if so, what period is this intellectual history associated with? The earlier period in which the events are described such as the relatively autonomous Ava period of Burmese history (1368-1551) or from some much later period such as the Kòn-baung period (1752-1885) in which European influence on historical writing is already seen?

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Finally, can one answer these questions with absolute certainty? To take one extreme example, the debate over whether the literary history of the Greek Iliad corresponds to fact has oscillated from one extreme to another over literally hundreds of years with no absolute certain resolution in sight, disagreement and debate perhaps even being an inherent part of the search for certainty (Strauss 2006, 225-229).

Given the wealth of information in indigenous historical chronicles, the question naturally arises *why scholars have not used indigenous chronicles more intensively in conceptualizing models of the premodern agrarian Southeast Asian State*. The so-called *mandala* and “galactic polity” models have remained the mainstay in Southeast Asian history for quite some time (see for example Tambiah 1976; Wolters 1999). These dominant models, however, address only a tiny fraction of the many dimensions of the premodern agrarian state. This paper explores the inter-relationships between two understudied dimensions, warfare and the natural environment, of the premodern agrarian state in Burma.

Although it is conceivable that small premodern city states such as Bassein or Martaban in Lower Burma owed much of their wealth and food supply to long distance maritime trade (Malacca even relied on rice shipments from Pegu in the early 1500s), most settlements in Burma were highly dependent on local agriculture for their food supply and surplus wealth. One can characterize the premodern states of Burma as “agrarian states” and as such, they should share many characteristics of this general class of states whether they are inside or outside of Southeast Asia. There is no *a priori* reason why comparisons should be restricted to Southeast Asia, especially given its radically different geographies and natural environments.

Agriculture was highly dependent on the local constraints imposed by the natural environment surrounding a settlement. Local agricultural regimes in turn enabled warfare in the premodern state as Perdue (1996, 759) observes for premodern Chinese history: “ultimately the resources of men, food, money, weaponry, and prestige had to be extracted, purchased and produced from the agrarian substructure.” In short, a local settlement’s potential for success in warfare was in a large part determined by local environmental constraints.

Warfare itself, however, took place outside of the local settlement. Premodern warfare exposed a society to the vicissitudes of nature outside the immediate ecological habitat of the local settlement. Military expeditions had to overcome the impediments of topography, environment, geography, and demography, this can be seen by the great amounts of space in Burmese historical chronicles devoted to: 1. counts of animals mobilized for warfare, 2. the exact routes taken during military campaigns, and most importantly 3. detailed descriptions of situations that arose when there was not enough food during a military campaign, during sieges or after scorched earth.

Scholars usually study warfare and the natural environment in isolation from each other. This paper enlists the help of various models and paradigms to help draw the two together conceptually.

The factors operative in the premodern state can be broken down into three interacting levels: infrastructure, structure, and superstructure. Infrastructure consists of environment, demography, climate, and agriculture. Structure consists of politics, economics, and social organization. Superstructure consists of

ideology, religion, and political theory (Ferguson 1999). A diagram from Johnson and Earle (2000) describes how these three levels were related:

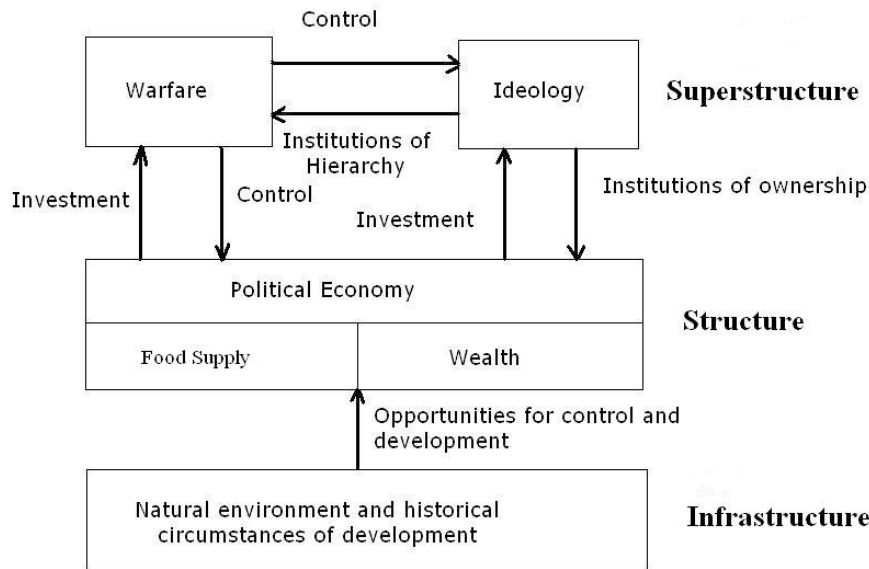


Figure 1 Earle's Chiefly Power Strategies

A hypothetical "ecological chain of causation" is also proposed that links infrastructure to warfare:

Environment => Land => Agriculture => Food Supply =>
=> Manpower-Animal Power => Warfare => State Formation

Environment → Land → Agriculture → Food-supply → Man-animal power → Warfare → State Formation

Figure 2 Ecological chain of causation in state formation

Scholars use formal ecological models such as Turchin (2003) to further elaborate this chain of causation and describe how long-term ecological patterns (Braudel's *longue duree*) played out in the short-term events of warfare (*histoire evenementuelle*).

Specifically, this paper looks at a series of conflicts that took place along the middle of the Irrawaddy River in Burma during the period 1389 to 1411. The beginning of the fifteenth century was a special time in Burman and Mon history. Coming almost a century after the decline of Pagan, the period was the subject of the greatest epic of warfare in the Burmese and Mon languages, *Rajadhirat*, known as *Razadarit Ayeidanpon* in Burmese. The epic tale of *Rajadhirat* records the history of a long war between Lower Burma and Upper

Burma (c. 1383-1425) which survives to this day in a collection of manuscripts written in three different languages: Mon, Burmese, and Thai (Banyadala; San Lwin; Chao Phraya Khlang 2003). Many of the events recorded in *Rajadhirat* find correlates in Û Kalà's *Great Chronicle* (*Maba-ya-zawin-gyi*) (1961, 2006), the first wide-ranging and inclusive royal chronicle of "Myanmar" as the state is referred to in the chronicle itself. Ming Chinese sources such as the *Ming Shi-lu* (Wade 2005), and sources from coastal Arakan on the border with Bengal also cover some of the same events. There is no standard name for the war discussed in this paper, nor is there agreement on how long the war lasted, or even perhaps whether these disparate conflicts warrant classification as a war at all. Historians have referred to these events in various ways:

- a. "the grueling north-south wars of the 14th to 16th centuries" Lieberman (2003, 130)
- b. "the north-south conflicts of 1385-1425" Lieberman (2003, 130)
- c. The "Burman-Mon wars" Lieberman (2003, 130)
- d. The "intermittent wars between Pegu and Ava" (1386-1422) (Tun Aung Chain 2002)

This paper will refer to these conflicts as the "Ava-Pegu War (1383-1425)." This name and periodization uses the names of the two capitals or political centers, makes the most limited assumptions about the extent of control that these political centers had and avoids over-generalizing the Mon and Burmese ethnic composition of the ruling elite to the diverse populations mobilized during the wars. The starting date for the war coincides with the beginning of Rajadhirat's succession crisis (see Fernquest 2006a, 5-6). The ending date coincides with the end of military expeditions by Ava into Lower Burma also largely a result of a succession crisis, at Ava in 1426, and subsequent political instability in Upper Burma (See Fernquest 2006b, 55-61).

The *Great Chronicle* and the *Rajadhirat* epic have a semi-historical nature, combining history, fiction, and lessons on politics in one multi-vocal text. The character of the hero Lagunein in Rajadhirat pushes the fictional theme of heroism to the limit with his continual excessive behavior. In one early episode, the hero refuses fight until the king presents him with his queen. In another episode, the hero enters the bedroom of the enemy king and steals his sword from right under his nose while he sleeps. Later, the hero cannot even keep a planned ambush secret, so eager is he to deride the enemy's stupidity to their face. For this, the hero is to suffer the death penalty, but is given a chance to redeem himself by further heroic deeds and in the act of doing so suffers a proper heroic death in battle (Fernquest 2006a).

In two places, *Rajadhirat* strongly hints at the principles of indigenous Indian political theory (*Arthasastra*). The work effectively provides lessons in political theory by suitable modifications in the emplotment of history. The king is described as a ruler "highly qualified in the art of vanquishing enemies" with knowledge of the four *upayas*. "*Upaya*" has various translations including "means of policy," "influence techniques," "stratagems," "means of overcoming the enemy," or "skillful means." The four *upayas* are concerned with military tactics and strategy in an abstract sense and are thoroughly secular. Roughly, they run

as follows: agreement (*sama*), sowing dissension (*bheda*), punishment (*danda*), gifts (*dana*) (Fernquest, forthcoming).

The present study is broken into five sections as follows. First, it looks at conflicts over the middle Irrawaddy (1389-1411) from various perspectives with different sets of historical data, including changes in chronicle lists of settlements; the observations of a British colonial-era gazetteer, the narrative of Kalā's *Great Chronicle* and the Rajadirat epic. Previous papers (Fernquest 2006a, 2006b) have discussed in detail the larger context of these conflicts in the Ava-Pegu War (1383-1426).

Second, it then describes the historical geography of Lower Burma and the middle Irrawaddy River basin and draws out the implications for military power. Historically, the north-to-south orientation of the Irrawaddy River has broken the east-to-west orientation of settlements in Lower Burma. This fragmented geography together with the limited farming potential and difficult terrain of the Irrawaddy Delta, contributed to an underlying localism in Lower Burma's geography. Viewed in this context, the middle Irrawaddy River region is a pivotal thoroughfare providing access to the delta region, Lower Burma, and food supply located along the river. Battles over this strategically important stretch of river are a crucial turning point in the Ava-Pegu War with food supply and adjustments in military logistics playing a crucial role in the course of the conflicts. Apparently, because of the difficult nature of Lower Burma's geography, the Burmans never established a military outpost any further south than Tharrawaddy on the Irrawaddy River, before the delta even begins.

Third, ecological patterns conditioned the long-term conduct of warfare. The regular yearly cycle of changing climate and agriculture conditioned the way wars were fought if manpower was to be optimally conserved. The subsistence crisis was used as an extension or weapon of war. Long-term climate patterns may have increased the potential for these subsistence crises.

Fourth, from the underlying constraints of environment and ecology in warfare the paper passes to the dynamics of warfare. A cycle of expansionary warfare explains how military success fueled further military success through the accumulation of geopolitical resources such as land, food supply, and manpower. A marchland factor also was operative in which enemies on fewer fronts aided the expansionary warfare of a state. Eventually, imperial overstretch and logistical overload resulted in a reverse process of state contraction in which the resources accumulated during expansionary warfare were quickly lost. Scorched earth tactics in which local food supplies were destroyed were part of the offensive strategy of expansionary warfare, whereas flight to the hinterland was part of the defensive response.

Finally, in the conclusion the paper re-examines the agrarian nature of the Burmese state suggesting that general cross-cultural models of premodern agrarian states lead to richer explanations than the region-specific *mandala* or "galactic polity" models traditionally employed in Southeast Asian history. Cross-cultural models allow for more realistic multi-causal explanations of historical events. They also allow for the posing and testing of a wide variety of different hypotheses and the possibility that disparate, geographically unrelated cultures, have shared historical experiences and processes. A Bayesian approach that brings in and

integrates knowledge of other premodern agrarian states in the form of a priori probabilities is suggested as one approach to crafting such a multi-threaded history of *what-might-have-happened*.

Taken together, the six sections of this paper demonstrate how various seemingly fictional elements typically found in Southeast Asian historical chronicles, fictional elements often conceived of as a historical deficit, rather provide rich details that should be conceived instead as a historical surfeit worthy of study in and of itself.

North-south conflicts over the Irrawaddy river basin (c. 1389-1411)

In the century following the decline of Pagan, Tai raids on Upper Burma brought land out of cultivation and reduced the population, but by 1368 Upper Burma had begun a process of recovery under the leadership of the King of Ava, Mingyiswasawke (r. 1368-1400). Irrigation works were repaired and extended. The new king built the Zidaw irrigation weir at Ava's principal granary at Kyaukse and improved the irrigation infrastructure at Meiktila Lake further south. Prior to this period, land in areas remote to the capital had been abandoned and lapsed into jungle during the conflicts of the previous century due to a lack of manpower and perhaps a need to live in more concentrated and protected settlements. During the present period, this lapsed land was brought back into cultivation often with the help of religious orders (UKI: 424; Harvey 1925, 81; Than Tun 1959, 92-96; Lieberman 1991, 5-12; for detailed background on these events, see Fernquest, 2006b).

Lower Burma, the middle Irrawaddy and Arakan were all areas of contention in the Ava-Pegu War. What intrinsic value did these areas possess that could possibly motivate and spur on this contention? Lower Burma and Arakan are both located on the coast so access to maritime trade revenues was one possible motive. However, there is very little concrete historical evidence to support this hypothesis. Trade, tribute, manpower, religious conversion, prestige, or easier access to Buddhist India and Sri Lanka are all possible motivations for warfare. Some multi-causal combination seems much more likely than a single mono-causal explanation.

There was also a truce between Ava and Pegu circa 1406 that demarcated a north-south boundary between the two states. This provides some evidence that trade access was an important motive in warfare. In addition to marking a boundary, items were exchanged between the two sides. In the bargain, Pegu provided tribute of 30 War elephants and the customs revenue of Bassein. The king of Ava provided his sister Min-hla-myat in a marriage alliance (UKI: 493-503; SL 88-90; Harvey 1925, 91, Tun Aung Chain, 41, Fernquest 2006a, 12). Bassein's population appears to have been much greater than other settlements in Lower Burma, if we accept the census of 1580 as a long-term indicator of Bassein's relative population (See table 3). Moreover, Rajadhirat encountered stiff resistance at Bassein, apparently helped by foreign mercenaries, in his consolidation of Lower Burma.

There is evidence that Upper Burma elites valued access to maritime ports. The title that the King Mingyiswasawke adopted, "Lord of the Gold Mines, the Silver Mines, and the Ruby Mines and the Ports and

Umbrella-bearing Kings,” reduces Upper Burma metonymically to its economic value of precious stones and Lower Burma to the access to maritime transportation. Trade is not mentioned here, and at low levels of exchange, trade is hardly distinguishable from mutual gift exchange between elites, exchanges that reinforced political relations and enhanced prestige. Frequent missions to deliver tribute from Southeast Asian capitals to the Chinese capital during the Yuan and Ming dynasties were of this nature. A circa 1067 mission from Sri Lanka seeking military aid, brought with it valuable goods not found in Burma, including camphor and sandalwood that would have had exchange value in trade, as inducements to elites in Lower Burma to participate in military campaigns (Luce 1966, 59-60). This also seems to rank more as a form of elite gift exchange on the margins of what could be considered trade. Yet one motive for sending these missions may have been the trade and exchange engaged in during these missions. Contact with other Buddhist communities in India and Sri Lanka may have been a far more important motive for Upper Burma obtaining access to ports and establishing permanent control over Lower Burma (Frasch 2002, 66).

The extension of cultivated acreage that accompanied economic recovery in Upper Burma during Mingyiswasawke's reign is evident by comparing lists of domains subject to Upper Burma at the beginning and at the end of his reign (See Table 1 and 2 below):

Table 1 - Ava at beginning of Min-gyi-swa-saw-ke's reign (1368) (UKI: 423; cited in ROB 10, 2)

Southern	Toungoo, Taung-dwin-gyi, Yamethin, Nyaung-yan, Wadi, Yei-hlwe-nga-hkayaing, Meikkaya
Northern	Myedu, Tabeyin
Irrawaddy River	Tagaung, Sagaing, Pa-kan-gyi, Talok, Pagan, Sagu, Prome (Pyi)
Unknown	Taung-pyon-gyi, Wa-yin-tot, Pauk-myaing

Table 2 – Ava at end of Mingyiswasawke's reign (1400) (UKI: 480; cited in ROB 10, 2-3)

Southern	Toungoo, Taung-dwin-[gyi], Yamethin, Wadi, Yindaw, Pinle, Hlaingtet, Nyaung-yan, Myin-saing, Meikkaya, Pindale, Pyinsi, Kyauk-pa-daung, Pattanago, Pin, Nat-maw, Thagara
Northern	Myedu, Yei-ne, Si-bok-taya, Sitha, Tabeyin, Badon, Amyint, Kanni, Yaw, Hti-lin, Laung-shei
Irrawaddy River	Hkyun-taung, Mya-taung, Tagaung, Nga-sinku, Sagaing, Pa-kan-gyi, Talok, Pagan, Ywa-tha, Sagu, Sale, Pa-kan-nge, Ye-nan-hkyaung, Salin, Le-kaing, Mye-hte, Tha-yet, Mindon, Min-tat, Prome (Pyi), Tharrawaddy

By the end of Mingyiswasawke's reign, Ava's control extended into new regions such as the Lower Chindwin, the Upper Irrawaddy past Tagaung, and of concern here, further south along the Irrawaddy to Tharrawaddy. Ava's control was also intensified in the regions already held, with most of the new settlements in the 1400 list being settlements within the outermost settlement boundaries of the 1386 list. Whereas in 1386 there were only five settlements along the Irrawaddy River from Pagan to Prome, in 1400 there were thirteen settlements.

These tables are based on categories that are implicit in Kalà's historical chronicle. The towns have been grouped by the three-fold regional classification used by Kalà in the later 1400 place name list: Northern, Southern, and Irrawaddy. The names in each list are in the order of their location along the principle axis of the region, either a river or, in the case from Kyaukse to T'oungoo, a straight north-south axis bounded by mountain ranges. The "southern" region includes settlements stretching from Kyaukse, adjacent to the capital of Ava, down to T'oungoo and Taung-dwin-gyi on the frontier between Upper and Lower Burma. The "northern" region includes settlements along the Mu and Chindwin Rivers. The "Irrawaddy" region includes all settlements along the Irrawaddy from the Tai-Shan region (Tagaung) north of Ava, down past Pagan to Prome and Tharrawaddy in the sub-delta region.

Increased land reclamation efforts during the period of the Ava-Pegu War (c. 1383-1425) can be seen in the Burmese inscriptional references to land reclamation efforts cited by Lieberman (1991, 7): 1377, 1395, 1396, 1397, 1400, 1402, 1404, 1405, 1435, 1437, 1442, and 1495. Eight out of twelve of these efforts occurred during the war or leading up to the war. The Rajadhirat years appears to have been both a period during which agriculture as well as warfare intensified.

The large-scale pattern of conflict over land during the Ava-Pegu War was of interest to British colonial officials. The Gazetteer of the Tharrawaddy District found the history of alternating control over the lower Irrawaddy during the Ava-Pegu War of sufficient interest to include a summary and analysis. The extent to which the analysis of the gazetteer suffers from imposing colonial notions of territorial control is a problem to watch out for (cf Thongchai 1994). One should therefore read the gazetteer's analysis cautiously. The analysis does, however, take a unique large-scale big picture view of a series of events that it is easy to get bogged down in the details of.

Shortly after Rajadhirat overcame a succession crisis and seized power at Pegu in 1383, a war began with Ava making an initial push into the delta. Laukpya, a local lord in Lower Burma, who had participated in the succession dispute of 1383, is said to have called upon Ava to invade:

In 1386 Minkyizwa[sawke], King of Ava, attacking Pegu sent out two columns, one to move down the valley of the Sittang, the other through the Tharrawaddy down the valley of the Hlaing or Myitmaka [along the Irrawaddy]. This invasion being unsuccessful it was renewed the following year and again a force went by land down the Hlaing river as far as the town of Hlaing [along the Irrawaddy], where they were defeated by the Talaings [Pegu forces] under Razadirit [Rajadhirat] and pursued as far as Prome, but *no permanent occupation* of Tharrawaddy was effected by the victors [Pegu] (Perkins, 1959, 24).

Without first having consolidated control over the far flung domains of Lower Burma, it would have been premature for Rajadhirat to establish a remote outpost at Tharrawaddy, located in the transition area between Lower Burma and Upper Burma along the Irrawaddy. Rajadhirat's conquest and consolidation of the various

relatively isolated domains of Lower Burma may have actually been spurred on by Ava's unsuccessful invasion of 1386, as a security measure to protect Pegu from further future invasions. The inherent localism of Lower Burma's geography and the implications this would have had for the nature of political control will be addressed further below.

Lacking coordination, Ava soon withdrew its forces to the north again and Rajadhirat did not erect any outposts or garrisons to assert control over the lower Irrawaddy. By 1390, after fighting off this first incursion by Ava, Rajadhirat had consolidated his hold over Lower Burma asserting control over the whole delta area right up the Irrawaddy to Myanaung south of Prome and erected fortifications to defend these positions (Fernquest 2006a, 6-7):

...from reference in the Hmannan history it would appear that about 1389 there were Talaing [Mon, Pegu] *outposts* Hlaing and Hmawbi while on the Talaing *frontier post* was at Gudut [Myanaung]. Two years later [1391] it would appear that the Talaings had *withdrawn from the district*, for it is related in the above mentioned that the people of Prome found a white elephant in Tharrawaddy and the King of Ava came down to enquire into the matter. Thereupon Razadarit advanced with large forces and the King of Ava withdrew after protesting the peaceful nature of his designs (Perkins 1959, 24).

The analysis of the gazetteer here assumes that an outpost or frontier post implies military and political control over an area and that an elephant expedition would have never proceeded into an area with an outpost. The function of an outpost seems to have been more of a surveillance and monitoring function for an area, a trip wire to warn of unauthorized activity in an area, rather than a garrison to provide an area with outright military protection. In fact, the elephant expedition might not have been aware that the area was being so monitored. The existence of an outpost could also be essentially a literary artifact added after the fact to attest to the fact that the area was in fact being monitored, and that the elephant expedition into the area by the king of Ava triggered a military response by Pegu.

Nonetheless, the event as recorded in the chronicle does appear to be significant and a critical turning point. What appears to have been a marked informality in the use and territorial control of this middle Irrawaddy region before, as exemplified by the King of Ava's elephant hunting expedition, starts to escalate into contention. After the accession of King Mingaung at Ava in 1400, Ava firmed up control over the lower Irrawaddy by the appointment of an official, as noted in the gazetteer:

At this time [1389] Tharrawaddy was apparently disputed territory but the Talaings soon gave up all claim to it for in 1402 we find Tharrawaddy mentioned as the headquarters of a *myoza* subordinate to Ava. Three years later [1405] the frontier between the two kingdoms of Pegu and Ava was defined and the line of

demarcations was drawn from Tabintayaung on the west to Sapaka on the east. In 1409 Tharrawaddy was fortified by Mingaung of Ava, and Razadirit [Rajadhirat] was withstood at Banan. (Perkins 1959, 24)

In stressing boundaries here the gazetteer neglects the very conflicts that led to frequent changes in boundaries. In fact, continual conflict rather than setting boundaries is far more salient in the indigenous historical narrative itself. The period discussed by the gazetteer here corresponds roughly to a long period of contention between Ava and Pegu over the middle section of the Irrawaddy River and its food supply from 1405 to 1411 (Fernquest 2006a, 12-16).

After this, the Ava-Pegu War (1383-1426) moves south along the Irrawaddy and drags on in the delta region with no decisive assertion of Ava's control over Lower Burma beyond Tharrawaddy. In 1426, there was a large-scale succession crisis at Ava and a state of internal warfare bordering on civil war in Upper Burma forced Ava to turn inwards and deal with this problem (Fernquest 2006b, 55-61).

In summary, following the accession of Rajadhirat to the throne of Pegu, Pegu made continual assertions of control of territory along the Irrawaddy up to Myanaung just before Prome, but in the end Ava consolidated control over the Middle Irrawaddy, as evidenced by domain lists in the chronicle. Tharrawaddy was the southernmost settlement that Ava erected fortifications at.

The name of the settlement Tharrawaddy signifies the wealth of the middle Irrawaddy and sub-deltaic regions. The name "Tharrawaddy" is *Saravati* in Pali combining the Pali words *sara* (wealth, substance) and *vanta* (indicating possession). In the Tharrawaddy gazetteer, Perkins observes that, "the district was probably so-called owing to its natural wealth in timber and paddy which sent much revenue to the royal exchequer; Burmese writers say it was so-called because of the large amount of revenue it yielded" (Perkins 1959, 1). We turn next to the full detailed account of warfare along the Irrawaddy as found in Kalā's *Great Chronicle*.

The conflict between Ava and Pegu over the middle Irrawaddy Basin took place over a long period of time stretching from 1389 to 1411. In the first conflict over this region, Laukpya, a local ruler in Lower Burma, played a pivotal role. Laukpya had changed sides and struck an alliance with Ava shortly after the 1383 succession struggle at Pegu and Rajadhirat's rise to power. In 1386, allied with Laukpya, Ava invaded Lower Burma before Rajadhirat was able to fully consolidate control over all the localities of Lower Burma after his succession. After Rajadhirat had repulsed Ava's invasion, he redoubled his efforts to bring all of the statelets of Lower Burma under his control.

Myaungmya, ruled by Laukpya, was the last statelet to be subjected in 1389. This allowed the collective man and animal power, as well as food supply of Bassein, Myaungmya, and Khepaung to be mobilized for further expansionary warfare up the Irrawaddy River (SL: 73). Rajadhirat allowed Laukpya to live out his remaining days as a monk at the Shwedagon Pagoda but shortly afterwards Laukpya died. Laukpya's sons Byagun and Thametbyakyin fled to the protection of Ava with their elephants, horses, and followers, and were given the important strategic locations along the Irrawaddy River of Salin and Prome to

govern over, respectively (UKI: 454). Both of Laukpya's sons played a prominent role in the subsequent conflict over the middle Irrawaddy River basin.

The second conflict over the middle Irrawaddy occurred shortly after Pegu's failed attempt to take and occupy Ava. In 1404 Pegu attacked and occupied Ava for a short period. Ava was weak and still reeling from the effects of the succession crisis that followed the death of the long ruling King Mingyiswasawke (UKI: 473-484). The following year in 1405, Pegu attacked and took Myanaung and then moved on to a siege of Prome (UKI: 487). During the siege the lord of Myo-hla was able to break out of Prome, send word of the siege, and call for a relief force from Ava (UKI: 488). Ava sent a relief force, and although Pegu forces successfully repelled them, the Ava forces were able to continue their advance on Prome shortly afterwards (UKI: 489-490). Although the Ava side had some initial success, the situation at Prome soon devolved to a stalemate and the two sides negotiated a truce (UKI: 494-511).

A fundamental change in Ava's northern frontier with Ming China starting from 1406 and had a far-reaching geopolitical impact that stretched as far as the north-south Ava-Pegu War in Burma (Fernquest 2006b). In this year the Ming under the Yong-le emperor started moving large numbers of military personnel out of Yunnan to northern Vietnam. The Ming occupation of northern Vietnam [Annam] and this displacement of military forces would last until 1426. Already in 1403 first the small Tai state of Onpaung-Hsenwi, in what is now the southern Shan states of Burma, had voluntarily been incorporated into the kingdom of Ava as a tributary state (UKI: 472) and then in 1405 Nyaungshwe also in the southern Shan states also followed suit (UKI: 486). So already before the Ming withdrawal from the Tai region of Yunnan, ties had developed between Ava and Tai states bordering Yunnan.

After 1406, there is increasing evidence of forceful military campaigns into the Tai region bordering Yunnan (Fernquest 2006a, 50-53). Tai manpower and animal power seized in these military actions was used in Ava's campaigns against Pegu in the south. This increment in military manpower on the Ava side seems to have led to an increased incidence of subsistence crises during the military campaigns of the Ava-Pegu war.

The third conflict over the middle Irrawaddy took place in 1408 and ran from the battle of Pangyaw to the Mingaung's great retreat back to Ava. As the war gathered momentum from 1405 to 1411 food supply became the critically important factor during long campaigns. Hostilities between Pegu and Ava switched to a fight over Arakan for a time, perhaps over trade, but in 1408 hostilities over the Middle Irrawaddy were renewed when Pegu defeated Ava at Pangyaw by trapping them in a tidal current moving up the river.

After Ava's defeat at Pankyaw, Ava far away from home and facing a dwindling food supply, entered into negotiations for a truce (Fernquest 2006a, 14; SL 95-99). An inadequate food supply posed a strategic predicament for Ava, it ruled out both a further attack as well as an orderly withdrawal back to Ava. On home ground, Pegu most likely did not face the same food supply problem as Ava did, so its forces were in better condition to fight. On their initial advance into Pegu territory, Ava's foraging parties had depleted the countryside of food stocks, so to gather further food supplies:

[Minhkaung sent] foraging parties totaling about three thousand strong as far as Paukngu, Malauk, Dawgon, Awtit and Taungnyo. Rajadhirat sent Samim Awanannaing after these foraging parties to ambush them on their return. As these parties came back bent under baskets of rice in the husk they made easy prey and five to six hundred were killed, over two hundred were captured alive, as were male and female elephants and over twenty horses. This happened two or three times. Thus casualties mounted and when they had to forage further and further, *what meager provisions these parties could collect were mostly consumed during their travels to and fro*. To the West dense jungle barred their entry and to the east numerous lakes, swamps and morasses hindered their travels. Enemy ambushes made foraging costly. Therefore little rice was to be had and famine stalked the troops (SL 97).

As Diamond (2005, 165) notes of human porters carrying food supplies to forces on the march, “beyond a march of a few days to a week, it becomes uneconomical to send porters to carry corn [or rice in our case] to provision armies.” This describes what was essentially a universal of premodern agrarian warfare, logistical overload and over-extension leading to military failure.

Various attempts at a truce failed and Avan forces were forced to make a costly and disastrous retreat northwards back to Ava. This retreat was an important turning point in the war (Harvey 1925, 94; UKI: 528-532). In the later Kòn-baung era *The Treasured Precedents*, this second battle is subject to extensive interpretation and commentary, using various Buddhist folklore stories as a basis for interpretation. The Sakkunaggi Jataka is enlisted to draw a moral from this historical episode. A hawk catches a quail outside of its natural habitat. The quail tells the hawk that if it had been in its natural habitat that his strength would have been equal to the hawk’s. The hawk takes the challenge, releases the quail but ends up smashing its head against the ground in pursuit after the quail disappears down a hole in the ground (Bagshawe 1981, 110-112).

After 1409, the king of Ava’s son, Prince Minyekyawswa, took over from his father as the principle commander. The prince undertook a much more active and aggressive approach in the campaigns in the south, combining them with manpower raids into the northern Tai (Shan) frontier zone with Ming Yunnan in order to bolster the human and animal might of his army (Fernquest 2006b, 48-55).

In the fourth battle for the middle Irrawaddy Basin, we see an instance of “marchlands” geographical advantage at work. The Tai statelets were no longer a threat to Ava as they had been the century before and had been transformed into a target for manpower raids and a source of strength in warfare. In contrast, Pegu in the south was still vulnerable to attacks from Tai statelets in the central mainland. Rajadhirat attacked Prome in 1411 while Ava was campaigning against Tai states in the north. When Kamphaengphet in turn attacked Martaban, Rajadhirat was forced to pull some of the troops away from Prome to deal with the problem (UKII: 10, SL: 112-113).

Events came to a head around 1411. When Rajadhirat rushed back from Prome to Pegu to defend against the invasion by Kamphaengphet in 1411, he blockaded the river north of Prome to prevent food supplies sent by Ava along the river from reaching Prome (SL: 112-113). Ava was still able to evade the

blockade, establish a stockade at Nawin, and supply Prome with food. The food supply advantage reversed once again when Ava laid siege to Pegu forces at Prome, capturing food supply boats sent from Pegu and forcing them into starvation (Fernquest 2006a, 17 summarizing SL 114-115). When Ava attacked Prome, Rajadhirat sent provisions and then returned to Prome himself (SL: 113-116). The death of the Mon warrior Lagunein marks the epic climax of the narrative and the turning point. From this point forwards, almost all the fighting will be in the delta of Lower Burma with Pegu defending its territory.

Pressing into the delta region shortly after that, Ava occupied the delta for the duration of the rainy season and as a result most of the land in the western delta region could not be put under cultivation except for some land immediately adjacent to large settlements like Myaungmya, Khepaung, and Bassein. Famine in the south was the result (Fernquest 2006a, 18; SL 120). A cultural protocol or norm, discussed in detail in a later section, was to bring warfare to a halt during the rainy monsoon season. At this point in the narrative of Rajadhirat, we see a strategic violation of this protocol, leading to famine on the enemy side and a renewed advantage on the battlefield.

After the main theater of warfare moved south to the delta region, stretching Ava's supply lines. Ava occasionally faced problems supplying its troops with food once the conflict moved into Lower Burma proper. Encamped at Khepaung in 1415, soldiers were forced to eat yams and tubers. The commander Prince Minyekyawswa faced the choice of destroying his warboats and marching back north by land or confronting the Pegu side in a naval battle. Pegu drove stakes into the river to prevent boats from traveling south and disrupted Ava's food supply lines along the Irrawaddy to the north at Henzada. Ava forces sent south to free up the supply fought with Pegu forces trying to cut it off (SL 130-131 cited in Fernquest 2006a, 19)

In summary, from 1405 to 1411, battles were often fought over food supply enabling supply lines around Prome. After 1411, Ava had largely overcome its supply line difficulties in the middle Irrawaddy Basin and the fighting permanently moved southwards from Prome down the river and into the delta area to such settlements as Bassein, Myaungmya, Hmawbi, and Dala.

Long-term historical geography of Lower Burma

An inferior ecology, insofar at least as human habitation was concerned, meant that Pegu could only field a smaller army than Ava. Since, over long periods of time, military success is highly correlated with military manpower advantages, Ava ultimately prevailed in the north-south conflict over the important middle Irrawaddy region. Control over this stretch of river not only provided access via boat to the coast and ports such as Bassein, possession of this territory also augmented Ava's food supply and guaranteed access to this food supply via boat. However, the localized geography and adverse terrain of Lower Burma meant that Ava was not able to assert permanent control over Lower Burma, with Tharrawaddy along the Irrawaddy river being the military outpost furthest south that Ava was able to establish.

The two-fold division of Burma's geography into an upper and lower part makes it sound like there is a well-defined boundary between the two regions. There was actually a gradual ecological transition between Upper and Lower Burma along the Irrawaddy River. Upper Burma is usually characterized as a "dry arid zone" and Lower Burma as a wet "inland coastal zone," but:

Between the two zones lies a subdeltaic strip. Historically, however this area was always subject to one of the major zones, usually the north, and never exercised control over the central basin (Lieberman 1984, 17, footnote #3).

Important settlements were spread out along the whole length of the Irrawaddy River Basin, both to the north and the south of Prome: [Danubyu-Henzada-Kanaung-Myanaung]-Prome-[Thayet-Myede-Malun-Magwe]-Sagu-Salin. The bulk of the Ava-Pegu War as depicted in the Rajadhirat epic is fought over these settlements to the south and north of Prome. Later in the war, explicit reference is made to the segment of the Irrawaddy north of Prome. During fighting in Prome, Rajadhirat sent boats to collect rice from the Myede-Thayet-Magwe-Malun area. With this explicit reference, we can surmise that this group of settlements stood out in the minds of elites of the era as a distinct rice-producing area.

The Irrawaddy River to the immediate north and south of Prome constituted a critical juncture point between three regions: Upper Burma, Lower Burma, and Arakan. The Prome stretch of the Irrawaddy was particularly vulnerable to intrusions from Arakan and riverine watch posts near Prome by tradition performed essential garrison duties (Trager and Koenig, 1979, 136-138).

Military expeditions sent along the Irrawaddy to Lower Burma shifted from the Irrawaddy River to the Hlaing River around Prome for all destinations save Myaungmya or Bassein, the only large settlements in the delta. After Myanaung the Hlaing River branching to the east to Tharrawaddy, Hmawbi, Dagon, and up the Pegu River to Pegu, was a more important stretch of river militarily than the main artery of the Irrawaddy that passed through Henzada to the delta.

Henzada did not lie on the main line of communication between the kingdoms of Pegu and Ava...the line of march for invading armies lay either via the Toungoo valley, and the Sittang, or more often *down the Irrawaddy as far as below Prome, and then down the Hlaing stream – in those days an outlet of the main river* – in order to avoid the high waves of the lower reaches of the Irrawaddy. Nor was it in the direct route between Arakan and Ava, or Pegu (Morrison 1963, 16).

The crossover point from the Irrawaddy to the Hlaing River for military forces could actually have been anywhere from the Nawin River junction above Prome to Myanaung south of Prome, making the whole Prome stretch of the Irrawaddy essentially one large river junction between Upper and Lower Burma. In its

upper reaches near Prome the Hlaing River is known as the Myitmaka River. During the British colonial era there was uncertainty about the source of the Myitmaka River. The nature of the river changed during Monsoon season flooding which made it difficult to map. In an early British map “there was shown a connection between the Nawin [River] above Prome and the head of the Myitmaka, which was accordingly supposed to receive flood-water from the former river.” Military expeditions more likely shifted from the Irrawaddy to the Myitmaka at some point to the south of Prome:

[South of Prome] there are many channels by which the flood-waters of the Irrawaddy find their way into the Myitmaka or those of the Myitmaka into the Irrawaddy according to the relative heights of flood in the two rivers at the time. The highest connection of the Myitmaka with the Irrawaddy is the Singaung creek which is navigable only during the rains, and joins the latter some forty-five miles above the origins of the Bassein river (Perkins 1959, 6).

Tharrawaddy, Ava’s southernmost outpost during the Rajadhirat era, was located at the southern extremity of this area where the Irrawaddy joined the Hlaing River.

The settlements of the Irrawaddy River Basin appear to have been critical or pivotal strategically insofar as the possession of their food supply was essential for victory in warfare. In general, food supply likely formed the principle military objective given the premodern agrarian nature of the economy. In a similar riverine geographical context of the Northwest Coast American Indians, Ferguson (1984) has argued that contact with the West brought trade opportunities and weapons. During a pre-contact period, such as the Rajadhirat period, the objective of warfare was largely subsistence resources such as food supply. In the post-contact period, the objective shifted to the control of trade and waterways used for trade using firearms.

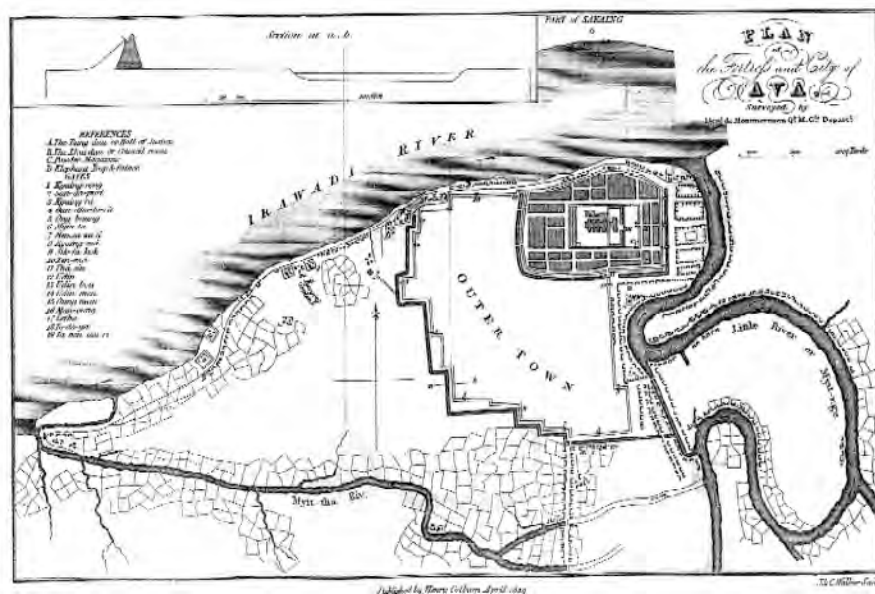


Figure 4 – Capital of Ava at river junction to Kyaukse granary

Control of resources depended on control of critical transportation junctures such as ports, river mouths, river junctions, or crossroads. The capital of Upper Burma, Ava, was well placed at a river mouth leading into the principle Kyaukse granary and being on the Irrawaddy, had relatively quick access to all settlements along the Irrawaddy River Basin. (See figure 4 for a map of the critical river junction that Ava is located at; Aung-Thwin (1990) includes maps of the Kyaukse and neighboring granaries).

To maintain access to the Irrawaddy River basin and Lower Burma possession of settlements along the Irrawaddy were of critical importance. To the southeast, transportation and access to Yamethin, Toungoo and Sittaung from Ava became progressively more difficult because it required overland transportation which made these settlements good protected locations during periods of political discord in Ava, for instance during the post-Shan invasion Min-gyi-nyo era. (Fernquest, 2005b, 88-89) The port town of Bassein may have been an instance of a post-contact armed strategic trade junction. When Rajadhirat first attempted to take the town early in the war “sailing ships manned by foreigners ...fired their weapons at them causing much casualties.” (Fernquest 2006a, 8) Bassein stands out in Table 3 for its wealth and statistics circa 1580 of course. However, Tomé Pires mentions Bassein as an important trade port much earlier (Cortese 1944).

Settlements along the lower subdeltaic stretches of the Irrawaddy Basin may have also been important for Upper Burma as sources of wild elephants. The ecology of Lower Burma appears to be better adapted than arid Upper Burma for sustaining a thriving elephant population (Charney 2007). The Kings of Ava traveled southwards to Lower Burma when they went elephant hunting as Mingyisawawke did in 1391 at Tharrawaddy (UKI: 458).

In summary, an important region in Lower Burma, the Irrawaddy delta, was ecologically disadvantaged compared to Upper Burma. The carrying capacity in terms of military manpower that could be

supported, was less in the delta than it was in irrigated Upper Burma. Mobility in the delta was low since the terrain of the delta, consisting of innumerable small canals and creeks as well as marshlands difficult to traverse (boat, elephant, and horse, being successively more difficult modes of transportation, see Charney 2007, 8). The delta also contained key settlements that were arrayed east to west against the north-south flow of the Irrawaddy River making travel, communication, and coordination of these settlements perhaps more difficult than the main settlements of Upper Burma arrayed along the length of the Irrawaddy. Some sub-regions of Lower Burma such as the trans-Sittang literal which stretches from the mouth of the Sittang River down past Martaban and Moulmein were less accessible and vulnerable to military expeditions from Upper Burma using the rapid conduit of the Irrawaddy, whereas the Irrawaddy delta, because Upper Burma could transport forces there so quickly, was highly vulnerable. These three important ecological factors of carrying capacity, terrain-mobility, and connectivity posed constraints on premodern warfare and state formation.

In premodern Burma, the Irrawaddy delta region of Lower Burma had several characteristics, several of them limiting as far as agricultural production, food supply, and population were concerned:

Table 3: Delta Agricultural Ecology

Delta Ecology
a. Greater rainfall
b. Land in the delta was difficult to bring into cultivation due to seasonal flooding, swamps, heavy alluvial soils, saline water and soil
c. Malaria endemic, became epidemic in newly cleared jungle areas
d. Small urban populations, sparsely populated, small scattered hamlets
e. Patches of low-yield shifting paddy cultivation in clearings
f. Fishing, salt-boiling, fruit cultivation, and the collection of wild forest items such as resin, ivory, and honey were important for the local economy at this time

(Grant 1933, 1, 7; cited in O'Connor 1995, 972; Frasch 2002, 62; Lieberman 1984, 17-18, citing ZOK, 41, 50-51, 55, 58, 59; ROB 10, 13; Lieberman 2003, 131; note also that the Lower Delta of Siam also suffered from these ecological constraints, Bray 1986, 96)

The agricultural practices employed in the delta by Mon farmers, could be characterized as “flood managing” garden farming in contrast to the “flow managing” farming of irrigation adopted by the Burmese in Upper Burma (O'Connor 1995, 970, 972). Flood farming makes use of a river delta's given hydrological environment:

The exposure of this expanse of low flatland to a monsoon cycle of rainfall and drought gives the delta a highly distinctive hydrological environment. In the rainy season the delta receives not only *in situ* rainfall but also water flowing in from upstream. Because the delta has virtually no slope, this water cannot immediately drain away but accumulates steadily (Takaya 1987, 7).

As water accumulated, flooding resulted. During the dry season, the situation reversed and all the water disappeared making habitation difficult:

In the rainy season, there is no dry land; in the dry season, there is no drinking water. For these reasons, deltas were, until very recently, considered unfit for human habitation. Rather, they were left as grassland with patches of swamp forest, the domain of elephants and crocodiles (Takaya 1987, 7-8).

Cultivators in Lower Burma had to deal with this delta hydrological environment as best as they could. Rice cultivation on the delta's floodplain required managing flooding through drainage or by the selection of fast-growing varieties of rice suitable to this environment (Ishii 1978, 18). Only later on, during the British Colonial Period, was the rice-growing potential of Lower Burma's greater rainfall harnessed, after which Lower Burma quickly became the center for rice production in Burma (Adas 1974).

How much more flood farming was employed in Lower Burma compared to other regions in Mainland Southeast Asia can be seen in this table:

Table 4: Ratio of flood farming to irrigation farming (O' Connor 1995; cited by Lieberman 1991, 100)

	<i>Western Mainland (Burma)</i>	<i>Central Mainland (Thailand)</i>
<i>Upper/North</i>	1 / 3	1
<i>Lower/South</i>	27	3

This diagram indicates that Lower Burma had twenty-seven times as much flood farming as irrigation farming, whereas Lanna had an equal balance and the southern Chaophraya near Ayutthaya had about three times as much. Arid Upper Burma stands out with the reverse situation with three times as much irrigation as flood farming.

Flood farming is associated with low carrying capacity of land, that is land that can only support a lower population. The carrying capacity of an area of land is defined to be the number of people that the area of land can support given the quality of the natural environment and the level of farming technology of the population residing on the land (Turchin 2003, 52-53, 120-122; Zubrow 1975).

In general, an increase in irrigated rice farming technology relative to flood farming would increase productivity, which would in turn increase carrying capacity (Bray 1986, 62-63). Based on the predominance of flood farming, Lower Burma had a lower carrying capacity and was not as suited as Upper Burma was for supporting a large population and building up large armies, at least until the situation changed in the colonial period.

Evidence for a manpower advantage of Upper Burma over Lower Burma is mixed. There is evidence that the manpower and animal power of Upper Burma mobilized for warfare was somewhat numerically stronger than Lower Burma. The Burmese chronicle (*Kalà*) contains troop and animal counts for some campaigns during the Ava-Pegu War. Among all the expeditions covered in the chronicle, only a few provide directly comparable data for both sides. Relative comparative resource counts are probably more meaningful than absolute values since absolute values seem to have undergone exaggeration and amplification (Charney 2003; Lieberman 2003b). The data below indicates that there were notable and fluctuating disparities in military resources, disparities that usually favored Ava and Upper Burma. In the statistics below, “(E:200, H:3000, S:50000)” means “200 elephants, 3000 horses, and 50,000 soldiers.” In the row labeled “advantage” below, a positive number (“+”) means a numerical advantage for Ava and a negative number (“-”) means a numerical advantage for Pegu.

Table 5:**Comparison 1: 1405 (UKI: 489)****Pegu and Ava fight in Prome**

State	Elephants	Horses	Soldiers
Ava	200	3,000	50,000
Pegu	100	8,000	40,000
Advantage	+100	-5,000	+10,000

Comparison 2: 1408 (UKI: 519-520)**Ava marches to Pegu (UKI: 516-521)**

State	Elephants	Horses	Soldiers
Ava	800	20,000	200,000
Pegu	200	3,000	80,000
Advantage	+600	+17,000	+120,000

Comparison 3: 1411 (UKII: 6)**Pegu marches to Arakan**

State	Elephants	Horses	Soldiers
Ava	300	3,000	80,000
Pegu	50	200	50,000
Advantage	+250	-2,800	+30,000

Comparison 4: 1418 (UKII: 43)**Pegu marches to Toungoo**

State	Elephants	Horses	Soldiers
Ava	300	4,000	80,000
Pegu	350	1,000	70,000
Advantage	-50	+3,000	+10,000

Died: 3000 Mon, 30 elephants, 50 horses

Lower Burma's ecological constraints made three realities likely over the long-run, here presented as hypotheses. The first likely reality is that Lower Burma's lower carrying capacity probably put the region at a long-run military disadvantage compared to all neighboring regions (Upper Burma, Chiang Mai [Lanna], Ayutthaya). The second is that North-South differential in the flood-farming ratio was much greater in Burma than in the Central Mainland (modern Thailand). In the long-run this may have translated into the greatest differential in carrying capacity, explaining why Upper Burma usually dominated Lower Burma in warfare whereas warfare between Ayutthaya and Lanna was more evenly matched and inconclusive (c. 1350-1550).

The third is that the lower carrying capacity of Lower Burma may have translated into a lower population density that put Lower Burma at a disadvantage militarily vis-à-vis the Central Mainland (Chiang Mai, Ayutthaya). This may also have served as a magnet drawing elite migration from neighboring regions, for example, from Haripunjaya after a cholera epidemic (Swearer, Premchit & Bodhiransi 1998; Wheatley 1983, 199-102; Coedes 1960, 235; 1966, 116), or in the beachhead established by the Sukhothai merchant Magadu (Wareru) (SL 2-7; Griswold & Prasert 1972, 311-314). Lack of military manpower may have made Lower Burma a target for periodic military expeditions, including those against Martaban from Chiang Mai (c.1290) by Meng Rai (Wyatt & Wichienkeo, 1998, 36-37) and against Binnya U, Rajadhirat's father, in 1356 (Fernquest 2006a, 4; SL 11-13), and later during Rajadhirat's reign, against Martaban by Kamphaengphet (c.1411) (Fernquest 2006a, 17; SL 112-113).

The premodern settlements of Lower Burma, cited in historical works such as the Rajadhirat epic and Kalà's *Great Chronicle*, can be divided into largely autonomous local rice growing areas or bands (Lieberman 1984, 18, citing ZOK, 41) as in the following table.

Table 6: Five Rice Growing Areas

Rice Growing Area	<i>Settlements</i>
Subdeltaic	Danupyu, Henzada, Kanaung, Myanaung, Tharrawaddy
Western Delta	Bassein, Myaungmya
Central Delta	Pegu, Lagunpyi, Dagon, Dala, Khepaung, Hmawbi, Thanlyin
Trans-Sittang Literal	Martaban, Moulmein, Taikkala, Wun
Tennaserim	Mergui, Tavoy

The five bands of settlements of Lower Burma were arrayed down the Irrawaddy from Prome down to the delta and across to the east and then down the Martaban literal, in a large S-shaped pattern.

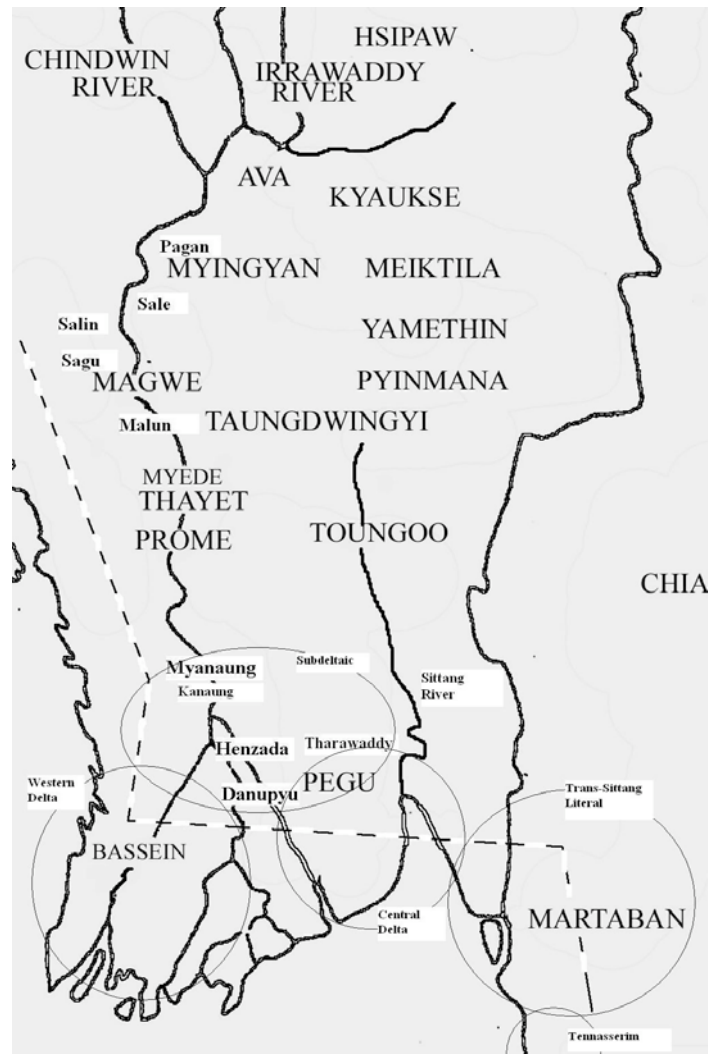


Figure 5: Irrawaddy River Basin

Geography made each of the five bands separate, distinct, and largely autonomous. This means that before Rajadhirat came to power, Lower Burma was likely characterized by a strong localism. In other words, before Rajadhirat's consolidation (c. 1383-1390) there were five divided, not one unified, political centers of power in Lower Burma. The fact that the main rivers and transportation arteries of Lower Burma ran north to south meant they ran against the grain of Lower Burma's east to west distribution of settlements, from Martaban north to Dagon west to Bassein north to Myanaung. This made transportation and communication between localities and unified rule more difficult:

...although Pegu, located in the center of Ramanya controlled the chief port, significant entrepôts also operated at Bassein, Martaban, and Tavoy, each of which retained its own courts, urban pagodas, and traditions of sovereignty. *Absent an east-west riverine artery, the dispersion of these port cities favored a localism almost as pronounced as the dry zone split between Ava, Prome, and Toungoo* (Lieberman 2003, 131; my italics).

Population distribution over Lower Burma's settlements was probably fairly even. The earliest tax census records for Lower Burma only date from 1580 at the end of King Bayín-naung's reign (r. 1551-1581). These records show concentrations of manpower at the capital and administrative center of Pegu as well as at Bassein, a prominent port center for trade, and a relatively equal distribution of the rest of the population across the other settlements:

Table 7: Lower Burma settlements, Manpower strength (c. 1580) (ZOK 41; Than Tun 1995, 4)

Settlement	Households	To Median
Pegu	9883	16.12
Bassein	6280	10.24
Henthada	889	1.45
Dagon	771	1.26
Ba Daung	667	1.09
Moulmein	663	1.08
Dala	640	1.04
Khepaung	587	0.96
Myaungmya	583	0.95
Thanlyin	583	0.95
Danupyu	529	0.86
Hmawbi	520	0.85
Kudut	493	0.8
Thayesi	482	0.79
Thamyindon	456	0.74

[Notes: ein-chei = collection of houses = households; to median = ratio of households in a settlement to households in the median settlement]

Rajadhirat indicates in several places that localism in Lower Burma was a deep-rooted feature that probably dated from before Rajadhirat's rise to power. First, the displacement of Binnya U, Rajadhirat's father, from Martaban to Pegu and the defense of the city state he built there from attacks by Martaban is evidence of the political divisions among several manpower weak settlements in Lower Burma before the period of the Rajadhirat epic (Fernquest 2006a, 4-5). Diamond describes a similar process in Mayan warfare as "power shifting" from settlement to settlement under the pressures of warfare (Diamond 2005, 165, 171). Second, the unwillingness of most settlements in Lower Burma to submit to Rajadhirat after his challenger to the throne

of Pegu, Smin Baru, was defeated is also evidence of political fragmentation and localism. The local lords of Lower Burma apparently did not accept a sovereign center in Pegu as being a natural state of affairs. The local Lower Burma ruler Laukpya shows independence of action when he realigns himself several times during Rajadhirat's succession crisis with different political actors. An extreme example is perhaps that of the ruler of Wun who manages to put off submitting to Rajadhirat three times (Fernquest 2006a, 7).

The frequently localized nature of warfare in the Rajadhirat chronicle also supports the model of Lower Burma's population being distributed uniformly among settlements with a large concentration at the capital Pegu presented above. Much of the fighting in the epic takes place in direct attacks by Ava on smaller settlements in Lower Burma that must have been defended by smaller local militias at each settlement. This is typically what happens when Ava is able to penetrate deep into the Delta during periods of Peguan weakness. When Rajadhirat is able to muster a large force from Pegu augmented with troops levies from other settlements, he typically meets Ava in advance on the approach to Lower Burma at settlements along the Irrawaddy or the Sittang Rivers.

The difficult nature of terrain in the delta made transportation and moving troops more difficult, which also accentuated localism. The vast deltaic plains that stretch from the Irrawaddy to the Sittang Rivers were intersected by creeks and channels with waters running through them that ebbed and flowed with the tides of the sea (Cheng Siok-Hwa 1968, 22). The all-pervading nature of the creeks and canals can be seen in Figure 6 below which depicts the deltaic plains from Bassein, on the upper left, to what was Dagon and Dala (on map, Rangoon), on the upper right. The terrain of the deltaic plains made travel difficult for forces with elephants, horses, and bullock carts and favored riverine warfare using boats that could navigate quickly through canals and creeks avoiding detection. This can be seen in the fighting along creeks and canals frequently depicted in *Rajadhirat* (Fernquest 2006a, 18-20).

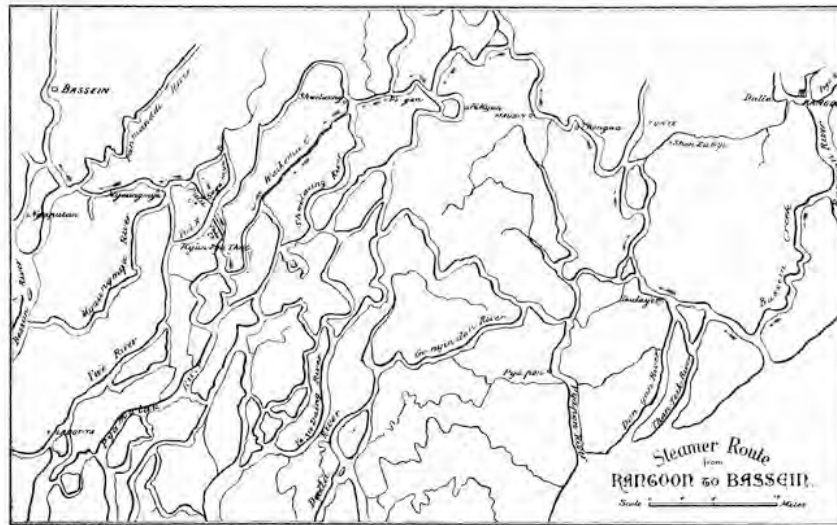


Figure 6: Creeks and Canals of the Irrawaddy Delta

Ultimately, warfare overcame the inherent localism or local autonomy of Lower Burma's geography. As Rajadhirat consolidated political power over Lower Burma he obtained concentrations of manpower and animal power that were comparable to Ava.

Long-term Ecological Patterns Influencing Warfare in the Burmese Agrarian State

Periodic subsistence crises broke the most fundamental link in the ecological chain (figure 2), the link between food supply and manpower. A classic example is a change in weather leading to a bad harvest. A food supply inadequate to feed the population of a settlement led to starvation and famine. Scorched earth tactics in warfare destroyed a locality's food supply and precipitated a mini subsistence crisis and this became a part of military strategy.

Some idea of what "food supply" entailed can be gained from the list of supplies Rajadhirat sent to Dala after he broke Ava's siege of the town. The supplies sent included food as well as armaments and tools: "rice husked and unhusked, salt, preserved fish, areca nuts, betel leaf, tea, rattan, bows, cross-bows, bowstrings, arrows, adzes, axes, swords, shields, helmets, spears and lances, jingals, cannon and firearms" (SL 137). A food supply for feeding war animals such as the horses and elephants, so ubiquitous in the troop lists of the Burmese chronicle, is notably absent from the above list, leading one to speculate how elephants and horses were fed in the context of Lower Burma. Elephants perhaps were left to forage in their natural jungle

habitats adjacent to villages, as Kautilya's Arthashastra suggests (Charney 2007 addresses this question for horses).

The premodern agrarian state went through subsistence cycles similar to the modern business cycle. War, famine, and disease, the three "specters," rather than the modern economic recession or depression, characterized the low point of the cycle. So far back in history does this cycle go that the three specters were known as the "four horsemen of the apocalypse" (famine, disease, war, conquest) in the Book of Revelations of the Bible. Three of the four elements (war, famine, epidemic) were also identified as important destructive factors in the Pali Buddhist texts describing successive creations and destructions of the world (kappa). Kalā's *Great Chronicle* borrows these elements for its narrative of the beginning of history (UKI: 2-8). All four elements had a tendency to arise simultaneously. The world historian Braudel called this historical coincidence of famine and disease the "old biological regime." An exogenous ecological shock initiated a subsistence crisis, which set the cycle in motion with a demographic downturn. The classic case of a subsistence crisis was climate (environment) affecting harvests (agriculture) affecting food supply, which in turn affected mortality rates:

In pre-industrial Europe the death rate and the birth rate seldom diverged greatly. In normal years the birth rate was slightly higher, and on average, and in the long run, pre-industrial Europe was characterized by a slowly growing population. However, with sad regularity weather anomalies, such as droughts, wet summers, and prolonged or late frost, would lead to harvest failures. If a harvest failure was widespread, it could easily turn into a famine, thus causing a so-called subsistence crisis. During such a crisis the usual relationship between birth and death rates would be reversed, and as more people died than were born, the total number of people dropped. This is the narrow definition of a subsistence crisis (Boomgard 2002, 1).

The mortality associated with warfare was not just the battle casualties we normally think of, death from starvation and disease was also a natural outcome of military strategies:

The third specter, often to be found in the company of dearth and disease, was war. War, of course, killed people directly, but the number of *indirect victims* was probably larger. Armies often *lived off the land*, which provided fertile soil for poverty and malnutrition to take root in the areas concerned, which opened the door to higher rates of morbidity and mortality. Sometimes, *standing crops were deliberately destroyed*. At the same time, armies brought epidemics, even when they did not *plunder or burn the crops*. The soldiers themselves, and the townspeople they *besieged*, frequently *fell ill*, owing to lack of good and sufficient food, clean water, hygiene, and to living in cramped conditions (Boomgard 2002, 1; my italics).

In fact, sometimes the coincidence of warfare, harvest failure, and famine had a strategic dimension to it:

...one should consider the possibility *that wars were caused or at least precipitated by crop failures*. What better time to start a war than when your adversary is crippled by a famine? Or, should a harvest failure loom, why not wage war on your neighbour whose crops are in better shape in order to fill your own barns anyway? (Boomgard 2002, 1, my italics).

It has been proposed since the time of Malthus that population pressure is a major causative factor behind warfare. Since crop failures caused population pressure, essentially making land unable to support the population that had grown to live on it (reduced carrying capacity of the land), crop failures would also have to be ranked as a causative factor behind warfare. Recently many have begun to question whether the lines of causality are that simple. Population pressure only leads to warfare under certain conditions (Turchin & Korotayev 2006, 1-2). Human political agency acting through warfare certainly changes those conditions and can make food supply effectively a weapon of warfare, and this is what seems to be happening in Rajadhirat as the conflict reaches a crisis point in the middle stretch of the Irrawaddy from 1408 to 1415.

A reliable and abundant local food supply was a precondition for military power. While ample food supplies sustained soldiers on expeditions to remote and distant military targets, they also strengthened the defenses of settlements and increased their ability to resist and survive incursions into dependent territory. Destroying or stealing local food supplies was an important part of offensive strategy, weakening an enemy's defenses and making it less able to support military manpower and wait out sieges.

Warfare was by no means a deterministic enterprise though. Food supply advantages could suddenly reverse. An aggressor forcing starvation within city walls or a stockade, could quickly be forced into starvation themselves. Consider the example of Rajadhirat's 1401 siege of Prome. According to Rajadhirat's minister Byat Za, Prome could only be won by waiting it out and forcing starvation inside the walls of the town. After a period of time, Prome's inhabitants were forced to live on starvation rations of rice bran and the pith of toddy palm, but when Ava broke the siege, winning Prome back, the situation was reversed and the Pegu side in turn faced a food supply problem. Couched as advise from Rajadhirat's minister Byat Za:

...since they had been subsisting on the environs of Prome and King Minhkaung had only come with rations carried by porters it would soon be used up and it would be necessary to provision himself by drawing on supplies from the Ava-Pegu region. 'When the environs of Prome face famine we will win,' he said 'The Burmese King will see the point as well as I do. Therefore, do not negotiate with him when he asks for a truce. With three to four hundred boats and picked men led by nobles we will see that rice from the Myede-Thayet-Magwe-Malun is collected and any amount remaining burnt and destroyed. The King approved of the plan so the scorched earth policy was carried out in every town and village in the area. As Minhkaung could not get his supplies from from far or near he had to send an envoy by the end of ten days or so with gifts of two good horses and ten robes (SL 87-88; Fernquest 2006a, 11-12)].

Letters were exchanged and a temporary truce resulted from this strategy. A boundary line running east to west near Tharrawaddy divided the domains of Ava and Pegu. Shortly afterwards, Ava caught a group of thirty traveling northwards by horse towards Ava at a jungle checkpoint. Rather dubiously taken as a group of spies, Ava used this incident as grounds for breaking the truce (Fernquest 2006a, 12).

Evidence from global climate patterns points to the beginning of the Rajadhirat period (1383-1400) as a possible period of subsistence crises. During the late thirteenth and much of the fourteenth centuries what is known as the “Medieval Climate Anomaly” made higher summer rainfall and more reliable rice crops likely for Upper Burma:

...after 200-300 years of sustained demographic/agricultural expansion, Upper Burma society faced severe pressures whose origins were simultaneously institutional and ecological. Although Southeast Asia has long been regarded...as people scarce, land-rich environment, in this context *instability reflected less a shortage of people than of quality arable land* (Lieberman 2003, 121, also 102-103).

Towards the end of the fourteenth century this period likely came to an end resulting in shortages of water that:

...compounded Upper Burma’s problems by lowering yields on established cultivation, by withdrawing from cultivation marginal *taik* lands, many newly opened; and by helping to *shift the center of gravity to better watered districts farther south*. Besides threatening peasant living standards, such changes may have placed additional pressures on royal (as well as aristocratic and monastic) income, *intensifying factionalism at court and perhaps in the countryside* (Lieberman 2003, 121, my italics).

The conflict over the middle and lower Irrawaddy regions depicted in Rajadhirat may have been a record of exactly such conflicts over “better watered districts farther south.”

In Burma a cultural protocol or norm barred warfare during the rainy “monsoon” season, a protocol that can still be seen in operation today. *The Treasured Precedents*, a work on political theory dating from the Kòn-baung period, has a quite explicit statement of this principal:

Thus the time of Kahson [May] and Nayon [June] is no time for war; after a little comes the time when there are heavy rains. If you embark now on an expedition which will take you to the Talaing [Mon] king’s country, it will be one in which you will be beset with mud and mire, thorns and creepers, vines and bushes. All the rulers of all the villages, towns, strong places, and princedoms collect their revenues and receive their homage in the month of Natdaw [December] only. No one comes to pay taxes or to render homage until Natdaw and they always plan for and arrange their wars after the rain has stopped in Pyatho [January] and Tabodwe [February]. It is too late for warfare now (Bagshawe 1981, 109).

This passage emphasizes that the monsoon made the transportation and communication necessary in warfare difficult in muddy terrain (Charney 2004, 190-191). The manpower tied up in remote warfare was also needed for planting and harvesting during the monsoon season, essential for maintaining a food supply. The timing of non-farming tasks so that they did not conflict with the harvest time can be traced quite far back in history:

Archaeological and epigraphical evidence from Central Burma of the Pyu and Pagan periods shows that not only the digging of irrigation works but also non-rural tasks such as the construction of urban fortifications and monuments and even warfare, were *seasonal activities confined to quite specific periods of the year when they did not conflict with the demands of the cultivation cycle* (Stargardt 1992, 63; my italics).

In this respect, Burmese warfare resembled ancient Greek and Roman warfare, which halted by convention during the winter months when restricted freedom of movement made moving supplies and finding fodder for horses difficult (Sidebottom 2004, 76). “Alternating seasonality of cultivation and wars,” or just the “seasonality of warfare,” can be considered a widespread characteristic of premodern warfare (Ferguson (1999, 391). Furthermore, this feature of warfare distinguishes agricultural societies from prior social organizations such as hunter-gatherers: “agricultural society cannot be continuously at war. Unlike hunters and gatherers farmers do not have year-round leisure” (Coleman 1986, 30).

A cultural protocol or norm of seasonal warfare also leveraged existing manpower so that a higher fraction of the population could be mobilized for warfare, in what Andreski (1968, 232) calls a higher “military participation ratio” or MPR for a society, defined as “the ratio of military utilized individuals to the total able bodied population.” Higher manpower mobilization rates associated with higher rates of war success:

In the off-season, the large agricultural work force could do other work without endangering the food supplies. *Such a mobilization of peasant labor would make the scope for expansion of nonagricultural activities several times larger than if full-time labor had been used...* the share of total labor force which could be used in urban areas for purposes other than food production was seldom more than ten per cent. But if all or most of the peasant population could be mobilized in the off season [a high mobilization rate for only part of the year], it would become possible to have ten percent full-time workers, plus an additional 80-90 percent during perhaps one third of the year. The result for the year as a whole would be nearly 40 per cent of the work force performing non-agricultural work... (Boserup 1965, 80-81).

Higher war mobilization rates could also augment manpower by war captives taken after these successful campaigns:

What alternatives did rulers of urban societies have if labor services were—or became—insufficient to meet demand? They *could conquer additional areas settled with peasants [territorial expansion], or they could capture slaves to replace or supplement peasant labor services [raiding for manpower]* (Boserup 1965, 80-81).

A resurgent Ava likely overcame labor shortages partly by manpower raids on Tai settlements to the north, reversing the earlier pattern of Tai raids on Upper Burma.

The Rajadhirat epic provides anecdotal evidence of how important the harvest cycle and local control of manpower was in the timing of warfare. At the beginning of Rajadhirat's succession crisis the nobleman Zeip Bye (later used to provide to convey didactic points on taxation and bribery, see Fernquest 2006a, 13-14) was called upon by to pursue Rajadhirat after he had fled the dangers that awaited him at the capital Pegu during his succession. Zeip Bye objects that the monsoon had already arrived and his men were in their rice fields engaged with the harvest, so the time was not yet ripe for gathering them into a fighting force. By the time he could gather them into a fighting force, Rajadhirat would have already mobilized the population of Dagon (Yangon) where he was residing and prepared defenses. If Zeip Bye was defeated it would merely augment Rajadhirat's forces with men, if victorious, Rajadhirat would simply take flight northwards to Upper Burma or the Shan States to evade capture. (SL 30 cited in Fernquest 2006a, 5) Political control of manpower for both agricultural and military purposes was a local affair.

In summary, the need for crop success and a reliable food supply determined the seasonal rhythm and pattern of warfare in the Rajadhirat epic. If crop failure was sometimes an offensive objective, crop success was always a defensive objective. Offensives and campaigns usually lasted only during the non-monsoon fraction of the year (there were also breaks in the fighting for a year or two). There were of course strategic exceptions to these norms in the Rajadhirat epic, in which the intensity of campaigning was increased and Ava pitched camp deep in the Delta within enemy territory for the duration of the monsoon season in order to: 1. prevent the planting of crops thereby inducing famine and weakening the enemy, and 2. seize the offensive advantage when the rains came to an end.

The Short-term Ecological Dynamics of Warfare in the Burmese Agrarian State

Conflicts over the middle Irrawaddy found in Rajahirat and Kalà's *Great Chronicle* share many features in common with premodern warfare in other societies throughout the world. One specific area of commonality is the dynamics of how kings conducted expansionary warfare.

First, premodern warfare exhibited an expansionary cycle with a “multiplier” or amplification effect, in which the accumulation of resources through expansionary warfare, including the taking of human captives, war animals, potential troop levies, tribute and taxation, enabled the further acquisition of resources.

Second, scorched earth tactics sought to assert control over an area by making the area uninhabitable, most commonly by attacking the food supply. Third, flight to mountainous forest hinterlands was a common response by local inhabitants to scorched earth tactics. Flight was possible if such a hinterland for refuge and resettlement existed, if the region was not environmentally “circumscribed” by a surrounding area of low carrying capacity that precluded flight. Given the existence of such a hinterland refuge, conquering states faced the problem of resettlement of a dispersed population after conquest, of drawing inhabitants back to their homes. Cutting a deal with local inhabitants could likely reduce the level of resources that the victor sought to extract from conquered regions, as a sort of social contract quid-pro-quo or bargain with local inhabitants for remaining in their settlements.

Before discussing these three elements of expansionary warfare dynamics and their relation to the narrative of Rajadhirat, an example of this cycle in operation in its contractionary phase is necessary. The example would rank as one of the most well-known in Southeast Asian history since it is taken from Ayutthaya-Burmese warfare which has been the subject of intense historical scrutiny in Thailand (e.g. Damrong, “Our Wars with Burma”). In Ayutthaya-Pegu warfare (c. 1581-1599) during the reign of Bayín-naung, expansionary warfare reached its height in premodern Burma. The contractionary overstretch phase of the geopolitical cycle kicked in during the reign of Bayín-naung’s successors. They failed to maintain the momentum of expansionary warfare and the subsequent contraction in domains and resources led to a subsistence crisis in Lower Burma during the 1590s (Lieberman 1984, 41, 97; Fernquest 2005). The Burmese chronicle version of the subsistence crisis is supported by independent European accounts that describe the same situation and events (Lieberman 1986, 240-247) Warfare increased manpower and food supply needs that agriculture could simply not keep pace with:

...constant campaigns placed an intolerable strain on the population of the Delta, the only area over which they exercised effective control...*the limited agricultural-demographic resources of the south [Lower Burma] meant it was particularly ill-suited to support continuous military expeditions.* Large numbers of cultivators were pressed into military and corvee service even during the growing season, and many who marched against Ayudhya and Vientiane never returned to till the fields. Despite the reduced population in the Delta, the government refused to reduce its demands for rice, corvee labour and military service – it probably increased demands of this nature during wartime – so per capita burdens on the remaining cultivators increased (Lieberman 1984, 39).

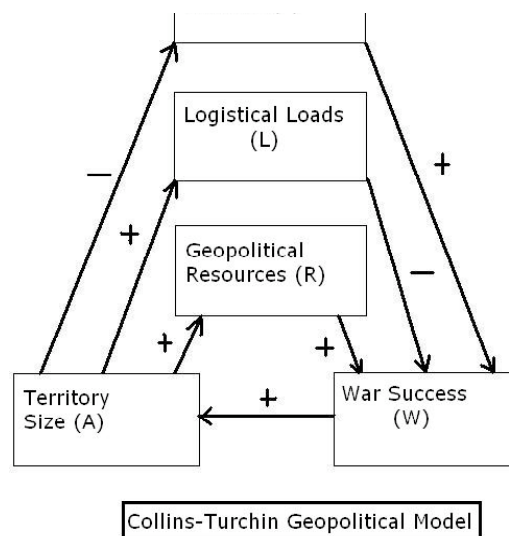
The end of war success in Burma’s expansionary warfare led to a contractionary spiral that worsened with each successive campaign, ultimately leading to famine and the complete collapse of the state centered at the capital of Pegu in Lower Burma.

From the simplified perspective of ecology, premodern warfare can be seen as a long-term competition between two agrarian states with each society’s geographical and ecological endowment forming

the initial conditions of the competition (Turchin 2003). Each of the competing states mobilizes its food surplus to engage in expansionary warfare. As the state expands it becomes increasingly difficult to mobilize the military and logistical resources necessary to maintain control over the state. The ability of a state to deal with supply line overstretch becomes a critical factor in sustaining expansion and avoiding contraction. Perdue (2005, 1996) provides a well-documented example of such supply line overstretch in Mongol-Qing Chinese warfare.

The ecological chain of causation in warfare was not a static one way influence, but rather a dynamic feedback loop, a repetitive cycle of environment affecting warfare and warfare in turn affecting the environment. Turchin's (2003) adaptation of the geopolitical model of Collins (1995) captures the essence of this cycle for expansionary warfare (figure 7).

Figure 7: Turchin-Collins Geopolitical Cycle of Expansionary Warfare



The link between manpower resources (part of R) and warfare success (W) in premodern warfare is a universally acknowledged causal connection. The link between manpower resources (part of R) and warfare success (W) in premodern warfare is a universally acknowledged causal connection. As Ferguson observes, “imperial expansion was based on the ability to martial overwhelming numbers” (Ferguson, 1999, 394). Besides raw population numbers, the intrinsic military participation rate (MPR) of a society, the percentage of the population of a state that could be mobilized for warfare also determined war success (Andreski, 1968; see section on seasonal warfare).

Table 8: Feedback sequences in the Geopolitical Model

Cycle	Period	Feedback
Expansion	1551-1581	W +A +R +W W +A +L -W
Contraction	1590s	W -A -R -W

Economics is perhaps the only social science that routinely verbalizes how events unfold according to theory in mathematical models. A contention of this paper is that this mode of explanation can be fruitfully applied to the premodern political economy of agrarian states. What follows is such a verbalization.

There are several positive and negative feedback loops embedded in this feedback mechanism. Initially, given overwhelming manpower resources, the impetus of war success (S) increased territorial size (A) and geopolitical resources (R), mainly a greater food supply, manpower, and animal power seized as plunder. Greater food supply and manpower in turn spurs more success in war, a counterintuitive phenomenon found in many premodern societies as noted by Jared Diamond (2005, 165) “Marchland position” in the geopolitical cycle is the advantage that “states with enemies on fewer fronts expand at the expense of states surrounded by enemies” (Turchin 2003, 17; citing Collins 1995, 1558). This means that increases in territory size can lead to war failure from “imperial overstretch” and having more frontiers to defend. The advantage goes to states expanding from an area easier to defend (Turchin 2003, 89).

Logistical load (L), the key negative feedback loop in the feedback mechanism, is defined to be the cost of providing a food supply to military expeditions in expansionary warfare against ever more remote targets. This cost of providing a military food supply included transportation costs and more importantly and unpredictably the cost of possible interrupted supply lines. Interrupted supply lines could induce a mini-subsistence crisis, as we have seen in the conflicts over the middle Irrawaddy. Logistical load increased with the distance of an expedition’s target, the ease of maintaining clear supply lines, and with the ability of fortifications to withstand assaults and force long sieges.

Scorched earth tactics destroyed local food supplies and weakened the defensive capabilities of the locality under attack (Charney 2004, 194-198; Fernquest 2006a, 11-12). From the perspective of the peasant commoner scorched earth tactics and manpower raids were unpredictable events that suddenly struck their settlement making them uninhabitable. For example, around 1415, just when it seemed peace and tranquility had finally returned to the area:

People from Bassein poured out from within the confines of the city walls thinking that the besiegers had gone away for good. They visited the gardens and parks savouring them when [suddenly] Minyekyawswa then at Kyet Kanet, sent warbboats and other craft accompanying them to take captives. He also had coconut and betel nut plantations razed (SL 136 quoted in Fernquest 2006a, 20).

Explicit descriptions of scorched earth tactics are legion in the Rajadhirat epic and jump out at the reader from the page. Consider the following examples, “I have laid waste Tagaung-Male and put the countryside to torch but no one there dared lift a finger against me” (SL 83); “He then had the Thakycin stockade destroyed and the rice stocks burnt” (SL 95 cited in Fernquest 2006a, 14); “...since he had reached Burmese territory, he had confiscated all boats, taking the good ones, destroying and setting fire to those that were not. He would build a strong stockade for them and leave a reserve force of war boats to go after the enemy if they came out to forage” (SL 78); and “The invading Burmese troops set fire to every village they came across and butchered all the cattle they could lay their hands on” (SL 95 cited in Fernquest 2006a, 14). It is highly unlikely that inscriptions or independent sources in other languages such as the Chinese *Ming Shi-lu* will ever verify any of these precise details. In the last item, stealing local food supplies for personal use rather than the outright destruction of pure scorched earth would also seem more logical.

Even if these are fictional details, they likely reflect common practice in warfare rather than purely fictional propaganda. The horrors of war and their rather obvious violation of religious tenets were real. They echoed in premodern Southeast Asian fictional works. The Thai poem *Khun Chang Khun Paen*, for example, explains that

lingers on the consequences of war, especially the sorrow visited on the families of slaughtered soldiers, and the human devastation when a city is defeated, its population is swept away into slavery, and its *wealth dissipated by looting and distraint* (Baker & Pasuk, forthcoming).

Furthermore, because violent warfare practices such as scorched earth violated the tenets of organised religion, they were often excised from official royal court histories. There are also well-known examples from western history of destruction of an enemy's food supply such as during the Peloponnesian wars of ancient Greek history (Hanson 2005, 35-64).

In defensive warfare, even before expeditionary forces arrived at their destination efforts were made by the settlements under attack to store away a food supply within the city walls or within a secure stockade as a defensive measure to wait out a siege and deny food supplies to the approaching enemy. How much could be stored away in this fashion depended on the timing of the campaign with respect to the beginning of the harvest season. As a last resort the destruction of crops that could not be conveyed to a safe place or harvested in time denied a food supply to the approaching enemy (Charney 2004, 195-198). Food shortages even sometimes necessitated the building of a separate stockade to protect the food supply from the hungry population protected within separate city walls (Fernquest 2006a, 16).

Flight from settlements to a safer less settled hinterland, often protected by forest and mountains, was a common response to expansionary warfare and scorched earth tactics. Environmental circumscription describes the conditions under which flight was chosen as a strategy by a locality attacked by an expanding state. Perdue (1996, 770) observes, “As they expanded their territories, the rulers faced the problem inherent

in the dialectics of conquest of land-based empires. Larger boundaries offered space for peasants to flee exploitation at the core by moving to the frontier (Perdue 1996, 770) As one military commander fighting the indigenous American Indians in 1675 complained: “Every swamp is a castle to them, knowing where to find us; but we know not where to find them!” (Parker 1996, 119) Or as the military historian Geoffrey Parker reflects: “...there are innumerable examples of colonial soldiers marching out with drums beating and colours unfurled in order to destroy an Indian ‘town’ – only to find it gone” (Parker 1996, 119).

Flight had advantages as a defensive strategy. Flight dispersed populations over territory and eliminated concentrated easy targets. If the carrying capacity of the land fled to was sufficient, subsistence from foraging or swidden rice farming would have been possible for long periods of time. Concentration of large numbers of people behind city walls or behind the defenses of a stockade, even if well-stocked with rice, ran the risk of unsanitary conditions leading to disease, a risk avoided by the dispersal of populations over territory by flight. In fact, the deep jungle and mountains might have been a healthier and more effective form of fortification.

Flight to the protective cover of the jungle is found in Rajadhirat. Early on, Zeip Bye responds to requests that he pursue Rajadhirat after the latter takes refuge at Dagon by observing that if Rajadhirat were to be victorious, Zeip Bye’s men would be captured, and this would only serve to augment Rajadhirat’s forces. If defeated, Rajadhirat would just flee northwards to Upper Burma or the Shan states to take refuge (SL30, Fernquest 2006a, 5). One can imagine Rajadhirat as a fugitive Mon lord resident at the court of Ava in Upper Burma much as Mingaung’s brother was a fugitive residing at the court of Pegu in Lower Burma later on.

Ruling elites accompanied with only a small band of followers also sometimes chose flight as a last-ditch survival strategy. One notable example of this elite flight occurs during Rajadhirat’s 1401 expedition against Prome, when the initial assault on the Irrawaddy Basin settlement of Tayokmaw failed, Rajadhirat laid siege to the town, but the ruler fled to the jungle. Rajadhirat decided to abandon the siege for the time being and move on to Prome, reasoning that after taking Prome, Tayokmaw would fall easily, and that this was a better strategy than pursuing the ruler into the jungle (Fernquest 2006b, 11, citing SL74). Two more examples of elite flight both take place in 1388 during Rajadhirat’s consolidation of power over Lower Burma following the succession crisis at Pegu of 1383. One was the flight of Laukshein ruler of Bassein, to Arakan around 1388 with “ten elephant loads of gold and silver.” The other was the flight of ruler of Wun after his delaying tactics failed (Fernquest 2006a, 8-9, 7).

Examples of flight as a strategy loom large in later periods of Burmese history. Setthathirat, King of Lanchang, later effectively employed the strategy of flight of the capital’s population to the jungle against the Bayín-naung. Repeated unsuccessful attempts to conquer Lan Chang met met this form of resistance over and over again over the better part of a decade (c. 1564-1574) (Lorrillard 1999; Aung Thein 1908, 1911-1919). In the end, Bayín-naung was forced to offer an amnesty to get local inhabitants to return to the Lan Chang capital. The Burmese in Nan faced the same problem much later (c. 1703-07) (Wyatt 1994; see next

paragraph). The Tais of “Mong Mao” in Yunnan also used the strategy of flight in response to Ming and Burmese inroads into their territory, a flight that precipitated a long pursuit that the Ming eventually handed over to the Burmese to complete (Fernquest 2006b, 61-66).

Ancient abandoned settlements in the Sri Lankan jungle may also attest to the universal nature of flight as a response to warfare:

...Thousands of ruined or abandoned tanks of smaller size were discovered in the wilderness...often within wide tracks of forest and jungle, but the villages which once stood near these tanks have disappeared, and the fields which were watered from them are overgrown with jungle...The reason which induced so many families to abandon their home and to settle in the wilderness were, were, no doubt, insecurity of life and property brought on by political disturbances...*many people were cruelly harassed and even often mutilated or killed by an undisciplined soldiery, their houses burnt, the cattle driven away as booty, the tanks breached, the weirs destroyed in the channels, and the fields and gardens devastated* (Geiger 1960, 51).

These jungle colonists were known as *vanni*. After warfare had subsided and the cause of their flight to the jungle had subsided, negotiations were held for their return from the jungle to settlements subject to state control in a temporary amnesty that resembles the Burmese amnesties in Nan and Lanchang cited above. The Burmese eventually treated those did not return as the enemy (Geiger 1960, 52).

Chinese history includes examples of flight. The Mongols used flight as a defensive strategy to stress Qing military supply lines (Perdue, 1996, 2005). Consider a situation in which the aggressor encountered effective resistance such as strong defensive preparations to withstand a siege (fortifications, manpower, stored food, flight). A common strategic response found in Burmese chronicle warfare was to attack neighboring settlements first to build up geopolitical resources such as manpower and animal power (see geopolitical cycle of figure 6), before returning to the initial target with renewed strength (Fernquest 2005b, 105-106, 110). One can see the Di Cosmo-Andreski model of incipient state formation as describing a similar process (Andreski 1968; Di Cosmo 1999; Fernquest 2005b, 122-124).

Certain conditions had to exist for the possibility of flight as a response to expansionary warfare. According to Carneiro's well-known “environmental circumscription” model, an area of circumscribed agricultural land was bounded by marginal unproductive land in the jungle, a marshy area, or the mountains, for instance. More extensive cultivation of this marginal land would bring severely diminishing returns. If there is no environmental circumscription, then the weaker side in a conflict can migrate out from the region and settle somewhere else. If there is environmental circumscription, then the weaker side is forced to submit to the stronger side because flight and migration is not an option. The populations of the stronger and weaker (conquered and conqueror) are united. The new state thus formed may have then alleviate the new population pressure by gradually increasing the productive capacity of agricultural through more intensive cultivation using irrigation, multi-cropping, new seed varieties, or other techniques discovered through local

experimentation and diffusion (Carneiro 1970, 1978; Lewellen 1992). As we will see, flight to the protective cover of jungle was often only temporary.

Although flight was an effective response, this also entailed great costs for both those fleeing and well as those pursuing. First, once the population of the town had fled into the wilderness it was difficult to resettle the town. Second, after the enemy looted and laid waste to the town, the town would have to be rebuilt. The problems that ensued after Burma's subjugation and destruction of Nan in 1703 demonstrate the difficulties with resettlement. In 1703 the town of Nan was leveled and as the Nan chronicle writes "the only thing left of Nan was the land." Four years later, in 1707, the Burmese king appointed Noi In as governor because he had been able to persuade many of the town's inhabitants to return. Another invasion occurred, this time by Lansang and Vietnamese armies. Captives were taken and those who could, fled from the town. Again Nan was depopulated and again Noi In had to persuade the former inhabitants to return. To speed up resettlement the Burmese king had Noi In issue an order that attests to the difficulty of resettlement. The order offered an amnesty and compelled the former inhabitants "to rebuild the city and resume their farm work and rebuild dams and irrigation ditches. If any farm landowner refused to comply, his land would be worked by others, and the owner would have no right to reclaim his land" (Wyatt 1994).

Strategies of resettlement after flight, or even better, strategies to avoid flight in the first place, were a necessary part of waging expansionary warfare. To avoid the burden of luring inhabitants back to a settlement after attacking, looting, and plundering it, explicit orders were sometimes issued not to engage in looting and plundering. In the 1406-07 expedition to Arakan, Rajadhirat issued explicit orders not to plunder the area around Sandoway (Fernquest 2006a, citing SL 91-92). That Than Tun's *Royal Orders of Burma* contains a similar order by Thalun ordering respect for local inhabitants along the march path to Yunnan, shows that this was a constant concern of rulers (ROB 1, 82, 85-88).

Conclusion

So what are Southeast Asian historical texts? To returning to the initial question posed at the beginning of this paper, we can now see that they are a lot more than history in the traditional sense of the term.

The models outlined at the beginning of this paper stressed that historical events have multi-causal rather than mono-causal origins. The Aung-Thwin Lieberman debate of the early 1980s over the role of religious wealth accumulation in the failure and collapse of the premodern Burmese state provides a good example of the limited theoretical basis that Burmese and Southeast Asian history has often proceeded upon (Aung-Thwin 1979, 1980; Lieberman 1980). Aung-Thwin (1979) provided an essentially mono-causal explanation of Pagan's decline, stressing religious factors to the exclusion of secular factors. Aung-Thwin's theory held that the accumulation of resources such as land and agricultural labour by the Buddhist *sangha* was *the* critical cumulative drain on the Burmese agrarian state that led to its collapse.

The essence of Lieberman's critique was that a multi-causal explanation that places an *a priori* equal emphasis on secular factors as well as religious factors should be allowed for (Lieberman 1980, 756). This is in line with Vickery's (1998, 3-7) recent suggestion that the theoretical machinery from which historical hypotheses for Southeast Asia are drawn from should be more diversified (For examples see Burke 2005). Lieberman (2003), taking a comparative world history approach, dares to formulate exactly such cross-disciplinary hypotheses such as using economist Alexander Gerschenkron's notion of "economic advantage of backwardness" to explain how institutional innovation by Upper Burma's backward periphery may have allowed linear stages in development to be skipped. The borderlands between Upper Burma and Lower Burma are conjectured to have been a region of economic experimentation that evaded the debilitating economic traditions of the royal center at Ava (Lieberman 2003, 127; Gerschenkron 1962).

Two requisites seem fundamental to multi-causal explanations: disciplinary boundaries must be breached in the search for a multiplicity of alternative explanatory hypotheses, and more rigorous and falsifiable models must be presented that can be tested against the historical data, data which must be made publicly available so that other scholars can assess the model and possibly falsify it, something that never happened in the Aung-Thwin -- Lieberman debate mentioned above.

In a recent paper, Vickery (2003) argues commonly accepted truisms in Southeast Asian history need to be questioned more. That Southeast Asia during the premodern period was land rich and people poor in terms of absolute quantities of resources available, is a truism "should not be repeated like a mantra because it may not always be true" (Vickery 2003, 8).

Vickery instead poses the question: Land or people? This question can, in turn, be expanded into a multiplicity of different falsifiable hypotheses to be tested regarding the influence of ecology and demography on warfare and agriculture. Employing a shorthand to state the hypotheses, in the manner of economists, can make these hypotheses more clear. For example one hypothesis uncritically accepted by Aung-Thwin that Vickery drew attention to, can be expressed as: Low P, High L, that in general Southeast Asia was endowed with low population levels and abundant amounts of land. Other common hypotheses run as follows: population pressure on the limited amount of land in a state causes expansionary warfare: $P \Rightarrow E$, holding L fixed, or given a fixed amount of land, an increase in population leads to higher levels of expansionary warfare, a hypothesis that has been shown not to hold universally (Turchin & Korotayev 2006; Johnson & Earle 2000). The hypothesis that Vickery proposes to counter Aung-Thwin's hypothesis is the Boserup hypothesis that $P \Rightarrow I$, holding L fixed, increasing the population on a fixed amount of land leads to greater employment of irrigation and managed water supplies (Vella 1986, 95 citing Boserup 1965). The converse of the Boserup hypothesis is the Malthus hypothesis: $I \Rightarrow P$, namely an increase in irrigation leads inevitably to an increased food supply, and a catastrophic population increase resulting in famine. Another hypothesis might run: $W \Rightarrow P$, namely an increase in war success (W) leads to an increase in population (P) because the existing population of the conqueror is augmented with war captives. Again, Vickery criticizes Aung-Thwin for accepting this truism uncritically for all cases without evidence.

Andreski's (1968) work on the sociology of warfare, and particularly the flowchart that he uses to integrate many of his ideas, provides many more hypotheses on warfare that historians might pose for premodern agrarian states.

Fresh falsifiable hypotheses applicable to warfare and the premodern state can come from unexpected quarters. The work of Ferguson (1984) on the anthropology of warfare of northwest coast Indians in America compares patterns of conflict before and after contact with western traders armed with modern western firearms (precontact and post-contact periods). The advent of western traders shifted the objective in conflicts from acquiring resources that could be used for subsistence purposes in agriculture, such as land and manpower, to acquiring particular locations along trade routes essential to controlling these trade routes. This sort of multi-dimensional hypothesis that brings together several disparate elements, warfare, trade, geography, weapons technology, demography, agriculture, and contact with the west or China, has potential for providing more sophisticated post-Mandala or post-Galactic polity models of the premodern agrarian state in Southeast Asia.

Source criticism as an end in itself, debates sometimes failing to provide, in the end, any inkling of what might have actually happened (i.e. Rankean factual history). One can always end a paper with a cautionary note deferring final judgment until the day that further sources are uncovered, but what if such a wish list of UR sources never materializes?

What is needed, is rather reasonable hypothetical historical narratives of *what-might-have-happened*, most likely multiple instances of such narratives. Negative source criticism unaccompanied by positive statements of what might have happened, in the end produce a conjectural vacuum, an area of enquiry where there is seemingly no evidence at all, in which statements about *what-actually-happened* cannot be made with any degree of probability at all (See area D in the diagram below).

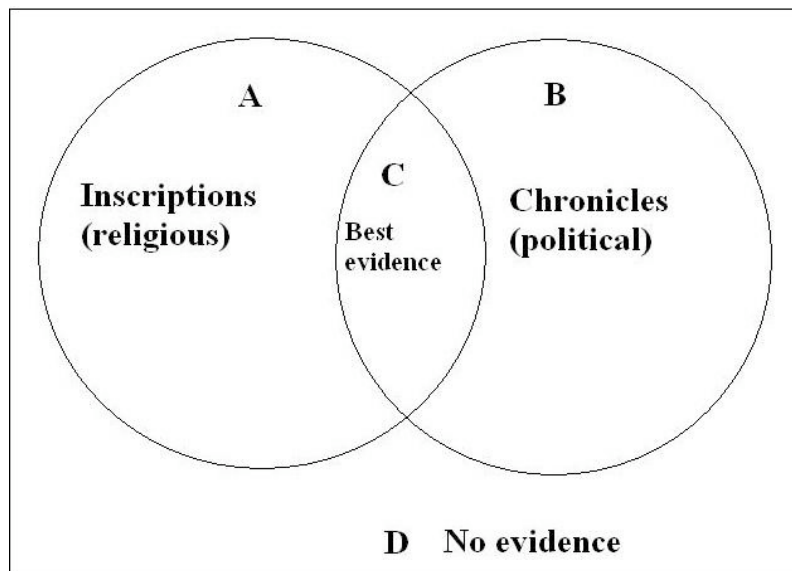
From the philosophy of science Bayesian inference is a useful paradigm that can inspire multi-threaded narratives of *what-might-have-happened* (Bird 1998). Reasonable assumptions derived from certain knowledge of similar premodern agrarian states can be introduced where hard evidence is not available. These assumptions can be introduced with certain subjective *a-priori* probabilities attached. The conjectural vacuum is then filled then, not with one master narrative, but rather multiple alternative narrative threads each of which stands as a possible explanation of *what-might-happened*. Following the model of Bayesian inference, the introduction of new evidence will lead to an update of *a-priori* probabilities and set of feasible narrative threads.

Different types of historical sources are useful for inferring historical facts regarding the three levels of infrastructure, structure, and superstructure. We can infer superstructure from inscriptions, which usually record religious donations. Indigenous historical chronicles also provide details of religious acts of merit and rituals at royal courts. We can infer structure from indigenous historical chronicles, royal orders, tax registers (*sittan*), as well as inscriptions. Warfare, in the diagram above, is also a part of this level. Infrastructure constitutes the long-run constraints that shape and constrain what can be achieved at the higher levels of

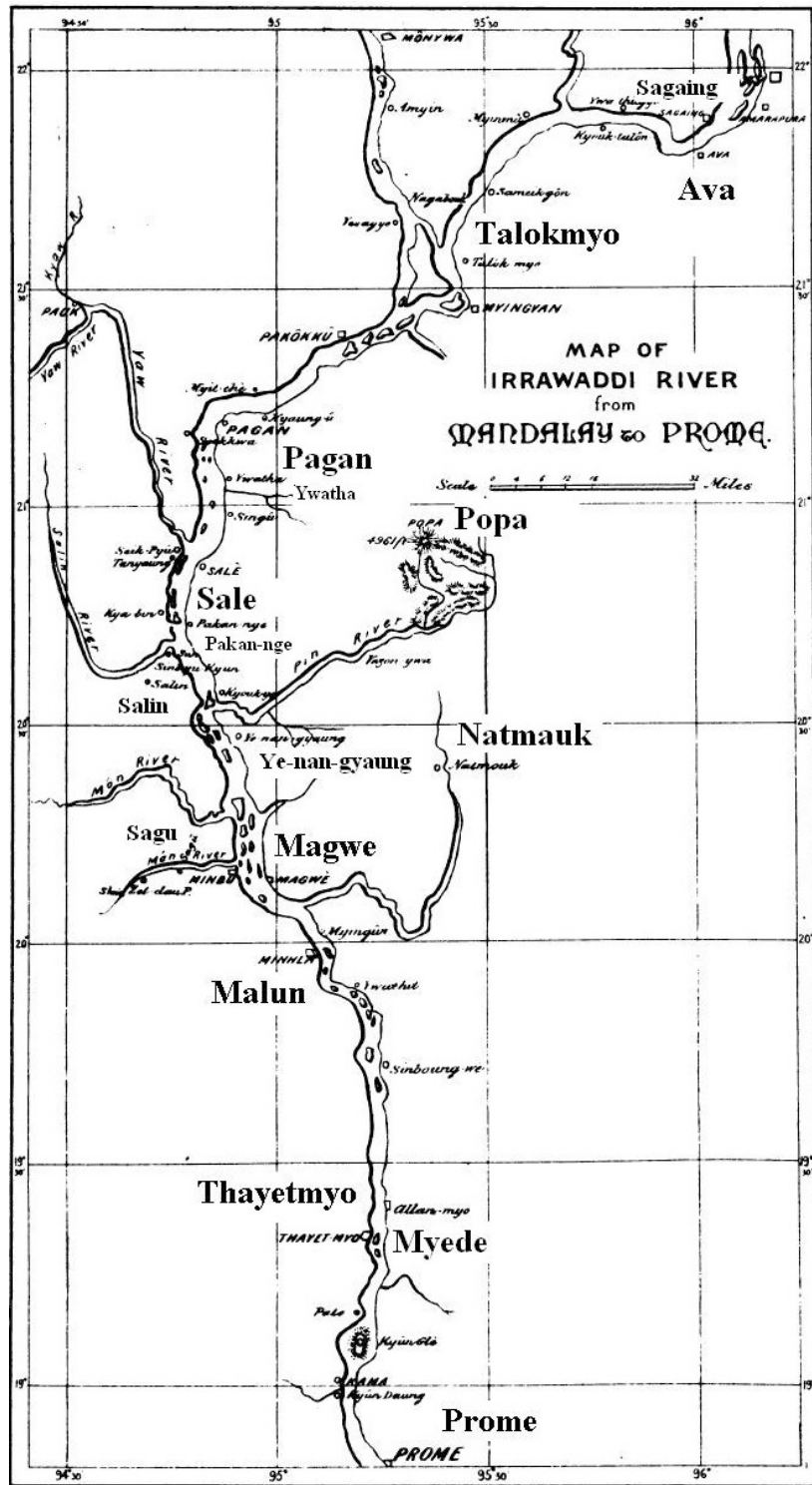
structure and superstructure. In the world of the premodern agrarian state “the conditions of land tenure, the nature of rural settlement, the type of crops, and human adaptations to environment to produce food are inseparable from how an army is recruited, organised, maintained and used” (Hanson & Strauss 1999, 440). Indigenous historical chronicles usually omit information at this level. Tax records and inscriptions can provide some evidence in this regard, but ultimately archaeology is necessary to uncover facts at this level. There are also many aspects of history that fall outside either type of evidence, which will necessarily be conjectural. Insofar as history consists of positive statements of what likely happened and not just the criticism and questioning of sources, historians must fill this conjectural vacuum.

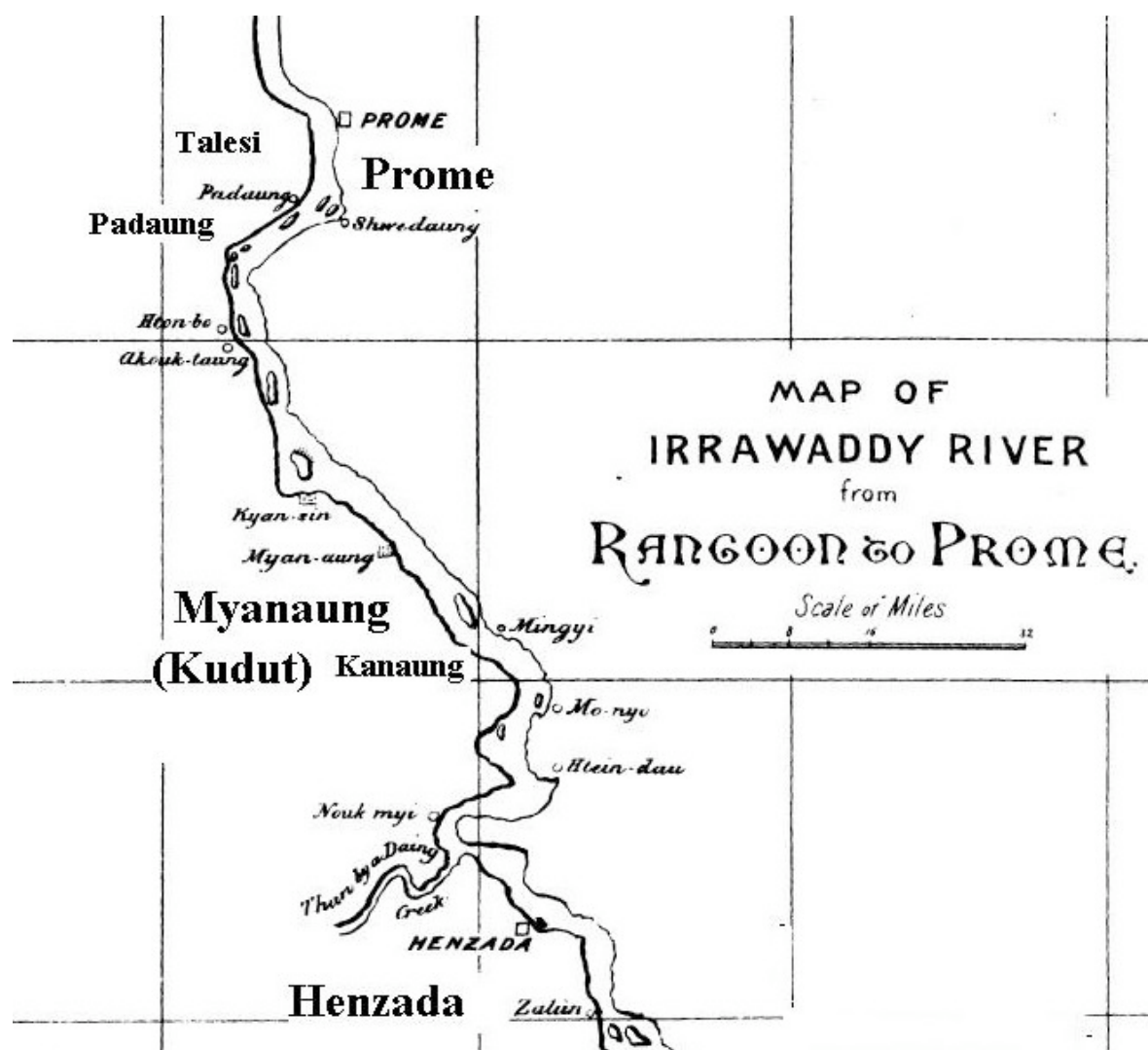
The diagram below summarizes the historical evidence available from indigenous historical sources, inscriptional and chronicle, employed by historians. Inscriptional evidence is mostly religious and chronicle evidence is mostly political. There is an intersection between the two types of evidence, often expressed as inscriptions verifying details in chronicles. Arguably, the most reasonable way to fill in this conjectural vacuum is to look at what was generally the case amongst all premodern agrarian states that faced similar circumstances. The influence of ecology on warfare in premodern agrarian states is one such domain with many commonalities investigated in this paper.

Figure 8.



Maps of the Irrawaddy





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