The Origins of Bagan.

The archaeological landscape of Upper Burma to AD 1300.



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A thesis submitted in fulfilment of requirements for admission to the degree of Doctor of Philosophy.

Statement.

This thesis contains no material which has been used in any other submission to any university or institution for the award of any other degree or diploma. The research involved no human or animal experimentation. To the best of my knowledge the thesis contains no material previously published or written by another person except where due reference is made in the text. Any joint research related to any material in this thesis is explained and acknowledged in the foreword and in the body of the text.

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Abstract.

The archaeological landscape of Upper Burma from the middle of the first millennium BC to the Bagan period in the 13th-14th century AD is a landscape of continuity. Finds of polished stone and bronze artifacts suggest the existence of early metal-using cultures in the Chindwin and Samon River Valleys, and along parts of the Ayeyarwady plain. Increasing technological and settlement complexity in the Samon Valley suggests that a distinctive culture whose agricultural and trade success can be read in the archaeological record of the Late Prehistoric period developed there. The appearance of the early urban "Pyu" system of walled central places during the early first millennium AD seems to have involved a spread of agricultural and management skills and population from the Samon. The leaders of the urban centres adopted Indic symbols and Sanskrit modes of kingship to enhance and extend their authority. The early urban system was subject over time to a range of stresses including siltation of water systems, external disruption and social changes as Buddhist notions of leadership eclipsed Brahmanical ones. The archaeological evidence indicates that a settlement was forming at Bagan during the last centuries of the first millennium AD. By the mid 11th century Bagan began to dominate Upper Burma, and the region began a transition from a system of largely autonomous city states to a centralised kingdom. Inscriptions of the 11th to 13th centuries indicate that as the Bagan Empire expanded it subsumed the agricultural lands that had been developed by the Pyu.

Contents.

Figures.

Tables.

Charts and electronic data CD-ROM.

A sleeve inside the back cover of this volume contains a CD-ROM and seven charts. On the CD, the folder called **Databases** contains two text files that can be opened in any mapping program such as MapInfo or ArcGIS, or in a spreadsheet program such as Excel.

bagan.txt is based on *Inventory of Monuments at Pagan* (Pichard 1992-2002) with extra data and modifications (as outlined in Chapter 7). **myanmar.txt** is the complete *Myanmar Archaeological Settlement Database*.

Foreword.

Acknowledgements.

I would like to thank the three anonymous examiners who assessed this thesis, and provided corrections and suggestions for emendations.

This study grew out of a GIS (Geographical Information Systems) spatial analysis project, for which Pierre Pichard of L'Ecole Française d'Extrême-Orient generously provided some then-unpublished data from the *Inventory of Monuments at Pagan*, which effectively made all the archaeological data from this monumental work available for study. M. Pichard also kindly sent copies of his UNESCO survey maps, and back issues of the *Pagan Newsletter*, which had previously been unavailable in Australia.

In Myanmar, my thanks go to U Nyunt Han, Director General of Archaeology, and to U Aung Kyaing, Assistant Director-General for Upper Myanmar, based at Bagan, for their continuing encouragement of my research. This has included permission to initiate and conduct excavations in conjunction with local colleagues, to photograph artifacts in the Bagan museum and to use an archaeology department office for storage and analysis of artifacts. Their hospitality and professional courtesy is greatly appreciated. My longtime partner in fieldwork and academic publication, U Nyein Lwin, contributed from his background both as an anthropologist and an archaeologist to these investigations. My digital site plans for the excavations at Yon Hlut Kyun, Otein Taung, Zi-o, Bagan 2003 and Letpanywa were compiled with the aid of his field drawings. My other major collaborator, both in print and in field survey, U "Tanpawady" Win Maung, gave unstinting access to his collection of site data, to his field notes, and to his private collection of artifacts. He arranged field trips and provided drawings of coins, bricks and other materials. The generosity of Win Maung to fellow scholars and his enthusiasm for all aspects of research into early Myanmar is well known in his own country (Khin Maung Nyunt 2002: 226) and is a byword among Burma scholars around the world. Terrence Tan was an active participant in some of the field trips, and provided much information in his specialist field of early jewellery. U Nyo Win, the curator at Halin, opened his home to our study group, and U Tin Thaung of Pyawbwe was an equally generous host during our survey of Pyawbwe township. I have benefited from personal discussions with two of the greats of Myanmar archaeology, U Myint Aung and U Aung Myint. Thanks also to Daw Khin Hla Han, U San Win, U Sein Myint and other members of the Universities Historical Research Centre in Yangon.

In the field, I would like to acknowledge the contributions of Tessa Boermah and Emma Hetherington who spent part of the February-March 1999 excavation season at Yon Hlut Kyun. Don Tindale, Ted Robinson and Jordan Robinson worked on my excavations in February-March 2000. Phillippa Weaver worked on excavation and recording of data at Otein Taung in December-January 2000-2001. Ma Onhmar Aung of the Bagan Museum drew the potsherd samples on Charts 3 and 4, assisted by Ma Shwe Shwe Win and Phillippa Weaver. U Thaung Lwin, of Bagan, provided Burmese to English translations of several previously untranslated documents, including the *parabaik* that appears in the appendix. Other translations, either in full or in precis, of Burmese language documents including archaeological reports and pagoda histories, were provided by Nyein Lwin and Win Maung. The field archaeology would not have been possible without my core crew of excavators, U San Ke, U Nyunt Aung, U Kan Myint, Bo Kyin, Aung-Naing, Shwe-oo and Myint-oo. Special thanks goes to archaeology department officers and other local informants at sites including Bagan and its hinterland, Salay, Shinbinsakjou, Letpanchibaw, Pakhangyi, Mandalay, Amarapura, Sagaing, Twante, Pindaya, Beikthano, Sriksetra (Thayekittaya), Halin, Allagappa, Maingmaw and the Samon and Panlaung Valley areas where much of the original data for this thesis was collected. Abbots and monks, museum staff, antique dealers, village elders, amateur antiquarians, farmers and "treasure-hunters" all enthusiastically shared information and ideas.

Roland Fletcher's commitment of time, energy and ideas as supervisor of my thesis at the University of Sydney was both inspiring and challenging. It is significant that after digressions on my part that I have been assured often tend to accompany the early stages of a thesis, the thrust of the research came firmly back within the framework of study that Roland had initially suggested. Co-supervisor Mike Barbetti provided advice on the interpretation of radiocarbon dates, suggested essential research directions, and was constantly encouraging. The computer component has been aided greatly by advice from Ian Johnson and Andrew Wilson of the Archaeological Computing Laboratory/Spatial Science Innovation Unit. Formal seminar presentations of my research design to the Archaeology Department at the University of Sydney brought a wealth of useful suggestions, and I have benefited from informal discussions with Penelope Allison, Alison Betts, John Clegg and fellow postgraduates. Pamela Gutman has been a regular source of information, encouragement and proposals for avenues of research, and has supplied copies of aerial photographs of Bagan and the other major urban sites for stereoscopic analysis. She also kindly authorised my use in this thesis of unpublished thermoluminescence dates she had commissioned for a past project (see Appendix, page 281). David Price of the University of Wollongong supplied the thermoluminescence data from his laboratory files.

Access to resources has been greatly helped by the staff at Fisher Library at the University of Sydney, notably the team at the inter-library loans department, and also the staff at the library of the Archaeology Department in Yangon. Inch-to-the-mile maps supplied by the University of Western Australia were invaluable. I have had the benefit of regular correspondence and a field trip to Arakan with Michael Aung-Thwin, of the University of Hawai'i. I am particularly grateful to him for providing a manuscript copy of his forthcoming book, *The Mists of Ramanna*, which has been a vital theoretical source. Shah Alam Mohammed Zaini, who has been researching early Sriksetra, has been a regular correspondent, a source of data and ideas and a participant in field trips to the Bagan hinterland. I have also had the benefit of exchanging and comparing site data with Ernelle Berliet, a fellow PhD candidate working on early Myanmar urbanism. Dietrich Mahlo shared his extensive knowledge of coins as we undertook field trips together to Maingmaw and some of the more obscure corners of Bagan. Janice Stargardt, Don Stadtner, Elizabeth Moore and Guy Lubeigt have regularly exchanged ideas with me by e-mail and at conferences. During the final stages of thesis preparation, Elizabeth Moore kindly read and commented in detail on a draft

of Chapters 3 and 4. Jean-Pierre Patreau, Ian Glover and Bérénice Bellina have provided offprints or pre-publication copies of papers. Jackie Menzies of the Art Gallery of New South Wales identified a Vietnamese porcelain find from the 2003 Bagan city excavation. Laichen Sun translated a Chinese coin from the same excavation. Grace Barretto of the University of the Philippines provided information about early dental decoration in South-east Asia relevant to some finds at Halin. I will be forever grateful to Don Hein for introducing me to Southeast Asian archaeology through his work in Thailand, Laos and Myanmar, and for teaching me that the most valuable phrase an archaeologist can use is "according to the available evidence". Needless to say, my wife Kerry and daughters Rani and Pira have been hugely supportive during the period of research and writing.

This research was assisted financially by the Carlyle Greenwell Bequest and the James Kentley Memorial Scholarship, with conference travel funding by the Faculty of Arts, University of Sydney and the international Burma Studies Group. The Australian Institute of Nuclear Science and Engineering in Sydney provided radiocarbon dating facilities.

Field survey, excavations and database construction.

The research for this thesis began in 1998, after I had completed my B. A. (Honours) thesis which was essentially an analysis of the data from the *Inventory of Monuments at Pagan* (Pichard 1992-2002) using maps, aerial photographs, and field survey. This had involved using MapInfo, a computer-based GIS (Geographical Information Systems) method of creating analytical tools, including maps or graphs, from a relational database. During field trips I initiated the excavation of three sites in conjunction with colleagues from the Archaeology Department at Bagan, and was invited to participate in a fourth excavation. These were

- Yon Hlut Kyun, which resulted in the discovery of a rectangular brick compound and associated structural ruins in the eastern hinterland of Bagan (Hudson & Nyein Lwin 1999; Hudson, Nyein Lwin & Win Maung 2002; Hudson 2003b),
- Otein Taung, where a pottery production site within the Bagan monument zone was characterised and dated, and identified as having been active from the 9th century AD (Hudson, Nyein Lwin & Win Maung 2001), and
- Zi-o, where a furnace for producing bloom iron in an area that contained the remains of hundreds of furnaces was identified and studied structurally.
- In 2003, I was invited by the Bagan Archaeology Department to join in the excavation of a complex of structures within the walled centre of Bagan. My role included the production and analysis of a digital plan, and artifact analysis. The latter two excavations, hitherto unpublished, are dealt with in this thesis.

As my interest in the broader issues of the origins of Bagan grew, and I began to explore the notion that the history of the city was interwoven with earlier urban sites, some of which showed evidence of continuity from Late Prehistoric predecessors (Hudson 2001b, 2003c; Gutman & Hudson 2004), I visited the major Pyu sites of Halin, Maingmaw (Mongmao), Beikthano and Sriksetra, and a number of pre-urban cemetery sites in the Samon Valley, as well as conducting field surveys in the hinterland of Bagan, the Panlaung Valley, western Shan State and the lower Mu/Chindwin area. The major research tool for work in the macro scale, looking at sites within the Upper Burma region, and into neighbouring areas where appropriate, is an archaeological settlement database (Hudson 2001a, 2002), while the database used in my BA (Hons) thesis (Hudson 1997) has been

refined and expanded for analytical work at Bagan (see Electronic Data CD-ROM). Database compilation is discussed in detail in Appendix 1 (page 266).

Terminology.

There is no intention in this thesis either to use terminology that supports any political ideology, or conversely, to offend adherents of particular views on usage, although there is always the risk that in trying to please all, one ends up pleasing none. Myanmar and Burma, the country's current and historical names, are generally used here relative to references in which the terms appear, as are all names that refer to documentary sources. Recent changes to placenames in Myanmar, which reflect an old tradition of multiple naming, renaming (Maung 1956) or duplicate naming, perhaps in Pali or Sanskrit as well as indigenous languages (ASB 1917 p.35), are dealt with by initially quoting both (or several) names, but relying in the main on the names that are most familiar from academic literature and/or maps. Some recently changed names that have become common international currency will be used in their new form. Bagan will generally be used instead of Pagan. The Burmese letter used to spell this word appears to transliterate more as a *B* than a *P*, and it is useful to distinguish the placename from the English word "pagan". Similarly, using Yangon for Rangoon reflects the phonetic shift from *r* to *y* that is seen in a number of Burmese words. The shift from *Mranma* to *Myanma* is another instance.

Calendrical systems.

Dates for early Burma derive from several calendars, and all have been converted here to years BC or AD. Original dates may come from:

- The Buddhist or ***sasana*** (religion) calendar, which starts in 544 BC, the year in which Buddha is believed to have died.
- The **Saka** calendar of Gandhara, which starts in AD 78. This is called the *dodorasa* era in Myanmar, a mnemonic for 622, the number of years deducted in the *sasana* year 624 to introduce the new era, which for astrological/numerological reasons meant the era began in the year 2.
- The calendar of the North Indian **Gupta** dynastic era (c. AD 319-550), beginning in AD 319.
- The Burmese **Myanmar Era** calendar which starts in AD 638. This is known as the *khachapanca* era, a mnemonic for 560, as it was supposedly introduced by eliminating 560 years from the Saka era in AD 640 so the new era would begin, as had the *dodorasa*, in the year 2 (ASB 1911: 16, 1915: 20; Maung Hla 1923: 84).

There is also what some Burmese sources call the "short" era, commencing in 798 of the Myanmar Era, or AD 1436, which was used as a mode of reckoning in the 15th and 16th centuries. This has recently been dubbed the "Mohnyin Era", which refers to a traditional story surrounding the adoption of the calendar (Eade 1995: 17). The English translators of the *Glass Palace Chronicle* (see page 24) at times used the term "short era", somewhat confusingly, for what appears to be the Saka (Gandhara) calendar. They describe the founding of the first royal residence near Bagan as occurring "in the year 29, Short Era", or AD 107 (Pe Maung Tin & Luce 1923: 28). The calendric eras commencing in AD 78 and AD 638 were used in Thailand, where they were known as the Mahasakaraja (Greater Era) and the Culasakaraja (Lesser Era) respectively (Wyatt 1976: 113). Culasakaraja is abbreviated to "sak" in "virtually all inscriptions of Pagan" (Aung-Thwin 2004

Chapter 8). The Gandharan Saka era remained standard in the Cambodian record, and is still in use in Sri Lanka where, for example, the program for the AD 2003 Kandy Esala Perahera festival was dated 2547 Buddhist Era and 1925 Saka Era (Neranjan Priyadharshana Dullewa Wijeyeratne 2003). The Mahasakaraja (Gandhara) calendar was effectively replaced in Burma and Thailand after the adoption of the Myanmar-Culasakaraja era. The south-east Asian calendrical system was a powerful and effective tool for recording historical events and predicting seasonal or astronomical cycles, and has at times provided valuable information on days and dates in inscriptions (Eade 1994: 1-19; Than Tun 2003a). The Myanmar calendar was part of a regional system of calendars for which Indian or Indianised astronomer/astrologers have generally been given the credit (Soni 1955: 58-70).

Radiocarbon dating conventions.

Radiocarbon dates, in which the base year of 1950 is taken as "present", are quoted as "years BP ± error", and then converted to a calibrated (cal) range of years AD (or BC) using current calibration data. The calibration program used is *OxCal* 3.9 (Bronk Ramsey 1995, 2001, 2002) and the calibration data is from INTCAL 98 (Stuiver, Reimer, Bard *et al.* 1998). Radiocarbon dates from Myanmar, including those for my own samples, have been recalibrated for this thesis using current calibration data, but the original laboratory dates and references are also provided.

Technical notes.

This thesis was produced using Microsoft Office 2003, the bibliographical program Endnote 7, and the GIS program MapInfo 7 on computers using Windows XP Professional. The location of archaeological sites is given in decimal longitude and latitude, the conventional form for GIS. Longitude and latitude of sites mentioned in the text is provided in an appendix (page 271) and in files on the accompanying CD-ROM. Sites at Bagan are located on the metric survey grid that was established for the *Inventory of Monuments at Pagan* (Pichard 1992-2002). Buildings at Bagan are described by their traditional names with transliterated English spellings according to the *Inventory*, and the *Inventory* number is given in parentheses. All measurements are metric unless specifically quoting imperial or traditional measurements from early documents. Photographs and drawings use a centimetre scale. Larger views may be shown against a one-metre ruler or a metric ranging post. All illustrations, maps and photographs are by the author unless credited otherwise.

Title page credits.

The three repoussé bronze artifacts on the title page, from left to right, are a Late Prehistoric coffin decoration from the Samon Valley (now in the Win Maung collection), a figure from the Pyu-era Khin Ba reliquary at Sriksetra (from Luce 1985) and a gilded Buddhist votary plaque of the Bagan period (now in the Bagan museum).

PART 1.

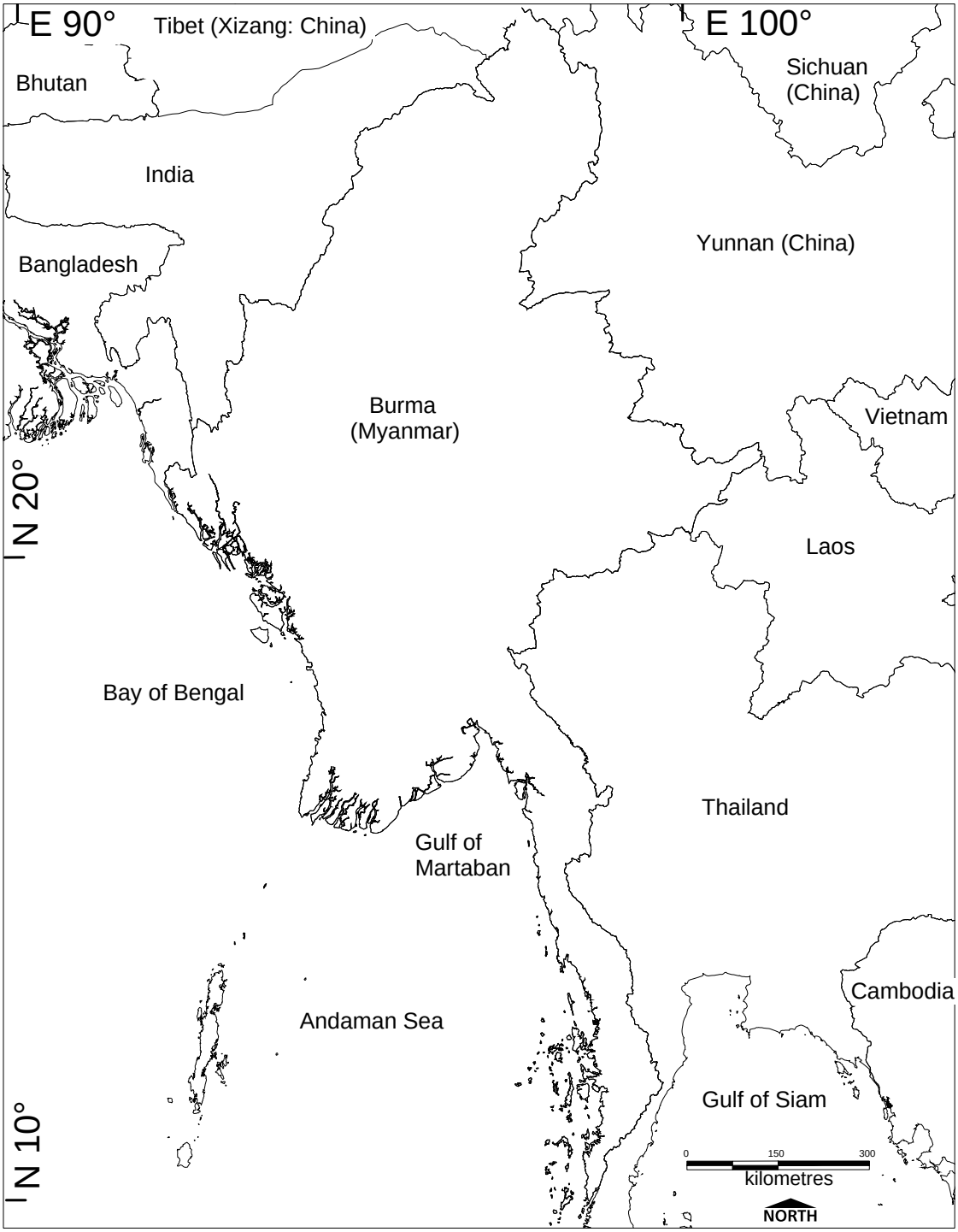

Figure 1 Myanmar and its regional neighbours

Introduction.

The archaeological landscape of Upper Burma from the Late Prehistoric to Bagan periods, c. 500 BC to AD 1300, is a landscape of continuity of settlement and culture, in which change over time can be explained by the indigenous adaptation of technologies and religious and political structures. This is in contrast to the older position that change was effected by the relatively sudden mass immigration of ethno-linguistic groups such as the Pyu and the Burmans. The hypothesis will be supported by a substantial quantity of new data, particularly in relation to the identification of a Late Prehistoric phase and culture, and the transition from this culture to the early urban "Pyu" system. An urban centre both in the first millennium AD Myanmar context and in general is defined as an area of habitation of 100 hectares or more whose archaeological signature can be expected to include evidence of management of space such as walled buildings or settlement walls, and some degree of literacy (Fletcher 1995). This thesis will propose that the central places of the Pyu urban system, Halin, Maingmaw, Beikthano and Sriksetra, developed following local dispersal of population and skills from a Late Prehistoric "homeland" in the Samon Valley. The analysis will stress that these large (each over 600 hectares) walled settlements existed as a loosely interrelated system, and were not a sequence of capitals of a mythical Pyu empire. The thesis proposes that the decline in importance of the Pyu cities and the rise to dominance of much of Myanmar by Bagan in the 11th-13th centuries involved long-term systemic change rather than pivotal, dramatic events such the destruction of a Pyu capital in the 9th century by invaders. The notion of gradual long-term change is supported by increasing evidence at Bagan of settlement activity before the historical 11th-13th century Bagan period. Some of this evidence is based on original archaeological excavations and survey, which will be reported in detail. A chronological model will be proposed for settlement at Bagan that places the origins of the city later than the 2nd century AD period of the Burmese chronicles, but several centuries before the surviving inscriptional records of the early 12th century had suggested.

The evidence has been gathered, and is examined, using a range of techniques from computer mapping via Geographical Information Systems (GIS) through textual studies to archaeological survey and excavation. Two databases, for Myanmar and separately for Bagan (see Appendices 1 & 2 and the accompanying CD-ROM), will be drawn on to analyse patterns of settlement behaviour.

Chapter 1 will critically review the mythological and chronicle history, the framework within which Burmese archaeologists and historians work, as well as the western histories, and summarise and analyse the "received" history up to the Bagan period. In these narratives, an emphasis can be detected among indigenous scholars on finding archaeological support for traditions of a Buddhist presence in Burma that, according to folklore, goes back to the lifetime of the Buddha. The western historians generally agree that Myanmar was home by the beginning of the first millennium of the Christian era to disparate ethnic/territorial groups. Under the influence of Indian culture, including literacy and religion, settlements developed in the central zone, enclosed by brick walls and populated by iron-using agriculturalists known today (via Chinese references) as the Pyu, but who probably called themselves Tircul. According to Chinese sources the Pyu declined after they were attacked by Nanchao, in what is now the Chinese province of Yunnan, in the early 9th century AD. As G. H. Luce saw it, their fellow Tibeto-Burman speakers, the Burmans, then migrated westward from their agricultural base in the Kyaukse area to establish Bagan (Luce 1959a, 1959b, 1985). This explanation is not convincingly supported by the archaeological evidence.

On population movement and migration, this thesis concurs with Oppenheimer who, in a recent synthesis of the past two decades of study of world mitochondrial DNA and Y chromosome

movements, suggests that the normal state of pre-modern populations should be assumed to be stable in terms of attachment to place. Genetic evidence indicates that "as they were filling up the Old World, once people got to where they were going they tended to stay put and, at least until the last five hundred years, were mostly able to repel newcomers" (Oppenheimer 2004: 276). At a timescale more specific to this study, the evidence suggests that "all the native peoples of southeast Asia have ancestries, in terms of language, culture and genotype, firmly grounded in the Southeast Asian region" and at no time for at least 2000 years "can we see any major replacements of native languages or populations by immigrants from outside the region" (Bellwood & Glover 2004: 4). This thesis rejects any approach that treats ethnicity and language inherently or by implication as genetic traits. Language and ethnicity are cultural traits that can be exchanged for others or modified in the same way that pottery styles, personal decoration or religion can change, sometimes very rapidly. The thesis takes the position that the normative process of the spread of languages and people involves small-scale, localised movements in different directions and over different routes, in which cultural traits which may have included language or ethnicity could have been adopted for the practical purposes of survival and socio-economic advancement. As Bayard (1979) has said, the spread of the languages that now dominate the Myanmar lowlands was a feature of the political centralisation of a number of isolated regional cultures. Leach's *Political Systems of Highland Burma* provides ethnographic examples of people expediently adopting both the language and the ethnicity of a dominant neighbour (Leach 1954). This chapter will also review in detail the recent work of Aung-Thwin on what he calls the Mon paradigm, a major historiographical issue which relates to the need to redate (in particular) the earlier structures and phases of activity at Bagan.

Chapter 2 reviews the geography and resources of Myanmar as they would have affected the development of early societies. It examines the way these early societies have been studied and presented. In the case of the early urban centres, it is suggested that the larger settlements have been incorrectly treated, amid a focus on Indianisation and art history, as sequential events rather than as members of an interrelated system. The influence of Indian civilisation, including religion, is not challenged. "Indianisation" is accepted in this thesis as the local adaptation by Southeast Asian élites of attractive or useful elements of Indian culture acquired through regional or long-distance trade networks (Vickery 1998; De Casparis & Mabbett 1999: 281; Glover & Manguin 2004: 51-58) during the broad period of the 4th century BC to the 4th century AD (Bellina & Glover 2004).

This chapter will consider the approaches taken by local and foreign archaeologists to research in Myanmar in recent years, and review Myanmar government heritage policy as it relates to domestic research priorities and goals. In the context of a review of the current state of archaeological studies of Myanmar up to the Bagan period it is suggested that the conventional approach to periodisation in contemporary Burmese archaeology, the classical European archaeologists' notion of "Ages" (Stone-Bronze-Iron), is an oversimplification that needs to be modified to reflect the technological complexities of early Myanmar.

Chapter 3 introduces the first major new datasets in reviewing and redefining Myanmar's prehistoric polished stone and early bronze-using cultures, and identifying and locating sites in the Ayeyarwady, Chindwin and Samon Valleys.

Chapter 4 will suggest that continuous, regionally distinctive patterns of settlement become more detectable in Myanmar in the period Glover has called, in relation to central and western Thailand, the "Late Prehistoric", c.500 BC to AD 500. He describes this as a time of "great increase in the manufacture and exchange of prestige goods of bronze and semiprecious stone, the domination of iron over bronze and stone as the main material for the manufacture of edged tools and weapons, and the emergence of visible social ranking within communities which previously had been

relatively egalitarian, mobile, and probably rather low in density" (Glover 1999a: 107). The evidence for these activities in Myanmar will be presented as a series of distribution maps of artifact types, and some of the characteristic artifacts will be identified. A good part of this data comes from unofficial finds, often due to the digging of pre-urban settlement sites by local people in what has been described as "bead frenzy" (Win Maung 2003b), a search for artifacts, mainly stone beads, that has seen ricefields turned into desolate spoilheaps as residents respond to demand from middlemen who are supplying both a local and an international antiquities and souvenir market. These pre-Buddhist sites, generally with no above-ground architecture, get negligible protection from under-resourced heritage authorities. While the interpretation of the data has led unavoidably to a kind of "horizontal archaeology", when more stratigraphic information would obviously be preferred, it is suggested that there are enough samples of various artifact types recorded, mainly from burials, to distinguish regional variation, and to propose that there are focal areas where increased densities and variety of artifacts suggest increasing cultural complexity and economic prosperity. The area where this evidence is strongest is the southern Samon Valley, a region still used for mixed dryland and irrigated farming, where resources such as copper from the Shan hills to the east and semi-precious stones from Mount Popa to the west were readily available to the early inhabitants. It is proposed that this was the homeland from which settlement diffusion to new agricultural territories to the north and south may have occurred, potentially providing population and resources for the construction in the first millennium AD of large brick-walled central places whose leaders adopted Indic modes of kingship. Evidence will also be presented of trade and cultural contact between the Samon Valley and China from at least 200 BC, a relationship that may demonstrate the adaptability of the Late Prehistoric culture to external elements.

Chapter 5 reviews the archaeological data, and the gradually emerging historical data, for these "central places" in Upper Burma, in relation to each other, and in relation to similar sites in Arakan on the west coast and in and south of the Gulf of Martaban. The role of coins bearing auspicious symbols and fingermarked bricks, artifact classes that in the past have been considered diagnostic of a "Pyu" culture, will be critically reviewed. It is suggested that the system of walled settlements in Upper Burma forms a coherent entity, despite cultural links with other systems in the region, and that if the early urban culture of Upper Burma is to be called "Pyu", this might be seen more as a convenient name for the people living within this system rather than a name for an all-pervading culture across first millennium Myanmar. It is suggested that there may have been two phases of settlement/polity in the early urban period, the first involving the major walled sites of Halin, Mongmao and Beikthano, the second involving the construction of Sriksetra. It is suggested that the Indic chiefdoms declined in influence due to elements that to some extent were of their own making, including siltation of agricultural areas, the adoption of a popular Buddhism which began to eclipse the Hindu cults that had supported the authority of the leadership, and a relationship with the expansionist state of Nanchao that was not entirely passive. Revision of the dating of the Pyu centres will suggest that they did not simply crash in the early 9th century due to invasion, and it is proposed that the "mystifying" gap that has been believed to exist between the "fall" of the Pyu and the "rise" of Bagan is, like the very notions of "fall" and "rise", a historiographical construction.

Chapter 6 reviews the origins of the state and the city of Bagan. It looks at the spread of the state based on epigraphic and historical information, using mapping to create a broad overview. The spatial evidence suggests that much of the agricultural land opened up by the Pyu came under Burman control or influence, providing a ready-made infrastructure for the Bagan empire.

The focus then moves to the chronicles and a critical appraisal of the traditional account of a confederation of nineteen villages forming as the first kings of Bagan settled nearby in the 2nd

Century AD. It is important to analyse this traditional history in the light of archaeological evidence because in the application of government heritage policy, which affects not just the presentation of information for local and tourist consumption but also the allocation of resources within Myanmar for research, great reliance is placed upon the received history. A survey of sites with claims ranging from folkloric to archaeological to have been part of this confederation, including the excavation east of Bagan of the putative palace of the first kings at Yon Hlut Kyun, demonstrates that the chronicle account is not supported by the archaeological record. The archaeological data provides important new information about resource exploitation and settlement in Bagan's eastern hinterland, including the possibility of settlement and economic activities that may be linked to the Bagan period. A revision of the historical record will suggest that the traditional timescale can be shortened.

Archaeological evidence of the pre-11th century antiquity of Bagan that supports the new shortened timescale is presented in the second part of the chapter. This analysis of the author's excavations at the Otein Taung pottery mounds within the Bagan monument zone provides the first direct evidence, through radiocarbon dating, of economic and craft activity at the city perhaps as early as the 8th century, and certainly in the 9th and 10th centuries AD.

Chapter 7 Traditional and chronicle accounts have led to the interpretation by the Myanmar Ministry of Culture and Archaeology Department of a complex of buildings excavated between 1990 and 2003 within the walled centre of Bagan as being the palaces of two early kings, Anawratha and Kyanzittha. The "Kyanzittha palace" is an excavation of the 1990s within Bagan's walled centre in which radiocarbon dating comes into conflict with a traditional interpretation of archaeological data, to the disadvantage of the traditional view. The excavation in 2003 of a complex west of the "Kyanzittha palace" has been interpreted by Myanmar heritage officials as the palace of Anawratha, which would date it to the third quarter of the 11th century, and make it an even *earlier* royal centre than that attributed to the late 11th-early 12th century King Kyanzittha. The author's work on this excavation points to strong evidence of a continuing post-Bagan administrative centre sitting above some Bagan period structures of (so far) indeterminate date, but there is no material that would identify any part of either city site with any particular individuals.

The second part of this chapter asks a key question. If there is no gap between the Pyu system and Bagan, if some of the Pyu centres remained active into the Bagan period, and if earthenware production was underway at Bagan in the 8th or 9th century, then what further evidence is there of activity at Bagan before the historically accepted date for the beginnings of its domination of Myanmar in the mid 11th century? This problem is approached by way of a critical appraisal of the epigraphic and historical dating of early Bagan. The current chronological framework will be extended backward by a century via documentary sources, and potential sites that might be investigated within Bagan for data to support an even earlier chronology will be proposed. These include the present walled centre, the village of Myinkaba, and the southern part of the monument zone around the Lokananda pagoda.

In **Chapter 8**, the issues of the thesis are summarised and discussed. It will be concluded that a Late Prehistoric culture in the Samon Valley was followed by the early urban "Pyu" system across Upper Burma. The Pyu system was related geographically and chronologically to the Samon culture, and Bagan in turn had a direct geographical and chronological relationship with the Pyu system. Continuity of site occupation was a much more consistent phenomenon of the pre-Bagan settlement of Upper Burma than has previously been assumed.

CHAPTER 1. HISTORY AND HISTORIOGRAPHY.

An approach to the received history of Myanmar could sit anywhere along a sliding scale from a literal "fundamentalist" acceptance of traditional tales filled with magical deeds to an agreement with Monbiot that "all nations, all classes, all tribes tell themselves stories that validate and centralise their existence (and) these stories are always false" (Monbiot 2004 Postscript, p.3). This chapter seeks out its information in between these extremes. It reviews the context in which histories have been written, and examines instances in which archaeological evidence can not only inform the modern reader of the chronicles but may also have influenced the compilers or composers of traditional accounts. A review of Aung-Thwin's work on the "Mon paradigm" concludes that a new approach to the historical dating of early Bagan is required.

The Burmese Chronicles.

The key sources for the traditional history of Myanmar are the chronicles. There is a tradition that a chronicle and astronomical document was compiled as early as 10 BC (Tet Htoot 1961: 52) but reasonably well authenticated works only go back about 500 years. The Burmese word for history is *yazawin*, from the Pali *rajavamsa*, or "lineage of the king", and this is indeed the focus of many of the major works. Some chronicles are more specific, and tell the history of a particular place. The *Thayekittaya Chronicle* concerns the legendary history of Sriksetra, the *Pali Paukkan Chronicle* appears to be a Pali version of the Bagan part of the *Great Chronicle*, and other local chronicles are available for places such as Pegu (Bago) and Tavoy. There are also *thamaing*, the histories of particular pagodas, monasteries or towns (Pe Maung Tin & Luce 1923: xxi) and *ayegyins* or *mawguns*, mnemonic verses on the exploits of royal ancestors (Tet Htoot 1961). Written pagoda histories seem to have appeared at least as early as AD 1608 (Than Tun 1983-1990: 71, Volume 10) and are still found in popular publications (see, for example, Myat Min Hlaing 2000, 2002).

While many historical documents may still be sitting unpublished and virtually unknown as hand-copied manuscripts in monastery collections (Frasch 1996b) and many others are still available only in Burmese, there is a sufficient body of primary sources translated into English, plus secondary sources and commentaries, for the English-speaking scholar to get a good grasp of the material. In addition to the available English sources, the translation into English of two Burmese-language historical manuscripts, the *Za-bu-kon-cha* (summarised and analysed on page 29 and presented in full in an appendix, page 283) and *A Brief History of Bagan* (Hudson 2003b) has been specifically commissioned for this project.

This analysis should not be taken simply as a rationalist, western critique of indigenous mytho-historical sources. There is also a significant and longstanding body of criticism and revision of the chronicles from Burmese scholars. More than 80 years ago Saya Thein, for example, distinguished four kinds of histories: those written in inscriptions, those written down by the learned by royal order, those handed down by word of mouth and those acted in plays. Only inscriptions are really reliable, he says: the chronicles are written to please kings and avoid their censure, and are untrustworthy. He also points out numerous contradictions between different chronicles, and at the same time, notes how many stories emulate earlier tales (Saya Thein 1918).

The "model" chronicle, *Hmannan Yazawin: a* critical summary.

The traditional history of Myanmar up to the Bagan period is related in the *Glass Palace Chronicle* (Hmannan Yazawin). The document was produced early in the 19th century by a committee working in a room of King Bagyidaw's Palace of Glass in Mandalay, hence the name. It is a key compilation for English-speaking scholars, available in English since 1923 (Pe Maung Tin & Luce 1923). Substantially based on the earlier *Great Chronicle* of U Kala (page 32), it relates the history of three Burmese kingdoms, Tagaung, Sriksetra (Thayekittaya) and Bagan (Pagan). The editors of the English version decided to ignore the first two parts, which deal with the story of Buddhism and the Buddhist kings of India, on the grounds that scholars of Pali and Buddhism would already be familiar with these. The English version ends with the decline of Bagan. The *Glass Palace Chronicle* contains detailed descriptions of religious ceremonies, particularly coronations or the establishment of palaces, and graphic tales of the intervention of gods and ogres in the lives of the nobility. It lists the omens associated with the life of each king, such as the day of his birth, and the portents surrounding his death. This integrated summary and commentary will focus on historical themes, population movements, locations that are represented in the archaeological record and incidents that while mythological, are illustrative of social context.

Tagaung.

The story goes that the kings of Burma were descended from a migrating Indian chiefdom, the "noble Sun dynasty of the Sakiyans", the same line of descent as Buddha. They arrived to settle at Tagaung around 850 BC, several centuries before the time of Buddha. Tagaung is a multiple-walled site on the Ayeyarwady above Mandalay with an extensive archaeological record (page 144). The sons of the first king quarrelled. One migrated west across the Arakan Yoma in 825 BC, founding the city of Dhanyawadi. After 33 kings had reigned, the Tagaung kingdom collapsed due to incursions by the kingdom of Gandhara, in what is now Yunnan. Followers of the last king, Binnaka, split into three divisions. One group founded "the nineteen Shan States of the East". The modern village of Binnaka, possibly named for this king (Win Maung 2001b), sits in the shadow of the Shan hills at the southern end of the Samon Valley (Chart 1). The area surrounding Binnaka has a continuous archaeological record going back to the late prehistoric period, as will be shown in Chapter 4. Others from Tagaung migrated down the Ayeyarwady and joined relatives who had moved there at the time of the migration to Arakan to rule three local tribal groups, the Pyus, the Kanyans and the Theks. The third group remained on the Upper Ayeyarwady. This three-way split is a recurring theme in the pre-Bagan parts of the chronicle, and could be viewed as a mythologised record of intra-regional population drift. A neighbouring king who had been insulted over a marriage arrangement, one of a number of incidents in the chronicle that demonstrate the importance of marriage alliances, then invaded and wiped out most of the Sakiyans. Following several migrations, the surviving leader Thado Jambudipa Dhajaraja re-established Tagaung as his capital and founded a dynasty of 17 kings. A description of his construction of a golden palace includes a feast at which two cats and then two men first taste the food, perhaps as a precaution against poisoning.

Buddha visits Burma.

It was during this last occupation of Tagaung that Buddha appeared in Burma with a host of holy followers. He made numerous visits to a sandalwood monastery that was being built for him at Pwinbyu in the "Western Country" and also left behind sacred footprints. He prophecised that 101 years after his death, which would be 443 BC, Mount Popa, now an inactive volcano east of Bagan, would arise from the earth, and the flow of the rivers east of Mount Popa would change. This does appear to have happened, though in a much greater geological timescale (see page 43). The prophesy also said that in 443 BC a man named Duttabaung would found a great city and kingdom. A second prophesy was that in the 651st year after Buddha's death or *parinirvana* (i.e. AD 107) a great kingdom would be founded at Bagan. The unique "pointing Buddha" of Myanmar, a standing image pointing with an extended right arm, traditionally commemorates these prophecies, though in reality, the tradition has appropriated a form of imagery that appeared in the 19th century following the foundation of Mandalay (Munier 1998: 8). Other prophesises and appearances of Buddha have been recorded in chronicles, pagoda histories or folkloric tales.

Sriksetra (Thayekittaya).

In 443 BC, the city of Sriksetra was founded with the aid of the god Indra (Sakra). King Duttabaung had enormous wealth, and showers of gems fell during his reign. He performed many works of religious merit, including the construction of zedi (stupas) containing Buddhist relics. A line of 20 kings followed. Some were "reckless in conduct and character" while others were masters of the kingly duties, and loved by their people. Finally, owing to the misuse of a golden image of the Buddha, the kingdom became "disordered and ungovernable", and there were rumours of war which alarmed the whole country. The people split into three divisions, the Pyus, the Kanyans and the Burmans. The Pyus then split into three further divisions, Pyu, Kyabins and Thek, and there followed a decade of wars and population movements. The Kanyans at one stage attacked and defeated the Pyu. The Burmans as an ethnic entity disappear from the narrative following this single brief mention.

Bagan (Pagan).

In AD 107, Thamoddarit, the leader of the Pyu, who had twice moved his tribal base due to pressure from the Talaings (Mon) and the Kanyans, "began to build a city with the dwellers in nineteen villages at Yonhlutkyun", in the eastern hinterland of Bagan (page 189). The English translation of the chronicle calls this the year 29, Short Era. If this Short Era is taken to refer not to the Saka calendar but to the Culasakaraja or Burmese Era (page 16) then this would make it AD 667 and put Pyusawhti in the early 700s. The compliers of the *Glass Palace Chronicle*, or of their source documents, may have missed this apparent discrepancy. Their historical model, which was required to stretch back to the time of Buddha, left them with a long line of kings to fill in before the Bagan period. Thamoddarit's son-in-law Pyusawhti was a heroic figure and subject of many stories concerning his heritage and brave deeds. According to the chronicle Pyusawhti reigned AD 167-242. Under a revised chronology and a reinterpretation of the data, Pyusawhti may represent the early historical leadership of Bagan (page 149). Twelve great festivals were held in the reign of Pyusawhti, including one to celebrate his victory over the Tarop (Chinese/Nanchao) army at Kosambhi (a traditional name for modern Allagappa, see

page 29), on the frontier of the kingdom. During the reign of Thinlikyaung (AD 344-387), the Mahagiri nats floated down the Ayeyarwady from Tagaung, and were enshrined at Mount Popa (page 198). The capital moved from Yonhlut to Thiripyitsaya, near the Lokananda pagoda near the southern end of the Bagan monument zone (pages 191, 245). Around AD 400, the scholar Buddhaghosa brought written copies of the Pitakas, the Buddhist scriptures, from Ceylon, although they were brought not to Bagan but to Thaton.

Around AD 520 the royal city moved to Tampawaddy, near the Dhammayazika pagoda. A line of kings whose reigns did not seem to involve any significant historical events followed over the next few centuries. Luce (1969: 6, Vol 1) describes this part of the chronicle as "a barren list of kings and omens". In AD 849, King Pyinbya built the walls of Bagan. In several instances kings came to the throne by overthrowing a predecessor with the aid of a queen or a concubine: two examples are Sale Ngahkwe (r AD 906-915) and Nyaung-U Sawrahan (r AD 931-964). The latter worshipped the Naga (snake or dragon) and consorted with the heretical Ari monks, whose doctrines allegedly permitted murder provided the "formula of deprecation" was recited. The chronicle says that the doctrines of the Ari were adopted because there were no *Pitakas*, raising another discrepancy in the story. In a religion known for its travelling preachers, how could the Buddhist scriptures avoid becoming available at Bagan despite arriving in Thaton 500 years previously?

At the end of the tenth century, three brothers held the throne in sequence: Kyizo (r AD 986-992), Sokkate (r AD 992-1017) and Anawratha (r AD 1017-1059). The latter gained power after he mustered an army at Mount Popa and marched on Bagan, killing Sokkate with a lance supplied by the god Sakra (Indra). A magically-born princess from Vesali was sent to be Anawratha's queen, and she gave birth to Kyanzittha, who was eventually taken into his father's court following a series of dramatic incidents relating to his birth and to Anawratha's fear of being overthrown. Kyanzittha became one of Anawratha's generals along with three other heroes, who came from Myin Mu (upriver near the mouth of the Mu River), Nyaung-u (the village on the northern end of the Bagan monument zone) and Mount Popa. The home territories of these heroes may reflect the significance of the relationship of Bagan's periphery to the administrative centre.

Anawratha had an innate longing to discover the true Law, and when he was introduced to Shin Arahan, a magically born monk of Buddha's race (from Thaton, according to the *Thaton Chronicle*, which the *Glass Palace Chronicle* takes as a source) "faith sank into him as oil filtered an hundred times soaks into cotton an hundred times teased". At the suggestion of Shin Arahan, Anawratha sent an envoy to the king of Thaton, with gifts and seemly words, to ask for a copy of the *Pitakas*, as Thaton was known to have 30 sets. King Manhua of Thaton rudely refused, and Anawratha and his four generals marched on the city, which was protected by a nat, a man sacrificed to be the city spirit. The nat was overcome and the Bagan army returned home with all 30 copies of the scriptures, religious relics, and captives, including King Manhua and people skilled in a number of trades including, anachronistically, makers of cannon and muskets. An alternate version of this story from the *Jinakalamani*, a Pali text dating to AD 1527, presents the conflict as involving competition for the ownership of a Buddha image (Guillon 1999: 103-104).

Anawratha made another expedition to acquire religious relics, this time a tooth relic from the "Tarop country of the kingdom of Gandhala" (Yunnan). Amid a series of magical incidents the tooth refused to budge, but Anawratha was told by Sakra that he was entitled, due to a prophecy, to take a relic from Thayekittaya (Sriksetra). He therefore attacked and destroyed Thayekittaya, and took the relic back to Bagan where he enshrined it in the Shwezigon pagoda, on the bank of the Ayeyarwady on the southern side of Nyaung-u. Anawratha then acquired a

replicated tooth relic from Ceylon, which again magically replicated itself four times at Bagan. The five teeth at Bagan were enshrined at the Shwezigon, on Tanggyi Taung on the western side of the river, at the Lokananda on the southern end of the Bagan monument zone, on Tuyin Taung, east of the city (Figure 157) and further to the east along the Tuyin range on Mount Pyek, effectively encircling and demarcating the city. Mount Pyek has been effectively forgotten, although it was mentioned as recently as AD 1917 as the site of one of the relic pagodas (Hudson 2003b: 124), but the other four are still important pilgrimage sites (Myat Min Hlaing 2002: 2-5). The now unidentifiable Mount Pyek pagoda is called the Shwethalyaung, the same name as a prominent reclining Buddha Image at Pegu (Bago), in an earlier chronicle, the *Jatatopum* (page 29), which also credits the five relic pagodas at Bagan to Anawratha (Michael Aung-Thwin, personal communication 2004). When a host of Khmer warriors marched on Ussa Pegu, Anawratha sent Kyanzittha and the other heroes south to fight them off. As the heroes returned with a princess for Anawratha, Kyanzittha lay with her, and was exiled. The princess suffered no blame, and became Anawratha's queen. Anawratha took his court on a circuit of his domains, building pagodas, dams and other irrigation works and 43 frontier towns and fortresses, the northernmost of which was Kaungsin, on the upper Ayeyarwady, close to the current border with Yunnan (Chart 2). As he returned to his palace, he was killed by a wild buffalo which had been an enemy of his in a previous life.

Anawratha's son Sawlu (r AD 1059-1064) became king. Sawlu recalled Kyanzittha, who was living in exile at Dala (Twante), in the lower country, but Sawlu then died in a rebellion. Kyanzittha (r AD 1064-1092) defeated the rebel chief and acquired the throne along with the Pegu princess, who became one of his queens. She had also been a queen with Sawlu, which indicates that marriage alliances were very much with the throne, not with its occupier. Kyanzittha built a palace, believed by many today to be the eastern part of a building complex within Bagan city walls that was excavated in the early 1990s, and further excavated in 2003 (see Chapter 7). He completed the Shwezigon and constructed many other religious buildings at Bagan and throughout the kingdom. He was succeeded by his grandson Alaungsithu (r AD 1092-1167). Wise men predicted that there would be many rebellions during his reign, and in one such incident bandits invaded the palace. The chronicle specifically names the twelve royal boats used by the king, indicating the importance to Bagan of dominating the Ayeyarwady for both military and supply purposes. As well as constructing irrigation works and religious buildings, Alaungsithu is credited with standardising weights of precious metals used as currency and measurements of land areas. He sent his soldiers out to establish colonies and fortresses across his territory. He travelled down to the mouth of the Ayeyarwady and embarked on a magic-filled journey to Ceylon and the mythical "southern islands" surrounding Mount Meru. He spent much time subduing rebels in the provinces, going as far south as Tenasserim, and resolved a dispute over the throne of Arakan, supporting a chieftainship based at Parein. He re-enacted Anawratha's visit to Gandhala, but failed, as his great-grandfather had done, to acquire the tooth relic. He banished one of his sons and was murdered by another son at the age of 101.

Narathu (r. AD 1167-1171), the son who had smothered old Alaungsithu, inherited the throne and immediately murdered his exiled brother and other family members. One of these was a daughter of a Kala (Indian) king, and her father sent assassins to take revenge. Next came Narathu's son Naratheinhka (r. AD 1171-1174) whose reign was filled with ease and prosperity, but the king desired his brother's wife, and ended up being killed at the behest of the brother, Narapatisithu (r. AD 1174-1211). Narapatisithu "wandered all over the land of Burma, surrounded by his queens, concubines and handmaidens, and made many canals and reservoirs and dams and channels". This quote neatly illustrates the importance of direct, personal control

of the country by the leadership, as well as the significance of the multiple marriage alliances that created a dichotomy in the elite structure: the wives or spouses who provided a link and a controlling force with their family domains would also have been producing competing heirs to the throne, either through producing children or by bringing brothers or other relatives to court. Narapatisithu built the Sulamani, Gawdawpalin and Dhammayazika pagodas. The Buddhist order split into four major sects during his reign. Characteristically, the schism was over matters of discipline and the historical validity of ordinations rather than any major doctrinal disagreement.

One of Narapatisithu's sons, Htilominlo (r. AD 1211-1234) succeeded the throne. He acted righteously, and "no region or village was ever known to be in anarchy or rebellion". The emphasis of the chronicle on this apparently unusual situation might suggest that a consistently unstable political system was otherwise the norm. He built the Mahabodi pagoda, modelled on the original at Bodhgaya in India, and the Htilominlo. Htilominlo was followed by his son Kyazwa (r. AD 1234-1250) a "philosopher king" who reportedly left most of the affairs of state to his son Uzana (r. AD 1250-1255). Kyazwa is credited with building a dam at the foot of Tuyin Taung and with commencing the Pya-tha-da, a large temple just east of the Otein Taung pottery mounds, which was left uncompleted (Chart 7). As crown prince, Uzana kept a lodge at Dala, in the delta (Chart 2). He acquired Saw, a damsel from Mount Popa, and brought her to court as "less than a queen and more than a concubine".

One of Uzana's sons, Narathihapate (r. AD 1255-1290) inherited the throne with the support of the chief minister, who had been insulted by the other (elder) son. He made Saw his chief queen, and she is mentioned a number of times in her role as counsellor and administrator of household matters. Narathihapate subdued the Thek kingdom of Macchagiri, down the river, and the king of Macchagiri was given one of Narathihapate's daughters to cement the alliance. Sons of the king were given the southern towns of Bassein, Dala (the old name for the pottery centre of Twante) and Prome to "eat" (benefit from the revenues). Narathihapate began work on the Minglazedi pagoda, the last of the very large buildings constructed at Bagan, in AD 1268 (the *Inventory of Monuments at Pagan* dates the building to 1285). The Minglazedi was dedicated in AD 1274 according to the chronicle, with a ceremony involving the enshrining of relics, silver images of the past noble families of Bagan, and the jewellery of those who took part in the ceremony.

A prophecy had said that the country would be ruined when the pagoda was finished. In AD 1281 a Talaing (Mon) leader, Wareru, captured Martaban from its Bagan administrator. In the north, the Tarop, from modern Yunnan, in China, which by this time was a province of the Mongol Yuan Dynasty, attacked the kingdom, and there were battles in the north at Bhamo and Ngahsaunggyan (Chart 2). Bagan's guardian spirits (nats) joined the battle, but they could not defeat the Tarop. The king decided to retreat south to Ywatha, and build fortifications there, using brick from thousands of pagodas at Bagan. There is a Ywatha village 12 kilometres downriver from Bagan, but it is a very common name. There appears to be no fortification there, or anywhere further south, made from recycled Bagan brick. The plan was changed due to another prophecy, and Narathihapate headed south for Bassein on a jewelled raft. The Tarop reached Bagan, but then withdrew due to the scarcity in the region of food and drink. On hearing that the Tarop had retreated, Narathihapate returned upriver to Prome, but died after accepting poisoned food supplied by his son, the ruler of Prome. Proverbs regarding the impermanence of kings and kingdoms are voiced by the wise Queen Saw as this section, and the English version of the *Glass Palace Chronicle*, concludes. Aung-Thwin has pointed out that as Bagan survived as a monarchic polity until the late 14th century, this is an arbitrary end point,

though it suits "the tendency among historians to search for dramatic and cataclysmic ends to glorious civilisations" (Aung-Thwin 1998: 88-92).

Some major chronicles: outline and comment.

The Glass Palace Chronicle was based on earlier documents, some of which are described here in chronological order as much as is possible.

The Jatatopum Rajavan.

A chronicle that includes royal and other important horoscopes, this document was known in the Ava (Inwa) period, during the reign of king Minye-kywadin (r. AD 1673-1698). The *Jatatopum*, though not without some confusion of dates (Frasch 1996b), has long been considered by scholars to be "one of the most trustworthy sources for the dates of Burmese history" (Taw Sein Ko & Duroiselle 1919: 3). Aung-Thwin (2004) considers it to be the most reliable of the early chronicles. Luce calls it "generally our best guide in the dating of early Pagan" and notes that it gives AD 850 for the building of the walled elite centre Bagan, which he attributes to the arrival of Mranma (Burman) conquerors at a site that was already a Pyu (and Buddhist) settlement with associated cylindrical or bulbous stupas. However the *Jatatopum* also gives AD 190 for the founding of Arimaddana, another name for Bagan (Luce 1969: 6, Vol 1).

The Za-bu-kon-cha.

In Burmese Buddhist cosmology Mount Meru, home of the gods, is the centre of the universe, with four large islands around it. The southern island is Zabudipa, on which the sacred *eugenia* tree (the rose-apple, *eugenia zambolana*) Zabu grows. Boats, carts and motor vehicles in Myanmar are often decorated with sprigs of *eugenia* as an offering to the spirit owners of the territory they pass through. Zabudipa is the world of humans, some of whom live on 500 smaller islands that surround it (Scott 1882: 91-93; Barrett 1935: 5-6). The name *Za-bu-kon-cha* translates as the "net of the southern island", the word "net", which "catches all the fish", used here to suggest a comprehensive overview. The chronicle may have originated in the late 1300s or early 1400s. The first known English translation of Part 2 of this chronicle, concerning the early capitals, appears in full in Appendix 4 (page 281). The *Za-bu-kon-cha* lists and describes a sequence of capitals, ending with the resettlement of Ava in AD 1364. Each capital is known by several names, which are specific to the eras of the four Buddhas of the present world cycle, a device which emphasises their legitimacy as exemplary royal centres. The *Za-bu-kon-cha*, says Myint Aung, provides early written support for the theory that the Pyu "spread their settlements to every nook and corner of the country" (Myint Aung 2002: 23). As a historical document, the *Za-bu-kon-cha* lays a territorial claim along the Ayeyarwady from Tagaung to Sriksetra and into the Samon/Panlaung and lower Mu and Chindwin valleys. At the very least, its authors seem to have been aware that the sites they listed all had some kind of archaeological evidence of antiquity. Kaungsin, Allagappa and Legaing, not prominent in other chronicles, were known to the author(s) when the *Za-bu-kon-cha* was written. Legaing can be dated at least as far back as AD 1066, from an inscription concerning the founding of a monastery there (Duroiselle 1921: 5).

The *Za-bu-kon-cha* sequence begins with a Pyu kingdom at **Halin** (Hanlin), a walled city with an archaeological assemblage containing polished stone, Late Prehistoric, Pyu, Bagan and post-Bagan period materials or structures (page 132). Halin only gets a brief mention in the *Glass Palace Chronicle*, as a geographical location rather than as a polity (Pe Maung Tin & Luce 1923: 136). In the *Za-bu-kon-cha* Halin is deserted by its population when its king kills his younger brother. The next capital is **Ava**, where a line of 110 rulers ends with a sinful king swallowed up by the earth. The "devastating rain of double edged sword used by ancient kings" is a contributing factor. The population migrates to Dhanyawadi, Tenasserim and Tavoy, a variant on the dispersal story in the *Glass Palace Chronicle*. **Makkhara (Hmetkaya)**, a walled settlement at the junction of the Myitnge and Zawgyi rivers that dates back at least to the Bagan period (ASI 1923-24: 84) is then ruled by a line of 160 kings. Hmetkaya today has an inner walled area surrounding a religious complex. Outer walls can be seen where they are cut by cart tracks. No reason is given for its decline.

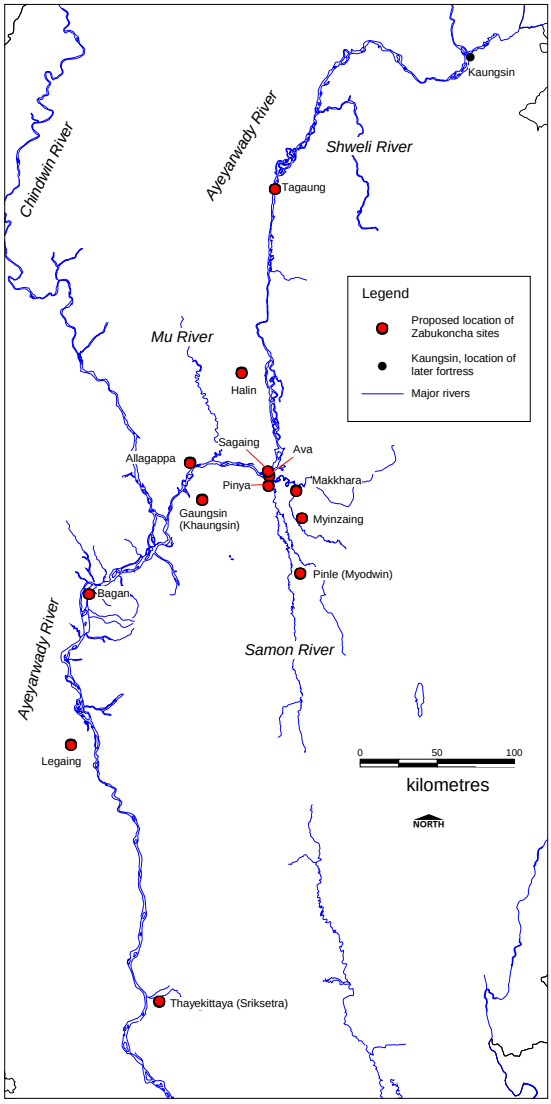

Figure 2 Early Myanmar capitals according to the Za-bu-kon-cha.

The name **Pinle** (Myodwin) has been carried on in a village on the edge of the Pyu complex known today as Maingmaw (Mongmao). Maingmaw is a village near the centre of the complex, but **Pinle** has been suggested as the traditional name for this walled site (Win Maung 2000b). In the *Za-bu-kon-cha* **Pinle** declines when the king collects too much tax and ends up in hell, while the city is destroyed by flooding. This area sits within sight of the Shan hills, and is currently under irrigation (page 126). The next capital is **Kaungsin.** This name is best known in the Burma literature in relation to a village across the river from a fortified site known as Sampenago, just north of Bhamo on the Upper Ayeyarwady. Bhamo is close to the present Myanmar/China border, and there is an account of a battle there with the Chinese during the late Bagan period (page 267). However a more geographically logical spot may be a site called Gaungsin (Map 84 O/10) or Khaungsin (NIMA 2001) on the south side of the Ayeyarwady opposite Allagappa. Subsequently **Allagappa,** 15 kilometres west of the junction of the Mu River and the Ayeyarwady had 26 kings and fell when the last king introduced arbitrary changes into the social order. The area is known to have yielded Pyu artifacts (Stargardt 2001b). Chinese sources mention a Pyu fortress, Mi-no Tao-li, in this area above the junction of the Ayeyarwady and the Chindwin (Luce 1937: 70). In 2004 the author and Win Maung surveyed the remains of a rectangular brick wall at Allagappa which covered three hectares. The bricks were similar in size to bricks of the Bagan period, and there were pieces of earthenware roof tile similar to examples found at the Otein Taung production site at Bagan (page 207). Local residents gave two alternate names for Allagappa, Ywapugyi, or village of the dwarfs, which is also given in the *Za-bu-kon-cha*, and Kosambhi, a name derived from an Indian site identified with Buddha, where according to the *Glass Palace Chronicle* (see page 25) King Pyusawhti of Bagan fought a Chinese army. The next capital was **Legaing.** The likeliest candidate, suggested by Win Maung (personal communication 2002), is a site with archaeological finds of Pyu material on the west side of the Ayeyarwady, 25 kilometres north-west of Magwe, within the Bagan period Minbu agricultural area. Despite a positive description of a city where "as justice reigned, hierarchy ceased" Legaing fell after it was "damaged", with no further explanation.

Tagaung, the original capital according to the *Glass Palace Chronicle*, is the eighth according to the *Za-bu-kon-cha.* There is a description of the foundation of a palace which shares some details with the *Glass Palace Chronicle* version (page 24), including the use of cats as food-tasters, though it is not the same king. The city falls when a king promotes disagreement among his people. The sequence of capitals is now in line with the story in the *Glass Palace Chronicle*. **Sriksetra** becomes the capital with 26 kings, and falls according to "the prophecy of being destroyed by the winnowing tray" (see details below in the summary of the *Great Chronicle*). The history of **Bagan** is summed up in only a few lines focusing on the stories of Thamoddarit and Pyusawhti.

Following the fall of **Bagan**, three brothers rule separately in **Myinzaing, Makkhara** and **Pinle.** An extensive brick ruin east of Kyaukse was known as Old Myinzaing, though there is also a village of that name further west, and the latter two appear above as earlier capitals. After the deaths of two of the brothers, the survivor moves to **Myinzaing**, and then to **Ava**. **Ava** suffers floods and the capital moves 6 kilometres south to **Pinya.** Despite the auspicious discovery of gold plates buried at **Pinya** the capital relocates without any reason stated in AD 1327 (the first date mentioned in the *Za-bu-kon-cha*) to **Sagaing (Cakuin)**, which today is a major monastic centre, and then, in response to bad omens, back once more to **Ava** in AD 1364.

The geography of the *Za-bu-kon-cha* account suggests that it is describing two migration sequences, one beginning in Halin and heading south to Legaing, then a leap back north to Tagaung followed by something of a repetition of the migration southward. The *Za-bu-kon-cha* sequence is parallelled in a later chronicle written by one of the authors of the *Glass Palace*

Chronicle, the *Saydi-ya-ka-hta* (Mongyway Sayadaw 1823). This also begins in Halin, and takes the capital from there to the Maha-myaing or "great forest" between Kalay and Ye-oo northwest of Halin on the east side of the Chindwin, across the Chindwin to Yazagyo, north to Thaung Htut, downriver to Kalay, just south of Yazagyo, and on to two unidentifiable sites, Kyundawgyi "the great teak forest" and Ingyibin. The next site is Taungzin, which may be near Settutra, on the west side of the Ayeyarwady near Minbu. This is followed by Pakhangyi, a Bagan era fortified settlement north of Pakkoku. Like the *Za-bu-kon-cha*, the sequence then shifts upriver, first to Tonnge, 10 kilometres north of Tagaung, to Tagaung itself, then Ava, Allagappa, Legaing, to Saku and Salin, which are both near Legaing, Taungdwin (near Beikthano), Ava, Pinle, Hmetkaya, Halin, Tahnyat, and finally to Tagaung and Sriksetra. Three years after composing this chronicle its author participated in a kind of tidying-up of the account, in which the earlier tales of migrations which must have been familiar from his work as well as from the *Za-bu-kon-cha* were rejected in favour of the *Glass Palace Chronicle* version of origins at Tagaung followed by migration to Sriksetra (page 24). All three of these chronicles ignore one major site with substantial archaeological evidence of antiquity, the walled Pyu centre of Beikthano.

The Celebrated (Famous) Chronicle.

(*Ya-zaw-gyaw, Yazawinkyaw, Rajavan-kyo, Maha-sammata-vamsa*). Written by a monk, Thilawuntha, the chronicle of the "great ancient rulers" dates to AD 1520. It largely focuses on the history of Buddhism in India and Ceylon, dealing with the Sakiyan kings and the conquest of Ceylon as told in the Pali chronicle, the Dipavamsa (Law 1959). The section devoted to Burmese history focuses on the Buddha's visit (see also page 25) in which he prophecised the foundation of Sriksetra. The author at one stage refers to an existing Burmese chronicle, but does not name it. Pe Maung Tin explained the absence of any mention of Tagaung in this chronicle by suggesting that its author did not think kings who had preceded Buddha were worth mentioning, and he suggested that the lack of an early reference to the supposed founding city should not be taken as evidence that the Tagaung story was absent from the mytho/historical repertoire of the time (Pe Maung Tin & Luce 1923: xiii, 6-7; Hla Pe 1985: 37, 52; Frasch 1996b).

The Old Chronicle of Pagan.

This is supposed to have been composed in the sixteenth century. The author is unknown. It contains the usual genealogy of the Buddha. The history of Burma begins with the Buddha's prophecies regarding Tagaung and the founding of Sriksetra, and relates the story of two blind princes, rejected by their father, the king of Tagaung, in the 59th year of religion, or 485 BC, who float down the Irrawaddy amid a trail of mythological events. According to this story, the brothers had their sight restored by an ogress, and both became Pyu kings, one fathering Duttabaung, the supposed founder of Sriksetra (Pe Maung Tin & Luce 1923: xiv, 6-7).

The Great Chronicle.

(*Maha-ya-zawin-gyi*). The author U Kala produced this 21 volume work some time shortly after AD 1730. His purpose, he says in his preface, is to show the impermanence of things, so that the reader may meditate on how even the mighty cannot escape death. U Kala seems to have used over 70 primary sources (Lieberman 1986). The chronicle, essentially an account of the lives of kings,

covers Burmese history from the beginning of the world, and incorporates previous chronicles and literary sources. Incidents covered include the domination of Bagan by a gourd, a tiger, a bird, a boar, and a squirrel. An allegorical treatment of what might have been a historical incident concerns the downfall of Sriksetra. “A great whirlwind arose at that time and carried away a winnowing-tray, and the woman whose tray it was ran after it crying ‘Nga Sagaw! Nga Sagaw! (My winnowing-tray! My winnowing-tray)’. Thereupon the whole country was alarmed and said, ‘the Nga Sagaw war has come!’, and the people split into three divisions.” It has been suggested that the ominous words “Nga Sagaw” may refer to an incursion by a tribe called Cakraw, or Sagaw- possibly the Sgaw Karen. This chronicle also appears in two shorter versions, the 10 volume *Yazawin Lat*, and the single volume *Yazawin Choke* (Pe Maung Tin & Luce 1923: xiv, xv; Tet Htoot 1961; Hla Pe 1985: 37-39; Luce 1985: 51).

The Maniyadanabon of Shin Sandalinka.

The “book of jewel-precious precedents” (1781) is essentially a collection of moral tales, translated into English by Bagshawe (1981). It “purports to give an account of various questions which faced Burmese kings of past times and the answers given to these questions by their chief minister”. The historical outline starts with three kingdoms existing “in the time of the Lord”, Tagaung, Dhanyawadi, and Thaton. The *Maniyadanabon* marks the earliest appearance in the Burmese histories of Mahasammata, the first human king of the world in Buddhist thought, and the founder of Tagaung, the first Burmese state. This origin myth allows all Burmese kings to descend from the solar race of the Sakiyan clan, from which Buddha also came. Charney points out that although this origin myth has been treated in secondary literature on Burmese history as a development stemming out of central Burmese thought, it did not surface in central Burmese texts until the *Maniyadanabon* in 1781, in an apparent attempt to make more universal the legitimation of the kings of the 1752–1885 Konbaung Dynasty (Charney 2002).

The *Maniyadanabon’s* history of the Sriksetra and Bagan dynasties is notable for the timescale it ascribes to Bagan, with the city founded by Thamoddarit in 26 Myanmar/Burmese Era, or AD 664, several centuries later than the *Glass Palace Chronicle* account. However it must also be noted that the *Maniyadanabon* has Pyuminhti/Pyusawhti living to be 110 years old, and there is a major inconsistency in the time gap between Sriksetra and Bagan. The story follows the *Great Chronicle/Glass Palace Chronicle* convention which puts the founding of Sriksetra close to Buddha's time. There is then a transition through 25 kings from the accession of Duttabaung in 101 Buddhist Era, down 607 years, to the end of the kingdom, which would be AD 164, 50 years or so later than the *Glass Palace Chronicle* version. The winnowing tray story and a decade or more of migrations preceding the foundation of Bagan are mentioned. Thamoddarit is the nephew of the last king of Sriksetra, according to this version. The reader of the *Maniyadanabon* is then expected to ignore a few missing centuries for the sake of the story, and by the same token to ignore the earlier kings of Bagan who were listed in the other chronicles, as the sequence continues with Pyusawhti, who according to the *Maniyadanabon*, fought his battle against “the Chinese” in AD 749. Bagshawe presents this chronology without comment (Bagshawe 1981: 4-5) but the section covering the time before Bagan could be viewed as a retrospective addition by the compilers of chronicles, designed to fill the period back to Buddha with authentic dynasties. The *Maniyadanabon* dates the accession of Anawratha to AD 1014, little different from the *Glass Palace Chronicle’s* AD 1017. In AD 1054, it says, “the king, ministers, officers, people and monks of Thaton carried the three Pitakas of the scriptures upon thirty-three white elephants to Pagan Arimaddana”. There is no mention as such of a “conquest” of Thaton, although this may simply

have been a story too well known to require any detailed retelling. The rest of the historical summary is similar to the *Glass Palace Chronicle* account.

The New Bagan Chronicle.

(1785?) This chronicle also connects the lineage of the kings of Tagaung with the Indian Sakiyan family, the tribe of Buddha, an account, as discussed above, that appeared in the central Burmese historical repertoire in the early 1780s. The chronicle takes a critical approach to its sources, at times arguing the merits of conflicting accounts. One story the chronicle rejects as improbable is the tale of Peitthato, a queen in Taungdwin, who owned a drum for the collection of revenue. King Duttabaung's spies destroyed the drum, so that she and her revenue became Duttabaung's property (Pe Maung Tin & Luce 1923: xv-xvi). The merits of the story aside, it is interesting to hear of the use of a drum as a kind of repository for wealth, reminiscent of one of the functions of the bronze Dong Son drums, which have at times been found containing valuables (Pirazzoli-t'Serstevens 1979: 127,130, 134; Nguyen Van Huyen, Hoang Vinh, Pham Minh Huyen *et al.* 1989: 15, 84-85).

A Brief History of Bagan.

(1790?).This manuscript is held in the library of the Archaeology Department at Bagan, in the form of a parabaik, or traditional folding book. It contains detailed measurements of the city, and names numerous officials, monks, donors and pagodas (see page 245). It has been translated into English and published with a commentary (Hudson 2003b), and will be referred to in later chapters.

Some other important chronicles.

The *Rahkaing Chronicle,* an early version of the chronicle of Arakan (Rakhine), dates to before 1775. The *New Dhannavati Chronicle* (1910), along with the Rahkaing Chronicle, relates stories of Arakan before and during the Bagan period (Pe Maung Tin & Luce 1923: xix). Part of the undated *Saravasthanaprakarana,* an "ancient Arakanese manuscript" describing Buddha's visit to Arakan and the casting of the Mahamuni image in his likeness was translated into English in the late 19th century (Forchhammer 1892: 2-6).

The *Hnget Pyittaung* was a chronicle of Tagaung, Sriksetra and Bagan in Pali, by a monk known according to convention as Hnget Pyittaung, after the monastic complex east of Nyaung-u which includes several large underground structures and the recently-restored building known as Shin Arahan's brick monastery (Khin Maung Nyunt 1997). This monastic complex was obviously important in Bagan times, as it is mentioned in nine inscriptions between AD 1215 and 1299 (*Index Inscriptionum Birmanicarum* 1900: 2-3). The *Hnget Pyittaung* deals with the period up to 1778, and includes the story of dacoits (bandits) invading the royal palace during the reign of Alaungsithu (Pe Maung Tin & Luce 1923; Tet Htoot 1961: 53). *The New Chronicle* was written towards the end of the eighteenth century by Twinthin Mahasithu, and made wide use of these primary sources.

The *Tagaung Chronicle,* another of the relatively few chronicles available in English (Pe Maung Tin & Luce 1921), was used as a source for the *Glass Palace Chronicle.* It is a legendary history in which a queen mates with a Naga (snake) king, the Indian god Indra (Sakra) appears to help a prince claim his throne, the blind twins go on their journey down the Irrawaddy, and Tagaung is

destroyed by a flood following the wicked actions of an unrighteous king. Its sources also appear to include Shan and Palaung legends (ASB 1916: 31).

The *Pagan Chronicle* must date to before 1869, when a copy was presented to the British Museum. It covers Sriksetra and the post-Pagan dynasties. The *Second Chronicle* (*Dutiya Maha Yazawin*) was in effect a continuation of the *Glass Palace Chronicle*, taking history up to AD 1869. A list of 38 previous chronicles and historical works was made by Maingkhaing Myoas, the Mandalay palace librarian, who was one of the compilers of the *Second Chronicle*, indicating the extent of the source materials available (Tet Htoot 1961).

Indigenous history and its challenge to archaeology.

Historians of Southeast Asia point to a barrier that appears around AD 1400 in the use of chronicles. Cambodia's history before the 15th century, when the centre of power moved from Angkor to Phnom Penh, was a blank for early-modern Khmer chroniclers (Vickery 1977). Hägerdal suggests that this may be something of a Southeast Asian historiographical syndrome, where the move of the centre of a realm or a dynastic break can wipe out much of the historical memory on the elite level. He gives the example of the Sasak principalities of Lombok, whose early history vanished or waned due to the dominance of the Balinese from 1676-1894 (Hägerdal 2001). In Myanmar, the proliferation in the 1700s of vernacular-language poems, biographies, devotional works, dramas, and chronicles supplementing more thematically restricted Pali and Burmese compositions may create a false impression of plentiful sources before this period (Lieberman 1999, 2003). Chronicles which purport to contain data from earlier periods need to be viewed cautiously, as the material may be coloured or replaced by subtexts and themes of the post-17th century authors or compilers. However a cautious and analytical approach to the chronicle sources, particularly if backed up by inscriptions and archaeological data, can add to existing information, and at times prompt research (see, for example, page 220). This is probably most valuable for the Bagan period and later. For example, the chronicles mention names from Bagan that correlate with names in inscriptions but they ignore the pre-Bagan élite of Sriksetra who are only known from burial urns found there within the past century (page 138).

The mythological stories and their many variants are entrenched in popular belief and are regularly presented in textbooks, magazines and popular literature as historical fact. For example, two recent English-language pagoda histories describe how Buddha left relics behind in Arakan (Tun Shwe Khine 1992: 31-37) and at Thaton (Maung Cetana 1997: 14-18). According to tradition, Buddha had visited many places in Burma during his past lives, and many more during his lifetime. These include Aparanta, a province whose legendary roots are derived from Indian Buddhist scriptures (ASB 1923: 17), where he stayed at a red sandalwood monastery built by a devotee. There is a Sandalwood Monastery Pagoda marking this legendary event at Pwinbyu, 35 kilometres north-west of Magwe. In the same general area, in Sagu township, 15 kilometres north-west of Magwe, Buddha is believed to have left behind two footprints (Munier 1998: 10; Myat Min Hlaing 2002: 72-73). These sites are within the Bagan-period Minbu irrigation area (Aung-Thwin 1990: 20-23, 71). He is believed to have visited Powundaung, near Monywa, according to a tradition described by Schober as "the construction of cultural hegemonies concerned with the veneration of Buddha's remains" (Schober 2003: 12). In other traditional accounts, Buddha visited Mandalay Hill, where he prophecised that a great city would be built, and Tanggyi Taung, opposite Bagan, where he also prophecised the foundation of a city (Ar Seinna; Bischoff 1995). Buddha at times indicated the location of relics from his previous lives in Myanmar. As he had been various animals in some of

his past lives, these relics could, in the eyes of the faithful, quite reasonably include animal fossils. Several such instances are recorded in the *Saravasthanaprakarana* (Forchhammer 1892: 3).

Chinese sources.

Chinese historians and geographers began to mention the territory that is now Myanmar as early as the second century BC, focusing on the Pyu kingdom(s) and people. There are references to overland trade or pilgrimage routes linking China, Upper Burma and India from 128 BC, to Pyu migrants settling in Yunnan (before AD 76), to a Buddhist kingdom, Linyang (nominated by Luce as the first textual mention of Buddhism in association with Burma) in the first half of the 3rd century, to a route from Yunnan to the Pyu kingdom (before AD 290), to a "civilised people" called the P'iao (before AD 420) and again around AD 524, to Linyang (Beikthano, or Vishnu City).

During the Tang Dynasty (AD 618-907) a Pyu capital, Shilichadaulo (Sriksetra) was mentioned in AD 646, 648, around 675 (the latter two in relation to Chinese Buddhist pilgrims), and 691. The overland trade route between Yunnan, Burma and India was described in detail in AD 810. Poems of the early 9th century describe performances by Pyu artistes at Chang-an, the Tang capital, in AD 800 and 801-802. Later historical compilations the *Man shu*, or *Book of the Southern Barbarians* (AD 863), the *Jiu Tang shu* or *Old History of the Tang Dynasty* (AD 945) and the *Tang huiyao* or *Important Documents of the Tang* (AD 961) all refer to the musicians' visit of AD 801-802. The *Xin Tang shu* or *New History of the Tang Dynasty* contains a detailed description of the Pyu kingdom, even listing the songs performed by the Pyu on their visit to Chang-an.

During the Song Dynasty (AD 960-1279) missions to the Song court from the P'u-kan kingdom in AD 1004 and 1106 are recorded in the *Zhu fan shi* or *Description of Foreign Peoples* of AD 1225. There is a record of missions from Bagan and Dali, including the presentation of gifts and Buddhist scriptures, to the Southern Song court in AD 1136. The name *Pugan* appears for the first time in Chinese records in AD 1178. An inscription of AD 1278 describes an incursion by the Bagan army into Yunnan. From the Yuan Dynasty (AD 1279-1368) the *Yuan wen lei* or *Collection of Literary Works of the Yuan* (AD 1334) contains a detailed account of the wars between the Yuan and the Burmans in the period AD 1271-1301 (Pelliot 1904; Luce 1924: 137; Luce 1932, 1937, 1961; Luce 1969: 8, 95-96, Vol 1; Luce 1985: 47-108; Sun Laichen 1997: 9-20; Bhattacharyya 1998: 157-172; Chen Yi-Sein 1999: 65-90).

The Western historians.

While Marco Polo (1254-1324) wrote of, though almost certainly did not visit, Burma, (Yule 1903; Olschki 1960; Rugoff 1961) and early European traders Ludovico di Varthema, between 1502 and 1508, Caesar Fredericke between 1562 and 1569, Gaspero Balbi around 1583 and Ralph Fitch in 1587 described their visits to Gulf of Martaban settlements such as Mergui, Dala, Dagon and Pegu (Fitch 1981; Abbott 1997: 1-38; Balbi 2003), the first western historical writing really began with people who were functioning as political analysts, such as Dalrymple (in Burma 1791-97), an "anti-colonial imperialist' who espoused "amiable intercourse with mutual benefit", and Symes, whose report of his embassy to Ava in 1795 included a 123 pages historical memoir, the first attempt to write a history of Burma in a European language (Symes 1800, 1955). Crawfurd, in 1829, referred to Burmese chronicles and a chronological table of kings, and gave an early

description of Bagan. The diplomat and linguist Burney discovered and explored the literature of Burma (Blackmore 1985) and at times used the chronicles to verify Burmese territorial claims. He was at the court of Ava when the *Glass Palace Chronicle* was compiled. Some authors did not bother to conceal a colonialist agenda. Hall accuses Bayfield, who wrote in 1835 on British relations with Ava, of inaccuracy, bias and deliberate dishonesty in an attempt to blacken the character of the Burmese (Hall 1961).

In the first significant western history of Burma based on Burmese sources, which covered the period "from the earliest times to the End of the First War with British India", Phayre (1883) was generous to the traditional accounts, relating the history as told in the chronicles in detail, though at the same time pointing out their legendary nature. He accepted that Upper Burma's Mongoloid tribes, with a language related to Tibetan, had been joined over time by Indian settlers moving across from East Bengal, resulting in "the gradual consolidation of those tribes into a nation, through the instruction of a more advanced race". He introduced the periodisation that is still generally accepted- "The Pagan period"- "the Konbaung period" etc- and treated the Burmese chronicles as a "rational record with certain magical and non-rational accretions"(Tinker 1961).

Harvey (1925) opened his account with the assertion that "when history began, the country was a medley of tribes" who had infiltrated in waves from the north. According to Min Naing (2000) there are at least 129 ethnic groups in modern Myanmar. In Harvey's view, the original inhabitants, perhaps Indonesians, had been displaced by Mon and Tibeto-Burman tribes from eastern Tibet. He proposed that literacy was a prerequisite for civilisation, with writing arriving from India around AD 300. Perhaps Harvey's most important contribution is his use of Chinese sources, which he quotes extensively, providing valuable information about activities at Sriksetra and Nanchao. The "native" account of Burmese history before Bagan, Harvey pointed out, owes much to Indian mythology and legend. "Buddha's coming to Burma is on a level with Joseph of Arimathea's planting the Glastonbury Thorn", he says (Harvey 1925).

"The early history of Burma is obscure", says D.G.E. Hall (1950), who also takes a strongly textual, classicist approach. Hall was fiercely criticised by Sarkisyanz (1972) as an apologist for British imperialism, a critique focused on Hall's chapters on the colonial period. Hall's book is still widely available in Myanmar, though perhaps due more to the absence of copyright control than to the demands of scholarship. Hall rejects the story with which the Burmese Chronicles begin, of the c. 850 BC foundation of Tagaung on the upper Irrawaddy by an immigrant Indian people, saying that this tradition is merely a copy of Indian legends. He relies on Ptolemy's geographical works as the first useful textual reference, and suggests that Indonesian, supposedly the "dominant race" in Indo-China in the time of Ptolemy, the second century AD, "must have been strongly represented in Burma". He then goes on to discuss the influence of seaborne Indians, bringing Brahmanism, Buddhism and Sanskrit culture to Indo-China, and suggests that Chinese and Indian cultures "clashed", with some blending, but eventual Indian dominance, throughout the region. From then on, Hall relies on inscriptional and archaeological evidence, and the early work of G. H. Luce (see below), to outline the history of the Pyu, the "earliest inhabitants of Burma of whom records are extant". He notes that Pyu cultural elements included Mahayana and Theravada Buddhism, Vishnu worship and cremation burials in jars (see a review of the archaeological evidence below, page 137). Hall also discusses the fourth century AD Candra dynasty, with strong Indian connections, based at Vesali, near the Kaladan River, on the west coast. He outlines the growth of influence of the Nanchao polity in what is now the Chinese province of Yunnan, noting the Nanchao-sponsored visit of a Pyu (P'iao) embassy, with accompanying musicians, to the Chinese court in AD 802. The Pyu, says Hall, had suzerainty over eighteen subject kingdoms before Nanchao tribes plundered the Pyu capital in AD 832.

Harvey had suggested that this celebrated raid, often portrayed as the "destruction" or "fall" of the Pyu, was less dramatic: a foray to remove slaves to populate an area of Yunnan. He pointed to a record of the Nanchao leader being presented with a gold Buddha by grateful Pyu 26 years after this raid, to thank him for his help against a local military incursion. Harvey also suggested that the Pyu may have been "a very early wave of Burmese immigration", citing the chronicle tradition that the earliest Burmese were divided into three tribes, the Pyu, the Kanran (or Kanyan) and the Thet (or Thek) (Harvey 1925: 15). Hall accepts that the Burmese appear to have been an immigrant group originating in China, who reached the Kyaukse district of Burma, south of Mandalay, by way of north-east Tibet and Nanchao (Hall 1950: 7-13). The migration tradition, involving numerous splits among tribes, is reflected in *The Glass Palace Chronicle* (Pe Maung Tin & Luce 1923: 1-29).

In 1969, G. H. Luce introduced his *magnum opus* with an overview that for its time was paradigmatic*:*

> "The pioneers in civilization, both in Old Burma and Old Siam, were the Mons. Strongest in the deltas near the coast, where they grew their irrigated rice, they had contacts with India from very early times. Their language, which is akin to Khmer and the pre-Vietnamese dialects of the Annamite Chain, is distantly allied to Indonesian, and quite different from Burmese or Pyu, which are Tibeto-Burman. In 638 A.D. the Pyu, descending from the north-east, founded the first big Buddhist capital of Burma, Sriksetra. This was near modern Prome, above the head of the Irawady delta, 200 miles from the sea. The last Sriksetra king whose name we know, died in 718 A.D. Some time later, it seems, the city fell; and the Pyu fell back on Upper Burma, making their new capital Hahn, 10 miles south of Shwébo. On their way north, some Pyu refugees are said to have settled near Pagan, a group of small villages on the left bank of the Irawady, 180 miles north of Sri Ksetra. Pagan is in the Dry Zone of Central Burma, below the mouth of the Chindwin, at the point where the Irawady, after flowing in a south-westerly direction from Mandalay, turns finally south towards the sea. In 832 and 835 A.D. Halin, the Pyu capital in the north, and Mi-chên, the chief Mon city in the south, were sacked by Nan-chao, the imperial lords of Yang-chu-mieh (Ta-li) on the high plateau of Western Yunnan. The dominant peoples of Nan-chao were probably Lolo, speaking languages closely akin to Burmese. The Burmans, Mramã, then subject to Nan-chao, and forced to fight Nan-chao's battles from Chêng-tu to Hanoi, took their chance to break away, and descend upon the hot malarious plains, where Nan-chao durst not follow them except on a cold-weather raid. The Mranma occupied the two irrigated rice-granaries of the Dry Zone: Kyauksê (80 miles north north-east of Pagan) and Minbu (60 miles south of it). They called them respectively the Eleven Kharuin and the Six Kharuin: kharuin meaning the core or hub from which government radiates. In 850, it is said, they built the walls of Pagan. It was then the advance-centre, rather than the capital, of Tambadipa, the first kingdom of the Burmans in Central Burma" (Luce 1969: 3 Vol 1).

This account, with the sacking of the Pyu capital and the "descent" of the Burmans, remains the received history. It is suggested in later chapters that Luce's view of the Pyu coming from the north-east to found Sriksetra is wrong in its timing, and excessive in terms of the distance travelled, though in the light of the new data on the Samon Valley (page 92), he picked the direction correctly.

Ethnicity and migration.

The creation of a historical narrative around a hypothesised flow of ethnic groups and languages in antiquity, based on later ethnographic evidence, is highly problematic. This thesis does not necessarily disagree with the prevailing scholarship that suggests, for example, that the Burmans or Myanma may have been part of the Nanchao kingdom, migrating to Bagan (Aung-Thwin 2002: 37). But it is time this story proved itself with scientifically testable archaeological or biological evidence rather than in the terms of the authority-based discipline of linguistics. It is a modern truism that a new language can be adopted and an old one abandoned within a couple of generations, in the instance of a linguistic group or an individual becoming part of a culture where economic and social success depends on adopting the language and behaviours of that culture. However there seems to be little evidence as to whether this was the case in pre-modern societies.

In more modern times race, a word somewhat synonymous with ethnicity in the colonial period, was a consuming interest among European scholars and administrators in Burma, with nothing pejorative to be taken at the time from the notion that "the Pyus intermarried with the Kanran and the Thet. Eventually the Burman race emerged much in the same way as the race of Englishmen has emerged from the fusion of blood and culture of several races, Britons, Romans, Jutes, Danes, Angles, Saxons and Normans" (Barrett 1935: 24). The irony was noted in the colonial period that the "British who, misled by the fact that the provinces they annexed were wrested from the kings of Burma, took it for granted that the great majority of the people were Burmese, and that Burmese was the language of the country. It will probably never be known exactly how much the British Government has done to make Burmese the language of the country, from the first by making it the language of the Courts, and the language which British officials in Burma must study; and latterly by the educational policy which almost forced every school-boy who came to school to learn English, to learn Burmese as well" (*Rangoon Gazette, Oct 26* 1888).

Aung-Thwin describes the attribution of historical causation to ethnicity as a modern, Western interpretation by the early colonial historians of Burma, suggesting that while the indigenous histories are aware of ethnicity, the motivation for action, notably during the Bagan period, is the struggle for power involving individuals and their supporters (Aung-Thwin 1998: 145-149). At times, linguistic evidence and material culture may indeed have direct information for each other, such as in the case of the "Gold Teeth" tribes mentioned in Chinese documents (Luce 1985: 15-16 Vol 1) vis a vis the recent discovery of decorated gold teeth in burials at Halin (Hudson 2003a), which will be discussed below (page 135). But the treatment of ethno-linguistic groups as actors in Burmese prehistory and antiquity must be approached with great caution. A notable example of this problem, highly relevant to the later arguments of this thesis concerning the origins of Bagan, has been the focus of recent debate: the "Mon paradigm".

The Mon and the "Mon paradigm".

Over the past few years a hypothesis has emerged which is having a profound impact on the study of early Burma, particularly early Bagan, and on the theoretical and analytical approach taken in this thesis. This is Michael Aung-Thwin's rebuttal of what he calls the Mon paradigm, the widely accepted notion among both indigenous and western scholars that the traditional story of King Anawratha invading and capturing Thaton in the 11th century and a subsequent inflow of Mon culture into Bagan (as outlined above, page 25) was a historical fact. The Aung-Thwin hypothesis was introduced at conferences in Amsterdam and Yangon and has been developed in a volume still in press at the time of writing this thesis which the author has generously supplied in manuscript

(Aung-Thwin 2004). Aung-Thwin's work involves a paradigm shift in the classic sense, in which "one conceptual view is replaced by another". It fulfils Kuhn's criteria of being a paradigm unprecedented so as to attract the scientific community, and open ended enough so that several different groups of scientists can work on different problems within it (Kuhn 1970). The reaction at the 2001 *Texts and Contexts* conference in Yangon, which saw two highly detailed, prepared rebuttals presented from the floor at the conclusion of Aung-Thwin's paper, which had been circulated in advance, was a fair indication that the academic community in Myanmar is attracted to the debate. The following summary of, and commentary on, the Aung-Thwin hypothesis (Aung-Thwin 2001a, 2002, 2004) will demonstrate that the new paradigm is open to new approaches in many fields.

Aung-Thwin suggests that:

- The conquest of Thaton by King Anawratha of Bagan in AD 1057 is a myth. There was no kingdom of Thaton to conquer at that time, it came later. The notion of a first millennium Mon kingdom in southern Burma originated with the 15th century King Dhammaceti of Bago (Pegu) as part of a retrospective claim of Theravada Buddhist orthodoxy for his regime. According to the story, Anawratha took captives, Buddhist scriptures and a generally more advanced culture to Bagan. He brought Buddhist relics to enshrine in the Shwezigon pagoda, and from his time, there was a substantial program of pagoda building (Phayre 1883: 33-35; Harvey 1925: 23-29). This portion of the received history emphasises a mid-11th century date for the beginnings of construction.
- Western scholars of the 20th century accepted the story of the early Mon kingdom as fact, and attributed many finds in southern Burma of coins, art works and archaeological materials, "even those with no dates or Mon writing on them" to the Mon ethnic group. The Mon were portrayed as the historical victims of aggressive Thais and Burmans, whose consolation for this injustice was to be credited with civilising their conquerors, a situation with parallels to the Roman adoption of the culture of the conquered Greeks.
- The introduction of Burmese writing at Bagan was wrongly attributed by modern-era scholars to the influence of the Mon after AD 1057. The first evidence of written Old Burmese was taken to be the AD 1112-1113 multi-language (Pyu, Pali, Old Burmese and Old Mon) Rajakumar (also called the Myazedi) inscription, widely viewed as Burma's Rosetta stone (Taw Sein Ko & Duroiselle 1919). Any Burmese inscription that predated this was considered unreliable and "impossible". Duroiselle had stated that "all evidence points to the fact that the Burmese language was not written until the middle of the XIth century, after the fall of Thaton in 1057; all inscriptions, therefore, which bear a date anterior to this must be considered as, and in effect are, copies made subsequently" (ASB 1920: 15; Duroiselle 1921: vi).The assumption of the greater antiquity of Mon civilisation, including writing, therefore became both premise and proof. Aung-Thwin suggests that Burmese inscriptions at the Mahabodhi temple at Bodhgaya in India, listing repairs and donations by Burmese pilgrims, go back to at least AD 1035 (Figure 155). He says that several dozen other inscriptions, existing mainly as copies, but 11 as originals, written in Old Burmese, precede the Old Burmese face of the Rajakumar inscription. He proposes that the Burma (Bagan) script was most likely derived from the Pyu script found at Sriksetra in the 7th and 8th centuries, and that the Old Mon script derives from the Burman, not vice versa. Aung Thwin's argument gains support from a recent study that suggests that the Burmese face of the inscription, of which two copies exist, one in the Bagan museum and one at the 19th century Myazedi pagoda, near which both pillars were found, appears on grammatical grounds to have been the original from which the other translations were made (Tun Aung Chain 2001).

- The effect of the Mon paradigm was to make “orthography the ultimate litmus test for deciding chronology”. Temples containing Archaic Burmese writings were automatically considered to be later than those with Mon writings. Aung-Thwin gives examples of misreadings of the written record, citing captions on the Jataka plaques at the East and West Hpet-leik temples at Bagan which were considered by early scholars to be Mon but were read in 2002 by Aung-Thwin and Myint Aung as actually being the Pali names of the Jataka stories, “no more Mon than they are Burmese”. Architectural styles were assigned, notably by Luce, to an earlier “Mon phase”, a “transitional phase” and a later “Burman” period. Aung-Thwin suggests that this should be rejected, and style should be assessed in terms of structural and technical development. However this must be done with the awareness that there was “ astounding continuity of the most dominant styles, which suggests that ‘change’ and ‘progress’ in temple architecture were not inevitable consequences of the mere passage of time”.
- The key documentary support for the idea of a Mon period at Bagan is the use of Old Mon in some inscriptions by Kyanzittha. Aung-Thwin points out that this represents only a dozen or so inscriptions, whose content mainly promotes the notion that Kyanzittha had been the god Vishnu in a previous life, and is therefore a claim of legitimacy for the throne. While Aung-Thwin tentatively advances some explanations for Kyanzittha’s use of Old Mon, such as the possibility that he may have relied on a Mon adviser, the Shin Arahan of later stories, he proposes that Kyanzittha’s preference for Old Mon is a one-off phenomenon rather than a trend or pattern, and with Old Burmese used much more widely before and after Kyanzittha, the emphasis on his use of Old Mon represents the “propensity among certain scholars of South-east Asia to make rules out of exceptions” (Aung-Thwin 2001a, 2002, 2004).

A pre-Bagan period founding date for Thaton, and its claim to be the centre that inspired Bagan, had been in dispute long before the argument was crystallised by Aung-Thwin. “This tradition is difficult to reconcile with the paucity of archaeological remains discovered in the area of Thaton”, wrote Subhadradis in 1966 (Subhadradis Diskul 1966: 166). There have been archaeological excavations around the sites of Winka and Hsindat Myindat, which are 30 to 45 kilometres north of Thaton. This area has at times been referred to, with no apparent basis, as “Old Thaton” ("Editor's Note on Excavation of Old Thaton" 1976), but is in fact a probable first millennium site traditionally known as Taikkala or Suvannabhumi, which in its own right merits further investigation (Myint Aung 1977, 1999). Thaton itself is shown by aerial photographs (1:6,000, 19 March 1958, THA 360, sheets 8-10, 26-31, 44-51, 59-67, 107-109) to be moated and rectangular in plan, with an enclosed site known as the “old palace” at the centre (Thin Kyi 1959; Luce 1969: 25; Aung Thaw 1972: 35-40). Archaeological excavation has revealed habitation material under Thaton’s stone and laterite wall (Baby 2000). A program of radiocarbon or thermoluminescence dating might be able to provide some concrete evidence of the age of the site.

Bagan and after.

There is more agreement between the traditional and western histories of the Bagan period, as the later chronicles, at least, used the inscriptional sources that continue to be compiled today (for example, Nyein Maung 1972-1998). The city (or polity) is first mentioned in a Cham inscription of 1050 (Aung-Thwin 1985: 21). Surviving inscriptions at Bagan date to the early 12th century. Lehman has suggested that features inherent in Buddhism as it developed at Bagan allowed Bagan to become a major monarchical state. A kingdom whose cosmological model was the heavenly domain of Indra (Sakra) was in theory divided into thirty two sub kingdoms, giving local leaders a sanctioned role that allowed them “to contest royal authority and administration with considerable

regularity". Lehman proposes that a separation of the monarchy from this galactic polity made the role of the king absolute. This was done through the adoption of the nat cult (37 nats, one for each cosmological sub-kingdom, plus the guardians of the four quarters and Indra) which created a national pantheon in which the nats were more powerful than the local leaders, who could no longer claim even to be minor kings (Lehman 2003: 27-28).

Economically, redistributional Buddhism at Bagan from at least the 11th century AD was a mechanism of centralised economic and social control, with the king effectively acting as chief donor (Wicks 1992: 121-155). By the end of the thirteenth century, as indicated by inscriptions (Chapter 6), the Bagan presence was strongly felt up and down the Ayeyarwady, including the rice producing areas of Kyaukse, the Mu valley and Minbu (Aung-Thwin 1990: 14-26). These centres, often the subject of religious dedications and donations, were easily accessible due to Pagan's control of the transport infrastructure, this being the river. Inscriptions indicate Burman influence north to the modern Chinese border, downriver to the Irrawaddy delta and south as far as Tenasserim (Chart 2). After two centuries of military domination and economic expansion, the kingdom was put under pressure by the Mongols in the late 13th century. By the late 14th century, the locus of power had moved upriver to the area around modern Mandalay.

The conventional explanation for this, the direct invasion and sacking of the city of Bagan in the 1280s by Kublai Khan's Mongol forces (a dramatic 19th century indigenous retelling of this story appears in Burney 1835), is poorly supported by historical evidence (Aung-Thwin 1998: 63-92). A long term process rather than a single event was the more likely cause. By the time of the Mongol incursions, the Bagan polity had been through a series of resource-depleting construction cycles. These may well have left its economy and administration vulnerable to new stresses (Aung-Thwin 1985; Hudson 1997). Aung-Thwin has suggested that the provincial administrators charged with defending Pagan's northern frontiers against Mongol incursions actually did so with such success that they became the new power élite. Their domains became the locus of Burman administration. The centre of government gradually moved north to Ava, which sits at the head of the rice-producing Kyaukse valley, and remained in the area around Mandalay for most of the time until colonisation (Aung-Thwin 1996, 1998). The geopolitical contraction of Bagan was followed by an expansion of Mon polities in the south, and the rise of Mrauk-U on the west coast (Frasch 2002). This left Bagan something of a backwater in terms of central control, although records of intermittent construction of buildings (Table 11) indicate that the city remained a monastic and pilgrimage centre, despite regular earthquakes and pillaging, until colonial times and into the modern era (Than Tun 1996a, 1996b). The excavations of 2003 (page 226) suggest that there was also a continuing civil administration.

Summary

The indigenous histories of Myanmar as they stand and as they are evoked today operate on a dualistic paradigm. There is an entrenched belief that the religion links the people back in an unbroken chain of authority and doctrine to Buddha, and that the people, in particular the leadership, are also biologically linked to the tribe of Buddha. There is an intense focus on place, where the capital, from which radiates both the righteousness and the power of the king (Hagesteijn 1989), is a site that must be founded and maintained by ritual. As the story in the Za-bu-kon-cha (page 29) indicates, the protection accorded by meritorious royal behaviour and correct religious behaviour cannot last forever, and a sequence of capitals is the result. The nomination of sites as early capitals, even in the oldest chronicles, is not necessarily based purely on fiction or

myth. The preservation of town names in chronicle sources has led to archaeological discoveries, one example being Allagappa (Chart 1) and other villages around Myinmu (Moore 2004: 39).

The early Western historians drew both on the traditional sources, which they portrayed as mythological while at the same time accepting much of the main thrust of the traditional narratives, and on the historiographical approach of western culture, which led to something of an over-emphasis on ethnicity as a social agency. This approach has been deconstructed by Aung-Thwin in relation to the Mon paradigm (page 39). The importance of this exercise to the thesis is to further throw open the issue of the early dating of Bagan.

CHAPTER 2. BURMESE ARCHAEOLOGY IN CONTEXT.

Myanmar's geographical position has shaped patterns of human settlement and cultural development. This chapter describes the landform and resources amid which early cultures developed. It then outlines the history of archaeological research into these cultures, describes the approach taken by the Myanmar government today, and summarises recent international research programs. It briefly backgrounds the work on phases earlier than those that are the focus of the thesis, the investigation of palaeontological and archaeological issues before the appearance of bronze and polished stone tools. It suggests a general periodisation for the addition of bronze and iron to the technological repertoire, and concludes by outlining the key issues with which this thesis deals, the transition from Late Prehistoric to Early Urban, and the transition from the Early Urban system to the more centralised administration of Bagan.

Geography.

Myanmar has links through mountain passes and river valleys to China and Tibet in the north-east and north and to the Indian subcontinent in the north-west and west. Its situation on the Bay of Bengal gave it relatively easy access by sea to India, and both sea and riverine routes connect it with Thailand to its east. Chains of hills extend north to south (Gutman & Hudson 2004). The main river systems (Figure 4) are:

- the Kaladan, and its neighbour the Lemro, which flow into the Bay of Bengal;
- the Ayeyarwady (Irrawaddy, Elephant River), which runs through the centre of the country. Its major tributaries (from north to south) are the Shweli, the Myitnge or Doktawaddy (into which flow the Zawgyi, the Panlaung, and via the Panlaung, the Samon), the Mu and the Chindwin. Geologists have suggested that the present Sittaung and Samon Rivers are the old Ayeyarwady, split following volcanic upheavals that gave rise to Mount Popa, and that in geological time the Ayeyarwady and the Chindwin would have flowed parallel from north to south (Chhibber 1933: 38-40);
- the Sittaung, which empties into the Gulf of Martaban; and
- the Salween, part of which forms a border with Thailand.

The country is subject to earthquakes, the most notable in recent years being the tremor which damaged the majority of buildings at Bagan in 1975 (Pagan Newsletter 1982). The Burmese chronicles record dozens more, though some of these may be legendary ("Chronology: Earthquakes of Burma" 1976). The river systems are geographically isolated from each other and form individual agricultural areas. Each, with the exception of the unnavigable upper Salween, has its own transport system and access to the sea. The Ayeyarwady is considered to be one of the fastest eroding large rivers in the world due to a combination of soft materials in its watersheds and heavy but intermittent rainfall (Chhibber 1933).

Burma's different climatic zones require different water management strategies, from the conservation of limited supplies in tanks in the drier areas to the need to run-off surplus water from inundated fields in the areas subject to heavy monsoon falls. The mountainous coastal strips of

Arakan in the west and Tenasserim in the south receive more than 3000 millimetres of annual rainfall. The hill regions along the borders with India, China and Thailand receive upwards of 2000 millimetres. The Gulf of Martaban also receives the annual monsoon. However, the central plains lie in the shadow of the coastal hills and receive only a little rain. The area encompassing Shwebo, Mandalay, Meiktila, Minbu and Bagan receives less that 1000 millimetres of precipitation annually and can be regarded as semi-arid in terms of rainfall (Bender 1983: 13). Digital maps of the drainage system of Upper Burma (Digital Chart of the World 1993) portray a lattice of watercourses, but this can create something of a false impression of abundance, as many tributary streams are dry sand except immediately after heavy rain. Districts with the lowest recorded rainfall include Kyaukse and Minbu, two important irrigated rice-producing areas of the Bagan period and later (Scott 1900: 15, Vol 1, Part 1). Survival in such areas needs techniques for storing and distributing water, involving the widespread use of reservoirs (tanks) and canals. The dry eastern hinterland of Bagan has in the past relied on a system of tanks reminiscent of those attached to early urban centres of India (see Morrison 1993). In modern times pipelines from the Ayeyarwady have been supplying a series of water stations in Bagan's eastern hinterland (Aung Kywe, Khin Maung, Ngwe Thyein *et al.* 1988) and in 2001-2002 an elevated canal, designed to be fed by pumps, was under construction from the Ayeyarwady a few kilometres south of Bagan, heading eastward to the Tuyin hills. Vegetables are grown intensively on alluvial islands in the river and on its banks during the dry season. Rice is not completely unknown. In 2001 the author observed several small paddy fields built in old watercourses near the Yon Hlut Kyun archaeological site east of the city.

It was conventional wisdom until recently that rainfall during the Bagan period was no greater than today (Cooler 1997), although religious dedications have been interpreted as suggesting that there may once have been irrigated rice fields within the Bagan monument zone (Mackenzie 1913: 41). A drop in the river level over the past millennium, and a consequent increase in the difficulty of using overflow irrigation, may be one reason why the options for irrigation may be less at Bagan in modern times than in the 11th-13th century period, and also why the moat surrounding the walled centre of Bagan is no longer filled even when the river is in full flood. Part of the moat, restored over the past decade or so, contains water, but it is essentially a decorative reconstruction topped up by local runoff. However, there is now also a suggestion that rainfall in Myanmar may have increased during the Medieval Climate Anomaly of the 12th and 13th centuries (Lieberman 2003: 101-112) which would have improved the options for irrigation and agriculture locally at Bagan as well as permitting the well-documented expansion (see Chapter 6) of the outlying agricultural centres at Minbu, the Lower Chindwin, the Mu Valley, and around Mandalay and the Panlaung Valley.

Resources.

The mineral and other physical resources of Burma have been well recorded both during the colonial period and since Independence (Chhibber 1934; Bender 1983; Pow-foong Fan & Ko Ko 1994). This data suggests that prehistoric and early historic societies in Myanmar would have had access or potential access to most of the materials represented in the archaeological record (Figure 5). These include rock for toolmaking, such as quartz, jade (the term is used here generically to refer to the jadeite/nephrite group of silicates), softer stones usable for beads or decorative items (steatite, marble and talc), amber or burmite (Cruickshank & Ko Ko 2003), gemstones (rubies, sapphires, spinels), copper, tin, zinc, silver, alluvial gold (Than Tun 1995) and iron. Nearest neighbour analysis of sites in the *Myanmar Archaeological Settlement Database* (see

accompanying CD-ROM) using a formula from Johnson (1996: 269) shows, for example, that of 48 sites where prehistoric bronze materials have been found, none is more than 118 kilometres from one of 33 known sources of copper, and the mean distance between bronze sites and copper sources is 53 kilometres. Bronze Age sites in Yunnan, North Vietnam and North-east Thailand have been described as having "easy access" to copper if they were within 200 kilometres of an ore source (Glover 1999a: 115). In Myanmar, the proximity of copper resources to sites yielding bronze artifacts suggests that there was no need for copper or bronze ingots to be imported, provided the knowledge and skills required for ore extraction were present. This does not discount early participation in long-distance resource trade. Myanmar has been identified as the likeliest source of a ruby inlaid in a 3rd century BC Parthian statuette from Babylon (Calligaro, Mossmann, Poirot *et al.* 1998).

The semi-precious stones carnelian and chalcedony, used in beadmaking, have not attracted the same attention as the more economically important minerals, and are poorly represented in the geological literature, although recent research indicates that they have been available in Myanmar (Campbell-Cole 2003). These stones are from the same family (silicate group, subgroup quartz), and both can have their colour enhanced or artificially altered by heating or by the addition of mineral elements (Hankin 2002: 131-132). Beads identified with the Indian/South-east Asian trade assemblage are common in Upper Burma. While their origins in prehistoric times are generally attributed to trade from India rather than local production (Glover & Bellina 2001; Francis 2002), there is now increasing evidence of production within south-east Asia (Theunissen, Grave & Bailey 2000), a topic that will be dealt with below (page 82). An unfinished slab of chalcedony, worked laterally into the shape of an elephant and apparently set to be cut into several separate beads, was recovered by farmers digging at Maingmaw (Win Maung, personal communication, 2002). Modern craftsmen reproducing antique beads have no problem finding green chalcedony indistinguishable from that used to make elephant-shaped beads in the proto-historic period. The availability of resources in Myanmar to replicate trade beads and develop a local bead industry in ancient as well as in recent times no longer appears to be an issue.

Jade, a major resource and source of income in northern Myanmar at least since the jade trade with China boomed in the 18th century (Levy & Scott-Clark 2002) was, according to the current archaeological evidence, not used much in the prehistoric period. However a jade bracelet, or rather, considering its small size, a piece of jade carved in a characteristic bracelet shape, from Halin (Figure 25, lower left), suggests that there were at least casual finds. Khin Maung Nyunt claims that there may have been trade in jadeite from what is now Kachin state to China as early as the Shang Dynasty (Khin Maung Nyunt 1996). The main jade extraction areas today are in the north of Kachin State and the Sagaing Division, around Hpakan and Lonkin, along the Uru River, and at Khamti and Mawlu (Scott 1900: 277-289, Part 1, Vol 2; Business Information Group 2001; Nyan Thin 2002). There has been little archaeological investigation of these northern uplands, although there are reports of polished quartzite adzes and bronze axe-heads, rings and bracelets being dug up by the Kachin people and kept as protective charms (Leyden 1941).

Early research.

Archaeology as an academic pursuit can be said to have started in Myanmar in the 19th century, with a strong interest, characteristic of the times, in epigraphy. This was not exclusively a European occupation. King Bodawpaya (1781-1819), in an effort to determine which land was owned by religious foundations, and was therefore not taxed, had brought an estimated 600 inscription stones to Ava, and scholars began to study them, using the data as a basis for

investigating the chronicles. Around 1833 Burney and several officials/pilgrims from Ava visited Bodhgaya, in India, and brought back a copy of an early Burmese inscription from the holy Buddhist city (Burney 1834). After the annexation of Upper Burma by Britain textual studies had a practical and political context in determining borders.

In 1881 Forchhammer, a Pali scholar, became the first government archaeologist. He collected copies of inscriptions and published works on Arakan and Bagan, but died while on sick leave in Germany in 1890. The material he had taken with him which he hoped to deal with on recovery was not seen again. Bagan, with the greatest number of buildings surviving, was the major focus of conservation and scholarship, though also of treasure hunting. Von Noettling, a geologist working on the Yenangyaung oilfields in the 1890s, removed glazed tiles, carvings and artifacts which ended up in the Berlin Folk Museum. In 1899, Thomann, apparently working on behalf of the Hamburg Ethnological Museum, removed plaster frescos from the Kubyauk-gyi temple (298) at Wetkyi-in. The lower part of the walls of this temple are today bare, and the upper frescos still bear what appears to be a pattern of cut-marks, said to be where the plaster was sawn in preparation for removing them. Thomann was reportedly expelled from the country, and some of the artifacts were reportedly recovered. He went on the publish the results of his work (Thomann 1923). A law of 1904 prohibited digging for treasure in localities which possessed archaeological or historical interest. This legislation was not only aimed at foreigners or at local thieves intent on profit. Relic-hunting was often done from religious motives, with the aim of re-enshrining important religious items from the past, and monks (*pongyis*) often initiated searches for treasure.

By 1902, the Burma Archaeological Department was established, an Annual Report published, and efforts were underway to conserve and protect the monuments. Burma reports were also published by the Archaeological Survey of India. Excavations of Halin and Sriksetra (Old Prome) began in the early 1900s. The results at Halin were not considered encouraging because they yielded very few inscriptions or museum pieces. Investigation at Sriksetra continued with more fruitful results, which appeared in departmental reports, although this important site still awaits the publication of a comprehensive survey and critical summary of almost a century of excavations. In 1910 the Burma Research Society was founded, and its journal remained in print until the 1970s. Archaeology was poorly represented, with only seven papers published up to 1970 (Than Tun 1970: 53) although the topic was well covered in the departmental reports of the *Archaeological Survey of Burma* and the *Archaeological Survey of India*. There was a strong emphasis in the *Journal of the Burma Research Society* on epigraphy and etymology, as witness, for example, the vigorous discussions on the derivation of the name “Prome” (S.A. 1911; Duroiselle 1912; May Oung 1912; S.A. 1912).

While scholars tended to be more interested in urban sites, notably Sriksetra and Bagan, pre-urban archaeology did receive some attention. Chipped stone tools had been found since the 19th century by geologists or collected by colonial administrators, largely in the Upper Ayeyarwady Valley. Polished stone axes and bracelets, and bronze axes, bracelets and rings had also been making their way into museum collections. In 1937-38, the American South-east Asian Expedition for Early Man studied early chopper and handaxe finds in Burma (Movius 1943, 1948).

During World War II, the staff of the Archaeological Survey of Burma moved from Mandalay to Bagan, where they were able to preserve many important artifacts and documents. By the mid 1950s, an official report proposed that there should be formal research into Neolithic, megalithic, bronze and early urban cultures. Several archaeologists were sent to India for training. There were efforts to systematise the research program. From the 1960s, there were field expeditions to the early urban sites of Beikthano, Halin, Sriksetra and Maingmaw. There were excavations of a Hoabinhian site at Padah-lin, south-east of Mandalay in the Shan hills, of the Neolithic site of Letpanchibaw north of Bagan, and of what were described as “prehistoric” sites which included

finds of iron tools on the Myitnge River, east of Mandalay, and at Taungthaman, virtually in Mandalay's southern suburbs (see page 78). Early urban sites in the south, such as Winka and Wagaru, were investigated in the mid 1970s, and finds included a hoard of early coins (ASB 1938: 15-24; Taw Sein Ko 1913: 94; Luce 1948; Aung-Thwin 1983; Than Tun 1996a; Myint Aung 2002).

Myanmar government research and conservation programs.

Since 1988 the Myanmar Department of Archaeology has concentrated its efforts on restoration of historical monuments and the establishment of local museums. Academically, a Department of Archaeology has been created at Yangon University of Arts and Sciences and an undergraduate course in archaeology is taught at Mandalay. There has recently been keen interest among postgraduates and departmental employees in overseas education, notably a two year training course with the Archaeological Survey of India and a course in wood preservation in Japan. These courses have the added attraction of a stipend that exceeds departmental salaries. Archaeology is the responsibility of the Ministry of Culture. In August 2002, the Ministry's Internet site summed up the mission of the Department (their spellings and syntax are retained- the numbers AD obviously refer to centuries):

> "The Department of Archaeology looks after the restoration and preservation of ancient monuments and edifices in various archaeological sites through out the country, especially in Bagan, the rest are for instance Shwebo, Bago, Thayeykhitaya (Sriksetra), Hanlin, Pinya and Inwa. Archaeological Department is doing research works and field-studies to track down ancient culture of Myanmar. Excavation and field-studies of ancient capitals, studies of inscriptions on stones, manuscripts, on bells, are done systematically. Moreover, maintenance and renovation of ancient edifices (monuments) and palaces were also implemented.
>
> Excavations pertaining to the Stone Age are in progress at Shwezaryan, Taungthaman Inn, Let Wei Chay Pawywa. To study about Pyu culture Beikthano Myohaung (AD 1 to 4 AD), Hanlin Myohaung (AD 5 to 9 AD), Sriksetra Myohaung (AD 5 to 10 AD), Maingmaw Myohaung (AD 5 to 9 AD) are excavated. Similarly, Kyaikkatha Myohaung (circa 5 AD) is being excavated to study about Mon culture, and to know more about Rakhine culture Vesali Myohaung (AD 5 to 9 AD) are excavated respectively. Ancient pagodas and city at Thayeykhitaya (Sriksetra), 2230 city, caves, stupas, monasteries and ordination halls and mural paintings from Bagan wooden monasteries from Mandalay, Sale, Pakhangyi, Sagaing and Inwa regions are preserved" (Ministry of Culture 2002).

Under the US-trained Director-General U Nyunt Han, the department is divided into three divisions: Research and Training, Administration and Finance, and Conservation of Myanmar Cultural Heritage. In 2003 there were 112 officers and 1093 professional and administrative staff. A significant aim stated in the charter of the department is "to restore ancient monuments and create the cultural landscape which can attract the Local and Foreign tourists. It is also intended to make the Local and Foreign researchers to view and enjoy the already preserved ancient cultural monuments and antiquities of historic evidences and to raise the value of Myanmar ancient historic culture" (Ministry of Culture 2003). Substantial funding comes from entry fees charged to foreign visitors at major sites. The Shwedagon Pagoda in Yangon reportedly took $US 550,000 at US$ 5 per person and Bagan took $US 751,660, representing 75,166 visitors, in the fiscal year 2002-2003 (Myo Theingi Cho 2003).

UNESCO became involved in Bagan following the earthquake of 1975, and trained local staff in repair and restoration techniques (Pagan Newsletter 1982-1989; *Methods for Repair and Strengthening the National Monuments in Pagan* 1983). There are no UNESCO World Heritage sites in Myanmar (UNESCO 2003) although in 1999, US $30,000 was budgeted by UNESCO for the production of a heritage management plan for Bagan (UNESCO 2000). Since 1998 there has been a major restoration and rebuilding program at Bagan involving government, corporate and individual contributions (*New Light of Myanmar, March 8* 1998; Maung Kyaw Zaw 1998; *New Light of Myanmar, Nov 28* 1999; *New Light of Myanmar, Apr 15* 2000; Hudson 2000b; Htein Linn 2002; *New Light of Myanmar, Sep 3* 2003; Khin Maung Nyunt 2003). In 2003, worldwide attention was drawn to the proposed construction of a viewing tower at a hotel complex on the edge of Bagan which critics claimed was deleterious to the site (Joshi 2003). This issue was also raised in the context of broader criticism of Myanmar government heritage policy (The Economist 2004: 34).

International research.

In recent years several individual aspects of Burmese prehistory have been given the attention of international scholars. These include finds in Myanmar of stone beads (Moore & Aung Myint 1993), and studies that placed Myanmar beads in a regional context (Glover & Bellina 2001; Francis 2002; Bellina 2003; Campbell-Cole 2003; Glover & Bellina 2003). Studies of the proto-urban sites of Upper Burma have been stimulated by the excavation of the "Bronze Age" site of Taungthaman (Glover 1999b; Moore & Pauk Pauk 2001; Tayles, Domett & Pauk Pauk 2001; Nyunt Han, Win Maung & Moore 2002; Moore 2003b). A joint French/Myanmar project has excavated several pre-urban cemetery sites (Pautreau, Pauk Pauk & Domett 2001; Pautreau, Mornais, Coupey *et al.* 2003; Pautreau, Coupey, Maitay *et al.* 2004; Pautreau, Mornais, Coupey *et al.* 2004).

The major published work on the early urban system is *The Ancient Pyu of Burma* (Stargardt 1990). A substantial section of this is an analysis of an existing monograph (Aung Thaw 1968) on one specific site, Beikthano. Stargardt's book has been criticised, and the criticism vigorously rebutted by the author, for its relative scarcity of original data (Bellwood 1992; Bronson 1992; Bellwood 1993; Stargardt 1993). Moore, in association with Aung Myint, has examined finds of fingermarked bricks (Aung Myint & Moore 1991). Aung Myint, a specialist in interpretation of aerial photos, has also provided (in Burmese) a pioneering work on locating settlements from aerial survey data (Aung Myint 1999a). Ernelle Berliet in 2004 is completing a PhD with a focus on field study of some of the early enclosed settlements based on her earlier work (Berliet 1999, 2000) and Shah Alam Zaini is completing a PhD on early Sriksetra involving field survey and excavation (Zaini 2002). Moore's current research focus is the enclosed sites of the Gulf of Martaban and peninsular Burma (Moore 2003a), which, as will be discussed below (page 145), seem to differ substantially from the "Pyu" sites of Upper Burma. The early urban settlements have been examined through existing documentary sources and visits to the larger sites in terms of their irrigation systems, landscape and environment (Donovan, Fukui & Ito 1998; Ito 1999, 2000). The author has published on the mapping and characterisation of archaeological sites (Hudson 2001a, 2002, 2003c) and on some more specific proto-urban finds (Hudson 2001b, 2003a) as well as an archaeological overview (Gutman & Hudson 2004). Gutman has examined the archaeology and art of Arakan (Gutman 1976, 1998, 2001b, 2001a). The political/religious history of Bagan has been covered by two major studies involving textual and epigraphic analysis (Aung-Thwin 1985; Frasch 1996b), and there have been specialist publications on the city's architecture (Carmignari

1975; Strachan 1989; Pichard 1992-2002), historical geography (Lubeigt 1998) and wall paintings (Bautze-Picron 2003).

The archaeology of Myanmar: a brief review up to the end of the Bagan period.

The archaeological argument of this thesis will begin with the Late Prehistoric period and the appearance of sites containing a mixture of polished stone, bronze and iron artifacts. The first part of this summary, a review of approaches that have been taken to earlier archaeological phases, including palaeontology as a sub-discipline of archaeological investigations in the Myanmar context, is intended to provide background to the later work. It will outline some of the social, cultural and political conditions under which Myanmar archaeologists work, and indicate how paradigmatic and methodological decisions may be affected by factors ranging from Buddhist doctrine and folk traditions to post-colonial nationalism. One significant aspect is the direct involvement of "political officers" in archaeological research. The first expedition to Padah-lin, for example (page 50), was "launched at the instigation and support of the Central Organisation Committee headquarters of the Burma Socialist Programme Party" with an aim of finding material for "the basic political history of Burma being compiled by the Party" (Aung Thaw 1971: 123-124). It should be pointed out that in this archaeological report, once the formality of linking the project with the BSPP is done with, there is no overt ideological content or interpretation such as may be found, say, in the Chinese account of the Neolithic site of Banpo, excavated in the 1950s, whose inhabitants are portrayed as "the lineal ancestors of the Chinese nation" living in an ancient, idealised communist system where "both land and produce belonged to all members of the community" (Zhao Wenyi & Song Peng 1994: 55, 63). However, there have been instances in Myanmar when political involvement in field research has appeared to be more direct.

Palaeontology.

The study of Myanmar's palaeontological record was brought to attention worldwide in 1999 when Houtman focused on a search for fossils, including early primates, in a critique of what he called "Myanmafication", an institutionalisation of tradition for political purposes. In particular, he pointed to the substantial involvement of the military in the search in the mid-1990s for primate fossils around the Pondaung hills. This involved claims, based on limited evidence, that Myanmar was the homeland of the first primates, and therefore by extension, of the human species (Houtman 1999a, 1999b). Some academic reports credited a military intelligence officer, Colonel Than Tun, as principal investigator. He is not to be confused with the venerable scholar Professor Than Tun, who was in fact one of the earliest to call for caution in this field of study (Than Tun 1996c). An expedition in 1997 was "sponsored by the Office of Strategic Studies of the Ministry of Defence", and following two joint investigations with Japanese and French scientists, Colonel Than Tun "who from the outset had led the various expeditions" was quoted as expressing his pleasure that the finds of the first expedition "had stimulated the interest of scholars of the United States of America, France and Japan" (Hla Myo Nwe 1998; Than Tun 1998). The OSS, it must be pointed out, was a semi-academic institution, albeit largely focused on security issues (Selth 2002: 113). The effect of Houtman's criticism was to quash the overenthusiastic claims, at least as they were presented for international consumption. The continuing interest in primates in Myanmar has led to a substantial corpus of publications, which take a cautious and descriptive approach to a limited

body of evidence, and involve considerable international collaboration (Tin Thein; Hla Myo Nwe 1998; Nay Thaung Thaung, Bo San, Hla Myint (1) *et al.* 1998; Ba Maw 1999; Jaeger, Tin Thein, Benammi *et al.* 1999; Yaowalak Chaimanee, Tin Thein, Ducrocq *et al.* 2000; Ciochon, Gingerich, Gunnell *et al.* 2001; Shigehara, Takai, Kay *et al.* 2002).

Anyathian (Palaeolithic) and Hoabhinian.

It would be reasonable to take the presence of flaked stone tools in a number of sites along the Ayeyarwady basin as characteristic of the general movement of hominids into the river systems of South-east Asia and southern China in the Pleistocene period, although in the case of Myanmar, the timing of the appearance of tool-using hominids remains to be verified (Schepartz, Miller-Antonio & Bakken 2000). Hundreds of flaked or polished stone tools were recovered or described by Morris in the 1930s, including some donated to European museums (Morris 1932, 1935, 1936b, 1936a, 1937). Movius (1943; 1948) recovered hundreds more, and suggested that a Palaeolithic tool culture based on large tools made on cores was distinctive enough to be given its own name. He called the assemblage Anyathian, meaning “man of Upper Burma”. Many of the finds were made in the course of geological exploration for oil and other mineral resources in the Ayeyarwady basin, while in other cases poorly provenanced artifacts were provided by local informants. One sample was found on a golf course (Aung-Thwin 2001b). A map of the known finds between Upper Burma and the gulf of Martaban (Figure 6), based on the *Myanmar Archaeological Settlement Database* (see CD-ROM & appendices, pages 266 and 291), indicates there are sites defined as Anyathian in the major river valleys and in the Shan Hills. The available data also suggests that it is necessary to remain aware of possible sampling bias, given the circumstances of some of the finds.

In the late 1960s the government archaeological department led a multi-disciplinary team from Rangoon University on an investigation of the Padah-lin Cave complex in the Shan States, 100 kilometres south, and a little to the east, of Mandalay (Figure 6). The use of rock shelters and caves, beyond the obvious fact that artifacts are often better preserved in such environments as compared to open sites, may also reflect a regionally characteristic adaptation to upland forested environments (Schepartz, Miller-Antonio & Bakken 2000). The caves at Padah-lin contain undated paintings, presumed to be prehistoric, including human hand-stencils and animals drawn with red ochre (Hla Thein 1996). The archaeologists found pebble tools, which included hammerstones, anvils, unifacial choppers, bifacial choppers, hand adzes and scrapers. The tools were described at the time in the terminology of the European Palaeolithic, such as a scraper “flaked in the Levalloisian technique” (Aung Thaw 1971: 128). The soil contained hundreds of bone fragments and teeth of mammals, charcoal pieces, shells of land-snails, tortoise shell fragments and a few cord-impressed potsherds. There were perforated stones described as ringstones (see also page 60). These were interpreted as possibly being weights for digging sticks, and therefore an indicator of agricultural practices, although Aung Thaw also allowed that they may have been mace-heads (Aung Thaw 1969, 1971).

Table 1 Radiocarbon dates at Padah-lin.

Sample number	Material	Layer	Position	Radiocarbon age (years BP).	Current calibrated date range (95.4% probability).
R2547/1	Charcoal	1	Cave 1A, trench 1	1750±81	AD 70-440
R2547/2	Charcoal	2	Cave 1B, trench 1	6570±125	5,720-5,300 BC
R2547/3	Charcoal	3	Cave 1A, trench 2	7740±125	7,050-6,350 BC
R2547/4(A)	Bone carbonate	3	Cave 1A, trench 1	6570±125	5,720-5,300 BC
R2547/4(A)	Bone collagen	3	Cave 1A, trench 1	11250±200	11,900-10,900 BC

Sample number	Material	Layer	Position	Radiocarbon age (years BP).	Current calibrated date range (95.4% probability).
R2547/5(B)	Bone carbonate	4	Cave 1A, trench 2	6230±90	5,500-4,850 BC
R2547/5(B)	Bone collagen	4	Cave 1A, trench 2	13400±200	14,900-13,100 BC

The Padah-lin excavations produced radiocarbon dates (Table 1) from charcoal in the range 7050-6350 BC, from bone carbonate in the range 5720-4850 BC and from bone collagen in the range 14,900-13,100 BC (Aung Thaw 1971: 133). Stargardt (1990: 9-11) has pointed out the disparity between the dating of carbonate and collagen from the same bone samples. The dates suggest use of the caves over quite a few thousand years, but overall, the evidence for the contexts and associations of the material is considered poor (Moore & Pauk Pauk 2001: 43). The samples were processed by the Institute of Nuclear Sciences, New Zealand (Aung Thaw 1971). In 2004 a re-survey of Padah-lin with a focus on its rock art was under way (Tacon, Yee Yee Aung & Thorne 2004).

Despite the description in some published reports of Padah-lin as "Neolithic", it appears more likely that the early assemblage, at least, relates to the Hoabinhian (Myint Aung 2000). Since the Padah-lin excavations, several more caves with similar cultural materials have been discovered and partially excavated, mainly in the Shan, Kayah, Kayin and Mon states (Aung-Thwin 2001b). One published site, Waiponla Cave (Figure 6), contained chipped stone tools and remains of deer and other mammalian prey (Tin Thein, Aung Naing Soe, Soe Thura Tun *et al.* 2001).

Caves and rock shelters have been more intensively researched east of the Shan plateau, in Thailand, at sites broadly characterised as Hoabhinian, such as Spirit Cave (Gorman 1970) and Obluang (Santoni, Pautreau & Sayan Prishanchit 1990). Researchers in western Thailand have located over 100 open air lithic sites, with participants in one survey noting that "virtually every well drained flat area, with minimal or no undergrowth, that is on a ridge and near to a water source, has chipped and flaked stone tools on the surface" (Spies 2001). Around 50 caves, some containing log coffins, have been surveyed by the Highland Archaeology Project of Silapakorn University. One site when excavated demonstrated two distinct cultural horizons, Hoabinhian and Neolithic, the latter featuring the wooden coffin burials (Cherdsak Treerayapiwat 2002). The wooden coffin culture site of Pang Ma Pha cave in North-west Thailand has been dated to between 2080±60 and 1240 ±90 BP (Supaporn Nakbunlung & Sukhontha Wathanawareekool 2002: 173) which calibrates to an outer range of 240 BC-AD 900. The gap between the cultural horizons emphasises the need to view cave occupation, as both ethnographic (O'Connor & Pannell 2002) and archaeological studies (O'Connor, Spriggs & Veth 2002) suggest, as a transient rather than permanent phenomenon, with assemblages that are not necessarily representative of general settlement or subsistence patterns, let alone temporally contiguous.

While the relationship between the Anyathian sites of Myanmar's river valleys and the Hoabinhian sites of the uplands is worthy of a full study, the focus of this thesis, as mentioned earlier, is on the appearance of lowland settlements, increasing cultural complexity, the development of agriculture and the growth of polities. This is not to assume that there has not been a continuing relationship between upland and lowland. Today, trade and communications make this relationship a normal fact of life. Ethnographic studies describe a fluctuating social, political and economic relationship between upland and lowland (Leach 1954).

Proto-historical and early urban.

The methodology of the present study rejects the conventional notion (see, for example, Aung Thaw 1972; Than Shwe, Sein Maung Oo, Aung Thaw *et al.* 1993) that the major walled centres of Beikthano, Maingmaw, Halin and Sriksetra (the largest, enclosing over 1400 hectares) represent a sequence of capitals of a proto-Buddhist nation. It instead treats them as central places in a system of socially, culturally and geographically related settlements which developed amid increasing agricultural production, expanding trade, and social differentiation. It examines their relationship in terms of a spatial model of settlement behaviour. The origin of the early urban system will be explained by population drift and/or settlement fission, from small, rice-growing villages in the Samon Valley to new areas of settlement that eventually focused on large brick-walled cities whose leaders adopted Indic modes of kingship. A key problem is stratigraphic analysis. Virtually all informal finds, and most formal finds, suffer from a problem endemic to Burmese archaeology, inattention to stratigraphy (Bronson 1969; Higham 1999: 92-93). The focus will therefore often be on macro-scale analysis of centres of occupation and their spatial relationships, and on the relationships of artifact types to regions as much as to individual sites.

A key issue for this study has been how to fruitfully periodise finds that in Myanmar archaeology have in the past been categorised under the oversimplified European terminology of "Neolithic", "Bronze Age" and "Iron Age". The development of metals technology in Myanmar, as will be demonstrated in this thesis by archaeological examples, has involved increasing technological complexity and an increasing diversity in the materials used rather than the replacement of one material by another as implied in the notion of a sequence of "ages". However the addition of copper/bronze and iron to the technological repertoire can at least be put into a broad timescale based on sparse Burmese, and more readily available regional, data, particularly from western Thailand.

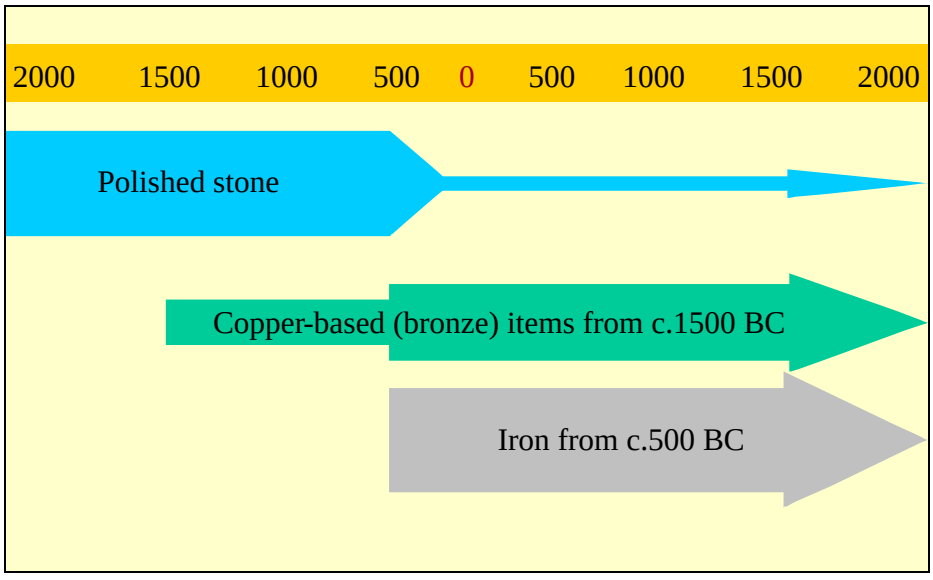

Figure 3 Timeline: adoption of metals technology in Myanmar, 2000 BC-AD 2000.

A timeline (Figure 3) shows copper/bronze appearing in the second millennium BC (Glover 1999a: 103; 1999b: 87; Higham 1999: 90) and iron in the middle of the first millennium BC (Bronson 1985; Stargardt 1990: 16; Higham & Thosarat 1998: 135-137; Higham 2004). Iron is linked with agricultural expansion, as iron tools are more efficient than polished stone or bronze. Iron weapons

and tools give an advantage not just because of their strength, but because they can be produced in much greater numbers than bronze, once the extractive and blacksmithing technology has reached the appropriate level. Iron tools can chop through roots and hard soil perhaps ten times more efficiently than polished stone or bronze, aiding in the creation of canals for irrigation areas. Iron also makes sturdy fasteners for building construction (Elvin 1973; Bellwood 1999: 116). The appearance in the archaeological record of new technologies should be seen as cumulative, rather than a replacement. There is the prospect of a change in emphasis on particular resources and skills. For example, stone polishing, a skill that was applied to "Neolithic" axes and rings, could be adapted to producing smaller and finer objects such as gemstones and more complex beads once stone axes are replaced by iron, and stone rings are replaced by bronze.

Bagan.

The replacement of the Pyu cities as power centres by Bagan is often portrayed as resulting from a specific event in the mid 9th century, an invasion by Nan-chao (for a characteristic summary, see Woodman 1952: 13-15) followed by the appearance of a new ethnic group, the Burmans, migrating from Yunnan via Kyaukse (see Luce's outline, page 36). The "sudden crash" explanation is considered in this thesis to be an overdramatic oversimplification. It will be demonstrated that the nascent Bagan was contemporaneous with the major Pyu settlements. While there is no direct evidence for the construction of fortifications or ritual buildings at Bagan in the traditional founding period of the mid 9th century (see Chapters 6 & 7) there is increasing evidence of monument construction and other activities, notably earthenware production, well before attested historical dates begin to appear in the early 12th century.

A reappraisal of the dates for Bagan in the light of Aung-Thwin's critique of the Mon paradigm (page 39) gives more credence to traditional Burmese dates for temples. One instance is the Patho-hta-mya (1605),which was proposed by Luce as the archetypal Mon temple because it was full of Old Mon writings. He dated it to c. AD 1080 (Luce 1969: 302-309, Vol 1). This is accepted by the *Inventory of Monuments at Pagan*, which attributes the Patho-hta-mya (1605) to the late 11th century and refers to Luce as its source (Pichard 1992-2002: 248, Vol 6). According to the Aung-Thwin model "there is no longer any need to force the chronology of the Patho-hta-mya temple into a predetermined period of time in order to accommodate Anawratha's alleged conquest of Thaton and his bringing back certain texts in order to explain the presence of those textual themes in that temple. It means we can once again reconsider the viability of Burmese tradition regarding that temple, namely that Saw Rahan, Anawratha's grandfather, was the one who built it in the mid tenth-century" (Aung-Thwin 2004, Chapter 9). Since this is by no means the only example of the *Inventory of Monuments* periodising on the basis of Luce and the Mon paradigm, the data in the *Inventory*, particularly for the earlier period, will be reviewed critically in the section on the monuments of Bagan (page 237).

The Mon paradigm as outlined by Luce provided a model for interpretation of the art history at Bagan that also requires revision. Beyond the assumption that the presence of written Mon made a temple "early", there was an assumption that wall paintings containing iconographic representations of certain Buddhist stories had to postdate the arrival of Mon culture and education. This all contributed to the notion that the earliest temple art, in both architecture and internal decoration, two areas which have tended to be studied in isolation from each other (Bautze-Picron 2003: 2-3), arrived in the latter part of the 11th century. It will be suggested (Chapters 6 & 7) that factors ranging from radiocarbon dates for pottery production to epigraphy and chronicle stories show that the chronological model for construction at Bagan should be put

considerably further back. It is time to take a completely new look at the textual and epigraphic evidence, the art history and architecture, and the archaeology of the origins of Bagan.

Summary.

The archaeology of proto-urban and early urban Myanmar has reached a stage at which it can be considered in terms of variations on a regional theme rather than as a limited number of exotic, disconnected finds. Evidence continues to appear of expanding material technologies, from the use of polished stone tools and ornaments, through the introduction of bronze, to the arrival of iron (Win Maung 1997, 2000a; Moore & Pauk Pauk 2001; Nyunt Han, Win Maung & Moore 2002). In the broader cultural environment there are indications in burials of increasing wealth such as beads, tools, pottery and weapons (Pautreau, Pauk Pauk & Domett 2001; Pautreau, Mornais, Coupey *et al.* 2003; Win Maung 2003b; Pautreau, Coupey, Maitay *et al.* 2004), the latter suggesting that the subsequent appearance of extensive walled settlements may have been related to competition for territory and resources. Surveys of sites in the field and of artifacts held in museums and private collections indicate that many places which yield polished stone or bronze materials form a continuum of location with more complex metal age and enclosed sites (Hudson 2001b, 2002, 2003a). This suggests that renewed attention should be paid to the notion of local development and local population movement, rather than assuming as the early historians did (page 36) that large-scale migration was the key factor involved in intra-regional change. Radiocarbon evidence of settlement activity at Bagan well before the 11th century (Chapter 6) and new indications of a long-term presence there of the Pyu (Hudson, Nyein Lwin & Win Maung 2001) prompt a re-examination of the notion of a rapid Burman migration to establish a settlement at the strategically valuable site. Glover (2001) and Higham (2001) have pointed out that Myanmar's archaeology is set for a broad reassessment and is in need of expanded programs of research. A key area in need of attention is the relationships between "Neolithic", "Bronze Age" and "Iron Age" sites. This should involve the replacement of an outdated mode of periodisation with terminology and concepts of cultural variation and expanding technologies more appropriate to the Burmese context. Another important question concerns the process of transition from "Iron Age" chiefdoms to Indianised cities such as Beikthano. Cultural elements hitherto identified as Pyu, but also found in Arakan and the Gulf of Martaban, need to be reassessed. Archaeologists and historians need to pay renewed attention to the possibility of relations with southern China, increasingly apparent from Neolithic times through to the Bagan period, as examples in this thesis will show.

In short, there are two pivotal phases to be considered in the case of the emergence of complex polities in Myanmar. These are:

1. increasing complexity indicated by the elaboration and regional clustering of burial sites with increasing quantities and types of grave goods, and what will be suggested was the consequent appearance of a complex of walled settlements: a process of transition from Iron Age chiefdoms to what are generally known as the "Pyu" centres of Sriksetra, Beikthano, Halin and Maingmaw, and their satellites, and
2. the emergence from this system of, or the subsuming of this system by, Bagan as a supra-regional administrative centre and Buddhist ritual focus.

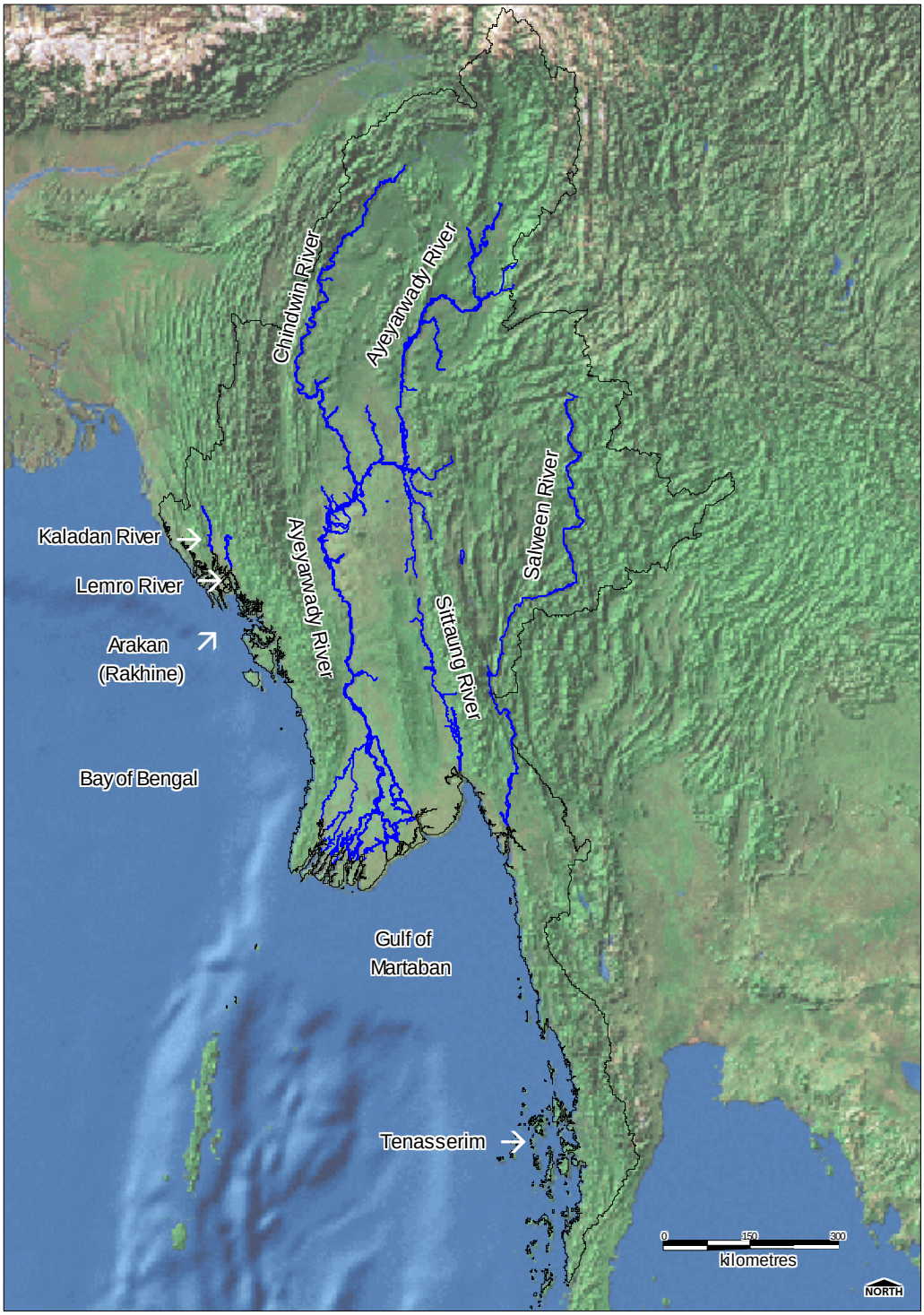

Figure 4 Myanmar: regional landform.

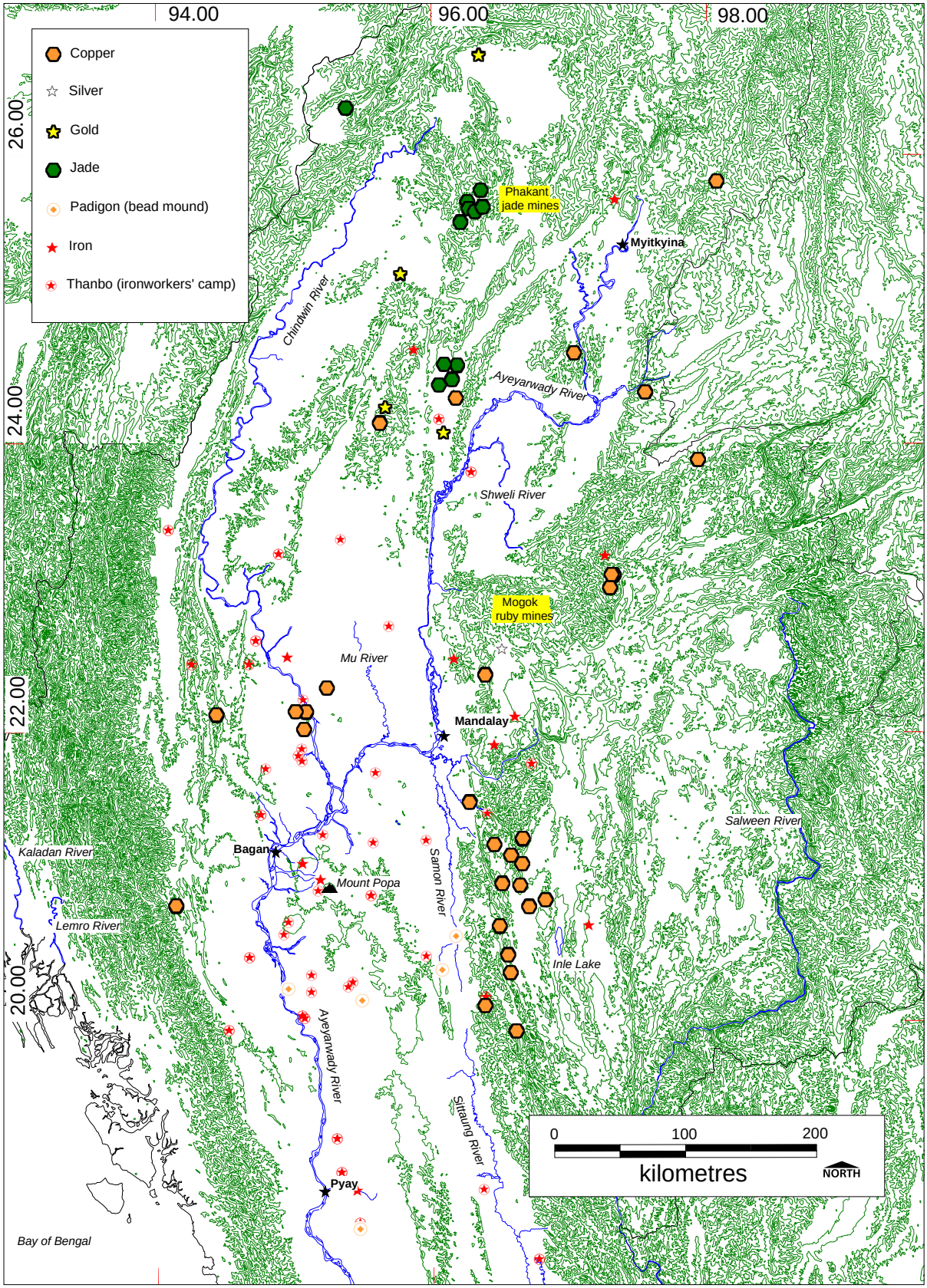

Figure 5 Resources, distribution.

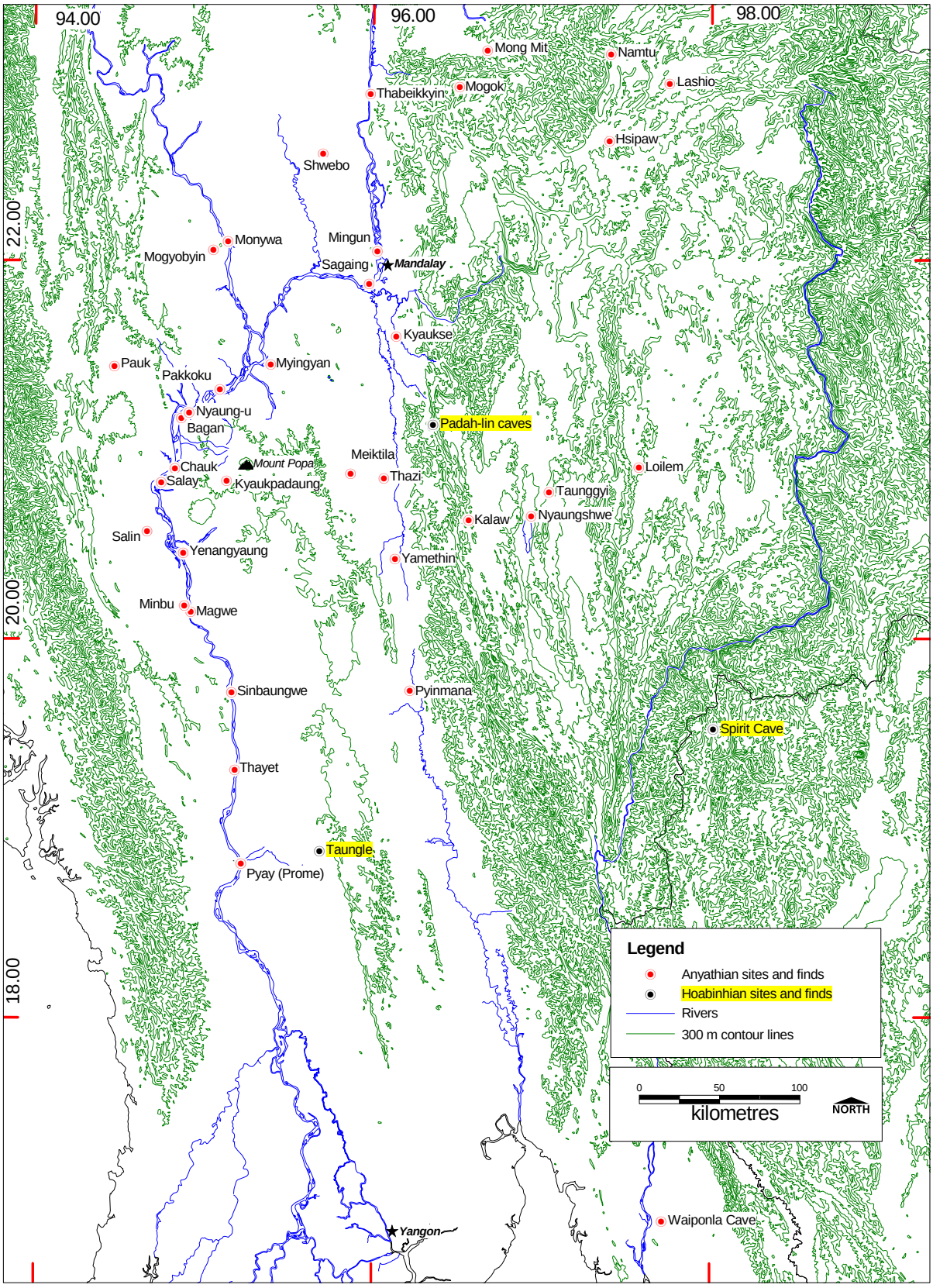

Figure 6 Anyathian and Hoabinhian sites, distribution.

PART 2.
CHAPTER 3. POLISHED STONE TECHNOLOGIES AND THE APPEARANCE OF BRONZE.

A key archaeological problem in studying Upper Burma during the period in which metals were introduced to the technological repertoire is the difficulty of differentiating sites whose assemblages consist purely of purely polished stone from sites that also include bronze materials. On the available evidence, it is not easy to distinguish specific pre-metal sites in Upper Burma. Many of the known sites yield a mix of polished stone and metal artifacts, though with poor stratigraphic context. A distribution map of currently known finds of polished stone tools, mainly axes/adzes and chisels, and polished stone rings, which includes sites that have been defined in the literature as "Neolithic" (Figure 13), indicates a spread of these materials from Nyaunggan and the lower Chindwin east to Halin, south through the Mandalay area to the upper Samon Valley near Pyinmana, and across to Khahlaing on the west side of the Ayeyarwady, and down to Pyay. There have also been finds along the upper Ayeyarwady, as far north as Putao, and at Winka, on the gulf of Martaban. This data comes with the caution that it represents the evidence available so far. There may be a sampling bias because the main bases for site exploration have been Bagan and Mandalay, and because the area to the northwest has been difficult to access, even for local researchers, due to security restrictions. The lack of reports of finds of stone tools, whether chipped Anyathian or polished "Neolithic", in the delta area south of Pyay may be due to siltation from upstream agriculture rather than to a relatively later occupation of that region. On the basis of reported finds, the map (Figure 31) does suggest that there may be some purely "Neolithic", non-metal sites west of the Chindwin and Ayeyarwady rivers from Monywa south to Minbu, and perhaps a cluster south of Mandalay. One formally excavated site that may provide a picture of a pre-metal polished-stone assemblage, Letpanchibaw, on the east bank of the Ayeyarwady opposite Pakkoku, will be reviewed in this chapter. Bronze axes are introduced in this section along with stone implements because they make a unique early appearance at the key site of Nyaunggan. The excavations at Nyaunggan are reviewed at the end of the chapter.

Stone assemblages.

Stone axes and adzes.

Polished stone axes, chisels and adzes have been found across lowland Burma, and also in the hills to the north and east. Beyond published examples, stone axes on sale at antique shops, in the National Museum in Yangon and the Bagan Museum, and in the Win Maung collection (Figure 11) most commonly seem to be ground unifacially, something also noted by past scholars (Coggin Brown 1931: 38). Stone (and bronze) tools have been considered by villagers to be thunderbolts thrown by the Indian gods (ASB 1911: 26). A polished stone axe found in a mound north-east of the Gubyaukgale temple at Bagan was thought to have been a religious offering (ASB 1937-1938: 6). The range of polished stone tools in Myanmar includes shouldered adzes (Figure 17) and flat-sided chisels. One interesting find near the Padah-lin caves in Shan State was a stone spear head

that appears to imitate the form of a ribbed bronze spear (Figure 15), thus further blurring the distinction between sites that may have been occupied by purely stone-using people and sites involving the concurrent use of polished stone and bronze materials. The Win Maung collection contains several more of these stone spear and arrow heads carved with midribs, plus a heavy pointed stone object that has been interpreted as a plough, although this tentative identification might benefit from microwear analysis to determine its actual function (Figure 16).

Stone rings and bracelets.

Polished stone rings, which were worn as bracelets according to burial contexts at Nyaunggan and Halin (see Figure 20, upper left, for an example from Nyaunggan with wrist bones in situ), but are also associated with other parts of skeletons including the waist and ankle (Moore 2003b: 28; Win Maung 2003b: 5), have been found at many sites in upper Burma. Shapes are circular, triangular, ovoid, rectangular (Figure 20) or round with multiple points. The latter are sometimes described as star shaped, as in an example (Figure 21) from Khabo, southwest of Mandalay (Win Maung 2000a). Broken examples have often been drilled and repaired with bronze wire (Figure 25). The outer edge of the rings are generally ground sharp. The spiral marks of drilling visible in the central hole have at times led to the erroneous assumption, presented as recently as 2001 in a display at the Bagan Museum, that the rings had been deliberately cut this way in order to grip a stick and be used as a kind of lathe wheel. The existence of eccentrically shaped rings, notably star shaped, renders this interpretation defunct. Circular discs with similar cutmarks on their outer edge, cores removed during the ring making process, are widely found. The presence of this kind of debris suggests local manufacture. There are also narrow rings with drill marks on their inner and outer edges, suggesting the re-drilling of some of the cores to create a second ring from the same piece of stone (Figure 22). Bronze tubular drills for stone working have been known in China since the Shang period (Beijing Jade Factory Team for Technical Research 1995) but there are no known finds that indicate what materials were used as cutting tools in Myanmar. A method of manufacture that did not require the use of any metals has been tested experimentally in Vietnam on a horizontal wheel. At Trang Kenh, a site dated to c. 1400-1000 BC, the production of nephrite rings was successfully duplicated using a flat pre-shaped stone disc fastened to a wooden wheel, which rotated like a potter's wheel.

> “An arm over the wheel held a jasper drill bit and when the wheel was spun and pressure put on the arm, a circular groove was cut into the jade disc. After cutting halfway through, the disc was turned over and cut on the other side, until the outer ring was free. This was then polished into an arm ring. But the work did not stop there. The drill bit was adjusted so that it would cut a smaller ring out of the remaining disc. Smaller and smaller rings were cut to be used for smaller hands and perhaps fingers. At the end, a very small plug was left, and this was made into a bead, being perforated with another jasper drill bit using a bow drill” (Francis 1997).

Some of the Myanmar rings have a raised edge around the central hole, a feature called “t-section”, in Chinese examples (Masato 1994). These have also been described as “flanged” (Nyunt Han, Win Maung & Moore 2002: 4). The known examples of t-section rings in Myanmar do not display the complex or multiple flanges of some of the Chinese and Vietnamese examples recorded by Masato. T-section rings have been found in north-east Thailand at Ban Na Di at a cemetery dated approximately to 900-400 BC, at Ban Lum Khao, dated to 1400-500 BC and at Nong Nor. As in Myanmar, some of the Thai rings had been drilled with small holes and repaired with bronze wire (Higham 2002: 138-151).

The distribution map of known examples of these two general groups, stone axes/adzes/chisels and polished stone rings, places rings in a more restricted area of Upper Burma, from Nyaunggan across to Halin, south to the Samon Valley, and west as far as Letpanchibaw and Mount Popa (Figure 29). In contrast, stone axes are reported from Sinbo in the far north to Winka in the Gulf of Martaban. The clustering of ring finds around Nyaunggan and Pyawbwe (Figure 19) may be the result of exploration by the Mandalay Archaeology Department around Nyaunggan, as part of the excavations there (Sein Myint 1999b), and to the extensive activities of treasure hunters around Pyawbwe, in the Samon Valley, so no strict conclusion should be drawn about the density of these finds compared to other areas in which rings have been reported. Finds of star and t-section rings have not so far been reported from around Pyawbwe, despite the extensive, though informal, digging there.

Perforated stones: a problematic dataset.

The excavation at Padah-lin (page 50) was an instance in which Burmese archaeology may have been precipitous in labelling artifacts with an ascribed function. The case in point is the objects generally described as ringstones. These centrally perforated oval stones were interpreted at Padah-lin as possibly being weights for digging sticks, and by inference, as evidence of agriculture (Aung Thaw 1971). The ringstones known in Myanmar generally have a ground biconical hole in the centre (Figure 8) with no apparent effort made to ream out the hole to provide better purchase for a stick. The shape would appear to have been an inefficient way of holding a handle, although this cannot be discounted. They may have been weapons, either hafted or suspended from a cord. Another possible use may have been in warp-weighted looms. Loom weights have been found in Catal Huyuk, an ancient city in Anatolia that dates to 7000 BC, and were widely known in the ancient world (Barber 1991; Beauchesne, Sun Eoh & McClosky 1997). Externally grooved ovoid stones at Hoabinhian Da But sites in Vietnam have been interpreted as net-sinkers, while perforated ovoid stones are more neutrally described as “ringstones” (Nguyen Khac Su 2004: 181). In Myanmar, an ascribed function awaits better context for the finds, and the descriptive term “ringstone” is for now more suitable. A sub-class of these perforated stones features small non-central holes (Figure 9). The samples of these seen during the database survey most often appear to be natural stream-worn stones, with small biconical holes in some part of them. The prospect of these being loom weights should not be discounted, although like the ringstones, archaeological context is poor. Most examples seen so far have come from private collections or from antique shops.

Survey evidence from the *Myanmar Archaeological Settlement Database* links the known finds of perforated stones (Figure 12) almost exclusively with sites later than Anyathian or Hoabinhian. Of 21 sites with recorded finds, twelve yielded rounded, centrally perforated stones, nine had generally smaller and flatter stones with off-centre perforations, and three were reported simply as ring-stones. The known samples are from Halin, Taungthaman, the Samon Valley and western Shan state. The samples at Pindaya were seen at antique shops, where they were described as locally collected, and at the home of an antiquarian who also possessed a polished stone spearhead (Figure 15) that had been collected near, but not inside, the Padah-lin caves among other polished stone tools. Apart from Padah-lin, none of these sites has been considered Hoabinhian, and Padah-lin itself seems to have had continuing use, according to the radiocarbon dates (page 50). The available evidence suggests that ringstones tend to belong to assemblages that include ground stone tools such as shouldered adzes. Eleven of the sites also yielded bronze materials such as socketed adzes or packets of bronze wire. More positive interpretations of these so-called ringstones might be possible following use-wear analysis. On the current evidence, the Myanmar

examples seem to belong to an assemblage later than the Hoabinhian. This casts doubt on their value as evidence of Hoabinhian agriculture.

Bronze assemblages.

Bronze axes.

In 1938, Morris published 14 copper or bronze implements, mostly socketed celts, but also spear heads and a flat, solid blade, which he said were the only ones known in Burma at that time. The majority of them went to British museums (Morris 1938). The bulk of finds of socketed bronze axes recorded since then has been in the Samon Valley, but there have also been occasional finds in Shan State, upstream and downstream on the Ayeyarwady, and in the Mu and Chindwin valleys (Figure 30). Sandstone moulds for axes have been found at Kokkokhala (Figure 27) and Myin-oo-hle (Win Maung 2003b: 5), which suggests local manufacture. Morphologically, bronze axes found in Upper Burma range from small, solid chisels to a socketed "halberd" (Figure 18). The variety of axes found at one site, Ywahtinkon, suggests that if they were locally produced, multiple moulds would have been needed to produce them (Figure 26). Axes whose provenance is known come largely from graves. There has so far been no use-wear analysis that might indicate whether the bronze axes were working tools or status items or both. It has already been demonstrated that copper resources for the manufacture of bronze axes were readily available (see page 44).

On the broad scale, a map of the known finds of polished stone and bronze artifacts (Figure 31) indicates clustering in several discrete areas. For illustrative purposes, the sites with finds of polished stone *or* bronze artifacts are shown as circles of 5 kms radius, and the sites that contain both artifact types are shown as red circles of 10 kms radius. In terms of the volume of known sites, the southern Samon Valley and the area west of the central Samon Valley predominate. There are smaller clusters of sites on the Chindwin and directly to the south of Mandalay.

Bronze artifacts other than axes appear mainly, though not exclusively, to be associated with sites that also contain iron materials, and will be dealt with in the next chapter.

Letpanchibaw.

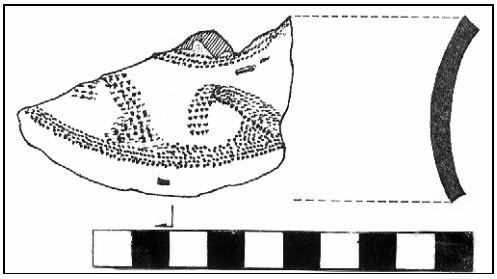

Figure 7 Incised earthenware at Letpanchibaw (Win Maung).

It was mentioned earlier (page 58) that while Myanmar has had considerable finds of polished stone materials, excavated sites at which polished stone exists as the sole artifact type are rare. A site that has been considered for some time to have potential for an investigation of a "Neolithic"

phase is Letpanchibaw. Known for more than half a century for stone artifacts (Movius 1948), Letpanchibaw was first excavated in the early 1970s. The archaeological site, known locally as Shwedaung, is just north of the village of Letpanchibaw (Figure 13) on the east bank of the Ayeyarwady opposite Pakkoku. Much of the area where stone tools are found is surrounded by the vestiges of an undated brick wall, and contains several small pagodas whose decoration and architecture places them in the post-Bagan Pinya or Ava (Inwa) periods. Flaked, edge-ground and polished stone tools were found, made from a range of igneous and metamorphic materials, and from petrified wood. The tools were classified as adze, shouldered adze, faceted adze, axe, chisel, ringstone, hammerstone and grinding quern, the latter made of sandstone. The tentative conclusion was that the post-Holocene inhabitants of the site had imported stone for their tools from other areas, and that the assemblage, notably the quern, suggested that they may have engaged in "incipient agriculture" (Myint Aung 1974; Myint Aung 2002). The presence of the wall and the post-Bagan buildings indicates that this site has been occupied, either intermittently or continuously, since the pre-metal period.

In 2001, a re-excavation by the Bagan Archaeology Department distinguished four distinct levels of materials to a depth of 3.6 metres. Finds included grooved pieces of sandstone that may have been used for polishing stone tools. The excavated material, which includes potsherds, is yet to be analysed, and work on this site was halted after one season in favour of other projects. The archaeologist in charge believes that the bottom level of the area so far excavated may be pre-metal (Nyein Lwin 2001). Potsherds recovered from surface collection (Figure 7) include some with designs similar to the characteristic incised Neolithic pottery of Vietnam, Cambodia and Thailand (Warren 1990: 36-43; Higham & Thosarat 1998: 67, 80, 83; Higham 2002: 83-105; Labbé 2002). On a visit to the site in 2001 the author examined several ash lenses containing animal bones, which sit at the lowest level excavated so far, and would potentially provide material for radiocarbon dating. The field is in use for agriculture and there is considerable movement of artifacts to the surface. Archaeology students from Mandalay who were asked to do surface observation as part of a field trip in 2001 found two intact polished stone adzes lying in the ploughed field. Letpanchibaw remains a site of considerable potential for the investigation of Myanmar's pre-metal phase.

Nyaunggan.

The excavation in 1998 of a burial site at Nyaunggan, east of the Chindwin River in upper Burma's Monywa district (Kyaw Han 1999: 67; Pe Maung Than & Win Naing 1999), spurred new interest in the pre-urban human occupation of Myanmar. Foreign experts were invited to Yangon to contribute their expertise and a collection of reports and commentaries was published (*Proceedings of the Workshop on Bronze Age Culture in Myanmar* 1999). The Bagan museum opened an exhibition on the "Pre-Bagan Period" in December 2000, displaying a mixture of "stone, bronze and iron age" materials from the museum's collections and some recent finds from field surveys, including Nyaunggan. The cemetery at Nyaunggan, which is actually the name of the nearest large village to the site, is significant for its assemblage, for the fact that it is one of the few "bronze age" sites in Myanmar to be the subject of professional archaeological excavation, and because it appears to be the earliest site of its kind to be excavated. The main classes of artifact excavated were bronze implements, polished stone bracelets (some repaired with bronze wire) and earthenware pottery. The consensus of the workshop participants was that the site tentatively dated to 900-600 BC, largely estimated from the chronology of similar sites and assemblages in Thailand (Glover 1999b: 87), although Moore has suggested that the date range could extend earlier to

1500-1000 BC based on the timescale for the appearance of bronze in the region (Moore 2003b: 26). No viable carbon was sampled that could provide an absolute date (Higham 1999: 93).

The bronze spearheads and arrowheads were strengthened with midribs. The spearheads, arrowheads and axes were socketed. An object described as a "socketed flared axe" was among the grave goods (Figure 28, bottom left, is an example from Halin, east of Nyaunggan). An implement of this general shape in the Chinese context might be called a halberd (see, for example, Lu Zhan Guang 2000: 33-35) though it would not be socketed. San Nyein has suggested that the morphological similarity with Chinese halberds is no indicator of a direct relationship with the implements found in Upper Burma (San Nyein 2000). Similar socketed "pediform" axes have also been found at Dong Son sites in Vietnam (Nguyen Van Huyen, Hoang Vinh, Pham Minh Huyen *et al.* 1989: 10, 13; Pham Minh Huyen 2004: 199). Some of the bronze implements at Nyaunggan appeared to have been placed in the hands of the deceased (Kyaw Han 1999: 55). Joyce White, whose own paper was apparently accidentally omitted from the workshop publication, has been quoted as suggesting that the bronze implements may have been the result of trade from Thailand rather than local products (Nyunt Htay & Khin Maung Win 1999: 72). This would presumably include the bronze wire used for repairing rings. Apart from the wire, the bronze items found were essentially weapons or tools. No bronze ornaments such as bracelets or rings were found. Glover (1999b) pointed out that there were no polished stone adzes or iron tools or weapons, but neither were the bronze implements accompanied by the kind of crucibles or mounds found in Bronze Age burials in Vietnam and Thailand. Evidence for local bronze production was inconclusive, although farmers from several local villages presented bronze finds to the study team (Sein Myint 1999a), and there is evidence of bronze casting spillage at undated sites around Nyaunggan (Moore & Pauk Pauk 2001: 42).

Polished stone rings were between 6 and 15 mm thick in the centre, usually tapering to a sharp edge. These were found around the wrists of some of the 37 skeletons in the cemetery (Figure 20, top left), but also on other parts of the body, suggesting ceremonial dispersal (Moore 2003b: 28). The fact that some of the rings had been broken and then repaired with bronze wire threaded through specially drilled holes suggests that they were objects of considerable significance to their owners. This repair technique is found as far back as the 2600-1900 BC Longshan sites in China (Underhill 2002: 187). Similar stone bracelets have been found in China, Malaysia, Laos, Vietnam (Le Xuan Diem 1994; Masato 1994) and Thailand (Rawson 1996: 84; Higham & Thosarat 1998: 117, 121-123; Higham 2002: 139, 142,149).

Pottery vessels buried with the skeletons were thought to have contained food offerings. The earthenware assemblage included small pots with perforated lugs, which could have been used to suspend the pots on string. The most complex of the pieces was a bowl (Figure 10) containing internal hollow pillars, which were perforated at the top (Sein Myint 2003: 64-65). There is a case for these being part of distillation apparatus, an issue that will be dealt with below (page 85). Most of the skeletons were orientated with the head to the north. The approximate quantities of grave goods, with a little variation between some of the published papers, were 2,800 pots, around 10 stone rings, around 18 bronze implements, several "terracotta beads" (something of a code-word in Burmese archaeology for spindle whorls- see page 84), two dozen or more cylindrical stone beads (Win Maung, who originally initiated the excavations at Nyaunggan, collected several other samples of these beads in soft grey talc) and about 90 gastropod shell beads. Some of this material was found within pots which also included animal bones and teeth (Kyaw Han 1999; Nyunt Han 1999; Pauk Pauk 1999a; Sein Myint 1999a: 27; Pauk Pauk 2001a).

One important dataset that has *not* been provided in the material published so far on Nyaunggan is a comprehensive catalogue and site plan of the grave goods. Glover, in defining the period 500 BC- AD 500 as "Late Prehistoric", suggests that the increasing amount of prestige goods in the

period *after* Nyaunggan is a means to measure "the emergence of visible social ranking within communities which had previously been relatively egalitarian" (Glover 1999a: 107). This aspect of Glover's model for periodisation might tempt the unwary into taking a romanticised view of "earlier" periods. It is difficult to see how the archaeological evidence at Nyaunggan would support the notion of a distinctively "egalitarian" society that could be contrasted with its more "hierarchical" successors. The fact that there are 37 or more skeletons at Nyaunggan, and fewer stone rings and bronze artifacts than that, suggests that not all members of the community had warranted the inclusion of these goods in their burials.

It is not easy to determine from the published drawings and photographs of the skeletons (Ni Ni Myint 1998; Khin Lay Yi 1999: 66-68; Kyaw Han 1999: 59-62; Nyunt Han 1999: 39-42) what relationship exists between the clusters of pottery containers, some at the heads or feet of skeletons, and some apparently not directly associated with skeletons, and the individuals in the graves, although on face value, some of the burials do appear to be more elaborate than others. It could be suggested, *pace* Glover, that while the Nyaunggan assemblage contains nothing to indicate an egalitarian society, it does have evidence of social practices that appear to have been replaced by quite different practices in the "Late Prehistoric" phase. This is demonstrated quantitatively by the presence of grave offerings largely consisting of food, although it must again be stressed that support for this position comes from descriptions, photos, drawings and the sheer volume of pottery at Nyaunggan rather than quantitative and contextual measurement of the pots and their contents. Nyaunggan, with a recorded average of around 70 pots per burial, may be compared with the early phases of Noen U-Loke in Thailand, where relatively large quantities of grave goods suggest the "achievement and expression of status through communal feasting on domestic animals" (Theunissen 2002: 271-272). At Noen U-Loke, later phases feature an increase in agate and carnelian beads, where "status is more dependant on visual display of storable wealth in the form of new high value personal ornaments" (Theunissen 2002: 271-272). It will be shown in the next chapter that this change may be detected in a number of sites in Upper Burma.

Summary.

The available data for sites yielding polished stone artifacts shows that these "Neolithic" artifacts can be found generally across Upper Myanmar, and in several of these areas, metals are not part of the assemblage (Figure 29 & Figure 31). However most finds of polished stone implements are from brief reports rather than from formal excavations. It is also common for polished stone axes and rings to be found with bronze implements. This leaves the issue of a "Neolithic" assemblage yet to be resolved. The lower levels of Letpanchibaw (page 61) may provide information about a site that on current information has an early polished stone assemblage followed by assemblages that include metals.

At the next stage of technical complexity, Nyaunggan has been called a "Bronze Age" site in that it contains bronze artifacts and apparently no iron. The bronze materials seem to be specialist tools or weapons, axes and spear or arrow heads, and they are relatively few in number. It is not yet clear whether the assemblage at Nyaunggan involves the local, indigenous exploitation of copper resources or long-distance trade in a limited range of bronze artifacts, which also includes bronze wire to repair stone rings. This issue could be approached in the future by way of an archaeometallurgical study.

Figure 8 Perforated stones A.

Figure 9 Perforated stones B.

Figure 10 Complex Chindwin region bowl, possibly distillation apparatus.

Figure 11 Examples of size-range, polished stone axes.

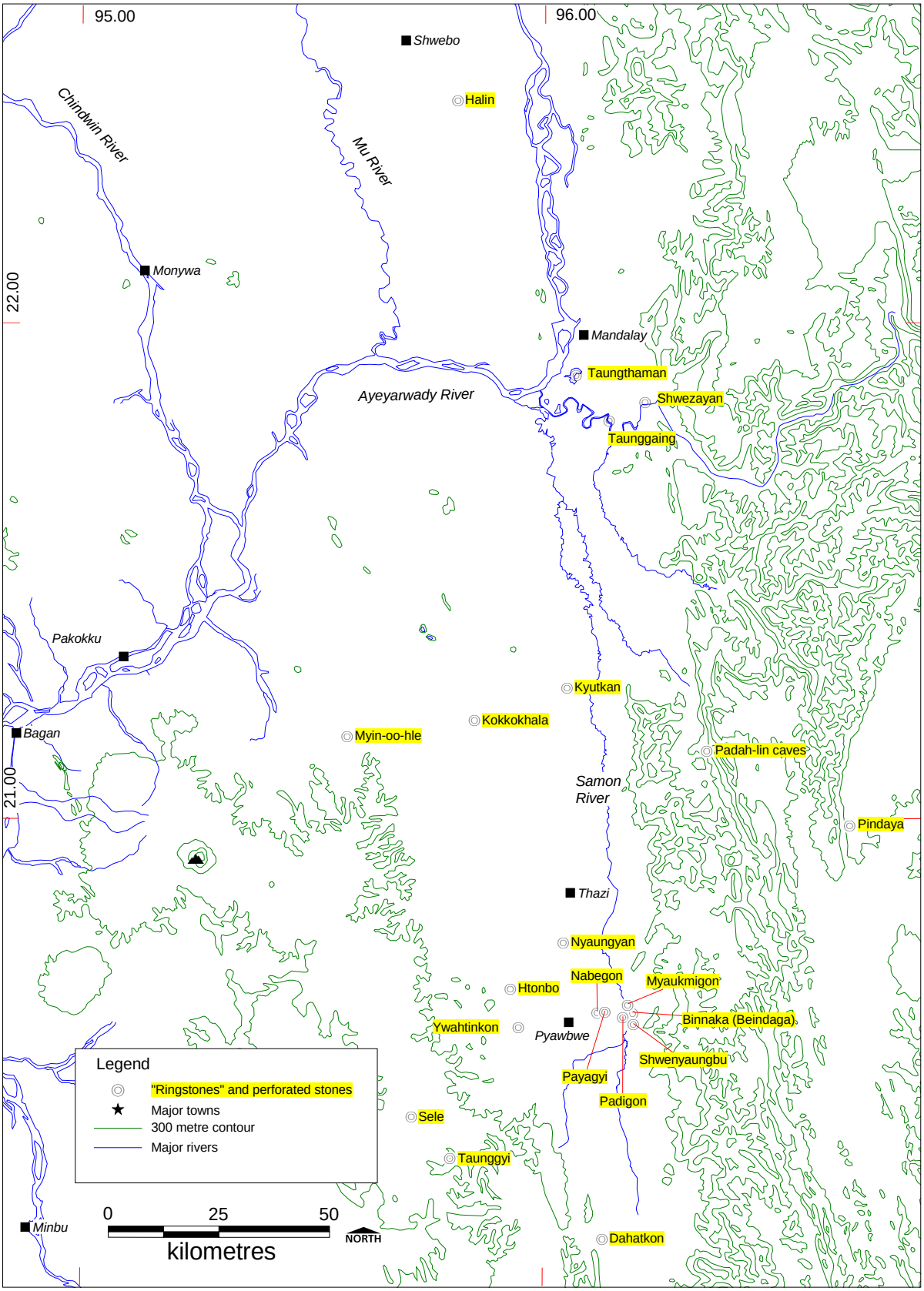

Figure 12 Perforated stones, distribution.

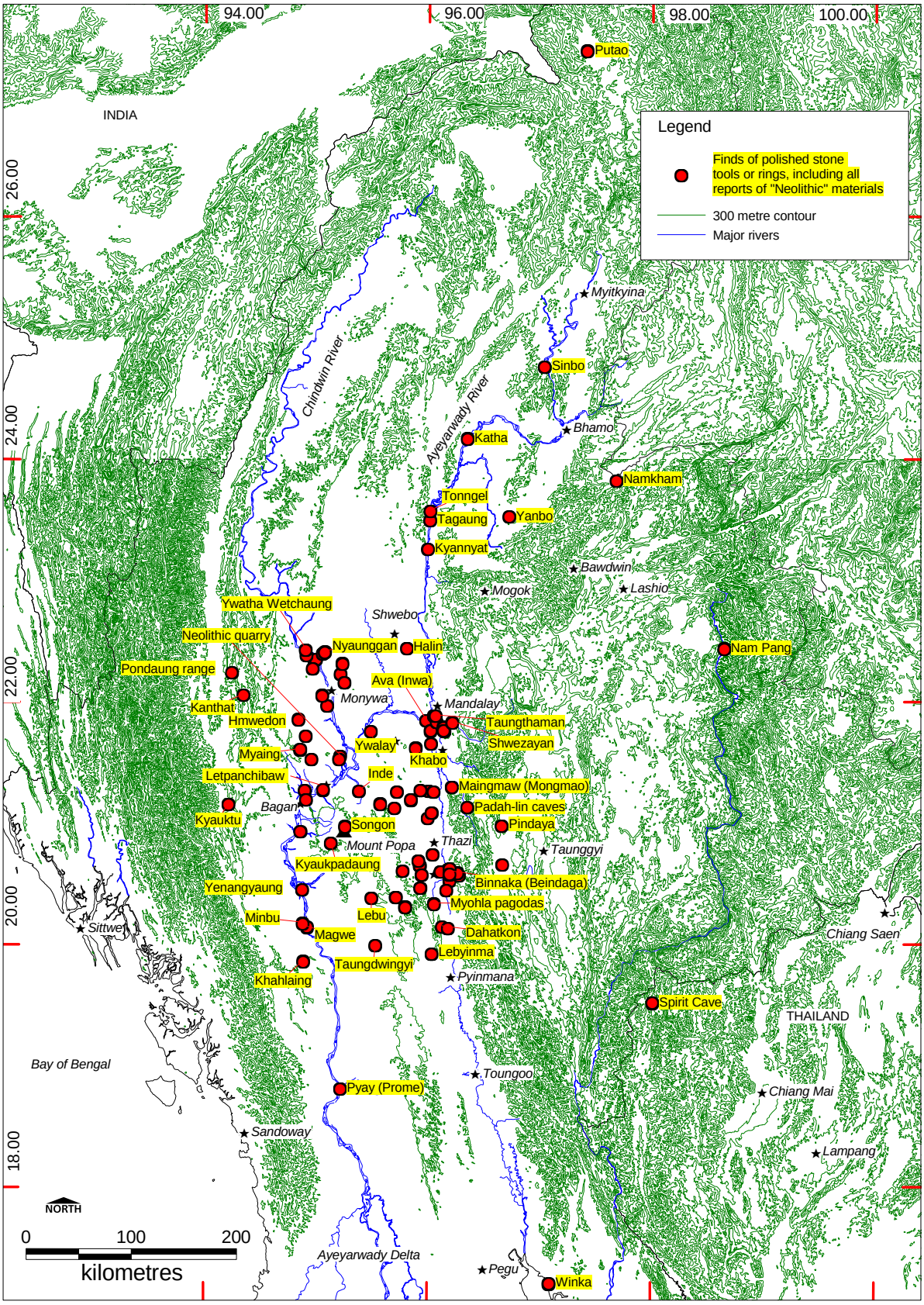

Figure 13 Polished stone artifacts, distribution.

Figure 14 Polished stone implements, Nine Banyan Trees Monastery Museum, Halin.

Figure 15 Polished stone spear head, Padah-lin.

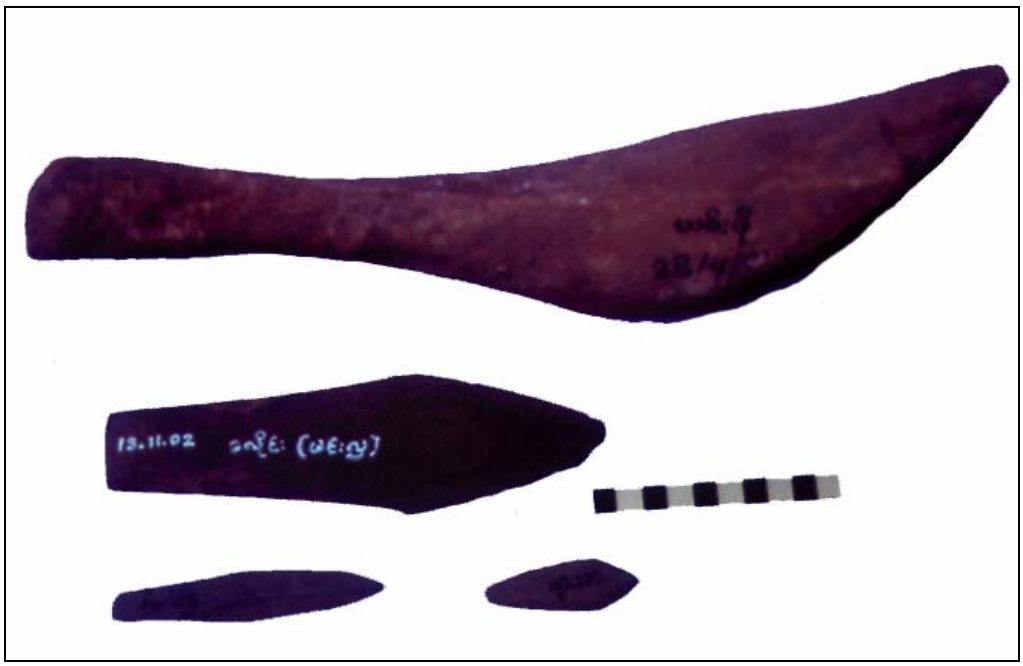

Figure 16 Pointed stone implements, Win Maung collection.

Figure 17 Samples of shouldered stone axes

Figure 18 Range of bronze axe shapes.

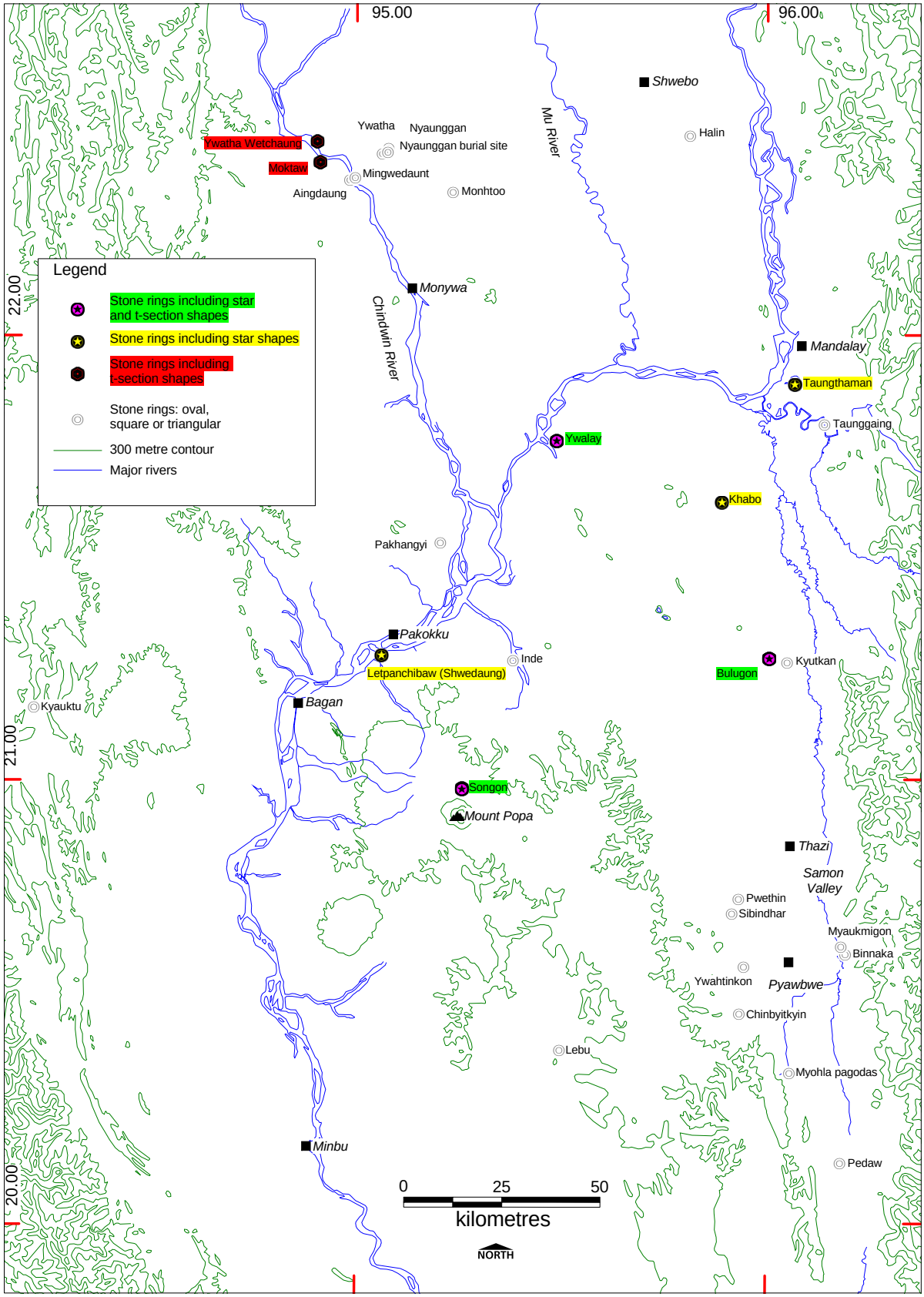

Figure 19 Polished stone rings/bracelets, distribution.

Figure 20 Polished stone rings, some characteristic shapes.

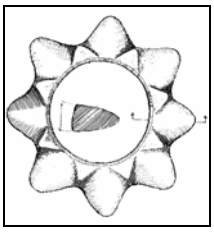

Figure 21 Star-shaped marble ring, Khabo, 12.5 cm diameter. (TWM)

Figure 22 Ring making: cores, reworked cores, possible polishing stone.

Figure 23 T-section rings A.

Figure 24 T-section rings B.

Figure 25 Stone rings drilled for repairs (above) and unusual green stone rings (below).

Figure 26 Socketed bronze axes, Ywahtinkon.

Figure 27 Sandstone axe moulds, Kokkokhala.

Figure 28 Bronze implements from Halin

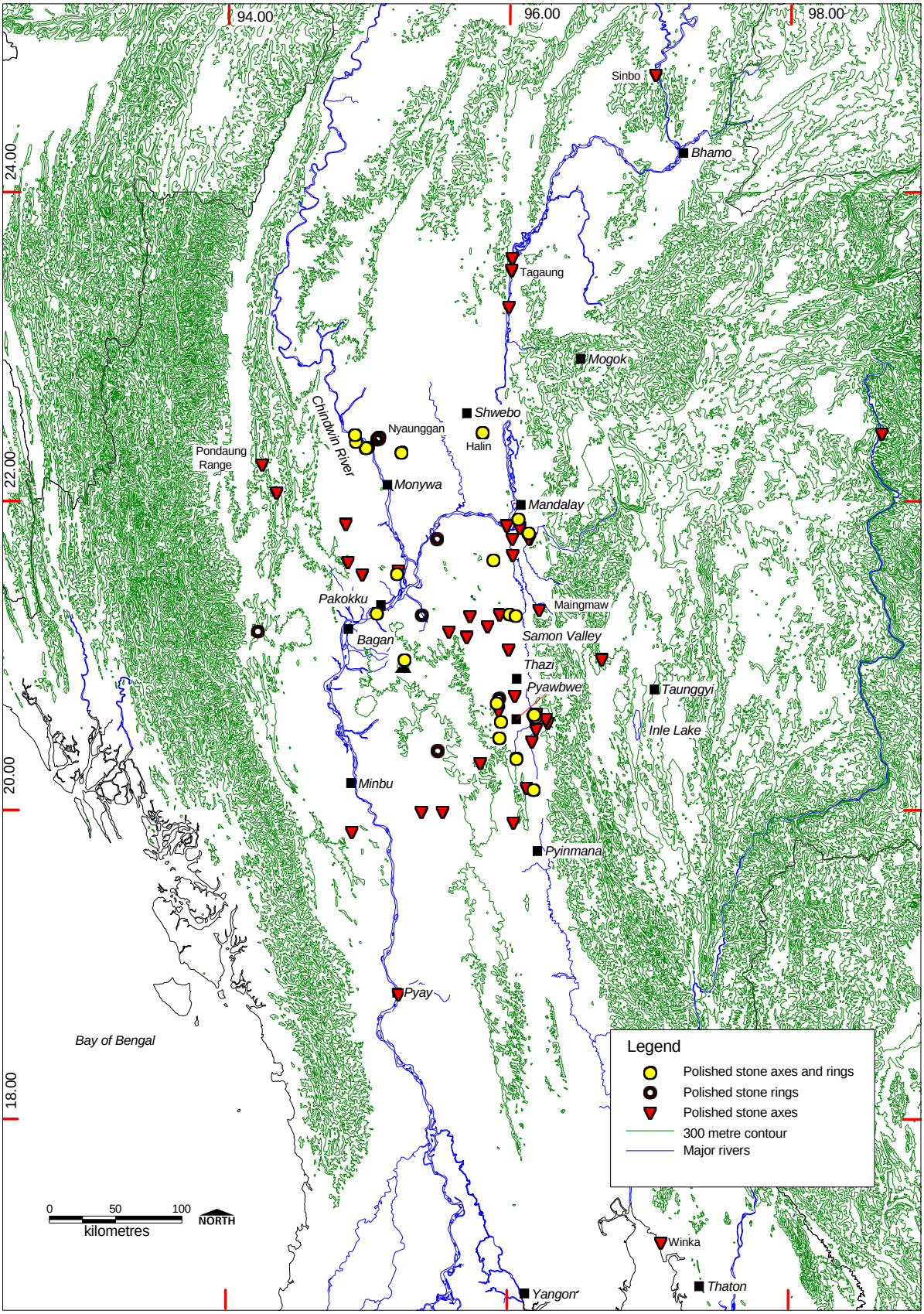

Figure 29 Polished stone rings and axes, comparative distribution.

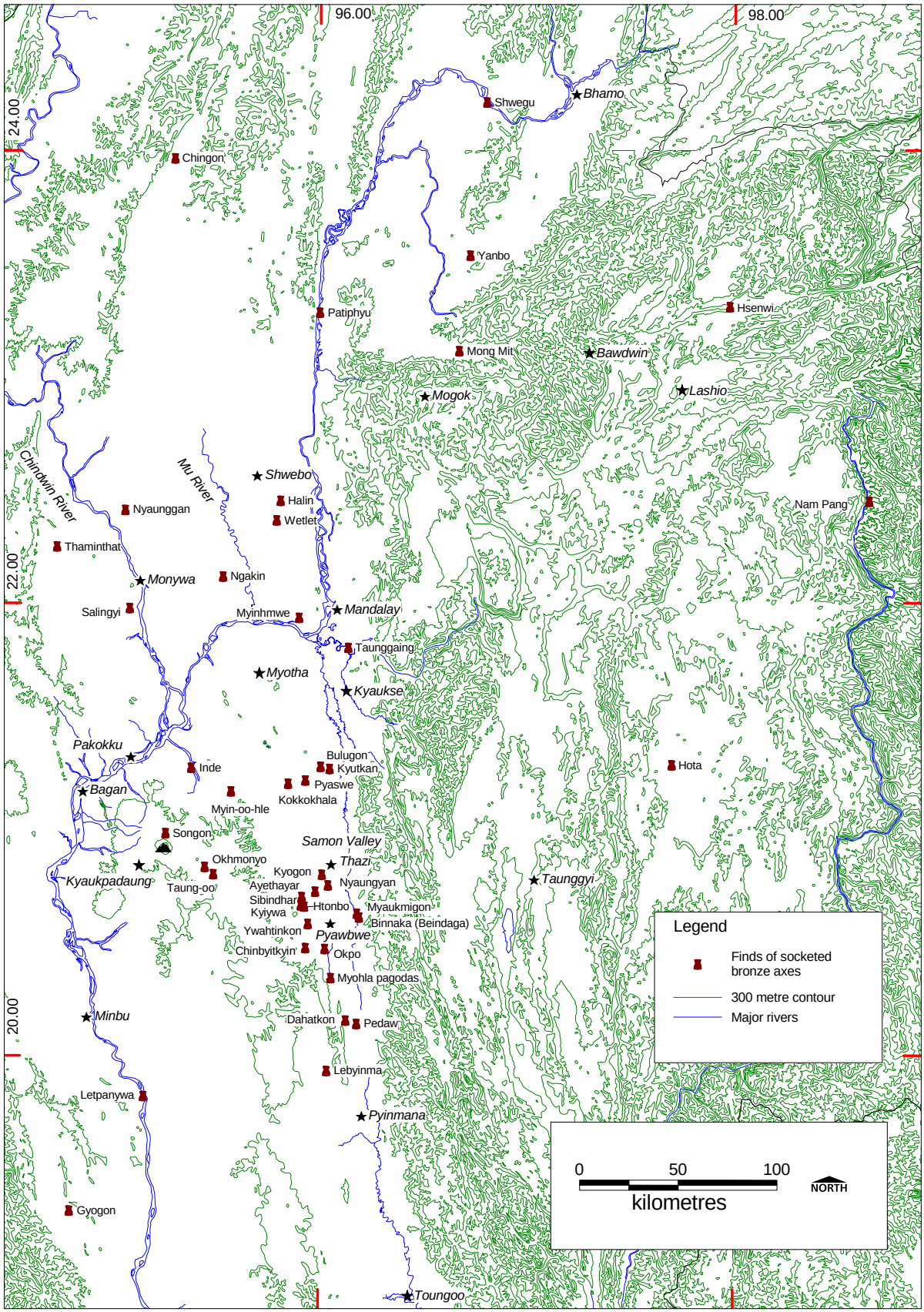

Figure 30 Bronze axes, distribution.

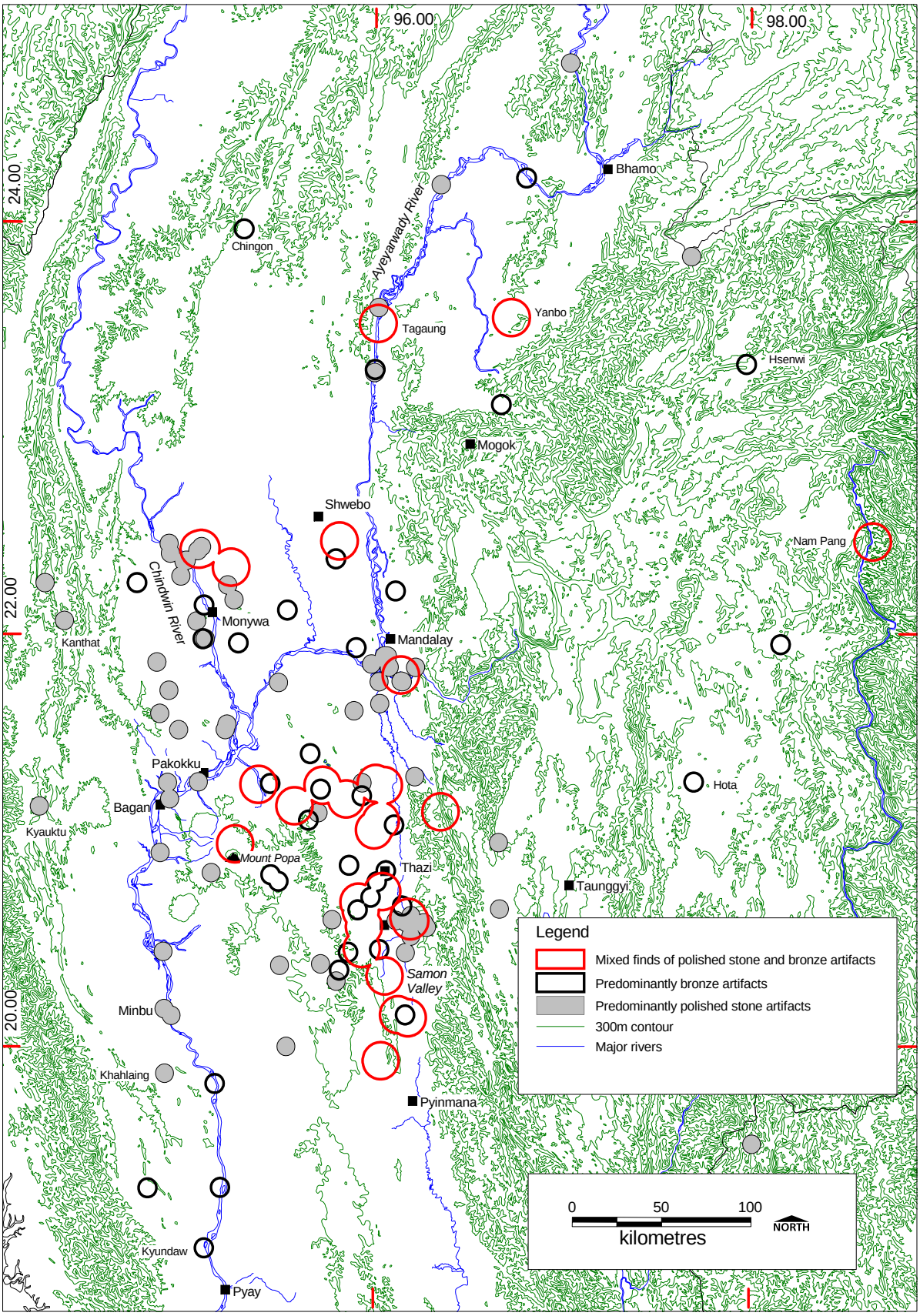

Figure 31 Polished stone and bronze artifacts, comparative distribution.

CHAPTER 4. WEALTH, STATUS, TRADE AND EXPANDING TECHNOLOGIES: THE "LATE PREHISTORIC" PHASE.

The archaeological evidence that relates to the Late Prehistoric period, as seen in the relevant classes of artifacts and their distribution, shows a concentration of economic and social resources, visible as a characteristic accumulation of grave goods, in one region, the Samon Valley. The greater variety and specific content of the Samon Valley assemblage suggests that this may have been the core area from which Upper Burma's early urban sites developed.

The artifact classes that are broadly spread across Upper Burma are polished stone rings, bronze spear and arrow heads, bronze axes, burials involving megaliths and distillation bowls. These are found from the Chindwin Valley to the Samon Valley and its western watershed, around Taungthaman and at Halin. Other classes of artifact are only found in the Samon Valley and its western watershed, and at Halin. These are beaten bronze coffin decorations, bronze wire packets, bronze bracelets, bronze-handled iron swords, *symbolic* bronze spearheads, bronze bells, blue glass bracelets and carnelian tiger beads.

The Samon Valley and Halin, the latter a specialist salt-producing site, appear to have been the focus of an intensification of wealth that points to the Samon area as the "homeland" of the early urban system. A review of each artifact class in turn, and a review of the archaeological investigations that have so far been conducted, contributes to a theoretical framework for the hypothesised "homeland".

Archaeological evidence of cultural transition, c.500 BC-c.500 AD.

Megalithic sites.

In examining megalithic sites in Myanmar it is useful first to exclude sites that involve the arrangement of pieces of stone but are outside the parameters of what can reasonably be identified as "megalithic". There are two areas of note.

1. In 2002 at Bagan the author visited what may be a pre-Bagan cemetery, just northwest of the Sitana-gyi pagoda on the southern end of the city (Chart 7). Several dozen circles comprising small pieces and fragments of fossilised wood can be seen on some eroded hilltops. Each circle is around 1.5 metres diameter. Local people say that in the past, many of the circles had one large dominant piece. The outlines of the circles can still be readily distinguished, but virtually all the larger pieces of fossil wood have been removed to decorate the gardens of hotels, souvenir shops and restaurants. None of the circles has yet been excavated. The Bagan site is unusual in this use of fossil wood, and excavation could help to characterise it, to determine whether it may be a cemetery, and to discover what period it might represent. Separately at Bagan there are references to a "cromlech or

dolmen", a table-sized stone slab sitting on top of several smaller stones, that was used as an offering table on the auspicious eastern side of the Shwe-hsan-daw pagoda (Scott 1921: 335). Yule, who reported it in 1857, opined at the time that it may have been a paving slab adapted to a new purpose (Yule 1968: 52-53).

2. A site involving a so-far unique kind of stone construction for Myanmar features 19 stone cairns sitting in rows at the east end of separate stone platforms. The cairns are up to 2 metres high, the platforms are between 2 and 4 metres long and 2 to 3 metres wide, and many of the platforms have one or more upright stone slabs around 50 cms high in place. This site is just outside Ywathit village (E 95.746121° N 21.707178°) near Myotha, 50 kms southwest of Mandalay, There is one similar cairn within the village. Local people believe the cairns are Buddhist monuments that relate to the settlement of the Myotha area in the Ava period. The cairns are kept whitewashed. Local informants said there were several more structures 50 years ago, but they were removed due to road building. The author visited this site in 2004, and concluded that due to the good condition of the cairns the site is less likely to be prehistoric than related to ritual activities of relatively recent times. There is a good case against archaeological excavation. The site is currently protected because of the religious beliefs of the local people. If excavation was to reveal anything valuable, the entire site might well be destroyed by treasure hunters. It remains an intriguing place, and has potential for future examination by non-intrusive technology.

There are, however, a number of other sites in Myanmar where burials are marked with large stones in a more identifiable manner, similar to the megalithic tradition that persists today in eastern India (Ray 2002). This involves stones, which are generally over a metre long, encircling a burial or resting above it. The distribution map (Figure 34) indicates that there are megalithic sites from the Chindwin area to the northern part of the Samon Valley. One site southwest of the walls of Halin (page 132) featured stones that covered an inhumation burial. The local people had removed two pillar shaped stones and thrown them in a ditch. Informants stated that megalithic burial sites were in the past considered an inconvenience to farmers, who would remove the stones to make ploughing easier. As the value of grave goods on the antique/souvenir market has become more apparent in recent years, megaliths stand even less chance of being preserved, as they now indicate to treasure hunters that there may be wealth beneath.

Within the walls at Halin a small rectangular brick building was discovered several years ago with what was described as an avenue of megaliths in front of it (page 132). Art historians have suggested that megaliths in Myanmar were an early monumental form that became incorporated into Buddhist practice. Early Buddhist megaliths at Sriksetra, for example, featured Buddha flanked by two stupas (perhaps representing past Buddhas), Bodhisattvas, devas or adorants (Luce 1969: 190 Vol 1). It has been suggested that megaliths in southeast Asia may have had cosmological or calendrical functions that related to a purported "megalithic culture", perhaps linked to the speakers of Austronesian languages (Christie 1979), but the strongest regional case is that they are commemorative or funerary (Glover, Bronson & Bayard 1979) and the limited evidence so far suggests that this is the case in Myanmar.

Bronze bracelets.

One of the characteristics of the excavation at Nyaunggan (page 62) was that although bronze was present as axes, it did not appear as personal decoration apart from being used to repair stone rings. Instead, the deceased had been buried wearing or associated with polished stone rings. There have so far been relatively few sites (Figure 35) from which bronze arm or leg rings have been reported,

and none are from formal excavations. At Halin, farmers have recovered bronze finger rings and bracelets that appear to be made of coiled strips of beaten bronze rather than cast (Figure 37, Figure 36 J, K, L, M). A spiral of flattened bronze from Halin (Figure 37, at left) appears similar to an example from an Iron Age burial dated to AD 200-300 at Noen U-Loke in north-east Thailand, which was identified from its grave context as a belt catch (Higham 2002: 204). In the Samon valley, there have been finds of hollow bronze bracelets and anklets (Win Maung 2003b: 5) (Figure 36 C, N).

Glass Bracelets.

Bracelets with a conical or pyramidal outer edge, made from blue/green glass, have been found at Halin, and in the Samon Valley (Figure 39). There have been finds of similar bracelets in the upper stratigraphic layers of circular earthworks in eastern Cambodia and western Vietnam. Radiocarbon dates for these sites tentatively suggest a terminal date around 400-200 BC. The Cambodia/Vietnam bangles have been compared to pieces found in southern Vietnam and at Ban Don Ta Phet in western Thailand, the latter site dated to the 4th century BC (Dega 1999; Albrecht, Haidle, Chhor Sivleng *et al.* 2001). Several dozen beads described as being made from a blue glass paste have been excavated at Ywahtinkon in the Samon Valley (Pautreau, Mornais, Coupey *et al.* 2003: 55).

Bronze spears and arrowheads.

Bronze spear and arrow heads have been found in graves at Nyaunggan, in the southern Samon Valley, the Samon-Ayeyarwady watershed, Halin and Taunggaing, on the Myitnge (Doktawaddy) River south of Mandalay (Figure 40). Spear heads are usually socketed, and have midribs of varying thickness (Figure 38 A, E, F, G, H, I). The arrowheads tend to be tanged (Figure 38 B, C). What appear to be symbolic spear heads have been found at Halin, and in and west of the Samon Valley, as far across as the slopes of Mount Popa. These flat, leaf-like objects, too thin and delicate to function as tools or weapons, are made from beaten bronze (Figure 38 J, K) and can be up to 30 centimetres long. They often appear in bundles (Win Maung 2003b: 5). Small, very thin socketed bronze implements of unknown function, 60 recorded as grave goods in one burial, are reported at Nil Kham Haeng, a copper-producing site on the Chao Phraya plain of Thailand, which operated 1100-300 BC (Higham 2002: 116-117, 121-122).

Iron implements.

Iron implements are difficult to relate to archaeological finds unless they are actually located in situ. They tend to be of less interest to treasure hunters. However some samples (Figure 41) held at the Nine Banyan Trees Monastery Museum at Halin give at least an indication of the range of tools and weapons that seem to have been in use in the Late Prehistoric period, as these objects were reportedly recovered from graves by farmers. They include tanged and socketed spear heads, adzes, hoes, and on the top left of the illustration, an iron axe with a curved shape reminiscent of the bronze “halberds” or “pediform axes” found at Nyaunggan.

Iron and bronze swords.

Higham has reported finds of early Iron Age spears at Ban Chiang, in north-east Thailand, which feature an iron head and a bronze haft, a "widespread technique in southern Vietnam and China at this period" (Higham 2002: 190). This two-metal technology, though not the same artifacts, appears in Myanmar in the form of oval-shaped double-edged iron swords (Win Maung 2003b: 6) with cast bronze handles (Figure 38 D, L & Figure 42). The hilts come with varying degrees of decoration (Figure 43, Figure 45), including decoration at times on the pommel (Figure 44). There is a range of hilt sizes (Figure 45, Figure 46). The blades are forged in a single piece, with the tang inserted in the handle. Future excavations might determine whether these variables correlate with other grave goods to give an indication of the relative wealth of the owner. The distribution of known finds is Halin, the southern Samon Valley, and Myin-oo-hle (Figure 47).

Bronze wire packets.

Bundles of bronze wire (illustrated in Nyunt Han, Win Maung & Moore 2002: 4) appear in graves at Halin, and westward from the Samon River as far as Mount Popa. In 2003, farmers at Myaukmigon showed the author a large clump of these bundles from a grave, which confirms that they were deposited in groups as well as in single bundles. A demonstrated use for the wire is to repair broken stone rings (page 59). The wire bundles have been found in the closed hands of skeletons (Win Maung 2003b: 6) and at various other locations on bodies. Distribution of known finds is shown in Figure 48. While bronze wire was found on stone rings at Nyaunggan, no packets were reported, so Nyaunggan is not included in the distribution map of bronze packets.

Bronze bells.

Bronze bells (Figure 36 A, B, D, E, F, H, I) of varying sizes appear to have been important items in late prehistoric graves, although most finds are unofficial. Distribution of known finds is Halin, the western side of the Samon Valley, and in the southern headwaters of the Samon (Figure 49).

Bronze funerary decorations.

There have been finds of repoussé copper/bronze sheets of varying degrees of complexity (Hudson 2001b; Nyunt Han, Win Maung & Moore 2002; Win Maung 2003b), none from formal excavations, but according to reports from the finders, generally associated with burials or coffins. The simplest of these are cones, usually with holes that may have allowed them to be nailed or stitched to something, and pieces that have been described as having floral patterns (Figure 50). The more complex figures feature groups of cones, with one, two or three large cones matched with two, four or six smaller ones, attached to a larger sheet of bronze. They are described here as single, double and triple on the basis of the number of large cones. The single cone sheets (Figure 51) have something of an anthropomorphic appearance, with extensions that could represent legs, though the more complex sheets (Figure 54) are squared off, to the extent that they have at times been fancifully described by their finders as "Pyu armour". There is no evidence that would justify attributing any particular symbolism to these items, and they are perhaps best described, in relation to the other bronze funerary finds, as "complex" figures. Most finds are around 80 cms long, although a recent find at Halin was only 25 centimetres (Figure 52). Distribution of known finds is

Halin and the Samon Valley, with a report of bronze cones at Mebekon, on the west side of the Ayeyarwady near Minbu (Figure 53).

Beads.

In the mid 1990s residents of Ywahtinkon (Figure 63) near Pyawbwe discovered old beads while digging the foundations for a new school. High prices offered by antique dealers in Mandalay and Yangon led to "bead fever" and farmers, using scatters of potsherds as their initial clue, unearthed numerous burial sites The farmers later described a consistent stratigraphy, which in their terms consisted of an upper "poor man's" layer of potsherds and rusted iron, below which was the "rich man's" layer with inhumations that contained carnelian beads. The farmers know, however, that if they dug even deeper they would only find another "poor man's" layer, with talc beads and bronze implements that were at the time not very saleable (Win Maung 2003b: 3 and personal communication, 2003). Excavation at this site (Pautreau, Mornais, Coupey *et al.* 2003) revealed iron tools among the burials, with pottery, and carnelian and glass beads (page 88). Carnelian beads and white-etched agate beads are popularly known in Myanmar as "Pyu" beads, but the indication from finds in burial contexts is that they predate the early urban "Pyu" period.

Agate, carnelian and other stone beads.

Line decorated carnelian and agate beads were manufactured in western India as early as the Harappan period (Insoll & Bahn 2001) and appeared in quantity in south-east Asia from around 500 BC (Glover 1991; Glover & Bellina 2001). While stone beads may have initially been prestige goods imported from India (Basa 1991) there is increasing archaeological evidence of early local manufacture of beads in Myanmar. At least five villages in Myanmar are named Padigon (Figure 5), or "bead mound" (CALLE 2001; NIMA 2001), and while in some cases this could indicate finds of manufactured beads rather than a manufacturing site, many unfinished beads have been found at Padigon near Pyawbwe, according to local informants. In 2003 the author was shown what appeared to be unfinished glass beads that had been dug up by farmers at Myohla, south of Pyawbwe. Glover and Bellina (2001: 205) report an unprovenanced collection of unfinished glass, stone and "etched" beads in the national museum at Yangon, provided by a donor at Pyay, near Sriksetra. A block of unfinished chalcedony elephant beads from Maingmaw was mentioned above (page 44). Campbell-Cole has shown that finds of unfinished beads now stretch from the Samon Valley to Moulamein (Campbell-Cole 2003: 119). There is a growing body of evidence for a southeast Asian stone bead industry, at sites in peninsular Thailand such as Khao Sam Kaeo (Bellina & Praon Silapanth 2004) and Khuan Lukpad, and at Oc Eo in southern Vietnam (Bronson 1990; Theunissen, Grave & Bailey 2000). There are also indications of a regional glass bead industry, as distinct from one dependent on India or China, at Khuan Lukpad (Bronson 1990; Basa 1991), perhaps from the early centuries of the Christian Era, and in Cambodia (Stark & Dussubieix 2002). It can now be suggested that Myanmar was also producing beads in the Late Prehistoric period. Beads are by no means definitive in themselves of a Late Prehistoric site, as many examples have also been found in later Buddhist reliquary deposits. However the context, as inclusions among donated treasures rather than as personal ornaments of a deceased person, is significantly different.

Carnelian tiger beads and a China connection.

Some of the beads that can now be placed convincingly in the last centuries BC or early centuries AD are pieces of carnelian carved into the shape of a tiger. Most known examples of these come from the Samon Valley (Figure 55), although there are at least two from Halin. One of these was recorded during excavations, though misreported as a dog (Myint Aung 1970 Plate 7). Another was found by farmers and is now in the Win Maung collection (Figure 56). These figures generally have holes drilled from below the chin to above the tail, a commendable technological feat in a bead that could be 10 cms long. Win Maung (personal communication 2003) suggests that at least three hundred tiger beads have been found in Myanmar, largely in the Samon valley. The author inspected several held in private collections or for sale by gem merchants in Pyawbwe in 2003. Copies or forgeries of these beads are also common. The author was shown an admitted forgery of a tiger bead by an obliging antique dealer in the Scott market in Yangon in 2004.

The beads have been variously described as lions or tigers. They were at one stage viewed as trade items originating from India and spreading to south-east Asia and Han China (Yokokura 1993). It would appear from the rather poor photographs available in Yokokura's paper that there is a case for proposing two morphologically distinct forms, the generally squat and squarish figure of a lion, which may share features with the Chinese chimera of the Han Dynasty (206 BC-AD 220) and the Six Dynasty period (AD 220-589) (Hong Kong Museum of Art 1996: 78, 90), and the generally more rounded and elongated tiger. The lion was one of the early symbols for Buddha, representing his clan, and Higham had suggested that the beads may have had a religious connotation (Higham 2002: 219). However there is such a close morphological relationship between the Myanmar carnelian felines and bronze Qin Dynasty (221-207 BC) "Tally Tigers" of China (Figure 57 & Figure 58), which were symbols of military office (*Museum of Chinese History, Guidebook to the Exhibits* 1964; Cheng & Cheng 1993: 193; Gengwu 2001: 64), that they may now be convincingly seen as representing tigers. Further, it might be suggested that their social function, as well as their form, may mimic the Chinese model on which they appear to be based, and that they might have functioned as symbols of status or authority. This could be tested by examining how the tigers feature in burial patterns. The presentation of Tally Tigers by Chinese officials to Burman princes occurs in the late Bagan period (Chen Yi-Sein 1960: 154-155; Aung-Thwin 1998: 97), demonstrating their longevity as a symbol of office in China.

One significant linking factor among the tiger beads of Myanmar is that many appear to be carrying a baby tiger in the mouth (Figure 59). One example has been found with line decorations in the form of a deer (Figure 60), a popular element of decoration on plainer beads. Decoration aside, there is a variability in shape, with some examples noticeably more elongated. Elongated tigers have been found at Halin (Figure 56) and the Samon Valley (Figure 55, top). The more square versions have been found at Binnaka and other Samon Valley sites (Nyunt Han, Win Maung & Moore 2002: 3, 5; Campbell-Cole 2003: 122) and at Ban Don Ta Phet in Thailand (Figure 61). A tiger bead described as similar to the Ban Don Ta Phet example, but smaller, has been reported at Khuan Lukpad, on the west coast of southern Thailand, around 200 kilometres south of the modern Myanmar border, and a further find has been noted at Khao Sam Kaeo on the Gulf of Siam (Glover 1990: 155; Glover 1991: 225, Fig 5; Mayuree Veraprasert 1992: 155; Higham 2002: 218-219). While the beads are found from Halin to southern Thailand (Figure 62), on the quantitative evidence the Samon Valley must be considered the likely source.

The figure from Ban Don Ta Phet is now in Thailand's National Museum in Bangkok. Radiocarbon dates on carbon remains in the fabric of pottery associated with this bead suggested to Glover a date range of 360-390 BC. This process of dating pottery was seen as experimental, and came with a warning from the laboratory not to put too much faith in the results (Glover 1990).

Glover's dates were based on a weighted mean of four samples. Recalibration of the individual samples, a more conservative approach, would provide a broad range from 550-40 BC, or as a weighted mean, from 400-200 BC (using calibration data from Bronk Ramsey 2002). However the Chinese epigraphic evidence allows a more precise estimate of the date at which these tigers first appeared, assuming that they were based on the Chinese version and not vice versa. The Museum of Chinese History tally tiger (Figure 58), which has been published in different views by Cotterell (1981: 149) and Cheng (1993: 193), appears to be a virtual template for the Samon Valley tigers. This particular example was issued for the disposition of troops, who could be ordered into battle when the emperor sent his right hand half of the figure to the general, who held the left half. The emperor has been identified as Qin Shihuang Di (*Museum of Chinese History, Guidebook to the Exhibits* 1964; Cheng & Cheng 1993: 193). The first emperor of a united China, who also left behind thousands of terracotta figures of his army buried near his tomb outside Xian, this military expansionist ruled between 221 and 207 BC (Zhang Lin 2001: 8-18). It appears that his symbol of authority was seen and adopted by the bead makers of the Samon Valley during or after this time.

Another find relevant to the notion of Chinese links with the Samon Valley was seen by the author in Pyawbwe in 2003. A cast bronze pull-toy, a horse standing loose on a wheeled platform (Figure 64), had been recovered by bead diggers, and was destined to be sold on to the antique trade. The only clue to its provenance is that it came from one of the sites around Pyawbwe that were being dug for carnelian beads. On stylistic grounds (see, for example, Wen Fong 1980: 342, 346), a Chinese origin, perhaps Han Dynasty, or at least Chinese inspiration for this piece is a possibility. As it may never be seen publicly again, it is included here for the record, and as an indication that further investigation of cultural links between the pre-urban Samon Valley and Qin or Han China is well worth pursuing. The Chinese link is further supported by the discovery of a probable Yunnanese bronze *sheng* flute at Myaukmigon, which will be discussed below (page 87).

Archaeological contexts of beads.

Beads are found associated with inhumation burials, in secondary pot burials, with cremation remains or in the relic chambers of Buddhist monuments. Most of these finds are out of the ground and in the hands of collectors or antique dealers before they come to scholarly attention, but there have also been provenanced discoveries. The Khin Ba mound at Sriksetra, a rich find of reliquary items, yielded green chalcedony elephants, carnelian, amethyst, crystal, quartz, agate and glass beads, including beads described as Chinese (Aung Thaw 1972: 28). At Bagan, a carnelian bead with 8 facets was found in a pagoda mound west of the Gawdawpalin (1622) (ASB 1937-1938: 6). The report does not further specify the location, but all the structures west of the Gawdawpalin date to the 12th or 13th century (Pichard 1992-2002). Stone and (predominantly) shell beads were found with skeletons at Nyaunggan (San Nyein 1999), a site discussed earlier (page 62). A blue bead, possibly agate, was found during sieving in the excavation of the Otein Taung pottery mounds at Bagan (see Chart 4).

Spindle whorls: a problematic dataset.

Museums in Myanmar, such as the Bagan Museum and the National Museum in Yangon, regularly display what they describe as earthenware beads, but which in the broader context of south-east Asian archaeology are much more likely to be spindle whorls. This misidentification also occurs in at least two key archaeological publications (Aung Thaw 1968: 49-50, Fig 77, Plate LIIb; Myint Aung 1970: 61, Fig VI). Spindle whorls are weights perforated by a stick to form a drop spindle, a

simple hand tool used to produce yarn (Weir 1970: 8-10; Hall 1986: 12-14; Kuhn 1988; Sayer 1988: 10-21). Bopardikar (1996: 33-35) gives a cue to the characterisation of spindle whorls by describing an Indian assemblage as "truncated", "irregular" or "pear-shaped". Barber suggests that "most round beads, the world over, are less than about 2 cm in diameter" and "a round, centrally pierced object significantly larger than 2 cm across is far more likely to be a whorl than a bead" (Barber 1991: 51-69). This can be taken further in relation to the Southeast Asian and therefore the Burmese assemblage. The whorls recorded in India by Bopardikar are all around 2 cm, but what distinguishes them from beads is their irregular shape. Given the near universal tendency for Burmese museums and archaeologists to rate any centrally perforated earthenware object less than a few centimetres across as a bead, it may be time to reverse the trend, and define any eccentrically shaped beadlike object as a spindle whorl unless demonstrated otherwise. Most of the pictured examples from Halin (Figure 65 A) are 3 cms in diameter. These artifacts have close ethnographic counterparts among the spindle whorls used by hilltribe groups such as the Akha and Lisu of the Myanmar-Thai border (Lewis & Lewis 1984: 11, 206, 244, 284; Anderson 1993 Plates 163, 164) and the Mru of Chittagong (Van Schendel, Mey & Dewan 2000: 82). The raw material used in cloth production has been assumed to be cotton, at least from the latter half of the first millennium AD onward (Ito 1999), although the cotton plant seems to be absent from early inscriptions at Bagan. Lieberman has suggested that wide scale production of cotton may not have occurred until after AD 1300, and the raw material in the Late Prehistoric and Pyu periods may have been the more coarse-fibred hemp (Lieberman 2003: 144). A bronze axe found at Halin bore the imprint of a coarse-fibre material or cord (Figure 66). This find indicates that samples for bioarchaeological studies may be available.

Early pottery assemblages and evidence of distillation.

The pottery assemblages of cemeteries of the "Bronze Age" and Late Prehistoric phase have been outlined, in terms of a general typology, at excavated sites including Nyaunggan (Sein Myint 2003), Taungthaman (Stargardt 1990: 19-24; Than Tun 2003b: 3-5), Hnawkan (Pautreau, Pauk Pauk & Domett 2001) and Ywahtinkon (Pautreau, Mornais, Coupey *et al.* 2003). There have been attempts to synthesise a broad picture of the assemblages of the Nyaunggan and Samon regions which have included data from several other unpublished sites (Ko Ko Kyaing 2003; Win Maung 2003b). It should be stressed that the evidence for pottery is largely related to burial contexts, and may not present a full picture of the broad assemblage that was in use. One interesting feature that occurs across Upper Burma is the presence in graves of bowls that may have been used for distillation of alcohol, along with tubular containers and cups, often with perforated lugs or pedestals, that may be alcohol-related artifacts (Figure 10). The hypothesised distillation bowls have hollow pillars that could have allowed them to sit above a pot of heated grain mash and below a pot of cold water, so the vapours from the mash could pass up through the pillars, condense on the cold surface, and drip back into the bowl. Versions of this pillared bowl with solid and presumably non-functional pillars are also found (Win Maung 2003a). As there are no drains evident in any of the bowls that have been recovered, the apparatus would have had to be pulled apart to empty the bowl. Physical analysis of the fabric of some of these artifacts might confirm the alcohol hypothesis. Tubular earthenware pots, with a rim around the top and a small hole in an otherwise enclosed upper surface (Figure 68, right), have counterparts at the Bronze Age site of Phu Noi in the Chao Phraya valley of Thailand (Higham 2002: 117, 125). As is the case for the pillared distillation bowls, there are solid models of the tubular pots in Myanmar (Figure 68, left). There is also a morphological similarity between tubular earthenware and bronze containers found in burials in the Samon Valley (Figure 69) which could suggest differential status or wealth among

the people with whom they were buried. The known finds of the putative distillation pots (Figure 67) suggest that from the Nyaunggan period, possibly before the first millennium BC, the people of Upper Burma may have been producing grain alcohol, and this behaviour was significant enough to represent itself through both functional and symbolic distillation pots as funerary inclusions. The non-functional distillation and tubular pots could be considered, with the non-functional bundles of thin bronze spearheads (page 80) found in the Samon Valley, to indicate a tradition of symbolic representation of property, and perhaps a change in practices with regard to personal property as funerary inclusions (Win Maung 2003a). The Samon mortuary pottery finds are distinguished by the use of rice husks as temper, as distinct from the Nyaunggan/Chindwin pottery which uses sand. This indicates that the Late Prehistoric Samon Valley was a rice-producing society (Moore 2003b: 36).

Taungthaman.

The earliest dated appearance of iron in Upper Burma is at Taungthaman, a southern suburb of Mandalay. Natural erosion revealed burials in the late 1960s and excavations began in the early 1970s under the direction of Aung Thaw and Sein Maung U of the Archaeological Survey of Burma. There are no radiocarbon dates, but four thermoluminescence dates from shards found in the graves were sampled in 1975 (Stargardt 1990: 16). The dates as they stand suggest an outer range for activity at the site of 910-175 BC. Fleming, who tested the samples at Oxford, suggested that the dates could be compressed to 550 BC ± 160, which gives a range 710-390 BC, but he also pointed out that there is a 32% chance that the true date of this context lies outside that range (Fleming 1979: 122, 127).

Table 2 Thermoluminescence dates at Taungthaman (Stargardt 1990: 16).

Sample	T/L date BP (P=1950)	Date range	Comments
186a4	2360±235	645-175 BC	
186a1	2410±220	680-240 BC	Iron fish-hook associated with pot and inhumation.
186a2	2570±200	820-420 BC	
186a3	2660±200	910-510 BC	

Australian National University tests at the same time gave absolute thermoluminescence dates of 360 BC, 560 BC and 150 BC for sherds associated with separate inhumation burials, while sherds from a hearth tested AD 660 and AD 860 (see page 281). The ANU samples are from archaeological contexts, but there are no published reports available.

The iron items recovered with the burials at Taungthaman include a fishhook, knife blades, short swords and several iron lumps. According to Stargardt, Taungthaman represented at about 500 BC the "very last and most sophisticated stage of stone technology co-existing with the beginnings of an initially crude, iron-working metallurgy" (Stargardt 1990: 13-14, 28). This date generally coincides with the first securely-dated iron artifacts known for China (Wagner 1993: 95-96; Wagner 1999). There are bolder claims for India, where radiocarbon dates as early as the 12th Century BC have been associated with iron production, although the bulk of the evidence puts the arrival of large-scale ironworking in India at a period contemporaneous with Myanmar and China (Juleff 1998: 98-100; Agrawal 2000; Upadhyaya 2000: 246).

The notion of a leap in resource exploitation at Taungthaman that bypasses the use of bronze is redundant, because finds such as Nyaunggan render obsolete Stargardt's valid observation at the time of writing that "no intermediate sites belonging to the Chalcolithic or Bronze Ages have been

found in Burma" (Stargardt 1990: 14). The puzzle of Taungthaman is the apparent absence of any bronze materials. It is now evident that bronze was made or traded in Myanmar and placed in graves at Nyaunggan (page 61) well before the putative c. 500 BC date for Taungthaman and, as will be demonstrated below (page 88), there were bronze inclusions in other excavated sites which appear to sit across the same timescale as Taungthaman. The information obtained by Stargardt appears to have remained otherwise unpublished, either in English or in Burmese, and there is no way at present to review the site reports or field notes, if they still exist. The excavations at Taungthaman were criticised by Than Tun: "the workers were left very much to themselves for several hours with only an instruction that the boss should be informed immediately when any worker unearthed something which the worker thought to be of some interest to Archaeology", while another critic noted that "in order to get one good skeleton, the archaeologist destroyed many other equally good skeletons" (Myint Aung 2002: 26). The possibility that poor work practices and lax supervision may have allowed attractive materials such as bronzes or beads to be removed by the labourers cannot be discounted. Taungthaman also presents considerable difficulties due to vertical movement of materials, with stone tools and rings often found on the surface (Moore & Aung Myint 1993: 58).

A significant feature discussed by Stargardt was the Taungthaman inhumation burials, in which the skeletons were found "under or between dwellings" with personal possessions such as stone adzes, iron knives and swords, and beads, and "striking differences in the number, value and type of the goods placed in each one", although she also pointed out that the lack of relative chronology left it unclear whether this represented general changes in community wealth over time or differential individual wealth at the same period (Stargardt 1990: 15, 19). This points to an important issue regarding burial sites, which is whether there was a tradition of burying the ancestors within the village, as the report on Taungthaman suggests, or in separate cemeteries, as the reports on Nyaunggan suggest, or in both at different times, and therefore whether these behaviours fall into any particular patterns over time or space.

Myaukmigon.

Myaukmigon (Chart 1) is a site in the Samon Valley that was being exploited by bead diggers in 2003 when visited by the author. According to local information it was one of at least 60 sites in the Pyawbwe district being dug over for artifacts. In an area covering about three hectares, a few hundred metres from Myaukmigon village, former rice fields have been dug by bead hunters to a depth of 5.5 metres. Carnelian and agate beads and socketed bronze axes begin to appear less than a metre below the surface of the grey loam. In one instance, at 4.5 metres, the farmers discovered a concentration of objects that included ten elephant tusks, sandstone querns and mortars, the handles of a bronze cauldron, and what appears to be a bronze flute (Figure 32). This gourd-shaped object (Figure 33), decorated with sculpted figures on the narrow end, is similar to the Chinese *sheng* flutes which are attributed to the Late Warring States-early western Han periods, c. 300 BC to AD 9 (*Chinese Bronzes of Yunnan* 1983: 116). Below the elephant tusks were some small glass or quartz beads. Other finds from Myaukmigon include unifacial shouldered stone adzes at 2.5 metres, polished stone rings, blue glass rings, iron hoes, gold beads, and tubular pots with lugs, sealed except for a small hole in the top (for an example from the Samon Valley, see Figure 68). Bone fragments and teeth from the burials are thrown aside by the diggers, and most of the pottery is smashed during the digging or shatters when it is handled while still damp from the soil. While it is impossible to tell, due to the destructive digging, what amount or proportion per skeleton of pottery, which could be linked to food offerings, accompanies the burials, Myaukmigon is a site at which substantial wealth accompanies at least some of the burials.

Myohla, Ywahtinkon and Hnawkan.

A more coherent view of the archaeology of the Samon Valley in the Late Prehistoric period is beginning to emerge following three formal excavations by a Myanmar-French team between 2001 and 2004 (Pautreau, Mornais, Coupey *et al.* 2004). In January 2004, at a burial site on the edge of the village of Myohla, the archaeologists noted that one part of the cemetery contained "rich" graves. One burial featured ivory armbands, a long bracelet of carnelian and glass beads, cattle limbs deposited under the legs, and ceramic and bronze vessels at the feet. The skeleton seemed to be lying in the remnants of a wooden coffin. Another burial had traces of what was described as a monoxylic (carved from a single log) coffin with a lid. The Myanmar authorities decided to preserve the skeletons in situ, which the French archaeologists said made it impossible to examine or sample the bones effectively. Local people produced bronze artifacts that had been recovered during digging for beads. Deposits included earthenware vessels placed near the feet of skeletons, some iron tools and weapons, necklaces, bangles and remains of large herbivores (Coupey 2004; Pautreau, Coupey, Maitay *et al.* 2004).

At Hnawkan the use of wooden coffins, possibly made of single logs, was again detected and there was an indication that coffins had been stacked together. This, along with the apparent tidying-up of bones in some of the deposits, suggested regular re-use of the sepulchres over time. Only one or two skeletons in each group had substantial jewellery, including blue glass-paste beads, and more rarely, carnelian. One grave contained a bundle of bronze wire (see page 81 & distribution map, Figure 48). There were iron sword blades, socketed axes, daggers, and spear and arrow heads (Pautreau, Pauk Pauk & Domett 2001).

The third cemetery excavated, at Ywahtinkon, also involved hollowed-out log coffins. Successive inhumation phases were identified, and defined respectively as "late Bronze Age", and "Iron Age". The earlier stage had bodies aligned with their heads to the north, a stone axe, and agate and rock crystal beads, but no carnelian. Bones of infants were in small pots, placed within larger pots over the pelvis of an adult. Up to nine pots were at the feet of the skeletons. Pots with perforated lugs were compared to specimens at Nyaunggan, the "site de référence pour l'âge du Bronze". There were bronze spear points and a socketed bronze axe.

The later stage, with tombs over several levels, featured bodies with heads pointing east, systematically accompanied by three pieces of pottery at the feet. Some of the pottery appeared to have been finished on a slow wheel, but there was no apparent use of paddles/beaters. There were cylindrical pots, enclosed except for a small hole in the top, a design that may have been elated to alcohol consumption (see page 85). Carnelian beads, some line decorated or zoomorphic, predominated. There were offerings of meat. Burials of children were accompanied by the shells of freshwater oysters and miniature grave pots. Infant burials were in several linked pots aligned east-west, beneath adult skeletons. Infant burials between two linked pots have also been reported at Songon, Halin and Kyaukkan (see Database CD). Corroded iron implements were excavated at Ywahtinkon, and many more iron spear heads, hoes and knives had already been collected by the locals. Bundles of bronze wire were also found. It was concluded that this phase represented the "late Iron Age" (Pautreau, Mornais, Coupey *et al.* 2003).

Win Maung has suggested that the variation between sites in the orientation of burials from north to east, at Ywahtinkon and elsewhere, may be an indicator of change over time, with eastward burials being later (Win Maung, personal communication 2002). While Pautreau and his team have pointed out that these are only a few excavations, there does appear to be a pattern of change that can be used as a model for examining further sites. A tentative periodisation of the formally excavated sites, using the appearance of iron and the trade or exploitation of carnelian from 500-400 BC (see page 82) as a pivotal point, would place Ywahtinkon Stage 1, which yielded bronze

weapons, plus agate and crystal beads, but no iron or carnelian, before 500 BC. It is noteworthy that the number of pots per grave at this site is characteristically less than 10, as compared to an average of 70 at Nyaunggan. Taungthaman, according to the absolute dates available, sits around 500 BC. Hnawkan, with only a few carnelian beads, would be on the carnelian boundary, c.500-400 BC (Glover 1991; Glover & Bellina 2001). Burial at Hnawkan involves coffins, bronze wire packets appear, and only one or two skeletons in each group have substantial jewellery. Next would come Myohla, which shows a similar differentiation of wealth, but with more carnelian, while finally Ywahtinkon Stage 2 sees a reduction in grave offerings to three pieces of pottery and a predominance of carnelian.

Pre-urban Myanmar in a regional context.

The volume of evidence now available allows Upper Burma to be included in regional overviews of southeast Asian prehistory rather than to be ignored due to lack of data, as has often been the case in the past. This development is exemplified in two key publications. Higham, in *The Archaeology of Mainland Southeast Asia* (Higham 1989) made minimal reference to Burma/Myanmar and effectively did not view it as part of the southeast Asian system. His approach at the time suggests that evidence for including Burma in a regional synthesis was simply not available to international scholars. However by 2002, Higham's *Early Cultures of Mainland Southeast Asia* was considering the bronze axes and other goods excavated at Nyaunggan as belonging to the "Southeast Asian Bronze Age tradition", and he proposed the Chindwin Valley as the westernmost point to which the Bronze Age of Southeast Asia can be traced (Higham 2002: 156-159, 166). A broad chronological and cultural sequence for Upper Burma, based on regional comparisons, can now be suggested, though it must again be stressed that given the relatively few formal excavations, many of which are still in the process of analysis and dating, a tentative, chronology must for now sit alongside an equally tentative view of common datasets.

Nyaunggan, which features less than one bronze weapon/tool or polished stone personal decoration per skeleton, but equipment (possibly) for alcohol production and an average of 70 pots of grave offerings per funeral, dates very broadly to the period 1500-500 BC (page 61). It is not the only such site excavated in the Chindwin, although it is by far the best reported. Its neighbour Monhtoo has been described at having pottery "more advanced" than Nyaunggan, but it is considered to be a similar site (Ko Ko Kyaing 2003: 52). The suggestion has been made that the bronze axes in the graves at Nyaunggan, low in number but morphologically variable, were trade items rather than the result of local production (page 61). If this is the case, then the burial could relate to the earlier stages of Southeast Asian bronze production, the period from 1500-1000 BC during which knowledge of the smelting and casting of copper and tin "seems to have spread very rapidly along the Neolithic exchange routes" (Higham 2002: 117). A morphological difference has been noted between the bronze axes at Nyaunggan and a less rounded, longer form in the Samon Valley (Nyunt Han, Win Maung & Moore 2002: 6) where the evidence for manufacture, as indicated by the finds of moulds (page 60) is stronger. Whether imported or locally produced, the relative scarcity of bronze materials at Nyaunggan cannot be taken as a precise indicator of chronology. If Myanmar followed regional tendencies, and "bronze only became truly abundant in mortuary rituals in the iron age" (Higham 2002: 121) then without absolute dates for Nyaunggan its estimated period is best left broad. What Nyaunggan *does* indicate is the existence of a pre-iron culture involved in skilled stonework and the production or exchange of bronze weapons, with mortuary rituals that involved communal eating and/or communal offering of food to accompany the deceased, and perhaps the consumption of alcohol.

Win Maung distinguishes between Chindwin and Samon “Bronze Age” cultures, with Halin having elements of both (Win Maung 2003b: 7). Nyunt Han *et al* (2002: 6) consider that the Chindwin area contains “Bronze Age” sites that are generally earlier than what the authors call transitional sites, and those transitional sites that are so far known are found in and west of the Samon Valley. Due to the lack of formally excavated sites, the focus of this part of the thesis has necessarily been on a kind of horizontal, rather than vertical, archaeology, looking at the regional distribution of artifact types. This evidence suggests that there was a consistent though not completely homogenous pre-iron culture right across Upper Burma. Bellwood has suggested that the more intensive use of bronze in Southeast Asia correlates with the rise of pre-Indic, ranked societies, probably involving exchange between regional elites (Bellwood 1999: 116). Mortuary finds in the Samon Valley indicate a broadening of the range of bronze artifacts, suggesting that this may be the area where social ranking was beginning to intensify, and indeed represents the transitional phase, the precursor of urbanism, proposed by Nyunt Han *et al* (2002).

There is evidence, at least in terms of the presence of polished stone tools and ornaments, of a “Neolithic” occupation of upper Burma which left its mark from the Lower Chindwin down the Ayeyarwady to Minbu, from the confluence of the Samon, the Panlaung and the Ayeyarwady near Mandalay south along the Samon Valley, and into the Ayeyarwady-Samon watersheds (Figure 13, Figure 31). In individual cases, stone axes continue to appear in iron age contexts, and for that matter as pagoda offerings at Bagan (page 58),but in terms of gross numbers of samples, the spread of stone axes, along with polished stone bracelets (Figure 29), largely on river plains that are used today for a mixture of paddy and dryland farming, suggests the dispersed occupation of about 37,500 square kilometres across Upper Burma.

Upper Burma, including the Samon and Chindwin areas, has a broad spread of artifact classes involving or associated with bronze that suggest an equally widespread early metal culture. These classes include polished stone rings (Figure 19), bronze spear and arrow heads (Figure 40), bronze axes (Figure 30), burials involving megaliths (Figure 34) and distillation bowls (Figure 67). The artifacts appear from the Chindwin to the Samon Valley and its western watershed, around Taungthaman and at Halin. Survey evidence (see accompanying CD-ROM) suggests that Halin and the Samon Valley sites then experienced a broadening of artifact groups, in association with iron, while the Chindwin area did not. This supports the picture of a dispersed Upper Burma “Bronze age” assemblage followed by a “Late Prehistoric” assemblage that was more focused on the Samon Valley and its western watershed, with an extension toward Mount Popa, with its nearby sources of carnelian, agate and quartz crystal (Campbell-Cole 2003) and a northward extension to Halin. The Samon Valley sites present a timescale that extends from before the appearance of iron and carnelian around 500 BC (page 88) to after the adoption of the Qin Dynasty tally tiger as a model for carnelian tiger beads (page 83), the earliest date for which must be around 200 BC.

Halin stands out in terms of the current data because it is a single site with no immediate neighbours sharing its pre-metal and Late Prehistoric assemblage. This is unlikely to be simply the effect of a lack of exploration of its hinterland for “Neolithic” and “Bronze” materials, because the Halin area has been explored for more than a century, with a number of early urban and/or Bagan period sites identified. The occupation of Halin in the Late Prehistoric period (its role in the early urban system will be reviewed later, see page 132) may have related to the exploitation of its salt resources. Higham has proposed that an expansion of bronze production during the Iron Age, along with the replacement of marble, slate and marine shell jewellery by carnelian, agate and glass, and the increased production of efficient iron weapons and agricultural implements, was symptomatic of the breakdown of the “long-standing affinal alliance and exchange system between independent communities” and indicated the increasing domination of new centres which

controlled the best land and resources (Higham 2002: 226-227). With its salt fields, Halin fits this model as a resource centre.

The "horizontal" evidence, the distribution of artifact types, indicates a Late Prehistoric expansion in the Samon Valley and its western watershed, as indicated by the increasing complexity and variety of materials associated with burials (Table 3). This area, along with Halin, is the focus of finds associated with burials of beaten bronze coffin decorations (Figure 53), bronze wire packets (Figure 48), bronze bracelets (Figure 35), bronze-handled iron swords (Figure 47), *symbolic* bronze spearheads (Figure 40), bronze bells (Figure 49), blue glass bracelets (Figure 39) and carnelian tiger beads (Figure 62). Carnelian beads in general are found widely across Upper Burma in both Late Prehistoric and early urban contexts, but they are not reported archaeologically around Nyaunggan and the Chindwin sites (Figure 63).

Table 3 Pre-urban datasets, comparing Upper Burma and the Halin/Samon Valley areas.

Artifact groups found across Upper Burma in the pre-urban/Late Prehistoric period.	**Artifact groups found in the Samon Valley and at Halin in the pre-urban/Late Prehistoric period.**
Polished stone axes.	Polished stone axes.
Polished stone rings including star shapes or t-section (flat rings found on wrists of skeletons and in burial contexts generally).	Plain polished stone rings only, no star shapes or t-section.
	Perforated ovoid "ringstones" (also found between Halin and the Samon near the Myitnge-Ayeyarwady junction, and at Padah-lin, east of the Samon).
Socketed bronze axes.	Socketed bronze axes
Megaliths associated with inhumation burials.	Megaliths associated with inhumation burials.
	Bronze bracelets.
	Blue glass bracelets.
Bronze spear or arrow heads.	Symbolic bronze spear heads as well as functional bronze spear or arrow heads.
	Bronze-handled iron swords.
	Bronze wire packets.
	Bronze bells.
	Beaten bronze coffin decorations.
Carnelian beads, etched or plain, round or oval (not reported at Nyaunggan and the Chindwin area).	Carnelian bead assemblage includes tiger beads.
Earthenware distillation bowls	Earthenware distillation bowls

Two of these artifact groups, the glass bracelets and carnelian tigers, lend themselves to a possibility of comparative dating. Blue glass bracelets appear in the upper stratigraphic layers of circular earthworks in eastern Cambodia and western Vietnam. Radiocarbon dates for these sites tentatively suggest a terminal date around 400-200 BC. Similar bracelets to the Cambodian and Burmese examples have been found in southern Vietnam and at Ban Don Ta Phet in western

Thailand, the latter site dated to the 4th century BC (Dega 1999; Albrecht, Haidle, Chhor Sivleng *et al*. 2001). Recalibration of the radiocarbon dates associated with the carnelian tiger at Ban Don Ta Phet is c.400-200 BC. The later part of this range is more likely, as there are strong indications that the model for these beads comes from the 221-207 BC Qin Dynasty of China. On the current evidence, the Samon region from c.200 BC onward is the likeliest source of these beads (see page 83, Figure 62). The bronze gourd flute from Myaukmigon (page 87) suggests another Chinese link with the Samon Valley in the period c. 300 BC - AD 9.

A proposed Late Prehistoric homeland of the Pyu.

The characteristic funerary deposits of the Samon Valley and its specialist salt supplier Halin come from 25 sites. Some of these sites appear as mounds in the landscape. This can at times be indicated by a Burmese name ending in *gon* or *kon*. Since the known finds are mainly from treasure hunters, it is not yet possible to state conclusively whether the mounds are former settlements with integrated burials, or natural mounds used exclusively as cemeteries. Clues such as the use of potsherds, possibly habitation debris, as a cue for treasure hunting at Ywahtinkon (page 82) and the reports of building materials among the burials at Taungthaman (page 86) support the idea of burials within villages, but other reports such as Nyaunggan (page 62) seem to identify separate cemeteries. Mound sizes noted so far from surveys by the author range from 3 hectares at the Myohla pagoda site, a kilometre southeast of the village, which is identified by a pagoda complex built on its crest, to 0.75 hectares on the eastern edge of Myohla village. The considerable depth of finds over an estimated area of 3 hectares at Myaukmigon (page 87) suggests use of the site over a long period, but there is no noticeable mound. The site was recently a rice paddy. Whether the sites are former villages or dedicated cemeteries, or a mixture, they all seem to be under 4 hectares in area. The deposits at Hnawkan covered less than a hectare (Pautreau, Pauk Pauk & Domett 2001: 76), with 3 or 4 hectares at Ywahtinkon (Pautreau, Mornais, Coupey *et al.* 2003: 56), where the archaeological phases of the cemetery suggest long-term occupation (page 88). The Samon Valley sites are significantly smaller, Pautreau (2003: 56) has pointed out, than the "vast" necropolis sites of northeast Thailand, suggesting a comparatively smaller site population.

While the map (Figure 70) is based on 25 sites containing the artifacts nominated above as characteristic of a Samon Valley Late Prehistoric culture, informants at Pyawbwe have indicated, as mentioned earlier, that they knew of at least 60 sites that were being worked by bead hunters in 2003. For the purpose of representing culturally linked individual sites as a region on the map, each site has been given one point for each kind of characteristic artifact found, and this variable multiplied by 4 kilometres, a figure based on the median daily operational distance for an agricultural village where transport is essentially by foot (Chisholm 1968: 43-67). The weighted distances are then used as the radius of a series of linked buffer zones around the sites. The result (Figure 71), notwithstanding a few outliers and the special case of Halin, which was discussed above, suggests a region covering the Samon valley and its western watershed. This region sits in the geographical centre of the later early urban system, which was characterised by brick walled settlements. The four largest, Halin, Maingmaw, Beikthano and Sriksetra, are dispersed at consistent distances apart up and down the plains from the core southern Samon area.

There are no major walled sites in the core area. The only known walled areas within the southern Samon are Hlaingdet, a 23 hectare site whose rectangular wall and the presence of an inscription (Aung Myint 1999a: 235; The Making of Burma 2000) suggest that it may belong to the Bagan period, and a reported walled site at Binnaka (Moore 2003b: 25). It is not clear whether the latter is

a 9 hectare site near Wadi, south of Binnaka, which has not yet been clearly characterised (Chart 1) or a separate site. However, there is not necessarily a contradiction involved in the absence of walled cities in the proposed homeland of the system of walled cities. By the time the walled Pyu sites appeared, the archaeological evidence suggests that the Samon Valley was a stable territory, offering no operational advantage to any of its member settlements to try to expand. A key indicator of this is settlement size. The size of the few settlements whose areas have been surveyed or published (outlined above) is at the bottom of the maximum 30 hectare operable range (Figure 81) that has been proposed for long-term stability in non-literate settlements (Fletcher 1995). During the years of occupation that lasted long enough for noticeable cultural change to occur, such as has been archaeologically determined at Myohla, Ywahtinkon and Hnawkan (page 88), the settlements, all under 4 hectares according to the current evidence, would have maintained a complex relationship, as suggested by the display, ownership or exchange of goods such as carnelian tiger beads. The presence of swords and spears serves as a reminder that this relationship may at times have involved conflict. Hearkening again to the report of 60 sites around Pyawbwe being dug for beads, it could be suggested that the Late Prehistoric settlements were dense across the landscape. This is the case in modern times. The 179 villages on the 1938 Pyawbwe inch-to-the-mile map 93 D/2 were a mean distance of 1.033 kilometres apart. While the measurement of site sizes, and hence the acquisition of data to estimate population densities, has been demonstrated to be difficult in the prehistoric southeast Asian context (Bayard 1992: 19-20), the hypothesis of a stable Samon Valley homeland without a central place hierarchy could be tested by a detailed survey.

Such a survey should be expected to find the Late Prehistoric settlements, including the 60 known sites around Pyawbwe, to be densely packed into the region and of similar size. This settlement pattern would have locked up land use. It would have been in nobody's interest to disrupt the system, or to allow a neighbour to gain ascendency. But when settlement fission or population drift took place, and new, less densely settled zones were opened up, the hold of the old traditions would have been reduced, leaving the way open to the differential application of new management skills, and to a new system that eventually saw the development of large, enclosed central places, situated at an uncannily consistent distance from the homeland and from each other. The symbols of authority in the new system do not appear to have included the Chinese-inspired carnelian tiger pendants. These remain specific to the Samon Valley, except for isolated finds of tiger beads down the southern peninsula that are attributable to trade, and two tigers found at Halin that support the view of its role as a salt supply centre for the Samon.

Note: prospects of investigating ancient population movements through DNA studies.

The hypothesis of local population movement could be tested by DNA analysis. There are two possible approaches, using ancient DNA extracted from burial remains, or testing modern populations. The use of ancient DNA in the reconstruction of population origins is subject to technical problems, particularly the difficulty of amplifying a significant number of samples and the contamination of samples with modern DNA (Kolman & Tuross 2000; Adachi, Umetsub, Takigawaa *et al.* 2004). Despite this, there have been encouraging results at the 2000 year timescale, with recovered ancient DNA used to distinguish relationships between populations in East Asia (Oota, Saitou, Matsushita *et al.* 1999; Kivisild, Tolk, Parik *et al.* 2002). The sampling of modern populations is also an efficient and effective means of accumulating data which can be used to track ancient populations (Oppenheimer 1998: 177-218; Oppenheimer 2004). The extraction of DNA samples using self-administered buccal swabs among rural populations in Myanmar would be an economical way to provide material for a DNA database.

Summary.

Pre-urban artifact groups are distributed across Upper Burma in two distinct geographical patterns. The artifacts widely seen across the whole region are polished stone rings, bronze spear and arrow heads, bronze axes, burials involving megaliths and earthenware distillation bowls. Agate and carnelian beads, including line-decorated beads, are also widespread. Some other artifact classes are, according to the available evidence, focused on the Samon Valley and at Halin. These are beaten bronze coffin decorations, bronze wire packets, bronze bracelets, bronze-handled iron swords, *symbolic* bronze spearheads, bronze bells, blue glass bracelets and carnelian tiger beads. The localised finds suggest a distinctive culture. The Samon Valley, where pottery with rice husk inclusions is also part of the Late Prehistoric mortuary assemblages where these artifacts are found, appears to be the main area in which resource exploitation, agriculture and trade contributed to the increased wealth. Halin, still known today as a source of salt, appears to have been an important outlier of the Samon area.

The Samon valley settlements date to before 500 BC, as indicated by the assemblage of bronze objects and agate beads at Ywahtinkon Stage 1. Carnelian beads begin to appear at Hnawkan, perhaps coinciding with early trade in carnelian trade from India, at around 500-400 BC. The Hnawkan burials also feature bronze wire packets and wooden coffins, characteristic mortuary items of the Samon area. These are probably the earliest indicators of a Samon valley culture. Differential burials, with large quantities of jewellery found on relatively few skeletons in each group, also appear at Hnawkan. Trade links with China can be detected from around 200 BC. Indicators of these links include carnelian tiger beads which accurately mimic the form of Chinese bronze tally tigers of the Qin Dynasty, a *sheng* flute comparable to flutes from Yunnan and attributed to the Late Warring States-early western Han periods, and a bronze horse with Qin/Han features. From around 500 BC, therefore, the settlements of the Samon Valley, small and densely packed into the landscape, increased in wealth, as demonstrated by mortuary assemblages. They also had trade contact with India, for carnelian, and parts of China, both the central Qin polity and the (then) essentially independent areas around (modern) Yunnan for exotic bronzes. The extent of contact with China was such that the tiger tally, the symbol of authority of the Qin emperor, was widely copied.

Figure 32 Querns, stone mortar and bronze artifacts including gourd-shaped flute, Myaukmigon.

Figure 33 Bronze gourd-shaped *sheng* flute, Myaukmigon: detail.

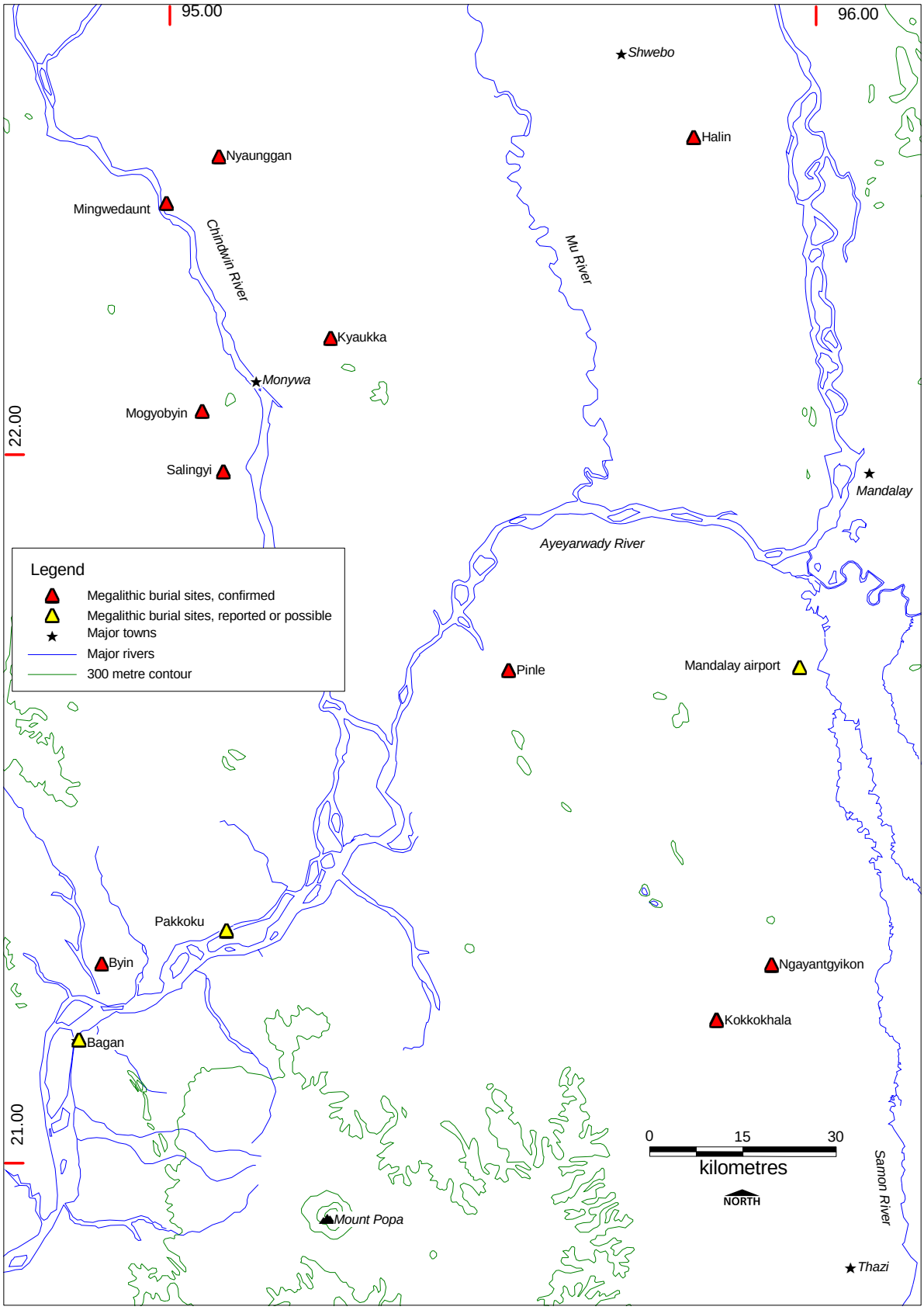

Figure 34 Megaliths, distribution.

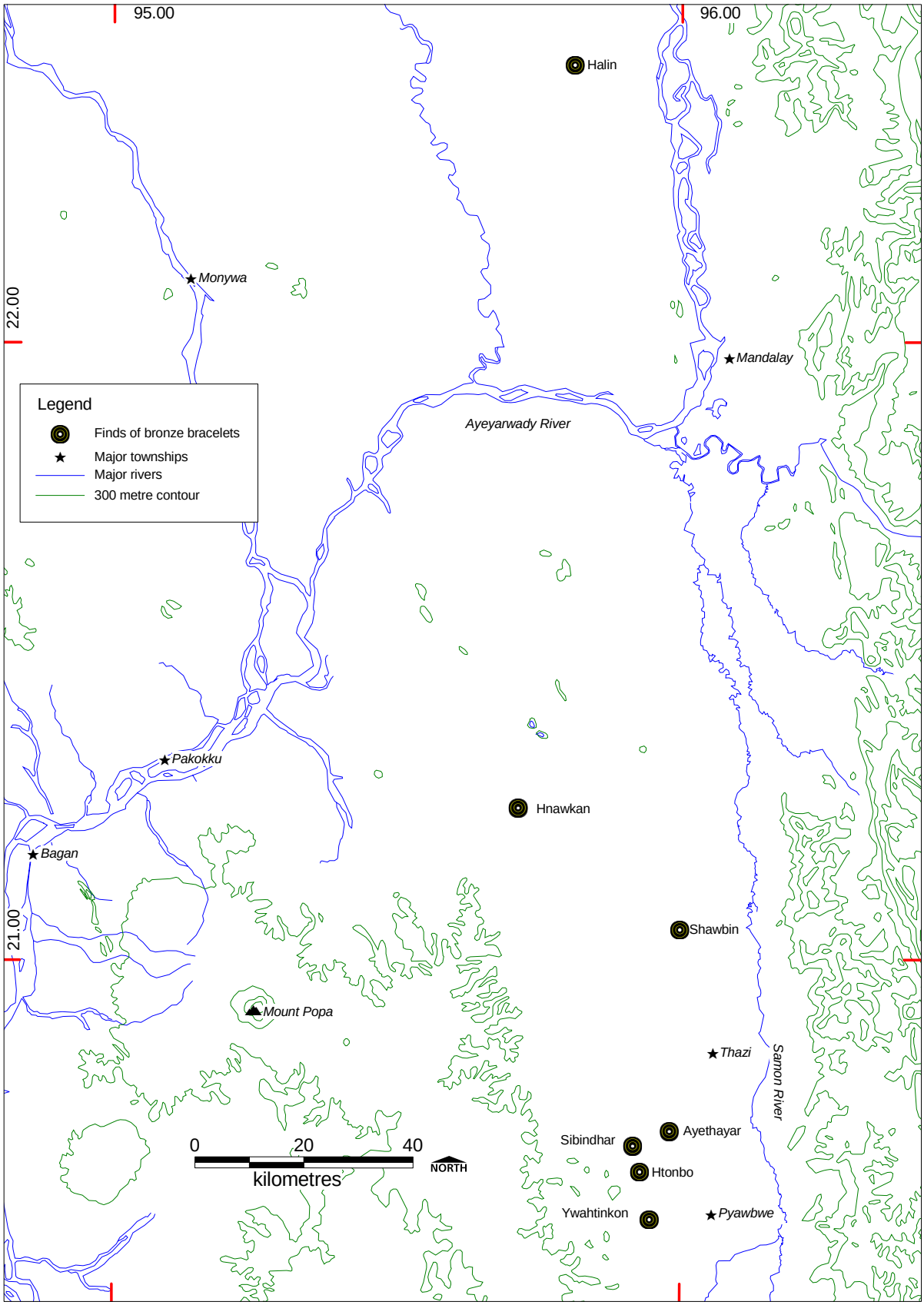

Figure 35 Bronze bracelets, distribution.

Figure 36 Bronze bells, bracelets and rings, Upper Burma.

Figure 37 Coiled bronze artifacts, Halin (detail of J &K, previous figure).

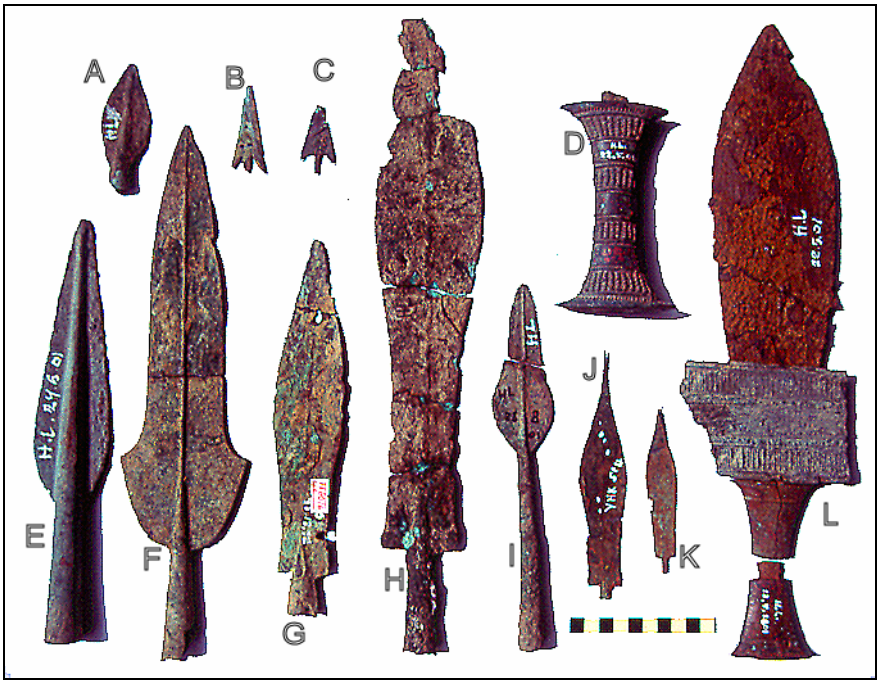

Figure 38 Bronze spears, arrows and swords.

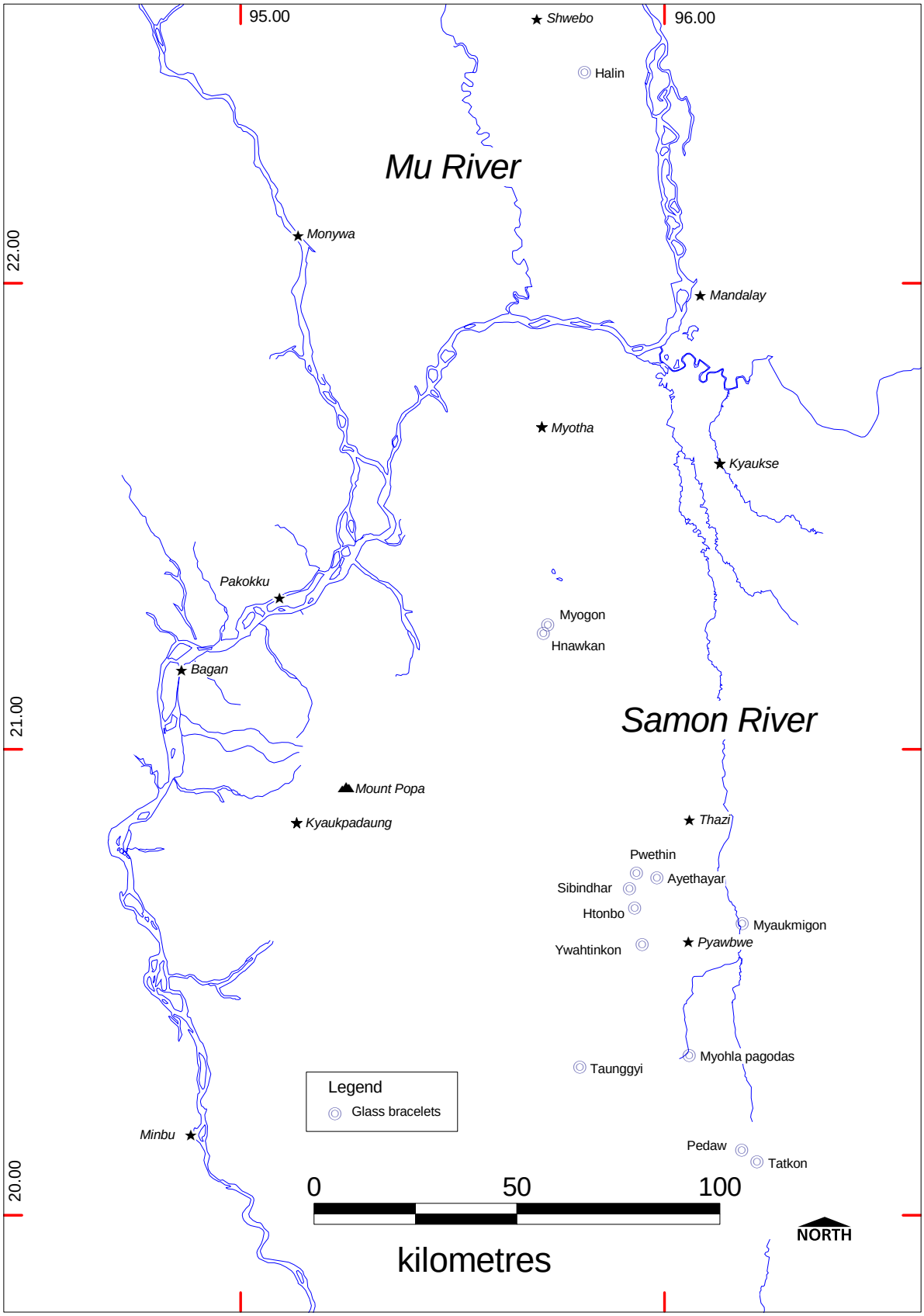

Figure 39 Glass bracelets, distribution.

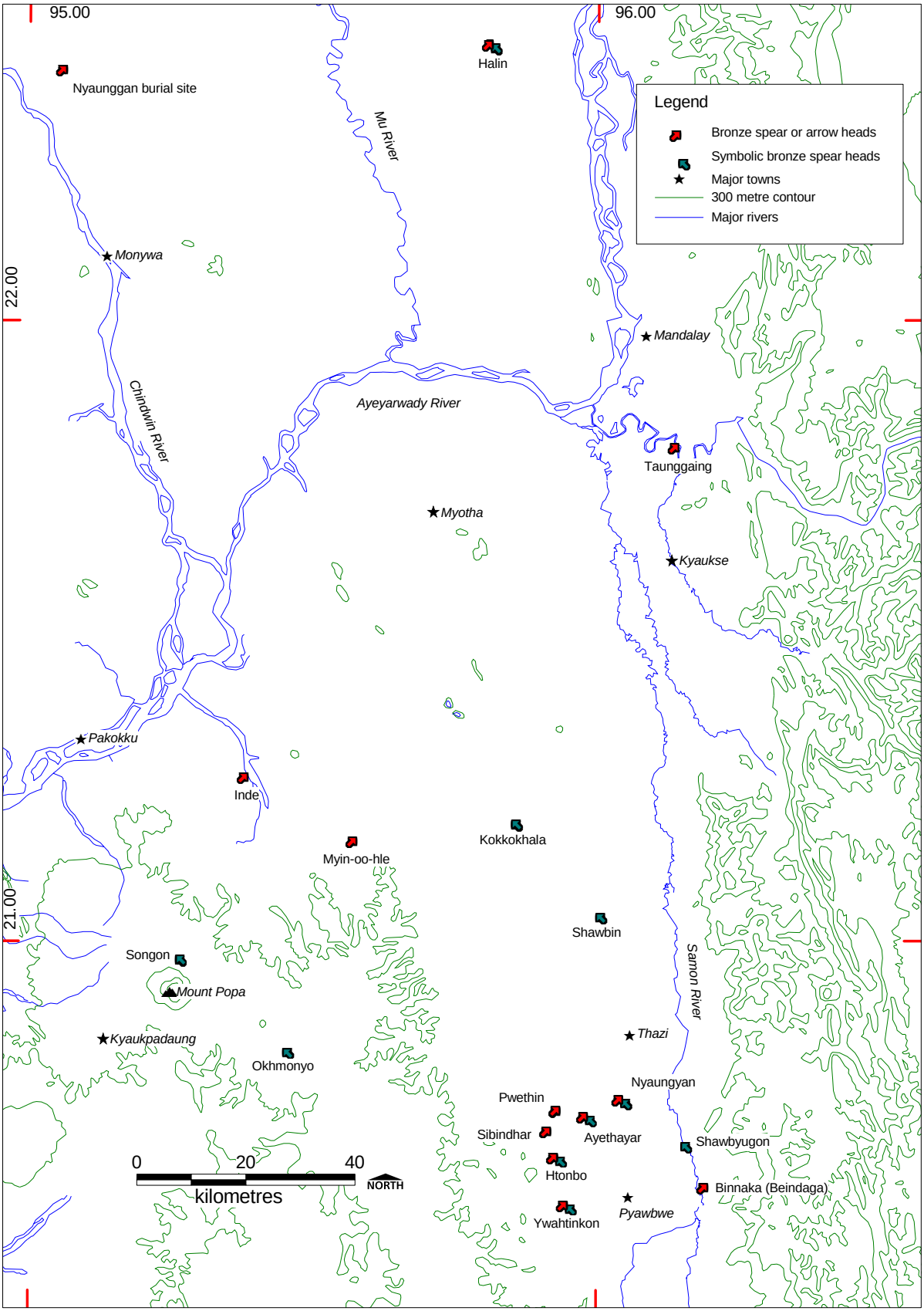

Figure 40 Bronze spear heads and arrow heads, distribution.

Figure 41 Iron hoes, adzes and spearheads, Halin monastery museum.

Figure 42 Iron sword with bronze handle, Myin-oo-hle, Samon Valley.

Figure 43 Bronze sword handle, Halin.

Figure 44 Bronze sword handle, pommel of previous figure, Halin.

Figure 45 Bronze sword handles, showing decorative variation.

Figure 46 Bronze sword handles, reverse view of items in previous figure.

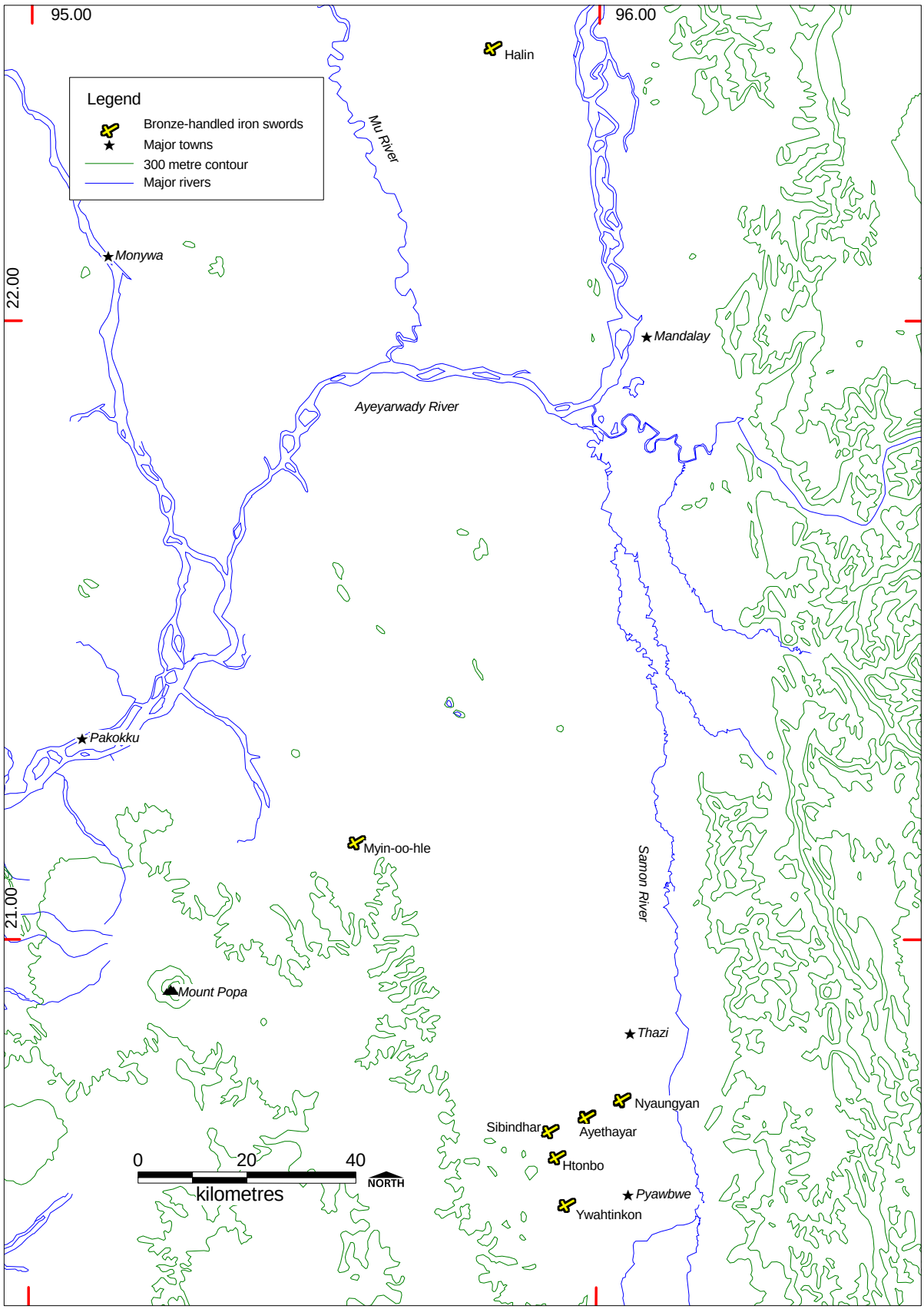

Figure 47 Bronze-handled iron swords, distribution.

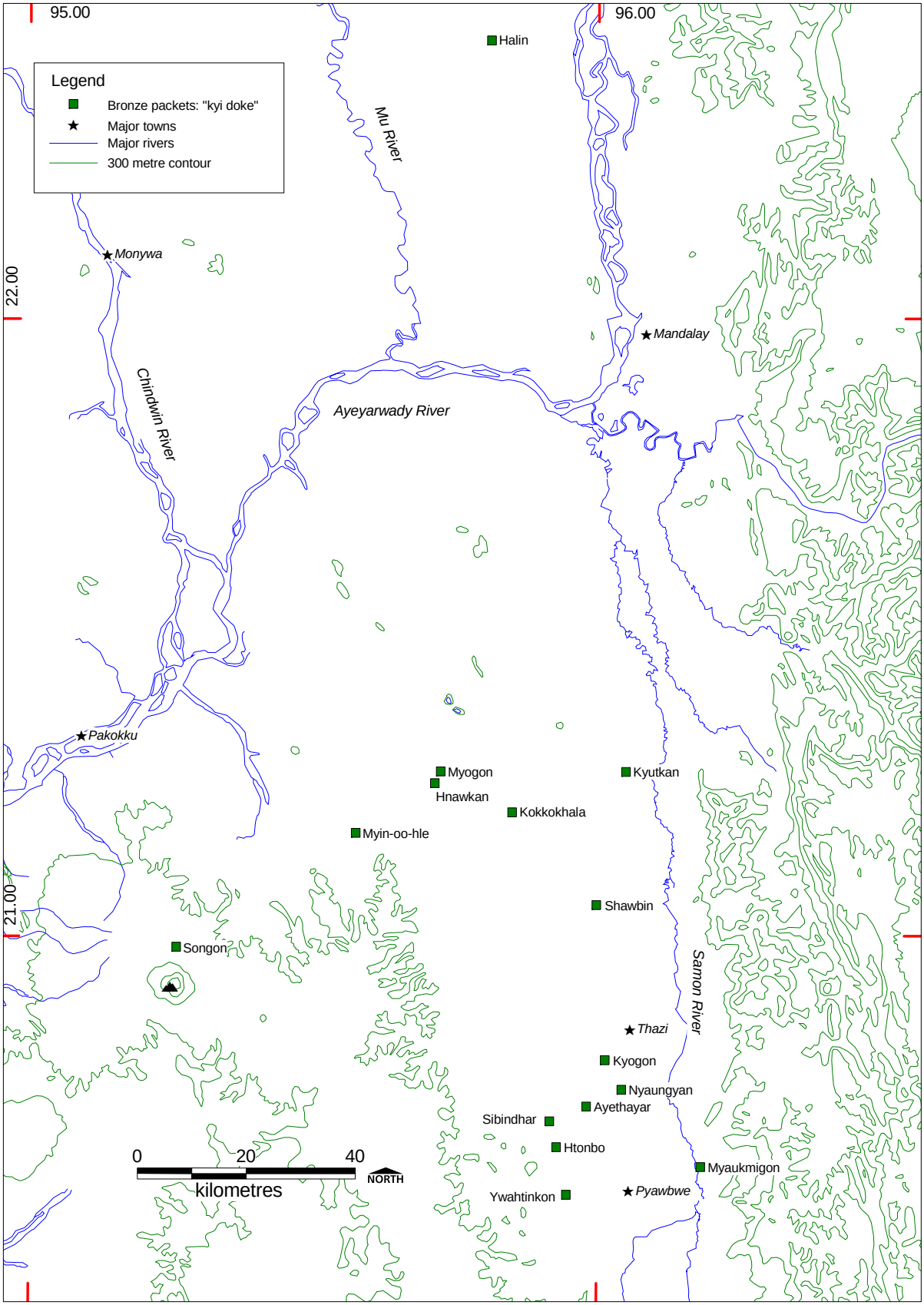

Figure 48 Bronze packets, distribution.

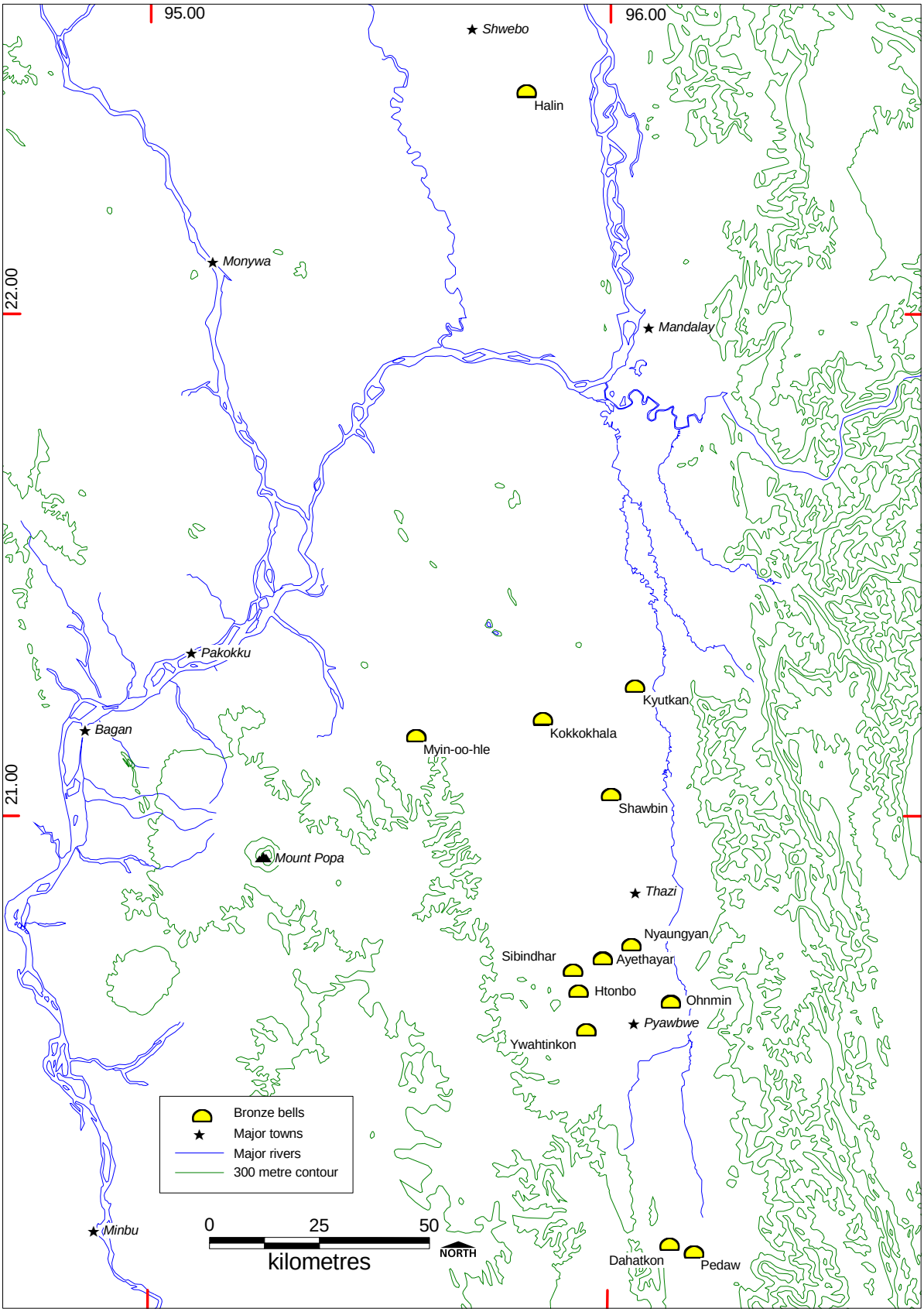

Figure 49 Bronze bells, distribution.

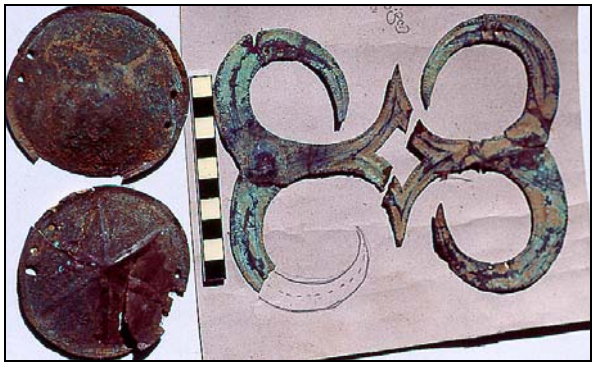

Figure 50 Bronze disc and floral funerary decorations.

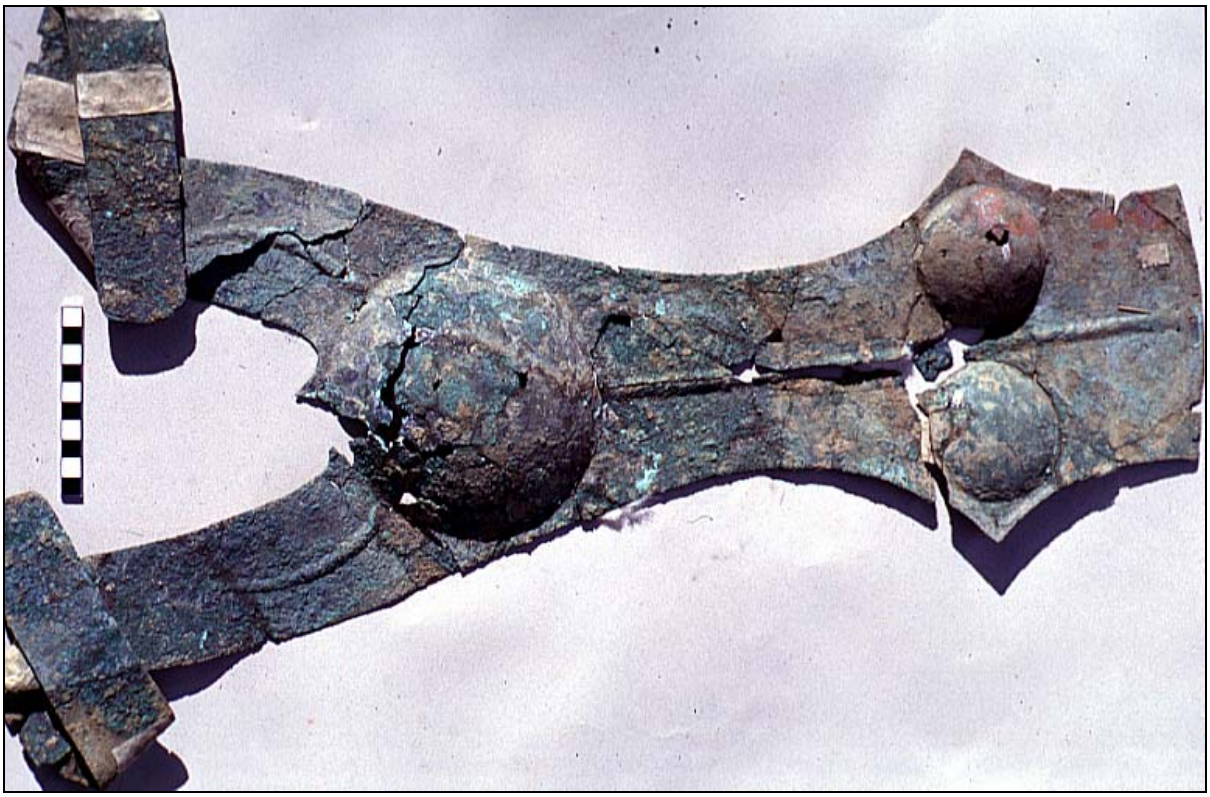

Figure 51 Complex bronze funerary figure, single, Samon Valley.

Figure 52 Complex bronze funerary figure, double, Halin.

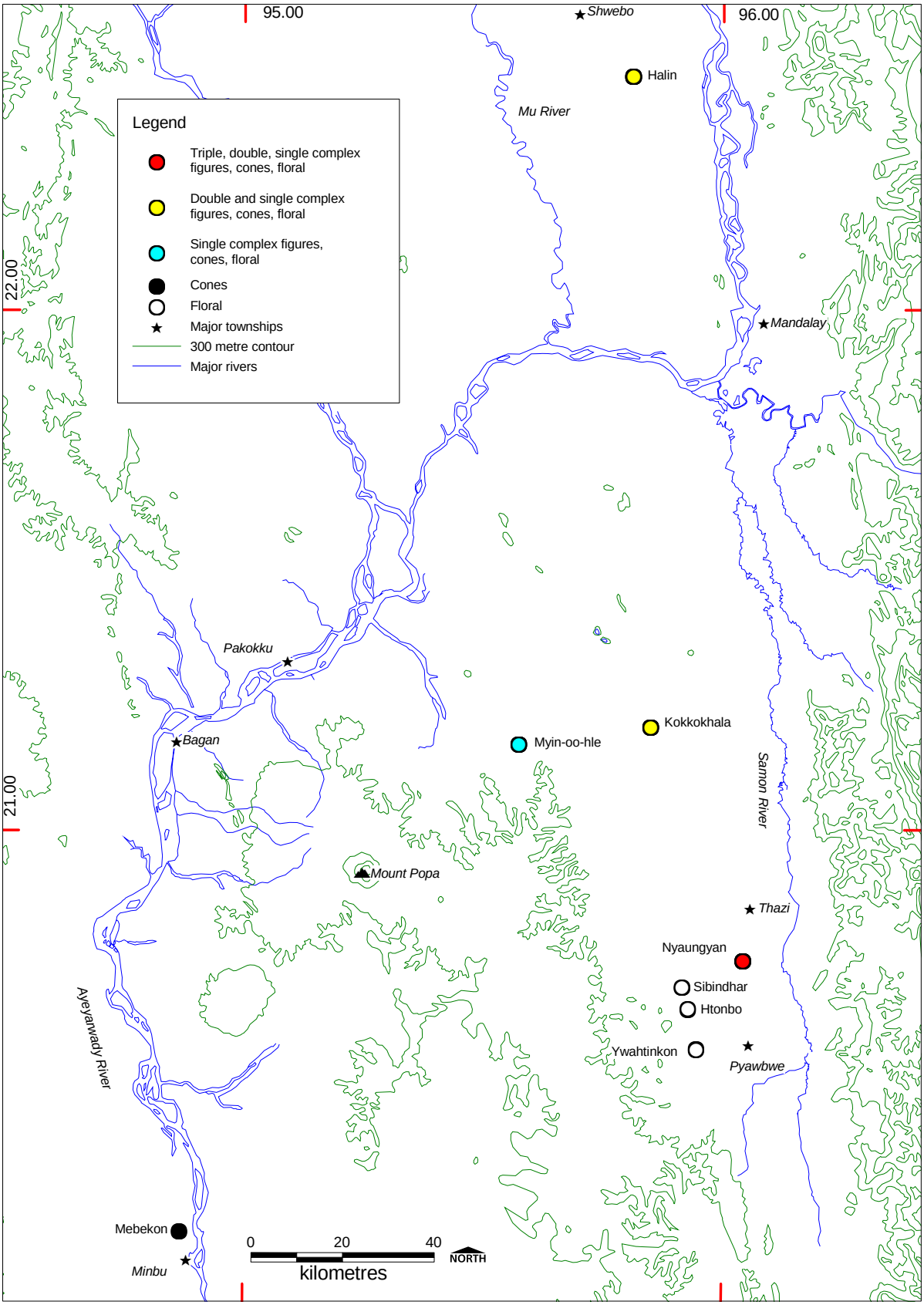

Figure 53 Bronze funerary decorations, distribution.

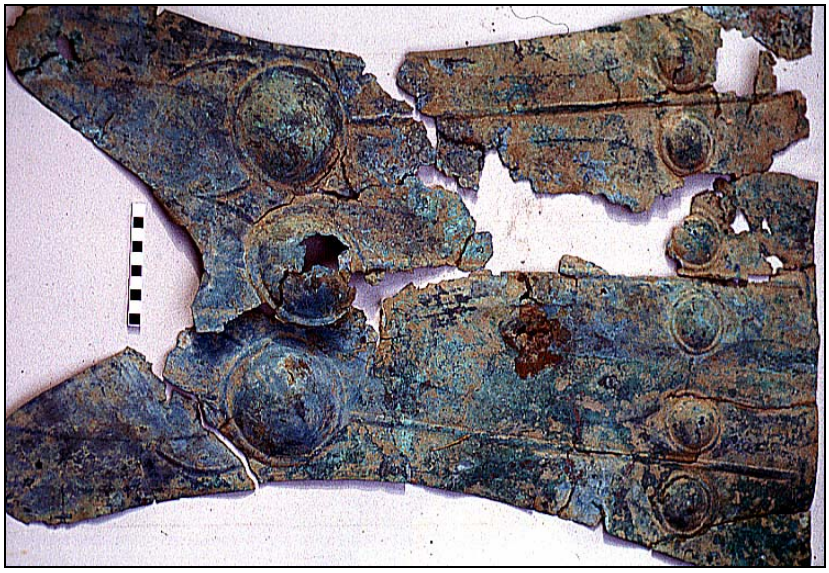

Figure 54 Complex bronze funerary figure, triple, Samon Valley.

Figure 55 Carnelian tiger beads, Samon Valley.

Figure 56 Carnelian tiger bead, Halin: same scale as previous illustration.

Figure 57 Bronze tally tiger, Qin Dynasty: length 9.5 cm (Gengwu 2001).

Figure 58 Bronze tally tiger, Qin Dynasty, naming Emperor Qin Shihuang Di (scale unknown: after Museum of Chinese History 1964).

Figure 59 Etched carnelian tiger, Samon Valley: detail of head.

Figure 60 Etched carnelian tiger, Samon Valley: length 7 cm.

Figure 61 Carnelian tiger, Ban Don Ta Phet, Thailand: length 7 cm (after Higham 2002).

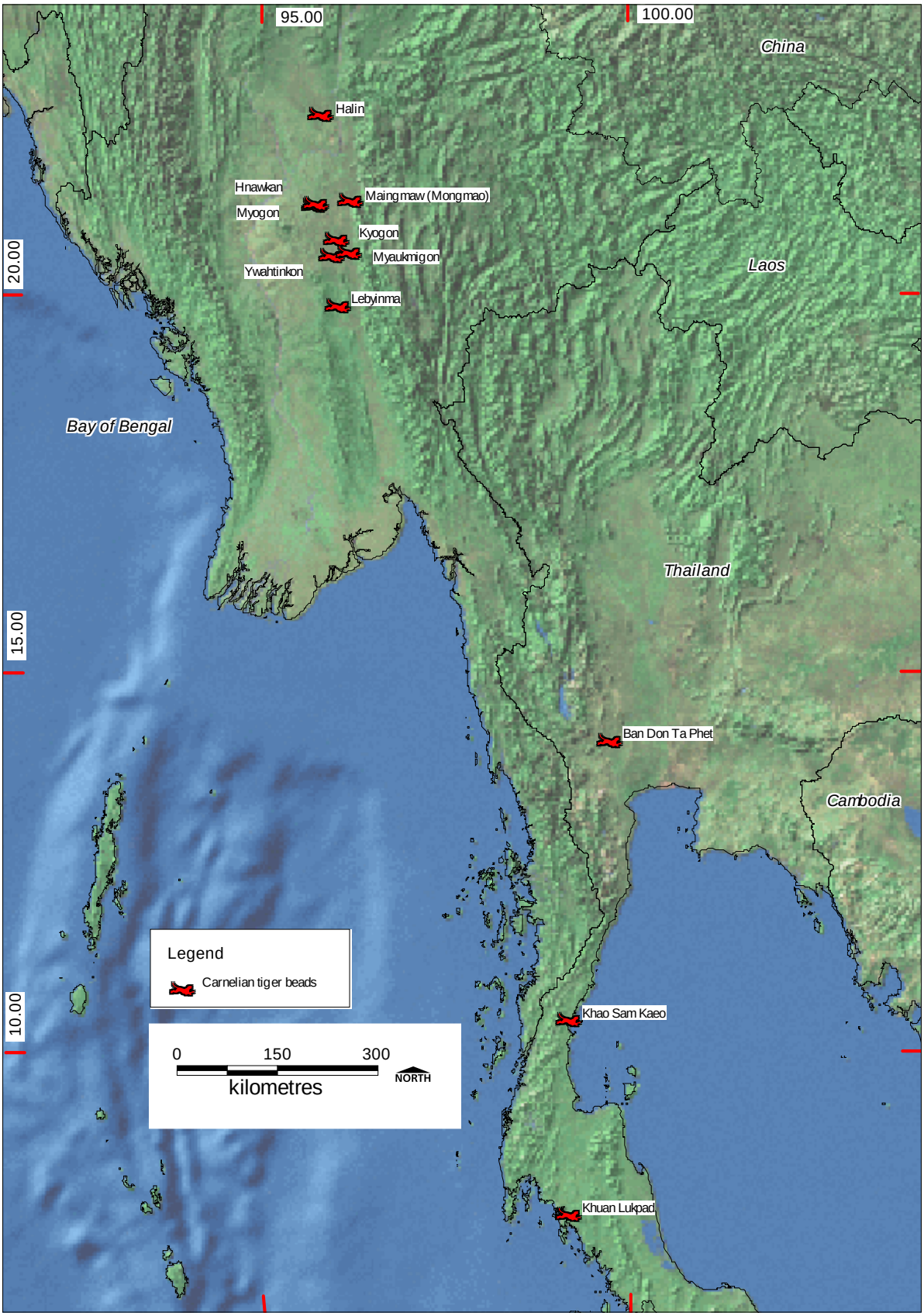

Figure 62 Carnelian tiger beads, distribution.

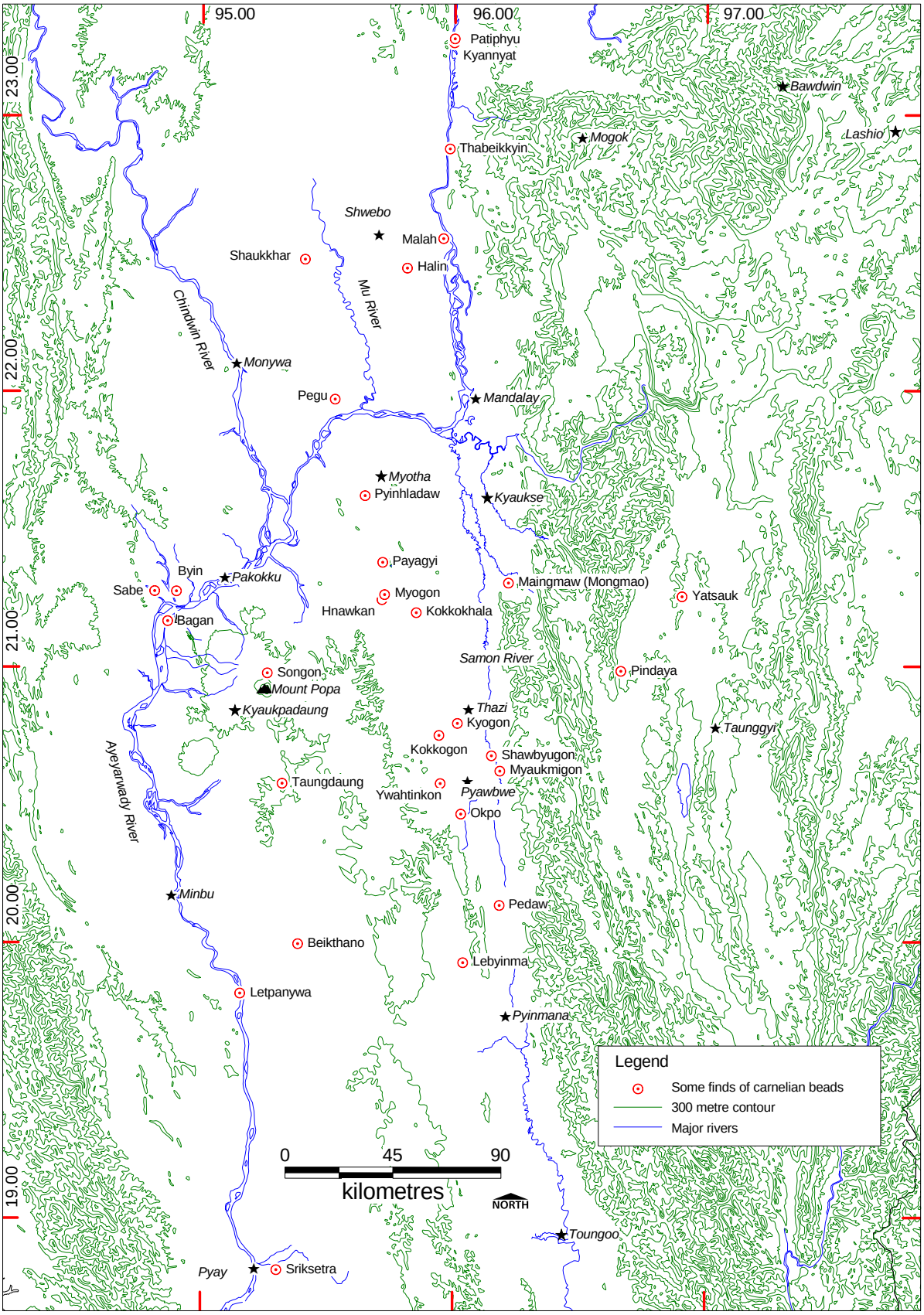

Figure 63 Carnelian beads, distribution

Figure 64 Bronze horse, found by bead diggers near Pyawbwe, 2004.

Figure 65 Spindle whorls and other artifacts from Halin.

Figure 66 Bronze axe with cloth or cord adhering, Halin.

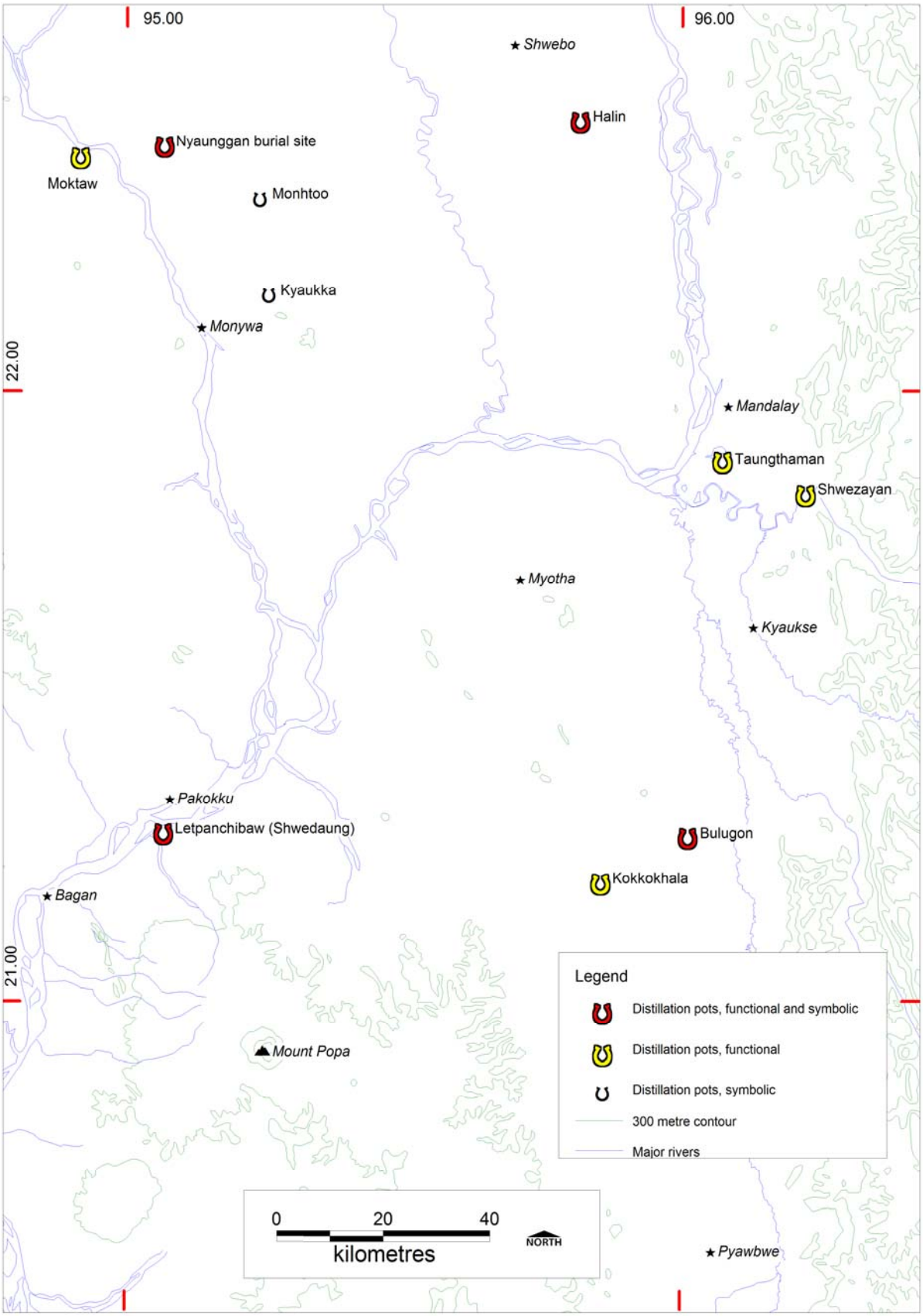

Figure 67 Earthenware distillation bowls, distribution.

Figure 68 Tubular earthenware containers, model and functional, Samon Valley.

Figure 69 Tubular bronze containers, Samon Valley.

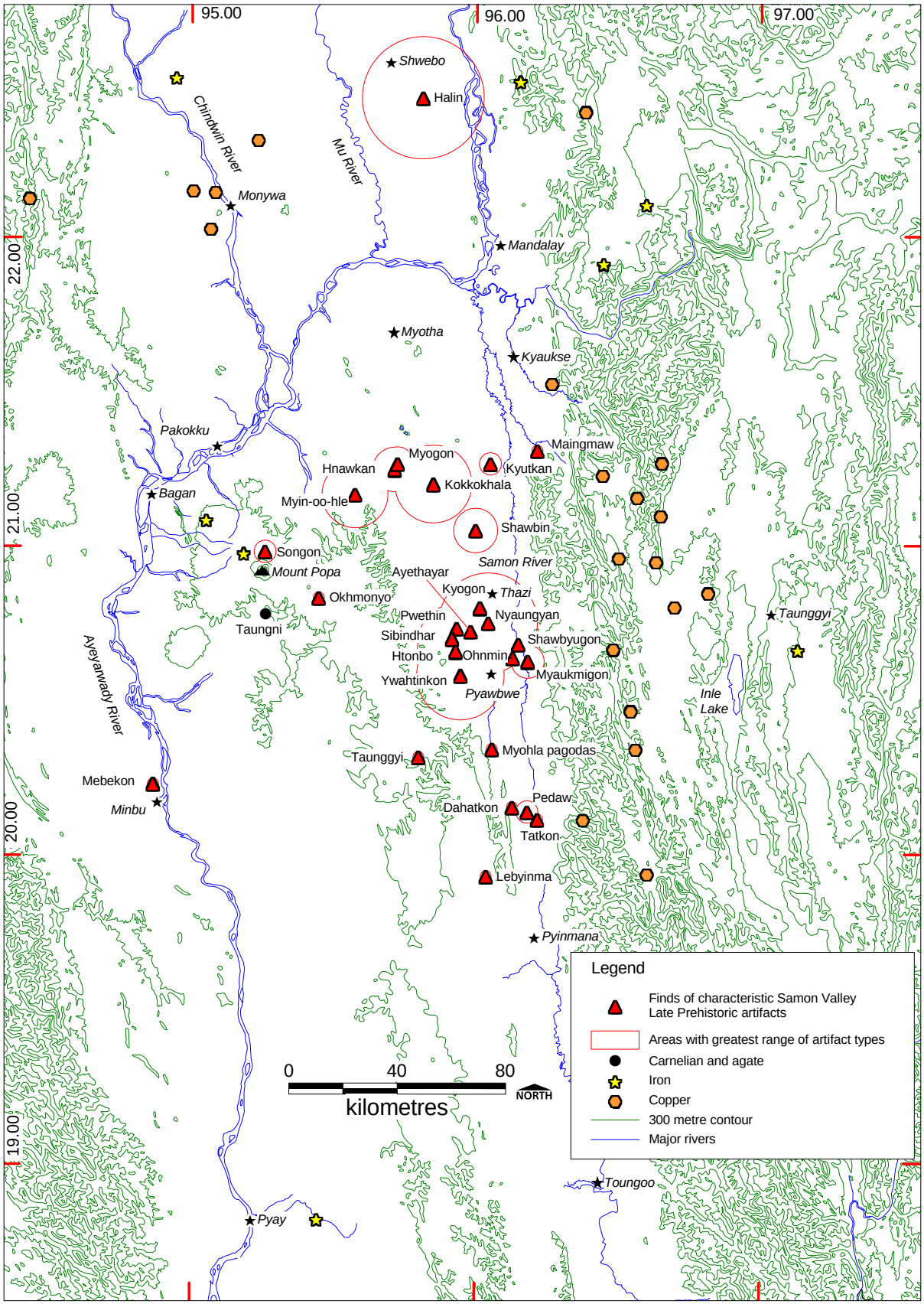

Figure 70 The "Samon Valley" culture: distribution of sites and resources.

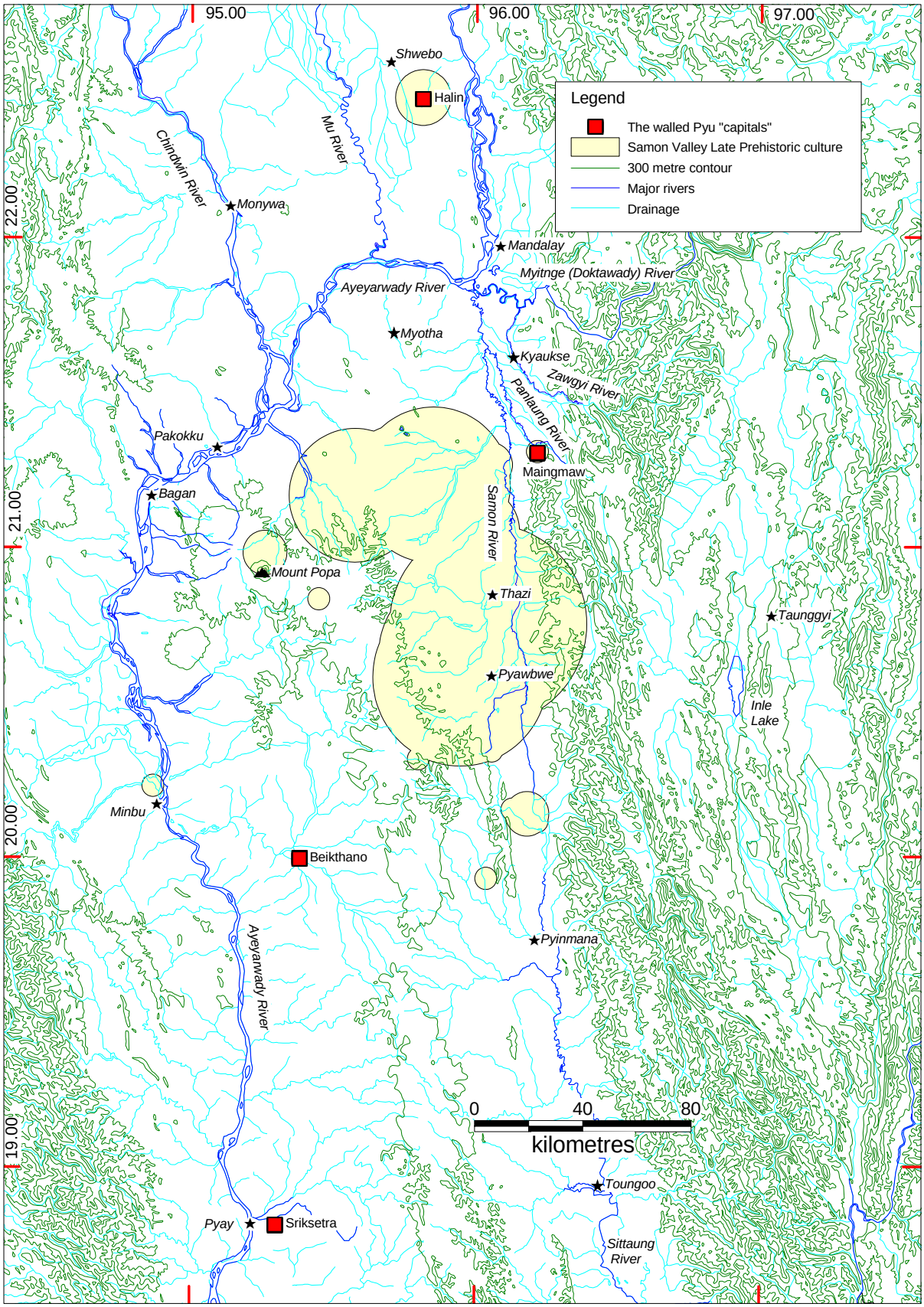

Figure 71 The proposed Late Prehistoric homeland

CHAPTER 5: CENTRAL PLACES: THE EARLY URBAN PHASE.

According to the available evidence, the Samon Valley was occupied in the Late Prehistoric period by people who were able to gain the wealth that appears in their graves by control of resources such as agriculture, iron, copper and semi-precious stones. The artifact record shows this area was more wealthy and economically successful than the rest of Upper Burma. Rice agriculture was under way, as indicated by rice husks used as temper in the mortuary pottery (Moore 2003b: 36). This chapter will propose a spatially based dispersal model for the skills in agriculture and resource exploitation that the people of the Samon Valley developed. It will be suggested that it is no coincidence that the key sites of what is generally known as the Pyu system, the four large walled settlements of Halin, Maingmaw, Beikthano and Sriksetra (for their areas compared to other first and early second millennium sites in the database, see Figure 81), sit at consistent distances (Table 4) up and down the central zone of Burma from Pyawbwe township, where the densest concentration of archaeological evidence of an economically advanced Late Prehistoric phase is found (Figure 71).

The early urban sites of Myanmar are situated in the central zone, in Arakan and around the Gulf of Martaban (Chart 1). Several sites on the southern peninsula will be dealt with later in reviewing the gulf sites, and so are not shown on Chart 1. The broad picture obtained from combining the map elements of enclosed sites (which will unavoidably include sites that have not been dated), sites recorded in the *Myanmar Archaeological Settlement Database* (see CD Rom) as Pyu or early urban, and sites recorded as having finds of fingermarked bricks and coins with auspicious symbols, the latter typologically different in the three zones, shows clustering of the Pyu sites from Shwebo to Sriksetra, with a northern outlier at Tagaung (see page 144) and a south-western outlier at Tondaw, where a Pyu inscription was found. The distribution of sites (Chart 1) suggests that Upper Burma was sufficiently isolated geographically as well as archaeologically from the west coast centres (page 146), on the other side of the Arakan Yoma mountains, and from the Gulf of Martaban and peninsular sites (page 145), to be viewed as an individual geopolitical entity. This view of the Upper Burma system as a self-contained entity is supported by the distribution of coin groups.

Aspects of urbanism.

It is axiomatic that human settlement behaviour, both within and between settlements, conforms to spatial rules in the same way that individuals in social situations interact at predictable personal distances appropriate to the occasion. A settlement can be seen as a material component of community life, in which the spatial layout of a village or town creates a “comfort zone” for its inhabitants. In Upper Myanmar, 69 sites enclosed by brick walls have been identified (Chart 1 & Figure 81) and are classified chronologically as

- First millennium or unknown,
- Likely Bagan period, or
- Likely post-Bagan period.

Walled sites have been selected as a key data type for study for the practical reason that the data is available, and because whatever other differences there may be between them, they at least share the consistent and characteristic activity of wall construction. This does not exclude the consideration of other settlements that have been identified by way of cultural context.

Individual settlements.

Individual first millennium sites are viewed here in terms of Fletcher's general model of settlement growth which considers the development of settlements in terms of the interaction and communication stresses of communal life, and how these stresses and their amelioration relate to the size to which settlements grow (Fletcher 2004). According to this model, a site area of 100 hectares is considered to be the transitional limit at which a settlement should be exhibiting characteristics that include the management of space and population with durable structures such as walls or internal barriers that remove domestic activity from public view and thus reduce social stress, and systems of stored data including numeracy, calendars and other aids to memory and communication (Fletcher 1995: 58-69). In Upper Burma, a shared system of symbols might involve the symbols transmitted on the coins of the first millennium AD (see page 122). According to this model, non-literate sites in the lower third of the range, under 30 hectares, will suffer relatively low stress levels, while at the same time, their assemblage should include mechanisms for managing material information such as decoration, which would identify people at a distance and signal their social ties. Sites in the upper two thirds would suffer increasing stress as they moved toward developing mechanisms to cope with their increasing size (Fletcher 1995: 55, 77-78). Non-literate sites under 30 hectares such as the pre-urban settlements of the Samon Valley (page 92) are therefore considered to have great potential for long-term stability.

Settlement systems.

The spacing between settlements of a particular society provides a buffer between communities which allocates resources while simultaneously allowing for desirable contact such as trade and cultural interaction. A measurable degree of spatial behaviour is implied when considering settlement behaviour, in which at the most basic level, the spatial distribution of human behaviour is taken to reflect an adjustment to the factor of distance (Garner 1967: 304). Certain distances between settlements suggest stability. Hansen suggests a general figure of a 30 kilometre administrative radius for a self-contained "city-state", a distance equivalent to a day's march for a defending army (Hansen 2000: 16-19). The defensive boundary would be greater than the practical daily operational boundary, the distance farmers could walk to and from a central place or one of its surrounding villages to their fields and at the same time be able to put in a productive day's work. Data from 20th century peasant Europe and Western Asia suggests that this distance would be between one and eight kilometres, with the optimum distance for maximising economic return at the lower end of the scale (Chisholm 1968: 43-67). In examining the settlements of Upper Burma, this thesis takes the general position, as Colin Renfrew did in his pioneering work on predicting polities from centres, that all other things being equal, the influence of a centre is proportional to a function of its size (Renfrew 1984: 54-77). This general theoretical base will be expanded on in the case studies below.

Early urban centres in a regional context.

Clusters of enclosed settlements appeared in several parts of Southeast Asia during the first millennium BC and the first millennium AD. The interpretation of many of these sites has been problematic. Around 200 circular earthworks were identified by aerial survey in the Mun River basin of Northeast Thailand in the 1940s (Williams-Hunt 1950). These have been interpreted as having water-harvesting and territorial/defensive functions, and as being indicators of centralisation (Kijngam, Higham & Wiriyaromp 1980; Moore 1988; Higham 1989: 217-228). AIRSAR ground-penetrating radar has located circular earthworks 25 kilometres north-west of Angkor. Their rounded form, which contrasts with rectangular Angkorian tanks and temples, suggests pre-Angkorian occupation (Moore 2000 p.43-44, 47). There are more than 30 circular earthworks in eastern Cambodia and western Vietnam. The largest of these is 4.87 hectares. It has been suggested that these sites "may not indicate socio-cultural evolution at all but may simply represent a materialisation of community or cultural identification" (Dega 1999). These are essentially pre-metal sites, featuring paddle and anvil pottery, spindle whorls and polished stone tools. Radiocarbon dates tentatively suggest a terminal date around 400-200 BC (Albrecht, Haidle, Chhor Sivleng *et al.* 2001).

A network of enclosed sites in Thailand's Chao Phraya Valley (Figure 72 & Figure 74) appears to have formed a regional economic system, known as Dvaravati, around the old shoreline of the Gulf of Siam by the 9th century (Vallibhotama 1992; Mudar 1999; Phasook Indrawooth 2004: 125-133). These sites are closest to the Myanmar sites in terms of chronology and size hierarchy as well as geographical location. However, they are different from those of Upper Burma in several ways. They appear to be earthworks rather than brick structures, and they cluster around the old shoreline of the Gulf of Siam and not along secondary rivers (Thiva Supajanya & Vanasin 1983; Thiva Supajanya 1995). Assuming, in the absence of contrary data, that the Thai sites were contemporaneous, Mudar defined an administrative hierarchy based on the site sizes, placing Nakhon Pathom as the supra-regional centre, with seven centres in the sub-regions. Nakhon Pathom is a double moated site, and Mudar points out that before the outer moat was added, enclosing 600 hectares, the site was in the same general 300 hectare range as the next two sites in the rank-size distribution (Figure 73), suggesting that an early phase of the system may have involved three competing polities (Mudar 1999). This variation over time in the enclosure of individual walled sites is not seen in Myanmar except, possibly, in the early phase of Maingmaw (page 126).

Dating and characterising the Upper Burma urban centres.

Origins- sequential or parallel?

An equivalent size-distribution ranking of the Myanmar sites would place Sriksetra as the supra-regional centre, with Beikthano, Maingmaw and Halin next in the hierarchy. Considering the early urban sites as a system rather than as a sequence, and assuming that the influence of a centre is proportional to its size, the buffering function in MapInfo has been used to create circles around the walled sites, with the radius of each circle proportionate to the area of each site (Figure 106). The size of the settlement is assumed in this exercise to reflect the amount of resources under its control, hence its ability to influence the surrounding area. In this example, the radii outlined in red

have been set so that Sriksetra and Beikthano border each other, while the areas shown in yellow consider the possibility that if Beikthano really did flourish only from the 1st to 5th centuries AD (Aung Thaw 1972: 6) and was subsumed by Sriksetra, the regional reach of Sriksetra may have extended north. In both cases, and on the understanding that this spatial model ignores landform, and takes the size of each enclosed site as its only variable, not only are buffer zones maintained between the major centres, but the hypothesised Pyu homeland, the core area where base zone inertia would have repressed any local development of walled central places (as discussed above, page 92), does not come under the aegis of any of the large polities. Nor does Bagan, which would have been able to develop away from the shadow of the central places. The spatial evidence suggests each of the central places should have been in a position to control its own sphere of influence while maintaining an ongoing relationship with the others.

If Hansen's city-state model is applied to the Pyu cities, their independence from each other is even more strongly supported. He defines a city-state as "a highly institutionalised and highly centralised micro-state consisting of one town (often walled) … settled with a stratified population (which is) ethnically affiliated with the population of neighbouring city-states … political identity focused on the city-state itself … large fraction of the population is settled in the town, the others are settled in the hinterland, either dispersed in farmsteads or nucleated in villages, or both". The maximum extent of the hinterland, he suggests, is around 30 kilometres, a day's march from the urban centre (Hansen 2000: 16-19). Letpanywa (page 132), 30 kilometres by foot and boat from Beikthano (page 128), fits this model neatly as a possible satellite of Beikthano. In the case of the large Pyu cities (Table 4 & Figure 74), the 30 kilometre range would leave a buffer zone of a further 30 kilometres or more before any city impinged on the territory of another. The defensive boundary would be greater than the practical daily operational boundary, the distance farmers could walk to and from the central place or one of its surrounding villages to their fields and at the same time be able to put in a productive day's work. As discussed earlier (page 117), studies in 20th century peasant Europe and Western Asia suggest that this distance would be between one and eight kilometres, with the optimum distance at the lower end of the scale (Chisholm 1968: 43-67).

The indigenous chroniclers of Myanmar and many western or western-trained historians have used a sequential model for periodising the early urban centres (see Chapter 1). The account in the Za-bu-kon-cha (page 29) is an example of a history that legitimises a new centre of power by linking it to past capitals. The notion that a nation must have a single capital, which may change locations over time for various historical reasons, but still represents a continuous authority, was equally appealing to historians in the colonial period, part of whose brief was to clearly identify the nation and its boundaries, and therefore its central administration. In the next part of this chapter, a review of the archaeological and dating issues will be undertaken to support the notion that the early urban centres of Upper Burma are better seen as part of a system of politically autonomous, contemporaneous settlements. This is not to suggest that all the walls that characterise the central places were built on the same day, or even in the same century, but to propose that the walled settlements represent an intra-regional pattern of occupation with unique characteristics, rather than the sequential migrations of a single ethno-linguistic group. The best available direct evidence for the construction of the walls is the radiocarbon data from Halin (page 132 & Figure 94). This admittedly small sequence of absolute dates suggests that the construction of fortifications took place within an outer date range of AD 50-450 (the equivalent of 2-sigma value, the longer line on the graph) or at a less conservative estimate, AD 125-400 (the equivalent of 1-sigma value, the shorter line on the graph).

Walls and gates.

In the same way as Mudar suggested for the Chao Phraya basin sites (Mudar 1999: 22), the walls of the early Myanmar enclosed settlements could "signify the presence of supra-site administrative functions". As well as the site-defining walls, inward-turning corridor-gates provide a space in which to physically contain and regulate the flow of people or goods passing through. Consistently 5 metres or so wide, the corridors range from 25-30 metres long at Beikthano to 67-82 metres at Halin, and 68 metres at Sriksetra (Kan Hla 1979: 100; Aung Myint 1998b: 30-32). The north-west gate at Sriksetra contained alcoves which might suggest spaces in which to perform some administrative activity, to keep goods or to post personnel. In 2001 the author observed similar alcoves and outbuildings in gate 21 at Halin (Figure 99), which has been excavated by the Mandalay branch of the Archaeology Department. The presence of a considerable number of gates on each city suggests that access to the enclosed area was convenient to people coming from any direction.

A defensive function for the walls is difficult to attribute directly. Iron spears and arrowheads and bronze-handled leaf-shaped iron swords, sometimes in scabbards (page 81, Figure 42 & Figure 43), have been located at Halin (Pauk Pauk 1999b; Nyo Win 2001b; Pauk Pauk 2001b), although their relationship to the period in which the walls were functioning is not clear. Caltrops, multi-pronged iron spikes apparently designed to be strewn on the ground to discomfort horses, elephants or soldiers in battle, have been found outside the gateways at Halin (Myint Aung 1970: 61; Aung Thaw 1972: 14). Given the extensive areas covered by Halin, Maingmaw, Beikthano and Sriksetra, one might wonder whether despite the use of caltrops, cavalry may have given attackers an advantage during a siege, leaving them able to rapidly reach less strongly defended gates or sections of wall. Of course one could also wonder whether mounted soldiers might have been of similar value *within* the walls, racing quickly to whichever section was under attack. Direct evidence of warfare, as distinct from the presence of weapons and walls that may have been designed as fortifications, is difficult to find. The sum total of weapons found at Beikthano (page 128) was one arrowhead, and while there is evidence of fire at Halin and Beikthano, it is not easy to determine from the archaeological data whether this was the result of an attack, an accident while a city was occupied, or an accident after the particular structures fell into disuse.

Fingermarked bricks.

There has long been a general impression in Myanmar that earlier bricks were larger in size, and that reduction in size over time may have followed a pattern. A description of a 12th century pagoda in Mandalay says, for example, that "bricks of these dimensions (53 cm x 35 cm) and even larger ones were used only in building the oldest monuments in Burma, the size gradually diminishing to that now in common use" (ASB 1917: 8). Bricks with fingermarks are commonly found in the early urban centres, and have at times been considered to be characteristically Pyu (Aung Myint & Moore 1991), although examples have also been noted as far afield as U Thong, a Dvaravati site in Thailand (Moore 2004: 5, quoting an unpublished paper by San Win). Marking bricks with simple signs (Figure 109 & Figure 110) would have been a valuable administrative tool in a largely non-literate but functionally numerate society. These bricks are not only used to construct walls, nor are they exclusive to walled cities, as the finds from Letpanywa (page 132) and other sites recorded in the database (Chart 1) illustrate. Moreover, fingermarked bricks continue to appear among bricks with Pyu letters and numbers at Sriksetra (Luce 1985 Vol 2, plates 35 & 36) and among bricks with pictorial stamps and Pyu and Burmese script at Bagan (Figure 111, Figure 112, Figure 113, Figure 114, Figure 115, Figure 116 & Figure 117) in

buildings that have been dated up to the 14th century (see Chapter 7). Fingermarked bricks as such are not, therefore, definitive exclusively of Pyu or early urban sites, and need to be read carefully. It may be that variation in size of bricks, as well as a reading of the markings, could be used as data to relate sites and perhaps construction periods. A preliminary experiment in multivariate analysis by the author suggests that such a study would be viable once more data becomes available (Hudson 2003c). A substantial database of brick sizes exists for India (Mishra 1997), but data sufficient for a statistical study of Myanmar brick sizes, which could use the Indian data for comparison, is yet to be collected.

Coins.

Coins are, along with beads, perhaps the most portable pieces of archaeological evidence in Myanmar. They are also the likeliest to be lost to scholars, and for that matter, to official notice. For example, a cache of more than 200 coins with Arabic inscriptions was reportedly found at Sriksetra in 2001-2002, but was only noticed after it hit the international collectors' market (Mahlo, personal communication 2002). The rush of coins direct from finder to overseas market is well recorded in other centres in the region such as the early 1st millennium site of Klong Thom on the Thai peninsula (Wicks 1992: 221-222). Early coins may be copied. There is anecdotal evidence of goldsmiths producing gold versions of particular ancient silver coins in response to enquiries from collectors. Ancient coins have been reproduced for ritual reasons. In the late 18th century, a coin with a *srivatsa*, a shield-shaped symbol common to Buddhist and Hindu iconography (Gutman 1978: 13-16 & Figs 1-32), enclosing a conch on one side, and a *bhadrapitha* or throne symbol (Gutman 1978: 17-18) on the other, was copied in India at the request of the court of Ava, with the aim of including the reproductions in the construction of the Mingun pagoda near Mandalay (Phayre 1882: 35 & Plate 5, Figure 2). Coins continue to be found, as the 2002 hoard at Beikthano indicates (page 128, Figure 84 & Figure 86), and while provenance may be an issue, there are substantial numbers of samples, with at least 30 coin types, some of which are represented by "many thousands" of specimens (Mahlo 1998: 89). Some of the symbols on the stamped coins of Myanmar are unarguably of Indian origin. The sun, wheel and swastika appear in South Asia as early as the Harappan period (c. 2500 BC), and along with the *srivatsa* they appear on early pottery, coins and monuments (Sharma 1990). Coins punch-marked or cast with state symbols were used by the "sixteen great principalities" of pre-Mauryan India from the 6th century BC (Chakrabati 2000).

Relatively few coins have been formally excavated in Myanmar. Some key examples with an excavation provenance that have been published, from Tagaung, Halin, Maingmaw, Sriksetra, Kyaikkatha (Win Maung 2002) and Beikthano (Aung Thaw 1968) are included here for reference (Figure 79, Figure 80, Figure 87, Figure 101, Figure 107 & Figure 108). Coin typologies of Burma have been attempted a number of times (Robinson & Shaw 1980: 8-15; Wicks 1992: 111-155; Mahlo 1998; Win Maung 2002), which may suggest that to the developers of each new typology, at least, the previous effort was not satisfactory. The broader regional spread of first millennium coins bearing auspicious symbols has also been outlined (Gutman 1976, 1978; Mitchiner 1982; Wicks 1992).

The large variety of coin types in Myanmar suggests that they were produced by a number of different centres, which had in common a repertoire of auspicious symbols, local preferences for certain symbols and symbol combinations, and sufficient autonomy as well as silver resources to produce their own coins. The motivation for producing the coins cannot be read directly, and none carry dates or names, but the 1:4 denominational structure of some of the Upper Burma coins

strongly suggests that currency was one of the uses (Wicks 1992: 114). A coin can stand simultaneously as currency and as some other kind of signifier, with no necessary contradiction. In modern times, for example, Thailand issued a 60 baht banknote to commemorate the auspicious 60th birthday of the king. For cultural reasons this note was rarely circulated, instead selling above face value as a collectible or for use as a religious donation. Distance from the source of the minting of a coin may have an affect on its function. There are ethnographic examples of coins, notably antique coins from British India, ending up as part of tribal costume in Myanmar (Min Naing 2000) and neighbouring countries (Lewis & Lewis 1984; Anderson 1993). Closer to the issuing polity, the symbols that give a coin its significance may support its value as currency despite variations in metal content. For example, three "Halin" coins tested for silver content ranged from 93 to 49 percent (Theingi Aung 1983).

Mahlo (1998) has distinguished five groups of Pyu coins, and his list, modified with recent data from Win Maung (2002), is used here to produce a tentative distribution map (Figure 118) and suggest some ways in which the coinage might relate to the early urban central places and their satellites. It must be stressed that this is a sample based on the available descriptions, and the quantitative data could be better. Not all locations recorded in the *Myanmar Archaeological Settlement Database* (see CD-ROM) as having coin finds have come with descriptions suitable to place the coins in any of Mahlo's groups. Some of the finds that are mapped, therefore, remain outside the areas nominated as coin-type ranges.

Mahlo's coin groups.

1. Rising sun symbol. The most common coin found, ranging from Shwebo in the north to Minbu and Taungdwingyi in the south. Often called the "Halin" coin.

Probably minted from silver from the Shan Hills (Figure 5), the "Halin" coin (Mahlo 1998, Figure 1) with a rising sun symbol (Figure 85) is also found at Maingmaw and Beikthano. Coins with the rising sun emblem on one side and symbols including sun, moon and swastika on the other side were also reported almost a century ago at Shwenyaungbu, east of Pyawbwe (ASB 1907: 14). Mahlo does not consider this coin to be common at Sriksetra, although it is represented with one excavated specimen (Figure 107, lower right). There have been finds on the Myanmar peninsula (Win Maung 2002), across to the Dvaravati sites such as U Thong (Figure 118), and a deposit of several hundred found at Nakhon Si Thammarat (not shown on the map), 420 km south of Tenasserim. This coin is seen in Vietnam and was copied locally in the Dvaravati centres of Thailand. It has been described as the most widespread of all ancient coinage from southeast Asia, but with an origin in Upper Burma (Wicks 1992: 116-119, 159-162). The range of this coin type might suggest a stable, long-term relationship between Beikthano, Maingmaw and Halin, over a timescale that also allowed the coin to spread to Thai sites and to pre-6th century AD Oc Eo (Mitchiner 1982: 6).

2. *Bhadrapitha* (throne) symbol. 3 types, mainly found around Sriksetra.

These coins (Mahlo 1998, Figures 3-5) also appear at Beikthano (Aung Thaw 1968: 54, 151). Mahlo suggests that they were circulating between the 5th and 9th centuries AD, and as they were predominantly found only around Sriksetra (Figure 107, upper right and left of picture, shows three excavated examples) the city "in spite of its size and wealth can hardly have been the capital of a unified Pyu empire" (Mahlo 1998: 93). This view supports the hypothesis of this thesis that there *was* no unified Pyu empire. There have been finds of these coins as far north as Halin, which suggests a continuing relationship between the central places of the Pyu system.

3. Central Burma heterogeneous group, 8 types, often featuring rising sun or sun/wheel. Located in the area between Halin, Mandalay, Mingyan and Yamethin.

These coins suggest to Mahlo manufacture by several "small Pyu realms" (Mahlo 1998: 93, Figures 15-22), and could indicate that the large central places were not always the source of coin production and dissemination.

4. Coins with "debased" copies of the auspicious symbols. Found in eastern central Burma and western Shan states.

Mahlo suggests that these coins represent a copying of the original symbols, notably the Halin rising sun and *srivatsa*, with no understanding of them, perhaps indicating a late period of unstable communal life (Mahlo 1998: 94, Figure 23). There are further examples from Loikaw and Pindaya, in Shan State, and also from Sriksetra, of coins that seem to drift away from the consistent presentation of recognisable groups of symbols (Win Maung 2002 Figures 35, 36, 42). These have been included in this group on the basis of Mahlo's definition. These coins are found the length of the country, from Bhamo to Tavoy. Another example of a coin that departs from a coherent program of symbols is the excavated find from San-nyat-khone, near Tagaung (Figure 101).

5. Gulf of Martaban coins, featuring sankha (conch), pot, lion or lotus wheel. Kyaikkatha is a key centre.

Mahlo considers these coins to be typologically Pyu, belonging to the 9^{th}-10^{th} century (Mahlo 1998: 94, Figures 24-28). This is the most problematic of his groups. The conch, a symbol of good fortune from Tibet to Vietnam, is by no means exclusive to the Gulf of Martaban. A stone mould for a conch coin has been found at the Dvaravati site of Chansen in Thailand (Phasook Indrawooth 2004: 133). The conch also forms part of the repertoire of symbols in samples excavated at Sriksetra, Halin and Maingmaw (Figure 79, Figure 80 & Figure 107). Some authorities place the Kyaikkatha coins earlier than Mahlo, in the first half of the first millennium (Robinson & Shaw 1980: 13-15; Mitchiner 1982: 8-9; Wicks 1992: 111-114). The focused distribution of these coins around the Gulf of Martaban (Figure 118) suggests that they may not be directly related to the Upper Burma Pyu system and its coinage.

Gutman (1978: 9-10) has suggested that the disappearance of coinage at centres such as Bagan, Sukothai and Angkor, in regions where coins had been used previously, was because surplus wealth that had been redistributed through the leadership, the Pyu chiefs in the case of Upper Burma, was instead redistributed through monastic and temple complexes. At Bagan this redistributive pattern appears to have been modified by increasing monetarisation in the 13^{th} century, when specific weights of silver began to appear regularly in inscriptions (Wicks 1992: 131-142). While coins are generally not known at Bagan, there is a tantalising reference to the discovery of 21 metallic coins, "of two sizes, one measuring an inch (2.5 cm) and the other ¼ of an inch" (0.64 cm) in circumference in an "elongated vase", which were deposited in the Bagan museum (ASB 1915: 37). If this measurement is correct they would have been uncharacteristically tiny coins. Perhaps the writer had meant to say diameter. This would have made them more of a typical Myanmar coin size, the smaller ones comparable to the Kyaikkatha coins from the Gulf of Martaban (see, for example, Robinson & Shaw 1980; Wicks 1992; Mahlo 1998). However as far as can be seen from the official records the coins were neither described further nor heard of again. Pieces of silver with 20% lead content, along with a gold ring, were found at Twinywa, also known as Monatkon, on the riverside at the southern end of the Bagan monument zone (Chart 7) but the material was not considered worth acquiring (ASB 1917: 42).

Coin distribution: summary and analysis.

The coin distribution map (Figure 118) indicates wide use of the **Group 1** coin in an area covering much of the upper Ayeyarwady and the Samon and Panlaung valleys. The fact that it is found away from the central places, the large enclosed sites of Halin, Beikthano and Maingmaw, as well as within them, suggests a link between the smaller sites and the central places, and a relationship between Maingmaw, Beikthano and Halin. The spread of the Group 1 coin type to southern Burma and U-Thong, as well as Nakhon Si Thammarat and Vietnam, suggests extensive use over both time and distance. The **Group 2** coins are predominantly found at Sriksetra, although they also reached Beikthano and Halin in small numbers. Their distribution suggests that Sriksetra, while the largest of the central places, did not dominate the other large sites, or for that matter the smaller outlying centres, economically or administratively. **Group 3** indicates independent local manufacture of coins, with dispersed autonomous centres remaining aware of and sharing the cultural elements of coin production, the auspicious symbols. The distribution of the later "debased" **Group 4** coins suggests that peripheral centres kept making coins after the decline of the cultural influence of the central places. People were no longer familiar with the auspicious symbols, but were still familiar with the idea of coinage. However with no central coin-making model to reinforce the economic and administrative aspects of the later coins, these coins may have been valued more for their bullion weight. It would only have been a short step to abandoning the stamped symbols, which had lost meaning anyway, and taking the path of using bullion by weight only, which would make precious metal a measurable barter item. Finally, the concentration of the **Group 5** coins around the Gulf of Martaban suggests that whether they were produced early in the first millennium AD by small maritime polities in contact by sea with India, or as Mahlo suggests, much later, in the 9th or 10th century, they belong in either case to a system separate from the Upper Burma Pyu/Early Urban system.

The major "Pyu" settlements.

Spacing of the Upper Burma settlements across the landscape.

Table 4 Pyu homeland to Pyu "capitals": distances.

DISTANCE: km	Maingmaw	Beikthano	Halin	Sriksetra
Pyawbwe	80	95	209	213

The major Pyu settlements, viewed from the hypothetical Pyawbwe homeland, are separated from their nearest neighbour by a space of between 80 and 129 kilometres (Table 4). The space between settlements will be affected by land use. In the case of the Pyu settlements, exploitation of geographically homogenous ecological zones and landscapes can be suggested as a reason for the consistency in distance.

Water management and ecological zones.

The early urban inhabitants of Upper Burma occupied and efficiently exploited a particular environmental niche, the valleys of the tributary streams of the dry zone, where water diverted by weirs was used for irrigation and to top up storage tanks (Stargardt 2001b). This cost-efficient system used and still uses existing streams as arterial channels. At least 500 wooden weirs were reported in 1977 to be functioning around Pyay, the modern city nearest Sriksetra, irrigating areas of between 30 and 200 hectares (Ito 2000: 76). A review by Donovan *et al* of the location and ecological features of the four major early urban sites and two of their satellites, Waddi and Thegon, indicates a mixed economy in a mixed landscape, with nearby hills providing wood for fuel and construction, upland fields providing fibre and oil crops, and irrigated lowlands providing rice. The authors suggest that the interior of the walled cities was not particularly suitable for wet rice cultivation, but may have been used to accommodate animals. The availability of the mixed products of this diverse local environment suggests that each settlement had a self-sufficient economy (Donovan, Fukui & Ito 1998: 121-122).

Maingmaw (Hmaingmaw, Mongmao).

The walled site of Maingmaw was identified in the 1960s from aerial photographs, and explored and excavated in the 1970s. Departmental reports in Burmese, circulated in a limited way as photocopies, describe finds, identify the city as a brick construction involving a range of fingermarked bricks and confirm that it shares cultural elements with Beikthano, Halin and Sriksetra, the three large early urban period settlements that were already known when Maingmaw was explored (Aung Myint 1977, 1978; Sein Maung U 1979, 1982). Structurally, Maingmaw is the most complex of the large walled settlements. It has a circular wall enclosing 44 hectares (Maingmaw 1 on the Panlaung Valley size hierarchy chart, Figure 78) surrounded by rectangular walls covering 100 hectares (Maingmaw 2: Figure 78). An outer circular wall encloses 625 hectares (Maingmaw 3: Figure 78) as measured from the unrectified aerial photo (Figure 76 & Figure 77, and see Appendix 1 for a discussion of the problems of rectifying Burmese aerial photos with maps). Crop marks visible in the photo within the inner circular wall suggest another smaller rectangular wall, possibly enclosing 6 hectares, but this has not been confirmed on the ground. Individual buildings at Maingmaw have not been precisely mapped, though around 10 ruins are known locally. A ritual structure decorated with bricks bearing a *bhadrapitha* design and pictures of a horseman has been excavated and conserved (Sein Maung U 1981; Aung Myint 1999a). A cemetery (Figure 77) with urns containing etched onyx beads was dug out by local people in the 1920s (Sein Maung U 1981). Coins with auspicious symbols and carnelian, agate and chalcedony beads are still regularly discovered by farmers. Two brick mounds outside the southern wall were pinpointed by the author with GPS on a field trip in 2001 (Figure 77). Maingmaw is bisected by a canal which is the source of irrigation for modern rice paddies. The canal cuts through the rectangular walled section as well as the circular external wall, and a convincing case has been made for it to post-date these structures (Ito 2000: 79-80). Sein Maung U tentatively dated the site to between the late 2nd and 6th centuries AD on the basis of cultural similarities with Halin, Beikthano and Sriksetra. He suggested that the absence of written materials was an indication that the city was not functioning by the time the Pyu script appeared, hence his terminal date (Sein Maung U 1981). More recent finds suggest that this is not entirely the case. Lead rolls with traces of writing have been found (Aung Myint 1999a: 39), although this was during surface survey (Moore & Pauk Pauk 2001: 44), which leaves their provenance in doubt. Of the fingermarked

bricks published for Maingmaw, one bears what may be the Pyu number 1000 (Aung Myint 1999a: 43 Illustration 18).

Table 5 Enclosure dimensions of the largest first millennium AD walled cities.

Site	Elite centre (hectares)	Inner walled areas (hectares)	Outer walled area (hectares)
Maingmaw	Not identified	6(?), 44, 100 (all these are problematic- see discussion)	625
Beikthano	18		859
Halin	32		629
Sriksetra	32		1452

The 44 hectare inner circular wall (Maingmaw 1) has become known as the "palace" site. There are no other round structures other than solid circular stupas in early Upper Burma, and as an enclosure, rather than a structure, it may indicate an earlier occupation phase rather than an élite building. The irregular rectangular structure between the two round walls (Figure 77) is also problematic. As will be seen below, the other major sites, Beikthano, Halin and Sriksetra, have inner rectangular structures that appear, with good evidence in the case of Beikthano, to have been élite or administrative centres. The rectangular walled area at Maingmaw (Maingmaw 2) is considerably larger, both in itself and in proportion to the outer walls, than the putative élite sites of the other major settlements (Table 5). This variance from the pattern may represent a local idiosyncrasy, but it is also worth considering that it could be a later construction, perhaps from the Bagan period, and perhaps focusing on a religious site that still exists in the very centre of the old walls. There is a series of walled Bagan period sites (Luce 1959a, 1959b; Win Maung 2000b) along the Panlaung and Zawgyi rivers (Figure 75).

Just west of Maingmaw (Figure 75 & Chart 1) are the villages of Kume and Pwesonkon, where Pyu artifacts have been found. Htangon, to the south, yielded rising sun/*srivatsa* coins (Sein Maung U 1981). Pinle/Myodwin is a horseshoe or cup-shaped 31 hectare walled enclosure that uses fingermarked bricks. It has been called a "Pyu satellite town" (Aung Myint 1998b: 18-19, 27) but the bricks may be recycled from Maingmaw, and there is considerable Bagan period evidence including the similarity of the shape of the wall with other dated Bagan period sites (Luce 1959a: 41; Luce 1959b: 82; Win Maung 2000b) so it is classified here as Bagan period rather than early urban. At 50 kilometres to the west is Waddi, a 202 hectare walled site which has been confidently identified as early urban (Aung Myint & Moore 1991; Moore & Aung Myint 1993; Aung Myint 1998b, 1999a). There is also a 50 hectare walled site, Pwabetsan, 10 kilometres northeast of Maingmaw, which was visited in 2003 by Win Maung, but has not been further explored or excavated.

The inner circular walled centre at Maingmaw (Maingmaw 1), and perhaps Waddi, might represent early central places in agricultural lands settled or developed on the northern boundaries of the heartland. "Maingmaw 3", the area enclosed by the outer wall (Figure 78), might then represent the subsequent expansion of this central place. The sequence and absolute dating of the enclosure in walls of Myanmar's early urban settlements is an issue that could be approached by the thermoluminescence dating of the bricks. There has only been one attempt so far to do this, the sampling of a brick from Beikthano, which dated to AD 1060 (see sample 1009, page 281). This

single result stands at least as encouragement for a future program of absolute dating and for the application of improved techniques.

Beikthano Myo ("Vishnu City").

Beikthano sits in the Yin Valley, just above the junction of four streams, which would have given the settlement access to multiple irrigation sources, plus water storage in the In-gyi, a tank that appears to have been an integral part of the walled settlement (Figure 83) and still functions today. Beikthano, whose central elite complex (Figure 83, item 19) is built over what may be a layer of habitation debris from a pre-urban village, therefore had an ecological advantage that would have allowed it to dominate its upstream neighbours economically and become the central place of a regional system (Stargardt 1994: 126-130, 136). The 850 hectare site has evidence of well established iron working, with discoveries, mainly at site 2, a structure interpreted as a monastery, of over 200 kilograms of nails, sockets, plates and other construction hardware. Only one item suggesting a weapon, an iron arrowhead, was recovered, at gate 15 (Aung Thaw 1968: 53-54). The brick gateways (Figure 83, items 13 & 15) curved inward at right angles to the city wall to form corridors up to 30 metres long (Aung Thaw 1968: 90, 93; Aung Myint 1998b: 30). The gateways excavated both had remnants of iron sockets, presumably for gateposts, about two thirds of the way in, suggesting provision for strict control over entry, as someone approaching the gate would have been required to stand within the corridor. Finds of coins with auspicious symbols include the recent discovery of a pot containing 18 rising sun/*srivatsa* coins, Mahlo's Group 1, a type also found at Maingmaw and Halin, (Figure 84, Figure 85 & Figure 86), in a mound outside the east wall (Nyein Lwin, personal communication 2002). Pottery is occasionally stamped with *srivatsa* or pairs of fish (Aung Thaw 1968: 28, 138). Stamp-decorated pottery occurs in both Pyu and Dvaravati sites. The regional introduction of this technique has been credited to the potters of Gupta and post-Gupta India between the 4th and 8th centuries AD (Phasook Indrawooth 2004: 135).

Problematic finds at Beikthano include a stone slab from building 2 with a floral pattern engraved on it which was interpreted as a votary (Aung Thaw 1968: 52-53, 148), although it is more likely a jewellery mould similar to those found at Oc Eo (c. AD 100-600), Chansen and U Thong (Bronson 1969: 142; Miksic 2003). Other regional similarities occur with coins (Aung Thaw 1968: 151), including the 2003 hoard (Figure 84 & Figure 85), which have close parallels at U Thong, Oc Eo and Cambodia (Gutman 1978: 14-15, Figs 11 & 12; Mitchiner 1982: 5, Figs 1-3), and inscribed seals (Aung Thaw 1972: 8) with counterparts that have been found at Sri Lanka's 2nd-3rd century AD Jetavana stupa in Anuradhapura (Ratnayake 2003: 42), 4th century AD Vesali in Arakan (Gutman 2001b: 7) and 5th century AD Khuan Lukpad on the Thai peninsula (Miksic 2003: 27-28). There is an intriguing record of finds of a miniature bronze feline and another bronze resembling a *hamsa*, or brahmani duck, at gate 15 (Aung Thaw 1968: 10-12, 54-55, Fig 84). The stratigraphic context of the finds is not described in Aung Thaw's report, and they might represent later deposits. The findspot is 500 metres from the extant village of Inywagyi. Authorities generally place these bronze artifacts, which are frequently animal-shaped, from the 17th century onward, when their use as weights and measures becomes well-recorded. In recent times they have acquired the tag "opium weight", apparently to enhance their appeal as souvenirs to backpackers who began to arrive in significant numbers in south-east Asia in the 1960s (Braun & Braun 1983; Gear & Gear 1992; Aye Myint 1993 Figs 372-375, 738-741; Gear & Gear 2002). Finds such as this serve to emphasise the need for caution in interpreting sites such as Beikthano where the recording and publication of the stratigraphic location of items excavated has not been as high a priority as the uncovering and identification of structures and works of art.

Table 6 Radiocarbon dates at Beikthano.

Sample	Type and location.	Radiocarbon date	Calibrated date range at 95% probability.
I-434	Charcoal: site 9, phase I	1950±90 BP	**180 BC-AD 260**
NZ-452	Charcoal; site 9, phase II	1890±95 BP	**100 BC-AD 390**
NZ-451	Charcoal: site 11, Phase I	1725±95 BP	**AD 80-540**
NZ-453	Charcoal: site 11, phase II	1650±85 BP	**AD 210-610**

Beikthano came to official notice in 1896, when engineers building a road found brass cups and silver coins which they interpreted as Indian. Local people believed the city had been ruled by a princess, Beikthano Minthami, who owned a drum which, when sounded, would bring floods to drown any invaders. This legend was also attached to a site in the Upper Chindwin. Beikthano was first excavated in 1904-1905. Initial finds included funerary urns (Scott 1900: 233, Vol 2, Section 2; AWB 1906: 7) whose distinctive range of shapes and decoration has since proven to be characteristic of the Pyu sites. Urns were at times closely associated with skeletal burials, and some appeared to contain secondary burial materials rather then cremation remains (Aung Thaw 1968: 29-37, 107-118; Stargardt 1990: 229-250; Than Tun 2002: 8-16). Stargardt has remarked that the drum-shaped form of some of these urns recalls the Dong Son bronze drums of Vietnam and Yunnan (Stargardt 1990: 188). These artifacts of the 7th century BC - 6th century AD period have been found in archaeological contexts in Vietnam containing weapons, coins or ornaments (Nguyen Van Huyen, Hoang Vinh, Pham Minh Huyen *et al.* 1989). Bronze drums with decoration deriving from or evolving out of Dong Son motifs are found at "archaic" sites across southeast Asia (Kempers 1988). Bronze drums were well known as traditional ritual items among upland Burmese groups such as the Karen (Marshall 1922) and they are reproduced today in Mandalay, which suggests extra caution in dealing with unprovenanced drums. However while drums feature in legend, as mentioned above, and while there may be morphological or decorative similarities between Dongson/Dian bronze drums and terracotta Pyu burial urns (Stargardt 1994: 134), to date there is little archaeological evidence of any bronze drums that may have served as a prototype, as had been the case when Bronson highlighted this absence in his review of Stargardt's *Ancient Pyu of Burma* (Bronson 1992). However the drum-shaped urns are hugely significant in the analysis of the site.

Stargardt has suggested that the location of the larger drum-shaped earthenware urns, buried around the central pillar bases of three rectangular monuments, 9, 10 and 11, with simpler urns inside and outside the buildings, represents the single-event enshrinement in each case of the remains of a hierarchically organised and finite group of people, who had the right and obligation to be buried together, and who then became the subject of continuous rituals. She proposes that this was a pre-Buddhist phenomenon (Stargardt 1994). This may have been the kind of founder's cult that is still common in southeast Asia, the urns enshrining the remains of the mediators between the original spirit owners of the land and the human settlers (Lehman 2003: 16), a symbolic commitment to sedentism that provided a solution, in a time when population was the most scarce of economic resources, to the problem of agricultural and social dispersion (as argued by O'Connor 2003: 281). A contrary view was published by the director of the excavations, Aung Thaw, who considered the buildings to be Buddhist structures (Aung Thaw 1968). This would imply that the deceased should have been religious figures. However Aung Thaw later indicated to Stargardt that he had reservations regarding the funerary content because it was not a feature of the Indian Buddhist architecture that was assumed to have been the inspiration for the buildings (Stargardt 1993: 29).

There are only four radiocarbon dates available for Beikthano, but as they all relate to these particular buildings, they are worth reviewing, while bearing in mind that the excavations were published with "very few stratigraphical or chronological data" and that the dates might be considered to be of "obscure pedigree" (Bellwood 1992: 2). The radiocarbon dates for Beikthano (Table 6 & Figure 94) were not integrated into Aung Thaw's monograph, and were originally published with incomplete figures (Aung Thaw 1968: 62; Smith 1979a: 503) because they did not reach Aung Thaw until the book was in press. The gap in the data has been rectified by Bronson (1969: 142) and Stargardt (1990: 149). Sample I 434, processed by Isotopes Inc., was also published in the journal *Radiocarbon* ("Burma date" 1963: 76).

The dates for Beikthano calibrated at current values (Bronk Ramsey 2002) and at a probability of 95% indicate in the broadest terms that four pieces of wood that had been growing and therefore absorbing atmospheric carbon between 180 BC and AD 610 were used in the construction of buildings 9 and 11. At some stage all four samples were subjected to burning, which resulted in the carbon surviving rather than wood rotting away and integrating into the subsoil. A consideration in relation to the possible timing of the fires is that the parts of the structures where the wood was used must have been sufficiently exposed to the atmosphere, though not necessarily still functioning, for combustion to have taken place. Stargardt suggests that the samples all came from small side braces of the buildings, and that there is no need to allow for the age of the trees (Stargardt 1993: 28; Stargardt 1994: 132). Accepting this, the best-case but most conservative treatment of the individual dates, which must be considered as ranges, not median dates, might be summed up in this way:

- Between 180 BC and AD 260, or with less certainty between 60 BC and AD 140, building 9 was constructed using one of the pieces of wood that survived as charcoal. Part of building 9 was built over the foundations of building 10, which must therefore have been older. A brick platform in building 9 sits "above the debris" and is taken to be a later addition. A second carbon sample, described as belonging to "phase 2" of the building dates to between 100 BC and AD 390, or with less certainty between AD 20-240. The original report (Aung Thaw 1968: 20-22, 85-86) does not present a convincing case for two construction phases. A platform or altar on the floor of a building may simply sit on debris that has been flattened out to take it. While Stargardt was privy to later personal communication from Aung Thaw (Stargardt 1993: 28), this does not appear to include anything about these phases of building. The most economical treatment of these radiocarbon dates is to sit them side by side. At 95% probability, they have an overlapping range of 100 BC to AD 260.
- Taking a similar approach to the dates for building 11, which has a stronger indication of two construction phases, but no details on the provenance of the carbon samples attributed to two phases (Aung Thaw 1968: 22,87), the dates of AD 80-540 and AD 210-610 overlap in the period AD 210-540.

The date of the samples could be *any* year during the periods outlined, but over-reliance on these radiocarbon dates, and perhaps the temptation to read a single median date into them instead of considering the date range, has led to the popular (Thaw Kaung 1998) as well as archaeological (Aung Thaw 1972: 6) position that Beikthano dates from the 1st to 5th centuries AD, and that because there was charcoal present in various buildings that the city had been destroyed by fire. The notion that the city was destroyed all at once fits comfortably with the "sequence of capitals" paradigm, but as all heat technology, cooking and lighting would have required combustion, extensive charcoal debris could be expected, along with accidental fires from time to time. As to the "foundation" of the city, on the basis of the existing radiocarbon dates AD 260 is as valid an initial date as 100 BC. The radiocarbon dates viewed from this cautious position also suggest that

what Stargardt says are pre-Buddhist burials of the remains of elite groups in rectangular timber buildings with brick foundations may have continued as late as AD 610, the upper range for building 11. While it is something of a cliché in archaeology to conclude an analysis by stating that "further investigations are needed", it is certainly the case here. This extensive and significant settlement has, after all, only as many radiocarbon dates in total as were used to date the materials surrounding a single carnelian tiger bead at Ban Don Ta Phet (page 83).

Stargardt's hypothesis that the rectangular buildings featuring castellated burial urns (9, 12, 11) indicate a pre-Buddhist behaviour, followed by the arrival of Indian-style shrines (2, 3, 4, 6, 12, 14, 18, 24) is supported in the case of the latter by architectural evidence. The monastery and stupa plans at Beikthano (Aung Thaw 1968: 75-106) bear a considerable resemblance to those found at Nagarjunakonda and the Krishna valley in south-east India (Aung Thaw 1968: 64-67; Gutman & Hudson 2004). Doorways at building 2 have semicircular "moonstones" at their entrance, a feature dating back at least to 6th century AD Anuradhapura, in Sri Lanka (Kulatunga & Amarasekera 1993: 60; Prematilleke & Karunaratne 1993: 95). Buddhist statuary is largely conspicuous by its absence, and this was initially explained by the suggestion that the Buddhist sect at Beikthano may not have used images (Aung Thaw 1968: 65). Two images are now known. A 5 cm high Buddha seated in *pralambanasana*, a posture with both legs pendant often described as "European style" (Figure 88), was found in 1996 and deposited at a monastery at Kokkogwa, a village outside the southern wall of Beikthano. It was later given to the custody of a monk, the Myingan Sayadaw, and is now enshrined in a pagoda in Yangon that was constructed to hold a duplicate of a tooth relic from China that ceremonially toured Myanmar in 1994 (Schober 1997; Win Maung, personal communication 2004). In 2003, a 10 cm high seated Buddha image (Figure 89) was excavated by the Archaeology Department near gate 13 (San Shwe 2004). This image has been interpreted as evidence of "early" Buddhist practices (*New Light of Myanmar, May 25* 2003; *New Light of Myanmar, June 24* 2003; Myo Theingyi Cho 2003). In India, Buddha images have been directly dated through inscriptions as far back as AD 80 (Schopen 1997: 242-243). However on stylistic grounds the Beikthano finds might better be compared with Dvaravati images of the 7th-8th century AD (see, for example, Snong Wattanavrangkul 1975 Illustrations 23-35; Van Beek & Tettoni 1985: 65-73; Warren 1990: 44, 173).

This more critical approach to the combination of the available absolute dates and relative dates and the way they have been interpreted to back up, perhaps inadvertently, the "sequence of capitals" paradigm, supports Bronson's suggestion that while it is "reasonable to conclude that at least some of the structures were built in the 3rd or even 2nd century AD" (Bronson 1992: 437) there is no compelling evidence that Beikthano is any older than that. The most reliable of the ANU thermoluminescence results (page 281) give absolute dates of AD 390 for a potsherd from building 3, AD 440 for a potsherd from gate 15 and AD 770 for a potsherd from building 2. These dates as they stand indicate the use at Beikthano of earthenware made between the 4th and 8th centuries AD. Along with the possible Dvaravati period Buddha images, these results suggest that the general approach to a terminal date for Beikthano as an operational central place should look later, at least to the 7th century AD (Bronson 1969: 143), rather than earlier. There is also the question of what appears on the basis of its architectural decoration to be a Bagan period building, the Kyaung-gyi-gon (structure 21), on a site where a modern well indicated occupation or reoccupation until recent times (Aung Thaw 1968: 26, 214-219). The stucco figures published in Aung Thaw's report strongly resemble figures decorating the Kubyauk-bo-chi-mi, building 995 at Bagan, which is attributed to the 13th century (Pichard 1992-2002). It is not clear whether the Kyaung-gyi-gon was an isolated structure operating amid the ruins or part of a complex that may have involved other, older, still-functioning buildings.

Letpanywa: a possible outlier of Beikthano.

In 2002, a cemetery in and around two rectangular brick buildings and containing around 20 skeletons was excavated at Letpanywa (E 95.1216° N 19.7183°), on the west side of the Ayeyarwady 30 kilometres southwest of Beikthano (Chart 1 & Figure 93). Several pots were associated with each skeleton. The burials were associated a variety of bead types: agate, black and white line decorated, blue glass, carnelian, and chalcedony elephants. Every skeleton was buried with an iron implement, a characteristic that has been noted of "Pyu" burials (ASI 1923-24: 83, 1924-25: 106, 1926-27: 166-167, 1929-30: 156). Other finds included silver and gold rings, a bronze anthropomorphic hilt decoration from an iron dagger (Figure 92), a large stone slab, pottery apparently scored with graffiti marks and fingermarked bricks (Nyein Lwin 2002, 2003, 2004). The appearance of brick construction (Figure 90, Figure 91) in an apparent direct association with the burials might suggest either a reflection in the periphery of Beikthano of central rituals, or a precursor Pyu site. The dating of Letpanywa has not yet been established, and as the evidence from other sites such as Beikthano and Halin indicates, it is not possible to claim a straightforward chronological sequence from inhumation to pot burials. However, Letpanywa provides a strong indication that brick construction and associated ritual activities were not unique to the large, walled central places, or for that matter, to walled sites in general.

Halin (Hanlin, Halin-gyi).

Halin (Chart 1, Figure 95 & Figure 99), with its substantial record of Late Prehistoric materials which appear to be linked to ongoing salt exploitation, is a special case in the expansion from the homeland. It is the only one of the four major sites with demonstrated and substantial pre-urban occupation of what later became a walled settlement, although it may be more accurate to say, since most of the known Late Prehistoric finds are south of the walls adjacent to the salt fields, that the walled complex was built beside, rather than on, the earlier area of occupation. Salt extraction has been recorded since the colonial period (Scott 1900: 116 Vol 1, Part 2 & 295-296 Vol 2, Part 1; Scott 1921: 253; Williamson 1929: 124-126, 141-143; Nyo Win 2001a) and remains of broad earthenware bowls that may have been precursors of the metal troughs currently used for reducing brine to salt have been recovered by local farmers, with some examples kept in the Nine Banyan Trees Monastery museum at Halin.

The geographical location of Halin supports the idea of a special function such as salt production rather than the prehistoric exploitation of networks of local streams for irrigation (see page 126). Maps (Figure 95) show the former bed of the Mu to the east of the present Mu river (Digital Chart of the World 1993), and a largely dry lake south of Halin (Burma One Inch series, 84 N/15). The geologically disrupted drainage system suggests that in prehistoric times this area may not have had the same access to irrigation resources as Beikthano or Maingmaw. In the Bagan period (Figure 96), the Mu canal was built from Myedu in the north, draining into the lake, Halin In, as the area was opened up for irrigated farming, and this system was extended in colonial times (Aung-Thwin 1990: 22-26, 72), but there is nothing to suggest that there was an earlier system of canal irrigation. The Halin/Shwebo area contains a number of Bagan period inscriptions (Figure 96), and there are similarities to Bagan in ceramics, with a red libation jar from Halin overpainted in white lines and dots (Myint Aung 2003: 112-113) comparable to a sample excavated in Bagan in 2003 (page 230).

The earliest capital of the Pyu, according to the *Za-bu-kon-cha* (page 29), Halin was first explored by archaeologists in 1905. Taw Sein Ko, director of archaeology, excavated ten sites, but was disappointed because the excavations did not yield the museum pieces he was seeking. His sites 1-

10 on the map (Figure 99), shown in black circles, are identified in the text as TSK to avoid confusion with the later excavated or explored sites which were numbered again from 1 in the 1960s by the Archaeology Department. The initial excavations were based largely on information from local people about discoveries of treasure, real or imagined. In one case, a site was excavated because someone had dreamed there was treasure buried there. Taw Sein Ko mapped the city walls and noted that the salt industry had denuded the area of fuel. Local people provided several silver coins and gold ornaments, and told the investigator that many bronze figures, coins or ornaments had been sold or melted down for the metal. These included figures of elephants, horses, bulls and serpents which had been dug up in a dry stream, TSK 7 (Figure 99). The now-vanished figures were described by the locals as having been filled with "medicinal or alchemical ashes", although this might simply have been burnt clay cores from the lost-wax process. One useful find, at TSK 6, was a Pyu stone inscription which was attributed paleographically to the 4th century AD or earlier (AWB 1905: 7-10; ASB 1915: 21-23). This appears to be a funerary record, referring to the bones of Lord Ruba, son of Lord Davi-ni-mli and grandson of N-ga Kno. While not bearing a specific date, it provides three names of people who were most likely residents of the city, and of sufficient importance to merit commemoration in stone. Other Pyu inscriptions found at Halin (location of the finds is shown on the plan) refer by name to (King) Sri Trivigrama (Trivikrama) and Queen Candradevi (Luce 1985: 149, Vol 1). "Trivikrama" is the name of an incarnation of the Hindu god Vishnu, who can set foot on several worlds at the same time and conquer them (Nai Pan Hla 1972b). Aung-Thwin agrees that Sri Trivikrama appears to be a general royal title, and points out that Luce's Queen Candradevi can also be read as Sri Jatradevi. Another stone mentions Mahadevi Sri Jatra (Aung-Thwin 2004 Ch 7). The vikrama suffix is shared with a dynasty at Sriksetra (see page 138). The South Indian script in the Sri Trivikrama inscription has been proposed as 8th-9th century AD (Aung Thaw 1972: 13).

In 1930, Charles Duroiselle collected coins with a rising sun on one face and a *srivatsa* with swastika, sun, moon and dots ands lines on the other, which are now considered characteristic of the site (Mahlo's Group 1), though they also appear at Maingmaw and Beikthano (Figure 85). He noted the discovery on the platform of a local pagoda of a Burmese stone inscription dated AD 1082-83 which mentioned a King "Sithu", something of a generic name for kings of Bagan, as part of a dedication of land to pagodas and monasteries by the local governor. This date is earlier than any known inscriptions at Bagan. Duroiselle suggested that it points to Sawlu, the son of Anawratha (ASI 1929-30: 151-155). Inscriptions from Halin existing as copies, and dated AD 1081, 1082, 1086 and 1285, published in *A List of Inscriptions in Burma*, indicate activity from the 11th and 13th centuries (Duroiselle 1921: 5, 6, 62). A 12th century stone inscription in Burmese that had reportedly been found at TSK 5 (AWB 1905: 10) does not appear to be included in Duroiselle's 1921 volume, even though the book drew on earlier lists compiled by Taw Sein Ko.

Duroiselle recorded the presence of an inscribed sculpture featuring the lower part of a figure, possibly a bodhisattva, with rows of devotees below (ASI 1929-30: 154) that had been found beyond the north wall. In 2001, this was still on display at Halin in a specially built shed. Halin was systematically excavated by Myint Aung from 1962 to 1967, sites 1-19 on the map (Myint Aung 1970, 1975, 1979, 2003). Myint Aung returned in 1996 with a group of his students from Yangon University and excavated site 20 (Hla Tun Phyru 1996). The Mandalay Archaeology Department excavated sites 21-24 in 1998 (Pauk Pauk 1999b, 2001b). Further data came from field surveys in 2000-2001 by the author, Nyein Lwin and Win Maung.

The four gateways so far excavated, sites 10, 11, 17 and 21, turn inward to the citadel, like the gates at Beikthano. A mound extending into the city at a right angle to the centre of the northern wall (E 95.81224° N 22.48867°) was surveyed in 2002 by the author and Nyein Lwin, and on size and orientation may be another gate. Sites 5, 8, 12, 13 and 15 appear to be ritual structures. Site 8,

outside the wall, contained charred bones, burial pottery and gold ornaments. Earthenware funerary urns were found buried both within and outside the exposed structures, which were square or rectangular buildings with a quadrangular projection on one side in some instances. There are both skeletal and cremation burials within the walls of Halin. Site 17, which was radiocarbon dated (Table 7 & Figure 94), contained around 50 skeletons and disarticulated bones buried next to the brick wall and "below" Halin cultural material. The date suggests that the cultural material may have been redeposition from the burial. Site 20 contained up to 5 skeletons. Site 22 was a brick building with a group of unornamented megaliths, 1.5 metres high and 45 centimetres wide, arranged in front of it in a 5:4:1 pattern. Stucco heads and torsos were also found here (Myint Aung 1970). At another unspecified location, numerous skeletons were discovered together with funerary urns. Architecturally, the square or rectangular ritual structures, with no round stupas, seemed comparable with those at Beikthano (Aung Thaw 1972: 12, 15).

Table 7 Radiocarbon dates at Halin.

Halin site number	Lab sample number	Source of sample	Delta c13	Notified CRA: BP	Calibration, notified CRA. 95.4% probability.	Recalculated CRA using oxalic standard: BP	Calibration, recalculated CRA. 95.4% probability	Laboratory Comments (Rafter Radiocarbon Laboratory, PC, 2000)
HL 9	NZ 894	Charcoal from wooden pillars of a hall destroyed by fire, depth 1.07 metres.	-25	1370±59	AD 560-780	1369±64	**AD 540-780**	*"Supports the archaeological evidence which assigns the structure to the 3rd-7th century AD"*
HL 10	NZ 895	Charcoal 1.14 metres below southern gateway.	-25	1810±60	AD 70-390	1818±65	**AD 60-390**	*"Assigns the fortifications to an earlier date within the period estimated archaeologically"*
HL 17	NZ 896	Charcoal 0.97 metres below south-eastern gateway, destruction level.	-25	1740±60	AD 130-430	1750±65	**AD 120-430**	*"Assigns the fortifications to an earlier date within the period estimated archaeologically"*
(Site 17)	NZ 897	Human bone carbonate from a collective burial, depth 0.86 metres.	-6.38	360±50	AD 1440-1640	300±58	AD 1440-1800	*"This result demonstrates the degree of exchange with atmospheric CO_2 and can be disregarded."*
(Site 17)	NZ 898	Human bone collagen from a collective burial, depth 0.86 metres.	-18.66	1440±85	AD 420-780	1403±98	**AD 420-870**	*"Measurement agrees with the habitation period."*

The general funerary picture is of a combination of cremation and inhumation burial. The excavation of disarticulated bones at HL 17 also points to a tradition of secondary burial. It may be worth considering that the notion that all pot burials at this site, and in early Myanmar generally, were "cremation" burials may be an interpretation based on investigator awareness of Buddhist and contemporary European cremations, and should be reconsidered. It may be that the presence of bones in a pot, rather than the presence of ash or carbonised bone, has been the archaeologists' criteria for defining a cremation burial. From the archaeological reports of the early 20th century, at least, archaeologists showed a far greater enthusiasm for the pots than for their contents, though to be fair, they were working in an era when bioarchaeological methods for studying the contents had not yet been developed.

The radiocarbon dates from charcoal samples at Halin have been recalculated by the testing lab (personal communication, Dawn Chambers, Rafter Radiocarbon Laboratory, New Zealand, in an

e-mail to Professor Mike Barbetti, Jan 27, 2000) since they were published by Myint Aung (Myint Aung 1970: 62). though only with minor variations from the original results. The lab has also produced dates from the same sample for human bone collagen and bone carbonate from site 17, which were not included in Myint Aung's paper, but supplied to him later. The dates indicate activity at Halin between outside limits of AD 60 and 870. While cautioning that these are the outer ranges of the dates, it can be suggested that according to the available radiocarbon evidence, there may have been parallel activity with Beikthano, with its carbon samples showing an outer range from 180 BC to AD 540, over a period of 480 years (Figure 94). But there is a qualification, beyond the obvious need to caution that this is really a very small group of samples.

The Halin samples include the only dates available specifically for first millennium fortifications in Burma, gates 10 (AD 60-390) and 17 (AD 120-430). The radiocarbon dates refer to the age range of the portion of the tree that provided the sample, and a gatepost may have required timber of substantial size. There is therefore an "old wood" problem, a dating issue that arises when there is no indication as to whether the sample was from sapwood or heartwood (Bowman 1990: 51). A sample from the outer trunk of a 200 year old tree, such as may have provided pillars or gateposts at Halin, will give a result 200 years later than a sample from the core of the trunk. Therefore it is reasonable to extend the possible range forward, and to consider that the construction phase of the gates and therefore the wall should be after AD 120, as the earliest possible date for the construction of both gates, if the sample from HL 17 came from the outside of the tree trunk, and possibly as late as AD 600 or so if both samples were from the core of 200 year old trees. It is not necessary, by this reasoning, to "assign the fortifications to an earlier date within the period estimated archaeologically" as per the lab comments (Table 7), but to consider that there may be a greater and possibly *later* range of dates for the construction of the fortifications than the two radiocarbon dates suggest.

The most reliable of the ANU thermoluminescence dates, for a potsherd at Gate 11, is AD 1050 (page 281), consistent with the epigraphic evidence of occupation during the Bagan period. Taking the same conservative view of the dates for Halin as for Beikthano, it can be suggested that the burial at site 17 may have been as early as AD 420 or as late as AD 870. Beyond the scarcity of absolute dates, there remains the problem of identifying sequences in a site where stratigraphy is difficult, not the least because, as shown by the regular appearance of stone axes in fields after rain or ploughing, there is considerable vertical movement on what appears to be a generally shallow archaeological horizon. Pyu Halin, like Beikthano, needs to be removed from the chronological restrictions imposed by the past interpretation of dating evidence, and its periodisation left more open until further evidence accumulates. The presence of the valuable salt resources at the site would be a motive for continuous occupation, and the gap between the last outer radiocarbon date of AD 870 and the thermoluminescence and epigraphic dates from AD 1050 to the 1080s is not necessarily evidence of a gap in the occupation of the site.

The "Gold Teeth" at Halin.

A heavy rainy season at Halin in 2001 followed by another uncharacteristically wet monsoon in 2002 uncovered artifacts which provide new evidence for continuity of occupation of the site since well before the period indicated by the radiocarbon dates (Nyo Win 2001b; Pauk Pauk 2001b). Most of this material has been reviewed in Chapters 3 and 4, but the find by farmers of an upper jawbone containing gold inlaid teeth just to the west of the Halin village cluster (Figure 99) is an example of the difficulty of data collection, periodisation and interpretation at Halin. The farmers were in the process of removing the gold from at least two skulls to sell when Win Maung was able to acquire one jawbone from them intact. The maxilla contains eight teeth that have been

deliberately drilled on the front with holes, then the holes filled with gold foil (Figure 100). Each layer of foil would have contact-welded to the one below it. The intact coating of gold on the front incisors suggests that this was the sought-after effect for all the teeth. The pain of drilling must have been considerable. Earthenware containers thought to have been used for distilling alcohol (see page 85) have been found at Halin, so there may have been a crude form of anaesthetic available (Hudson 2003a).

The farmers who discovered the teeth had dug up a site which was marked by a group of large stone slabs. According to the author's field notes from a visit with the landowners to the burial site later in 2001, after the finds had been removed, but with one of the stone slabs in question, 1.5 metres long by 40 cm wide, still to be seen in a ditch nearby, two skeletons had been found, heads pointed east, associated with iron hoes and knives as well as pottery. One skeleton wore gold and silver rings. A nearby burial (Figure 99) had skeletons whose heads pointed north, with associated painted pottery. These latter skeletons wore stone rings, and bronze rings and bracelets made of what appear to be coiled strips of beaten bronze. The grave goods and the orientation of the bodies would suggest a different and earlier burial practice.

Gold work in dentistry has been recorded in Italy as early as 700-600 BC, where a gold band riveted to a reused tooth was used to return the tooth to the jawbone by binding it to its two neighbours (Teschlor-Nicola, Kneissel, Braundstatter *et al.* 1998). Other Etruscan examples of the same period have been recorded, and in the 5th and 4th centuries BC Phoenicians repaired teeth with gold wire (Clawson 1934). An early use of gold foil as a dental therapeutic agent is mentioned in *Artzney Buchlein*, published anonymously by a German physician/dentist in 1530, in which the operation is quoted from Mesue (AD 857), physician to the caliph Haroun al-Raschid. The dental use of gold foil was known in Britain from the 16th century, and became widespread in 19th-century Europe and the USA (Travers 1994; Cox, Chandler, Boyle *et al.* 2000).

The teeth from Halin appear to have been modified for cultural rather than therapeutic reasons. The pre-Columban Maya, Aztec and Inca were known to inlay teeth with jade or iron pyrite, a practice dated to AD 500-900 (Alt & Pichler 1998). Modified teeth bearing small gold discs fixed into the teeth with gold pegs have been found at Bolinao in the northern Philippines, and dated to the 14th-15th centuries AD. Another of the Bolinao finds consisted of a moulded gold plate wired to six upper teeth (Legaspi 1974). The National Museum of the Philippines has a collection of teeth with gold pegged lozenge and floral shaped decorations as well as discs. These are broadly attributed to the period after AD 1200 (Winters 1977: 451-452). A similar collection including gold discs and plates, excavated in the 1920s at 3 separate sites in the southern Philippines, was held by the Museum of Anthropology at the University of Michigan. Some of these finds had been associated with Chinese trade ceramics of the Sung Dynasty (AD 960-1279). The habit was recorded historically in the Philippines in the 16th and 17th centuries, and described ethnographically in the Philippines, Sumatra and Borneo. The inlaying seems always to have involved gold, or at times brass, wire and pegs rather than foil (Guthe 1935). This kind of tooth decoration in the Philippines has been viewed as a mark of rank and high social status in the highly competitive post-European contact period, the early to mid-second millennium AD (Junker 1999: 124, 177-178, 348, 365)

There are references to this form of body decoration relevant to Myanmar in the Chinese historical record. From the Tang Dynasty (AD 618-936) onwards, the Wa and other tribes living between the Mekong and the Salween were known to the Chinese as the Chin-ch'ih, or Gold Teeth. The *Man Shu*, or *Book of the Southern Barbarians*, published in AD 860-873, lists the Gold Teeth along with other groups including the Silver Teeth, the Tattooed Legs and the Black Teeth. The Chinese chronicler reported that the Black Teeth lacquered their teeth, although he may have been describing people who chewed *arecea* ("betel") nut, whose teeth can look quite black. The *Man*

Shu also says the Gold Teeth "use gold carved plates to cover their front teeth" and remove them to eat (Luce 1961). The Chinese chronicler may in this case be describing an entirely different phenomenon to the Halin teeth, such as the Bolinao gold plate in the Philippines, or he may be repeating a confabulated description. Chinese reports of the Gold Teeth people appear over a period of at least 500 years. The Gold Teeth were among the tribes who submitted when the Mongols captured Kaungsin, 250 kilometres north of Halin on the upper Ayeyarwady, in 1283 (Luce 1969: 37). The P'iao (Pyu) are mentioned as one of the tribes of the "Gold Teeth Comfortership" in the *Yuan Shi*, or History of the Yuan Dynasty, which was completed in AD 1370 (Luce 1985: 66; Sun Laichen 1997: 20). On the basis of the Chinese references, then, the Halin gold teeth might date from the 7th century AD or later. However the burial context was individual, with megaliths and grave goods suggesting that it was not related to the communal system of urn or inhumation burials that is associated with Pyu brick platforms. The jawbone must, at least, post-date the availability of gold foil. The grave was originally found because the stone slabs covering it were close enough to the surface for the plough to hit them. These issues point to the need for further absolute dating and bioarchaeological analysis.

The Halin hinterland.

The hinterland of Halin (Figure 96) contains walled sites that sit at a consistent distance away, and it is worth considering whether they may form some kind of defensive or administrative circle. During World War II, British and Japanese soldiers in Burma had a daily combat marching range of 30 to 40 kilometres (Allen 2000: 79, 123). This supports Hansen's general figure of a 30 kilometre administrative/defensive "day's march" radius for a self-contained city-state (Hansen 2000: 16-19). There are at least nine walled sites within this range of Halin. An apparent burial urn (Figure 97) that is difficult to place in the existing Pyu urn typology (Hla Tun Phyru 2003) and a bowl with what may be Pyu writing (Figure 98) have been found at Shagwe. Coins bearing auspicious symbols were found at Minkyi. Sitha is said locally to be a Bagan period fort (Ernelle Berliet, personal communication 2003). Hladwe has a 13th century inscription. Siboktra shares a distinctive cup shape, an oval with a flat end, with several well-attested Bagan period sites of the Panlaung/Kyaukse district (Win Maung 2000b). Further investigation of these sites should provide a better indication of whether they were related to Pyu Halin, or whether they were outposts of Halin in the Bagan period, demonstrating its importance as an administrative and resource centre.

Sriksetra.

Sriksetra (Figure 103), a Sanskrit name meaning noble field or dwelling place, is called Thayekittaya in modern Burmese, has a traditional name of Yathemyo, or hermit city, and is also referred to as Hmawza, after the village in the centre of the walled complex. It is the largest of Myanmar's enclosed settlements (Figure 74) covering 1452 hectares, or more than 14.5 square kilometres, according to the measurement of unrectified aerial photos. Aung Myint reached a similar figure of 1477 hectares using the same method (Aung Myint 1998b: 14). Its oval shape is attributed in the chronicles to the god Sakra (Indra), who "stood in the middle of a piece of pleasant level ground and described a circle by means of a rope dragged round by the Naga" (Pe Maung Tin & Luce 1923: 14). The eastern boundary appears originally to have been a large tank, which may have been bolstered by the addition of a wall as it dried out or silted up (Stargardt 2001a: 488). Stargardt has suggested that the site was, as it is today, extensively irrigated (Stargardt 1990: 84-101). Around two dozen openings in the wall have at times been identified as

gates, including a dozen along the eastern wall (ASI 1910 Plate 154), although many of these seem to be gaps which could well have been formed by natural deterioration or the removal of bricks for recycling. A gate in a Pyu city would be more likely to present archaeologically as a mound extending inward into the settlement, as it involved a substantial amount of brick. Only two sites have been excavated at Sriksetra to reveal the characteristic inward-turning corners of a Pyu gateway. The Shwedaga gate, on the north-west wall, was a huge brick corridor, returning up to 68 metres into the city, with more than 30 metres of the section projecting further into the city consisting of alcoves, suggesting guard posts or other administrative spaces, that opened on to the corridor in several places and widened out the structure to around 10 metres (Aung Myint 1998b: 31-32). Terraces with layers of urns containing what have been generally described as cremation remains (ASI 1909-1910: 123; Stargardt 1990: 93; Stargardt 2001a: 491) are widespread inside and outside the walls. The northern half of the city is a low plain dominated by rice fields. Most of the surviving structures are in the southern sector and outside the city wall. Buildings, though never fully surveyed, number into the hundreds. Thaungbyegon, for example, in the southern part of the enclosure, was traditionally known as the site of 10,000 pagodas. While this is hyperbole, excavators early last century located 122 mounds in this relatively small area, including what appeared to be the remains of cylindrical stupas (ASB 1908: 6).

Epigraphic dates from burial urns.

There are no radiocarbon dates for Sriksetra, but several inscriptional dates were known since the early 20th century from burial urns discovered in association with religious structures. Inscriptions on four urns, three stone and one terracotta, found near the Payagyi pagoda, north-west of the city walls (ASI 1912: 147; ASB 1912: 7; 1913: 9-10) were interpreted by Blagden as recording the deaths of members of the city's ruling élite between AD 673 and 718 (Blagden 1917: 43; Luce 1969: 5, Vol 1). The first of these dates, accepting that they refer to the Myanmar Era (year 0 = AD 638) would come 35 years after the introduction of this calendar (Table 8). There is no evidence as to whether the Payagyi or the burials came first. The burials may have been *ad sanctos*, near an existing pagoda, or the pagoda may have been built later at the site of burials, either deliberately or coincidentally. The stone urns were made from a local sandstone (Tha Hla & Nyi Nyi 1958: 96). The largest stone urns found at Sriksetra, on a brick platform south of the city walls (Figure 103), were not inscribed, but suggest further elite burials.

Table 8 Dates for the ruling elite at Sriksetra 1 (after Blagden).

Names on the urns found in 1911-1912.	***Age at accession***	***Age at death***	***Year of death ME***	***Year of death AD***
(A relative of Suriyavikrama)			35	673
Suriyavikrama (? +*heroic, strong, bold advance, valour**)**	49	64	50	688
Harivikrama (steed of Indra, lion, sun, fire +*)	34	41	57	695
Sihavikrama (? +*)	21	44	80	718

A stone urn unearthed near the Payataung pagoda in 1993 (*Working People's Daily April 2* 1993) repeats the names of three of the people on the Payagyi finds and adds further names to the list. Many of these Sanskrit titles incorporate the morpheme *vikrama*, which means strong or heroic. In a seminar paper shortly after the discovery, San Win (1993) suggested that if each date of death and age at death as interpreted by Blagden were transposed (Table 9) then the order of appearance of the names on the Payataung urn could be read as a chronological sequence. After a decade of study, papers on the urn have now appeared (San Win 2003; Tun Aung Chain 2003) along with

good quality photographs and an English transliteration ("Hpayahtaung Pyu Urn Inscription" 2003). San Win (2003: 18). makes a case for the dates relating to the Gupta calendar (year 0 = AD 319), claiming that the Pyu script in the Sriksetra inscriptions is the same as the Gupta script of the 4th century AD. This is not the unanimous opinion of scholars past or present, but the claim should be considered as one of the contending possibilities (Moore 2004: 34) and would give a range for the three transposed Payagyi dates of AD 360-383. San Win acknowledges a suggestion by Than Tun that the dates may relate to the Saka calendar (year 0 = AD 78), in which case the deaths would have been AD 120-143. The transposition of ages and dates of death does not greatly affect periodisation. Considering the finds available to Blagden, the range with San Win's transposition of dates, but based on the Myanmar Era calendar as preferred by Blagden and Luce, would be AD 679-702, which varies little from Blagden's original AD 673-718. Treating the dates as Myanmar Era (ME), the evidence from the burial urns suggests a period of dynastic continuity during the late 7th and early 8th centuries, and this seems to be supported by the majority of scholarly opinion.

The analysis of the inscription by Tun Aung Chain focuses on names, rank and relationships. Six kings (Table 9) are identified by honorifics attached to their names. From the positions in the inscription as quoted by both authors, San Win's King Jatratata is taken here to be Tun Aung Chain's official, Katiddi Sri Candradatta. It could be suggested that Blagden's Suriyavikrama-Harivikrama-Sihavikrama sequence on the Payagyi urns might score higher on logical and actuarial grounds than the succession after the death of 57 year old Harivikrama (or 52 in a more recent reading) by 77 year old Sihavikrama, as suggested by San Win's proposal on transposing the Payataung list. However the succession of Harivikrama by the 20 years older Sihavikrama is explained by Tun Aung Chain's interpretation of the kinship terms in the inscription which would make Sihavikrama the brother-in-law of Harivikrama, not a son or nephew (Tun Aung Chain 2003: 11).

Table 9 Dates for the ruling elite at Sriksetra 2 (after San Win and Tun Aung Chain).

Names from the inscription found in 1993 (kings shown in bold type).	***Age at accession***	***Age at death.***	***Year of death, calendar not stated***	***Year of death AD, Saka calendar (after Than Tun)***	***Year of death AD, Gupta calendar (after San Win)***	***Year of Death AD, Myanmar calendar***
Stitidi (dynasty founder: perhaps an official of a previous dynasty?)						
Devamitra (god, celestial being, royal person + comrade of the sun or highest gods)						
Harivikrama (brother-in-law of Devamitra?)		52 or 57	41	120	360	**679**
Sihavikrama (brother-in-law of Harivikrama?)	77	80	44	123	363	**682**
Suriyavikrama (nephew of Sihavikrama, son of Harivikrama?)	40	50	64	143	383	**702**
Tatiddi (a brother of Suriyavikrama- the "relative" of the Payagyi urn?)	N/A	35				
Brithuvikrama (a full or half brother of Suriyavikrama?)						
Jatratata / Katiddi Sri Candradatta (an official?)	N/A					
Adityavikrama (sun, highest gods +*)				163	403	**722**
Kdapbetiddi Cintagatindra (an official?)	N/A					

With this reading of the kinship terms, Tun Aung Chain outlines a form of succession in which the brother-in-law of the ruler is the significant factor. There is a notable absence of a son succeeding his father. While Tun Aung Chain makes the reasonable point that without the principle of primogeniture, court politics may have been complex and disruptive, it could also be suggested that the structure of chiefly authority at Sriksetra indicated by the Payataung inscription may be indicative of a wider structure of alliances in Sriksetra's periphery, and of a system that while subject to stress at the centre, may have had compensatory factors of regional stability. It can be pictured in this way. As the central leader consolidates his position by taking the daughters of peripheral leaders as wives, the peripheral leaders become stakeholders in the central system. The peripheral leaders are in competition with each other, not just in terms of awaiting the production of heirs who in the absence of a system of primogeniture have no guarantee of inheriting power anyway, but more immediately in terms of gaining or maintaining influence in the central administration. A peripheral chief may not be in a position to go to court, as he must administer his own domains, but his son or sons might accompany their sister as she becomes a consort of the central leader. There may be an advantage to the peripheral chief of increased stability in his own domain, with his sons now focused on activity at the central place. The significance of the brother-in-law in the power structure at Sriksetra brings to mind the classic nat-origin story (page 198) in which Maung Tin De, the brother of a wife of the King of Tagaung, is seen as a threat to the throne and brother and sister are both murdered by the king (Pe Maung Tin & Luce 1923: 45-46).

The Kan-wet-khaung-gon inscription.

An inscription in Sanskrit and Pyu on the Kan-wet-khaung-gon Buddha image, also called the Buddha's Throne Inscription or the Wetgaungkangon, found at Hmawza (Luce 1985: 65, 132 Vol 1, Plate 17 Vol 2; Guy 1999: 20-21) states that it was dedicated to establishing peace and goodwill between an otherwise unknown Jayacandravarman and his "younger brother" Harivikrama, which is one of the names on the burial urns, at the behest of their wise guru. This inscription provides palaeographic and iconographic support for a Myanmar Era chronology for Harivikrama and his dynasty. The image has been stylistically ascribed to the later Gupta period, and the script seen as late Gupta-Brahmi, which would place it around the 7th century AD (Ray 1936: 19). Palaeographic analysis of the inscriptions on the Payagyi urns also places them in this general period (Tha Myat 1963: 50-51). The stated fraternal relationship between Harivikrama and Jayacandravarman has at times been taken as a literal one (Stadtner 1998: 45) though it could also be seen as the symbolic expression of a political relationship between two leaders who according to the story, had each founded a city "on the same day" and were now reconciling after a quarrel (Luce 1937: 51, 65). If this is the same Harivikrama who was buried with his relatives in the Payagyi urns, then the simplest explanation of Jayacandravarman is that he would have been the leader of a contemporary settlement. It is unclear whether this alliance is between Sriksetra's leader and a distant neighbour, perhaps the chief of Halin or Maingmaw, or someone more immediate, perhaps Beikthano or Thegon, one of those brothers-in-law whose place in the Sriksetra circle made him simultaneously an ally representing one of the peripheral domains and a contender for power. The timescale is less in doubt. Assuming that Harivikrama came to the throne as an adult, and given that he died in his 50s in AD 679, then the Kan-wet-khaung-gon inscription should belong to the period AD 650-679.

Jayacandravarman's *varman* suffix appears among several groups in India (De Casparis 1979: 382). A dynasty of Varmans ruled Assam c. AD 500-650, leaving records of religious donations on copper plate and stressing their legitimacy and independence from the Guptas, who dominated northern India at the time, by including extensive genealogies in the inscriptions (Wicks 1992: 79-

80). The Pallavas, who were a power in southern India from the 6th to 9th centuries, also used the "varman" suffix (Luce 1937: 243). Their hereditary titles were based on a claim of descent from the god Brahma. In AD 753, in the reign of Nandi-varman, a Pallava land grant recorded on copper plate opened with a Sanskrit eulogy of the king authored by one Trivikrama (Thapar 1966: 168-178), a name that also appears at Halin. Kings named Jayavarman (Sanskrit: "victory + protection, armour, shelter") appear at Funan and Angkor between the 6th and 13th centuries AD (Jacques 1977: 304-308), and one of these has an intriguing link with Sriksetra.

Vickery's study of Cambodian Sanskrit texts identifies a minor ruler, Candravarman, as father of Jayavarman I. The latter gained his throne around AD 655. There is also a mention of a "wise Brahmin" in a eulogy of Jayavarman I (Vickery 1998: 342-350). This coincides in time with Sriksetra's Kan-wet-khaung-gon inscription featuring Jayacandravarman and the wise guru who brought the quarrelling leaders together. It is not suggested at this stage that the link is anything more than a linguistic coincidence. Sanskrit was the mode for the "self-presentation of royal elites", appropriated in south and south-east Asia for the celebration of the fame and virtue of the rulers. A curious feature of this usage in Myanmar is not that Sriksetra and Halin used Sanskrit, but that the "fashion for Sanskrit epigraphs" died out much sooner in Myanmar than in places like Cambodia and Java, which were geographically, at least, much further from the Indian source (Pollock 1996).

Chronology and Art History.

Several other key finds at Sriksetra have contributed to a relative chronology for the city. From the early stages of investigations, the presence was recorded of large stones, often with low relief carvings (De Beylie 1907b: 91, 96, Plate VII; De Beylie 1907a: 242-244). One notable find in the 1970s was a stele bearing an image assumed to be a warrior-king and two attendants. They wear ear plugs and jewellery, and have elaborate turban-wrapped hairstyles. The central figure carries a large club, and the attendants hold Indian-style standards of office, a wheel and the head of a garuda, the bird that was Vishnu's sacred vehicle. On stylistic grounds, the warrior stelae has been attributed to the late 4th or early 5th century AD (Guy 1997; Guy 1999: 16-18, Fig 3).

One of the most spectacular archaeological finds is the Khin Ba trove, excavated just inside the southeast corner of the walls (Figure 103) in the 1920s. The reliquaries, Buddha images, jewellery, coins, containers, decorations and inscribed silver and gold sheets were well documented at the time (ASI 1926-27: 171-182, Plates 38-42), though with characteristic inattention to stratigraphy or even to the ritual layout of the finds (Stargardt 2001a: 493). Gold sheets from the mound inscribed in Pali have been attributed to the 5th century AD (Nai Pan Hla 1972b). A silver reliquary bearing the name of the presumed donors of the structure, Sri Prabhuvarma and Sri Prabhudevi, provides another instance of the *varman* lineage (Guy 1999: 19). Stargardt suggests that the stupa may have been repaired and rededicated with some additional contents included in the 7th or 8th century AD (Stargardt 2001a).

Small bronze figures consisting of three musicians, a dancer and what may represent a "lucky" dwarf carrying a bag of treasure (Guy 1999 Figure 11) were found in the 1960s near the Payama pagoda at Sriksetra in association with a bronze bell, which has been described as being decorated with *srivatsa* symbols. From photos (Stadtner 1998: 124), the bell looks more like it is decorated in Bagan period floral design, including an ogre holding a garland of flowers in its mouth. The four larger figures were stolen from the site museum, but were returned to Myanmar some years later by an American collector who had acquired them (Nai Pan Hla 1981, 1990). They are at times used to illustrate or even correlate reports of a visit to the Chinese court by Pyu musicians in the

early 9th century (Aung Thaw 1972: 31; Stadtner 1998: 46-47, Figs 24, 27-31). These figures are today commonly photographed or reproduced on stands, but they were originally found with small lugs on their back, perhaps to attach them to a larger bronze statue. Similar figures are attached to the base of a bronze figure of a dancing Shiva, which was excavated at Polonnaruwa, in Sri Lanka, in 1960, and is attributed to the 12th century (Prematilleke 1995: 50-51). While this is not suggested as a definite date for the Sriksetra figures, the association with an apparent Bagan period bell may be worth further investigation. Care needs to be taken that the figures are not credited inappropriately to the time of the Pyu musicians' visit to China.

A broader reappraisal of the art history of Sriksetra has come from Brown, who suggests that on the basis of anamorphic stone carvings, stone Buddha images, boundary stones used around ordination halls, Buddha and stupa triads, and stucco and terracotta sculpture, that the religious art most strongly relates to Dvaravati art of the 7th and 8th centuries. He supports his case with some remarkably similar samples of Dvaravati and Sriksetra plastic art (Brown 2001). This timescale matches the first phase of Dvaravati (Lyons 1979; Subhadradis Diskul 1979; Dhida Saraya 1999; Phasook Indrawooth 1999, 2003, 2004). It might be recalled that two Dvaravati-style Buddha images, apparently of the same period, have been found at Beikthano (page 128).

The surviving stupas.

Three tall stupas, the Bawbawgyi, Payagyi and Payama (Figure 103) are situated respectively to the south, north-west and north-east of the city wall. The Bawbawgyi is almost cylindrical, and the Payagyi and Payama have been described as sugarloaf shaped. There is a third "sugarloaf" stupa, the Myinbahu, restored but supposedly ancient, on a hilltop 2.5 kilometres south south-west of the Bawbawgyi (De Beylie 1907b: 93). It has been suggested that these four buildings (De Beylie 1907a: 249-252), or at least the better known three, guarded, in the cosmological sense, the extremities of the city (Luce 1985: 132, Vol 1). There is no way of telling whether this represents a deliberate demarcation of sacred space, as Anawratha was supposed to have done by building relic-holding pagodas at the extremities of Bagan (page 25), or simply the chance survival of several unusual structures, of which there may originally have been more. Aung Thaw related the Bawbawgyi, with its high cylindrical shape, to the hemispherical stupas of Sanchi and Amaravati, 1st and 2nd century AD sites in India (Aung Thaw 1972: 19), although it is difficult to see how a cylinder and a hemisphere can be so confidently linked. Guy (1999) attributes the Bawbawgyi to the 5th to 6th centuries. One aspect, at least, of the dating of the early pagodas has relied on what appears to be rash judgement. In 1907, De Beylie suggested that the Bawbawgyi dated to the 7th or 8th centuries AD, at a time of expansion of Tibetan Buddhism. He compared the stupa with the Endere stupa in central Asia that had been described by Aurel Stein (De Beylie 1907b: 90). Stein, however, had been at pains to point out that the architectural features of the Endere stupa did not "supply any distinct chronological criteria" (Stein 1907: 487, Fig 50).

If the traditional story in the chronicles is correct, that Anawratha visited the Bawbawgyi in the 11th century in what was otherwise supposed to be a destructive raid on the city (Pe Maung Tin & Luce 1923: 86-87) to remove relics and leave behind his own signed votive tablet of 50 Buddhas (Luce 1969: 19) the building would presumably have had to be a functioning religious site at the time. A rare architectural feature links the Bawbawgyi with the Kyauk-sa-ga-gyi (1029) at Bagan, a building attributed to the 12th century, and the Le-htaung-zedi (323), attributed to the 13th century. The Bawbawgyi, at least before the restorations of recent years, has its surface notched with vertical cuts, presumably to make plaster adhere better (ASB 1908: 13; Luce 1985, Volume 1). This is also seen at the two buildings at Bagan (Pichard 1992-2002: 260-262, Vol 4 & 100, Vol 2). The construction period of the extant stupas at Sriksetra, in the absence of any absolute dates,

and the diversity of possible interpretation, must really be considered inconclusive. A possible model for the shape of some of the stupas at Sriksetra can be seen carved on the stone covers of reliquary chambers (ASI 1926-27:174, plate 38d; Luce 1985: 136 Vol 1, Plate 27 Vol 2), and while these Sanchi/Sri Lanka style hemispherical domes may have been idealised shapes rather than architectural blueprints, they are, to be realistic, quite unlike the stupas that survive today.

The surviving small temples.

The "sequence of capitals" paradigm requires Sriksetra to decline and "fall" before being replaced by Bagan. Recent studies provide further evidence to suggest that this was not the case, with a survey indicating that, based on pottery typology as well as the smaller Bagan brick size, there are at least 20 monuments from the Bagan period at Sriksetra. The Department of Archaeology has also excavated a probable ordination hall which has two sets of sima stones, one from the Bagan and one from the Pyu period, suggesting that a Bagan period structure was built over the remains of a Pyu period one (Zaini 2002). A kind of circular logic has been applied to the temples at Sriksetra, the assumption being that as the city "must" pre-date Bagan, then the temples, generally either a simple vaulted room or a central pylon with four entrances and a corridor around, must be making their first appearance there (Kan Hla 1979: 101). Stadtner has suggested that the "few surviving brick shrines at Sriksetra have been mistakenly attributed to the Pyu period and incorrectly considered as prototypes for the later temples at Bagan". He points out that the small size of the surviving temples at Sriksetra may have been sufficient for them to be misinterpreted as early models for the later and often larger buildings at Bagan (Stadtner 1998: 47).

The question of small size may simply be one of the economics of a peripheral Bagan period settlement. Four sites on the river between Bagan and Sriksetra (see map, Pagan Newsletter 1986) contain ruins attributed to the Bagan period. There are more than 100 structures recorded in the Salay Cultural Heritage Zone, which stretches from Salay (E 94.746109° N 20.834339°) to the Shinbinsakjou stream several kilometres to the south. Some are still in very good condition. Of the structures at Salay, 92 have been identified as temples, and 12 as stupas. There are 41 structures or mounds further south at Hsale (E 94.828205° N 20.548695°). Of these, 27 have been identified as temples and 4 as stupas according to current survey maps kindly supplied by U Min Zaw Htwe, the archaeological officer at Salay. There are 26 monuments at Myingun (E 95.034° N 20.016°), and 26 at Kyuntaw (E 95.1098° N 19.0393°) on what is now an island in the river. All these structures have been attributed to the 13th century AD. The buildings at Salay are mainly small or medium size as defined in the *Inventory of Monuments at Pagan,* and the temples are based on a simple ground plan, square brick buildings with a vaulted shrine and a porch and short vestibule on one side. An inscription at Hsale bears a date equivalent to AD 1275 (Pagan Newsletter 1986). An unpublished inscription stone recently found near building 1 at Salay dates to AD 1222 (from a rubbing read by Nyein Lwin at the Archaeology Department, Bagan, 2003). Architectural evidence such as door jamb mouldings and stucco decoration also seems to link the small Sriksetra temples with the Bagan style (Guy 1999: 17), while the presence of Pyu sculpture inside these buildings may reflect the portability of artworks, rather than their inclusion as original features in the temples. It remains to be determined whether the Bagan-style buildings at Sriksetra represent continuous occupation or reoccupation, but they provide a further indication that the chronology needs to be reconsidered.

Tagaung:- the myth gains a little credit.

In the north, Tagaung (Chart 1 & Figure 104), a name that might mean “place of piles of goods” (Sein Myint 2000: 17) or “drum ferry” (ASB 1917: 23), on the east bank of the Ayeyarwady (E 96.014461° N 23.506245°), is worth attention because of its place in the mythology as well as recent archaeological finds. According to a Burmese rhyme, *"Mranma aca, Takon ka"*: "Myanma's Origin, Tagaung is" (Aung-Thwin 1998: 195). Tradition has it founded in the 9th century BC, and Tagaung is presented in folklore as the source of the populations of Arakan, Shan State, Sriksetra and Bagan (Chan Htwan Oung 1920; Pe Maung Tin & Luce 1921). In 1962 U Po Lat, a former Director of Archaeology, reported that there were Pyu burial urns at Tagaung (quoted in Maung Htin Aung 1970: 5). Excavations in the 1960s uncovered material identified as Bagan period, and for some time after that Tagaung was considered to have been essentially a Bagan outpost, despite the report from U Po Lat. As late as 1970 it was asserted that no evidence antedating the Bagan period had yet been found (Aung Thaw 1972: 99). However from more recent studies, it is apparent that Tagaung and the area surrounding it has an archaeological record going back at least to the early urban period.

There are two separate walled areas of 14 and 62 hectares, both enclosed by an outer wall, discovered in 1993, that surrounds an area of 204 hectares. Excavations and a regional survey by the Mandalay Archaeology Department and the Universities Historical Research Centre have continued since 1996. Surface finds in the area have ranged from stone adzes and axes at Kyannyat and Tonngel villages to post-17th century AD Tada-u pipes (Sein Myint 2000). Fingermarked bricks with parallel strokes and what may be the Pyu number 50 (see Tha Myat 1963: 84) have been found at Tagaung itself. What appear to be furnaces for extracting iron were found at Kyannyat (E 95.996063° N 23.268227°) and Patiphyu, 30 kilometres south of Tagaung village. Tanged iron spearheads, spindle whorls, carnelian and agate beads and socketed bronze axes have been found at San-nyat-khone (E 96.015643° N 23.44517°), six kilometres south of Tagaung, (Win Maung 1997) along with stamp decorated pottery that includes depictions of a bull, an elephant and rider, and an eight point star within a circle of beindu, or dots, and semicircular Chinese-style roof tiles, with round and inverted-triangle ends (Min Han 2003a) A silver coin found at Tagaung (Win Maung 2002; Min Han 2003b) appears to be a highly stylised late version of a *bhadrapitha*, or throne (Figure 101).

In 2003 and 2004, media reports pointed to the considerable amount of archaeological investigation still being undertaken at Tagaung: “the ancient Pyu coins, bricks, pots and goglets, that were excavated in Kya-hnyut and Hsin-hnyat-kone regions; the urn of a Pyu woman, and her personal belongings including rings, beads and the molar that were discovered at the ancient palace site of Tagaung on 20 June 2003; and the forges numbering about 100 that were found in Kya-hnyut region in Tagaung are helping highlight and discover the ancient Myanmar civilization in glory” (Einda Swe 2003). The burial urn, though with no real evidence as to the gender of the person whose bones were inside, was found within the smaller northern walled area. The contents of the urn included a bronze rattle made to wear as a ring, a coiled iron ring, six iron points looking like half arrowheads (it is tempting to consider them related to harpoons or fishing spears), a bronze bracelet and ring, and carnelian, quartz and chalcedony beads (Chit San Win 2003). Further discoveries in 2004 included two more pots containing iron swords, beads, and human cremation remains (*New Light of Myanmar, Aug 19* 2004). The inclusion of grave goods in Pyu burial urns is a phenomenon not previously reported, although it must be considered that pre-war reports, in particular when Sriksetra was being actively explored, may have ignored such contents due to the archaeologists’ bias toward museum objects.

There is no doubt that Tagaung was an active site during the Bagan period. While 19th and early 20th century claims that a Gupta period Sanskrit inscription was found there have since been discredited (Phayre 1883; ASB 1923: 6; Scott 1921: 350; Aung Thaw 1972: 100), the inscription appearing to have been the unfortunate invention of a scholar whose "mind was weakening" (Duroiselle 1921: ii), votive tablets of the Bagan period are well recorded. One tablet found at Tagaung featuring Buddha surrounded by stupas (Karow 1991: 144) is so similar to a Bagan example (Hasson 1993: 96) that at least from the pictorial evidence they might have been from the same mould. Tagaung appears to have finally come under Burman control in the early 13th century (Luce 1985: 40) along with the rest of the upper Ayeyarwady (Chart 2). The Burmans battled the Chinese for control of the town in the 1280s (Aung-Thwin 1998: 38, 45). Post-Bagan occupation is evidenced by green and yellow glazed pottery and tiles (Brown 1988: 109; Singer 1990: 109-110). Tagaung today is a major market for salt produced at Halin, which is used to preserve fish. It shares a key archaeological problem with many other Burmese sites. While the finds in themselves indicate a sequence from polished stone tools to 16th century glazeware, there has not yet been the kind of stratigraphic analysis and careful excavation that might detect patterns of continuity or disruption. This has not held back the enthusiasm at the official level to categorise Tagaung as a flourishing Pyu site (*New Light of Myanmar, March 30* 2004). The renewed interest in Tagaung was further demonstrated by a restoration program in 2004 with top level sponsorship (*New Light of Myanmar, March 31* 2004).

Gulf of Martaban and peninsular settlements.

Early walled sites from the mouth of the Sittaung river down the peninsula (Figure 105) are generally located near coastal alluvial plains. The architectural landscape suggests that these sites form quite a different system to the walled centres of Upper Burma, and while there are shared elements such as fingermarked bricks and coins with auspicious symbols, there is a key difference in the way the landscape is modified. While the Upper Burma sites made use of what was essentially existing landscape to enclose a large settlement, many of the peninsular sites appear to be religious complexes rather than residential centres, where alteration of terrain through use of laterite and other building materials to enhance existing hills and create artificial extended mounds on them seems to have been motivated by Buddhist practice and cosmology (Moore 2003a).

A site characteristic of Moore's description is Kyaikkatha (Chart 1), on the mouth of the Sittaung, which has an outside area of 375 hectares and an extant religious complex on a hilltop surrounded by a series of walls. It has revealed artifacts with what are generally described as Pyu characteristics: beads and glass, earthenware with beaten designs and a cache of hundreds of conch and *srivatsa* coins. There are laterite stupas, terracotta plaques with an affinity to the art of Dvaravati and, in the upper levels, green glazed wares (Ko Ko 1987; Aung Myint 1999a: 100-106). The presence of the "Pyu" materials suggests that if this is a different settlement system to that of Upper Burma, in which the author concurs with Moore, then these materials are not specific to the Pyu sites, but characteristic of the broader region. This is certainly the case with "auspicious" coins, which are also found in Bangladesh, Thailand, Cambodia and Vietnam (Gutman 1978; Robinson & Shaw 1980; Mitchiner 1982). This increases the difficulty of characterising the "Pyu" sites by their artifact content, and enhances the importance of landscape and central place analysis in defining a system.

Other southern sites share more direct structural characteristics with settlements in Upper Burma. There is a 167 hectare walled site dubbed Hmawbi (Chart 1), after the local village, on the Salween river north of Martaban (Aung Myint 1999a: 255-261). This is a possible candidate to be

Kalasapura, the city of pots. Luce had suggested that Kalasapura was somewhere near Twante, west of Yangon, for no other reason than that the area was well known for pottery (Luce 1985: 50, Vol 1). Gutman has suggested a broader range of possibilities, that Kalasapura, which was mentioned in a Sanskrit inscription at Sriksetra, would have needed to be near the mouth either of the Ayeyarwady or the Salween to be of strategic significance to the composers of the inscription (Gutman 2001c: 109, 115). An intensive ground survey might indicate whether Hmawbi was a pottery production site or trading centre and thus a candidate to be Kalasapura. Moore has suggested that Darwei (Tavoy) could also be considered (Moore & Than Swe 2004: 3).

There are varying amounts of evidence as to the antiquity, cultural characteristics and regional links of the gulf and delta sites. A relic chamber at Botahtaung pagoda on the Rangoon river bank exposed by a bomb in World War II, and since rebuilt, revealed a Pali inscription attributed to the 7th century, with votive tablets and images (Luce 1985: 162-163 Vol 1, Plates 72-73 Vol 2). Laterite sculptures and architectural fragments described as Mon have been found near Syriam, Twante and Zokthok where Sri Lankan-type offering stands are also found (Luce 1985: 159-160 Vol 1, Plates 64-71 Vol 2). Other sites have revealed traces of south Indian influence. Kyontu, 35 kilometres north-east of Pegu (Bago), with a brick-faced laterite city wall, has at the base of a pagoda platform a series of beaded laterite medallions with low relief human and animal figures similar to those of the first third of the 8th century at Kancipuram in India (Huntington 1985 Plates 14, 36; Luce 1985: 166-168 Vol 1, plates 76-81 Vol 2). Evidence of a maritime connection includes reports of cables and tackle of seagoing vessels dug up near Ayetthema at a spot 19 kilometres from the coast (Scott 1921: 171). Evidence of the infilling of the gulf and Sittaung delta region came from the discovery in the 19th century of a rusty iron buoy "a considerable distance from the sea" at Bawgyi village, southeast of Pegu, which suggested that in "recent historical times" seagoing ships had been able to reach the site, which by then had been affected by siltation (ASB 1919: 41).

The west coast: Dhanyawadi and Vesali.

There are enclosed brick-walled settlements similar to the Pyu sites of the central plain dating, despite traditional claims of foundation by Indian immigrants of the sun clan in 1508 BC (Tun Shwe Khine 1992: 20-21), from the first millennium AD at Dhanyawadi and Vesali in Arakan (Rakhine) on the west coast of Myanmar (San Tha Aung 1979: 10-13). These sites are separated from Upper Burma by the Arakan Yoma mountain range (Chart 1). The early urban sites of central Myanmar shared a number of cultural elements with their counterparts on the west coast, as well as with sites in Thailand, Cambodia and Vietnam (Gutman 2001b). Coins bearing auspicious symbols, which are found in many parts of Myanmar (Chart 1), also occur in Thailand and Vietnam (Phayre 1882; Gutman 1978; Robinson & Shaw 1980; Mitchiner 1982; Wicks 1992: 111-121, 157-163). Identical agate seals have been found at Vesali, Halin and Oc Eo, inscribed in 4th/5th century South Indian script (Aung Thaw 1972: 14; Gutman 2001b: 7; Campbell-Cole 2003).

Mahayana Buddhist sculpture has been dated to the late 5th century at Dhanyawadi and nearby Selagiri Hill (Di Crocco 1998). In Dhanyawadi, early coins are uninscribed and closely related to the conch/*srivatsa* coins of lower Burma, but from the 5th-9th century AD the coins picture a seated bull and are inscribed with names of kings. A royal inscription of c. AD 729 gives the names and reign periods of eighteen kings, the earlier of whom may have ruled at Dhanyawadi from the end of the 4th century. At Vesali, excavations in the 1980s uncovered a Buddhist ordination hall, a monastery and a building which may have been connected with the royal cult since a damaged stone image of a bull on a pedestal was recovered there. Vesali shared a Visnu cult with Sriksetra

and there are similarities between its sculpture and architecture and that of Dvaravati and the pre-Angkorian art of Isanapura, in Cambodia (Gutman 1976; Shwe Zan 1995: 165-167; Gutman 1999, 2001b; Gutman & Hudson 2004).

In 2003-2004, Kyaw Oo Lwin, the director of archaeology at Mrauk-u, was excavating a wall at Dhanyawadi and a wall and gate at Vesali that featured large teak gateposts (*Minister inspects cultural heritage maintenance tasks in Rakhine State* 2003; The city walls of ancient Arakanese city Dainyawaddy unearthed 2004) which should provide new evidence as to the similarities and differences between the Rakhine sites and those of the central plain. The broad picture at present is one of a politically independent system in Arakan during the early urban period (Gutman 2001b, 2001a; Lieberman 2003: 92), and for that matter, during the Bagan period as well (Frasch 2002: 67-74). Dhanyawadi and Vesali will therefore not be considered in this thesis as having a direct bearing on the functioning of the Pyu system of Upper Myanmar.

The early urban system:- expansion and decline.

The early urban system of Upper Myanmar consisted of walled central places and their satellites extending through the central plains from Tagaung in the north to Thegon in the south. While there are cultural elements such as fingermarked bricks and coins bearing auspicious symbols shared with Dhanyawadi and Vesali on the west coast, and with Kyaikkatha and other enclosed sites southward from the Gulf of Martaban, the Upper Myanmar system, which can also be called the Pyu system, was a geopolitically coherent entity with more in common among its members than with its regional neighbours. This structure becomes even more evident if the hypothesis of an origin in the southern Samon Valley is accepted. The radiation of a population with the skills to exploit local streams and construct or enhance existing tanks for water storage and the irrigation of crops including rice can be seen in the development of Beikthano, Maingmaw and Waddi at consistent distances from the point of origin to the Samon homeland, probably parallel with Halin which seems to have been a service centre supplying salt.

The “parent” culture of the Samon Valley presents as a system of chiefdoms, most directly demonstrated by differential mortuary assemblages, the unique classes of grave goods and elite burials that were discussed in the previous chapter. Higham has ascribed the development of chiefdoms in southeast Asia to increased long-distance exchange, access to rice lands, control of resources such as salt and iron, and the expansion of population in restricted river flood plains. All of these have been demonstrated in the southern Samon Valley. Higham also suggests that transformation into states, while involving substantial differences in the scale of such elements as walled cities, brick ritual structures, canals, a writing system and monumental statuary, may have been a rapid process, of “perhaps no more than a century” (Higham 2002: 229, 243). The timing of such a rush to urbanism in Upper Burma cannot yet be pinpointed with precision, neither in terms of when it happened, nor how long the process of establishment took, but an estimate is possible. The radiocarbon evidence for the Pyu system points to somewhere in the first half of the first millennium AD for the construction of gates at Halin, which is the only direct evidence related to the construction of walls. The radiocarbon dates for Beikthano and Halin taken as a group (Figure 94) look convincing from the 2nd century AD onward, which according to Lieberman coincides with the appearance of architectural and artistic evidence linking the Pyu sites with Indian culture, though these elements seem in greater profusion from the 4th century AD (Lieberman 2003: 89). The general period of the 2nd to 4th century AD might provide a point at which to consider that the first phase of the early urban system became active.

If the Pyu radiated outward from Binnaka/Pyawbwe, the spatial and archaeological evidence suggests that this may have involved several phases. With the Samon Valley locked into a pattern of small, densely packed settlements, the first migrants to settle in similar ecological niches would have moved outward from the homeland to the areas that eventually saw the formation of central places at Beikthano, Maingmaw and Waddi. These are proposed as **Pyu Phase 1**. In this "gravity" model, Halin is a special case. It was suggested earlier that Halin was a service centre, providing salt to the Samon valley. It shares its Late Prehistoric archaeological signature with the Samon sites, and while it is not in an identical (or ideal) ecological zone, the economic advantage of salt would compensate for any disadvantages in agriculture. The enclosure of the area adjacent to the Halin salt fields is proposed as **Pyu Phase 1B**. Sriksetra and its southeast satellite Thegon, and perhaps Tagaung to the north, are proposed as **Pyu Phase 2**. This numbering, though at first glance somewhat equivocal, has been deliberately selected to emphasise the early relationship of Halin to the homeland, and the "differentness" of Sriksetra, whose much larger enclosed area than the other three main centres suggests a new set of needs, and perhaps a larger population, as reflected in the architectural behaviour.

Due to the greater density of occupation and development of Sriksetra through to the Bagan period, indicators of its origin are the most difficult to pinpoint. While scholars have in the past been in general agreement that at least some of the contents of the Khin Ba relic chamber, including Buddhist scriptures, were deposited in the 5th century (see page 141), Brown's (2001) revision of the evidence places the bulk of the Buddhist materials at Sriksetra considerably later, in the 7th and 8th centuries, coinciding with the appearance on burial urns of the names of the Vikrama dynasty (page 138) and a new calendrical system (page 16). This does not necessarily make the Vikramas the founders of the city. They may have replaced an earlier leadership, perhaps the leadership portrayed or symbolised in the putative 5th century warrior stelae, those imposing figures bearing Indian symbols of authority (page 141). It is worth considering whether, as some of the Vikrama urns were buried outside the walls of the city, the significance of the walls to the city's inhabitants may by this stage have been reduced, allowing both ancestral and Buddhist sites, often the same location serving both functions (Stargardt 2003: 154), to extend substantially outside.

To take a long historical view of the walled central places, it might be suggested that initially, walls were built around some existing structures that included an elite centre and ancestor shrines. The need for more space may have been dealt with initially at Maingmaw (page 126) by building a new outer wall, but this is the only apparent case of expansion of an enclosure. While Sriksetra has multiple ramparts in some sections, this does not involve the incorporation of any significantly greater space. The need for more space seems generally to have been dealt with by moving activities, including what were presumably important ritual activities, outside the walls. This is seen at the relatively poorly explored and surveyed Maingmaw (page 126 & Figure 77) and to the south and southwest of Halin (page 132 & Figure 99). At Beikthano the archaeological maps up to the 1970s indicate considerable activity outside the walls (Figure 83), while Stargardt suggests in the light of her more recent analysis of aerial photographs that the extramural mounds are even more dense that previously estimated (Stargardt 1994: 128). Construction activity outside the walls is most noticeable at Sriksetra (see page 137, Figure 103 & 1:24,000 aerial photos 2-14-114 to 2-14-118 and 3-14-180).

Whatever role the walls may have played in the day-to-day enforcement of rules concerning who was permitted inside and under what circumstances, in a time of crisis the entire population, the supporters of the leadership, the "urban residents and peasants" who made up the social group (Wheatley 1979: 291), would have been able to shelter inside. However this would leave, notably at Sriksetra, dozens of treasure-laden pagodas undefended outside. For an enemy intent on booty,

the population withdrawing inside the walls would be a convenience. The most parsimonious explanation may be that the building of walls was a phase that related to a specific need, most likely defence. The local population and their valuables could indeed fit inside in time of crisis. However in a subsequent phase the walls became redundant for defensive purposes for reasons as yet unclear, and extramural activities expanded. One might like to think that the walls were no longer needed because quarrelling leaders such as Harivikrama and Jayacandravarman were brought together in peace by their guru, as the Kan-wet-khaung-gon inscription indicates (page 140). However it might be more realistic to suggest that the cost of maintenance of a structure built by previous generations may have been too great, or that new developments in military techniques or technology may have rendered walls ineffective, in the same way that the castles of medieval Europe became ineffective against cannon. The use of cavalry was one possibility raised earlier. The presence of caltrops at Halin and the decoration of buildings with small reliefs of horses and sometimes sword-wielding riders at Sriksetra (Luce 1985 Volume 2, Plate 41) and Maingmaw (Sein Maung U 1981) hints at the importance of mounted troops. Whatever happened, it may no longer have mattered whether buildings were inside or outside the wall. The redundancy of the walls also lessens the inertia of the population, as they are no longer locked into the social, economic and ritual obligations related to wall maintenance. These propositions could be tested archaeologically as data on the chronology of individual structures improves.

External stresses.

Nanchao and the “fall” of the Pyu.

Historical records indicate that Nanchao had influence over the Pyu territories during the eighth and ninth centuries AD. A state in what is now Yunnan, in China, Nanchao (Figure 119) arose during the Tang period, and drifted in and out of alliances with China and Tibet (Smith 1979b: 446-451; Pan Yihong 1997: 259). The attraction of the land of the Pyu to this expansionist state would have included a lack of any central government to organise resistance. The chronicles of the Tang Dynasty (AD 606-910) describe the land of the Pyu as containing eighteen states and nine walled towns, and while this has been considered possibly an exaggeration (Luce 1937: 250) there are at least seven walled settlements over 200 hectares in the early urban system of Upper Burma, Sriksetra, Beikthano, Halin, Maingmaw, Thegon, Tagaung and Waddi (Figure 81). The numismatic evidence (page 122) suggests polities independent enough to produce their own coins, which supports the Chinese picture of multiple Pyu centres. The Nanchao leader I-mou-hsun reportedly sent a troupe of musicians, some of whom were Pyu, to the Tang Court in AD 800 (Tha Myat 1958). Unless a single event has been confused as two, in 801-2 a Pyu leader sent another embassy accompanied by Pyu musicians to China under Nanchao sponsorship. The Pyu artists gave a performance of singing and dancing accompanied by musical instruments. The titles of the songs in their repertoire, all on Buddhist themes, were reported (Luce 1985: 72-73). A Chinese poet of the time criticised the emperor for wasting time listening to barbarian music instead of attending to affairs of state (Luce 1937: 249). Nonetheless, Chinese interest in the Pyu was stimulated, and the Tang histories contain detailed accounts of an unnamed Pyu capital and its inhabitants which are still regularly quoted by historians (Nai Pan Hla 1972a).

Nan-chao is recorded in Chinese annals as invading and plundering an unidentified “capital” of the Pyu Kingdom in AD 832, carrying off 3,000 captives (Luce 1961; Backus 1981: 129). Luce nominates Halin as the vanquished city, though Frasch has suggested that Maingmaw, which was

just as big and just as accessible from Nanchao, is also a possibility (Frasch 1996a: 121). The attack on the "capital" is best viewed in terms of a pattern of geopolitical disruption, rather than as a key causative element of a systemic "fall". It was an action typical of the way Nanchao managed its territories in an age when population was a key economic resource. Around AD 750, Ko-lo-feng, the grandfather of I-mou-sung, had forcibly resettled an estimated 200,000 Ts'uan families from the area round what is now Kunming, in eastern Yunnan, 300 kilometres westward to what is now Paoshan, a move that left Kunming "depopulated and in great disorder" (Backus 1981: 66).

The notion that once attacked or plundered a city has irrevocably fallen would be disputed by the stakeholders of many cities of the ancient world, from Rome to Angkor. The quick and permanent redirection, shortly after the AD 832 plundering of the "Pyu capital", of Nanchao aggression toward Annam, apparently aided by Pyu allies or conscripts (Backus 1981: 138), leaves unresolved the role of other large Pyu polities, Sriksetra, Beikthano and either Halin or Maingmaw, whichever of the latter two was not the Pyu capital that "fell". It is also significant that a chief of Nanchao, Ch'uan-feng-yu, in his role as "Lord of the Pyu", was presented in AD 858 with a gold Buddha as thanks for helping a Pyu group against a military incursion (Harvey 1925: 15). This was little consolation, of course, to the 3,000 captives of the AD 832 raid, whose descendants, according to *Man Shu, the Book of the Southern Barbarians* were subsiding on fish and insects in Nanchao in AD 863 (Luce 1961: 91). The possibility suggested by these shifting alliances and disparate reactions is that different Pyu groups had different relationships with Nanchao. The broad picture then becomes one of the destabilisation of the Pyu system by a powerful exterior cultural and political agency which gave some of the Pyu groups the opportunity to make profitable social or economic changes.

Internal stresses.

Economics, geography and ecology.

The central places of the early urban system of Upper Burma seem to have relied on the exploitation of local streams and tanks for irrigation, and the consistent regional ecology (discussed on page 126) has suggested that "the economy, if not cultural life, of the Pyu societies was 'closed' while that of Bagan was 'open' in the sense that the latter commanded different ecological zones from a single centre" (Donovan, Fukui & Ito 1998). These closed and centrally focused economies may have been vulnerable to stresses on land use such as erosion or siltation. Stargardt has noted that while part of the old Beikthano irrigation works still functions, part is badly sedimented (Stargardt 2001b). A program of coring might confirm whether sedimentation has been a serious issue in the central places. Parts of Maingmaw and Sriksetra are still under irrigation, though the irrigation within Maingmaw is more likely to relate to the Bagan period or later (page 126). Halin, with its special function as a salt producer and its general geological disruption, is least likely to provide clear information about siltation over time. This would leave Sriksetra and Beikthano as the optimum sites for a comparative study. A reduction in productivity of the land directly associated with the central places may have contributed to population drift or reduction, and to a lessening of the hold of the centre on the inhabitants. Current research at Angkor suggests that a deteriorating hydraulic system was a major cause of population loss there (Fletcher 2003; Associated Press 2004), so the Pyu central places would not have been subject to unique circumstances had they been suffering from degradation of their irrigation systems.

Ancestor cults and Buddhism.

The central places of the Pyu system contained "thousands" of burial urns, formally grouped together both inside and outside the walls (ASI 1909-1910: 123; Stargardt 1990: 93; Stargardt 2001a: 491). This represented and continued a late prehistoric tradition, perhaps a founder's cult that in the early urban period saw leaders adopt Indic "cosmological bases for authority and legitimacy", which made them "analogues within their own domains as Brahmanical (Hindu) gods (deva) in the world or universe at large" (Lehman 2003: 23). This behaviour had no problem integrating with Buddhist practices, with urns appearing around and within Buddhist structures. Stargardt emphasises the "huge attention devoted by the Pyu to placing their dead in proximity to the living" (Stargardt 2003). The commitment of resources to the construction of ancestor shrines and the continuing investment of resources in ritual and maintenance emphasises the inertia of a society that was also tied to the place by the investment in wall construction. However Buddhism had within it the potential to break through this inertia.

O'Connor suggests as a general concept that in southeast Asia the arrival of a popular religion, as distinct from a cult appropriated by the leadership, becomes a structural impediment to centralisation. After "centuries of Indianisation had subordinated the local to the royal" a world religion could return "sanctity to local communities" and shatter "the Indic state's monopoly on the sacred" (O'Connor 2003: 291). Apply this to Buddhism arriving or increasing in influence in Sriksetra, and it may be a reason for a reduction of the forces attracting the populace to the ancestor shrine, which was presumably devoted to the ancestors of the leadership. A Buddhist relic could be seen as an ancestor relic belonging to all Buddhists. As the enshrinement of relics became a focus of religious activity, as can be seen in the deposits in the estimated one cubic metre relic chamber of the Khin Ba mound discussed earlier (page 141), then the physical possibility of moving the group's palladium would have become greater. Buddhism enabled the portability of relics. If relics come from "elsewhere", then they can just as easily be taken elsewhere, and the need to remain near the ancestor shrines is diminished. Buddhism therefore becomes a key to mobility if other forces, such as the need to expand agricultural territories due to systemic landscape degradation of the central place, should come into play.

Summary.

The major walled central places of the early urban system of Upper Burma, Maingmaw, Beikthano, Halin and Sriksetra began to develop in the general time period of the 2nd to 4th century AD according to the current evidence. The spatial relationship of these centres suggests that there was no single dominant large centre, and that they coexisted with considerable autonomy. Shared cultural elements included coins marked with auspicious symbols, brick construction including the use of fingermarked bricks, stamped pottery and burial within settlements. The incorporation of burials into the settlement occurred at all scales, from the small site of Letpanywa with two rectangular brick buildings with inhumation burials both inside and outside, to pot burials of cremated or deferred remains within rectangular brick buildings in the early phase of Beikthano, and extensive platforms with bases consisting of rows of hundreds of urns at Sriksetra. The retention of ancestral remains within these settlements, which is easy to detect due to the relationship between the remains and the brick structures, suggests an answer to the issue raised in chapter 4, which is whether Late Prehistoric burial sites were special-function cemeteries or whether they were integrated into habitation sites (page 92). While some archaeological reports have identified Late Prehistoric burial sites such as Nyaunggan as cemeteries, implying that they were separate from habitation sites, it could be suggested that in the light of the integration of

burials in attested early urban sites, that sites preceding the early urban sites, in particular the mounded sites in the Samon Valley, may also have integrated burials within the habitation area.

The spatial evidence suggests that the consistent distances between the major walled sites relate to a homeland in the Samon Valley. This area has a number of sites where "Pyu" coins, bricks or art works have been reported, but no significant walled sites (Figure 75 & Chart 1). An explanation offered for this is that the old system of occupation, small villages densely packed on the landscape, gave no opportunity for the kind of individual settlement expansion that took place to the north and south, in areas not constrained by the old system. DNA analysis to determine ancient population movements is suggested as a means of testing the hypothesis of population drift from the Samon centre.

The early urban system functioned for hundreds of years. Its economic base was local mixed agriculture, with rice growing supported by weirs which diverted water from streams to fields or storage tanks. One factor in the loosening up of the system could have been siltation of the irrigation system and of the tanks. A variable relationship between Pyu groups and the neighbouring state of Nanchao may have contributed to the destabilisation of the system. Changes in religious practice, notably the arrival of popular Buddhism, could also have lessened the influence of the central places as cult centres.

While indigenous and Western historians have promoted the idea that the Pyu "fell" following the invasion of a "Pyu capital" early in the 9th century AD by Nanchao, with Bagan coming in to fill the power gap, this event is more likely symptomatic of the absence of a centralised administration to deal with such an event than directly causative of the "fall" of a civilisation. A revision of the archaeological evidence at Halin narrows any Pyu-Bagan chronological gap. The architectural evidence for the continuity of Sriksetra into a period parallel with Bagan is also considerable, though it is yet to be determined whether the Bagan-style buildings at Sriksetra represent continuity or reoccupation. Beikthano was an active site capable of supporting a large and well-decorated monastery in the 11th-13th century. The sequential periodisation of the Pyu capitals for historiographical reasons, the historian's urge to detect decline and fall, the reading of a deliberate conflagration into every piece of charcoal excavated, can all be rejected in favour of gradual and undramatic ecological, systemic, political, social and religious change as the cause of the deterioration of the early urban system.

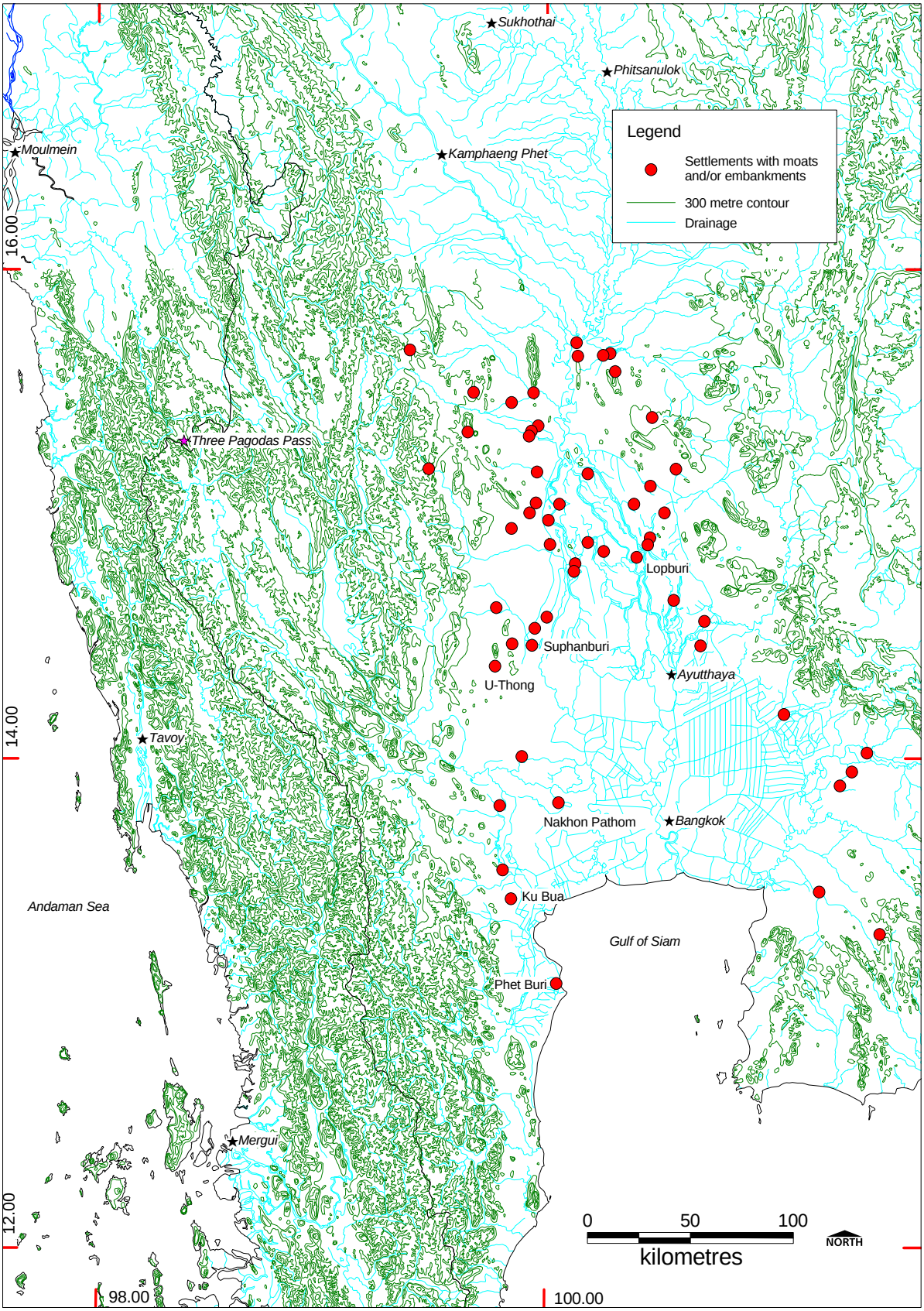

Figure 72 Thailand: enclosed settlements in the Chao Phraya basin.

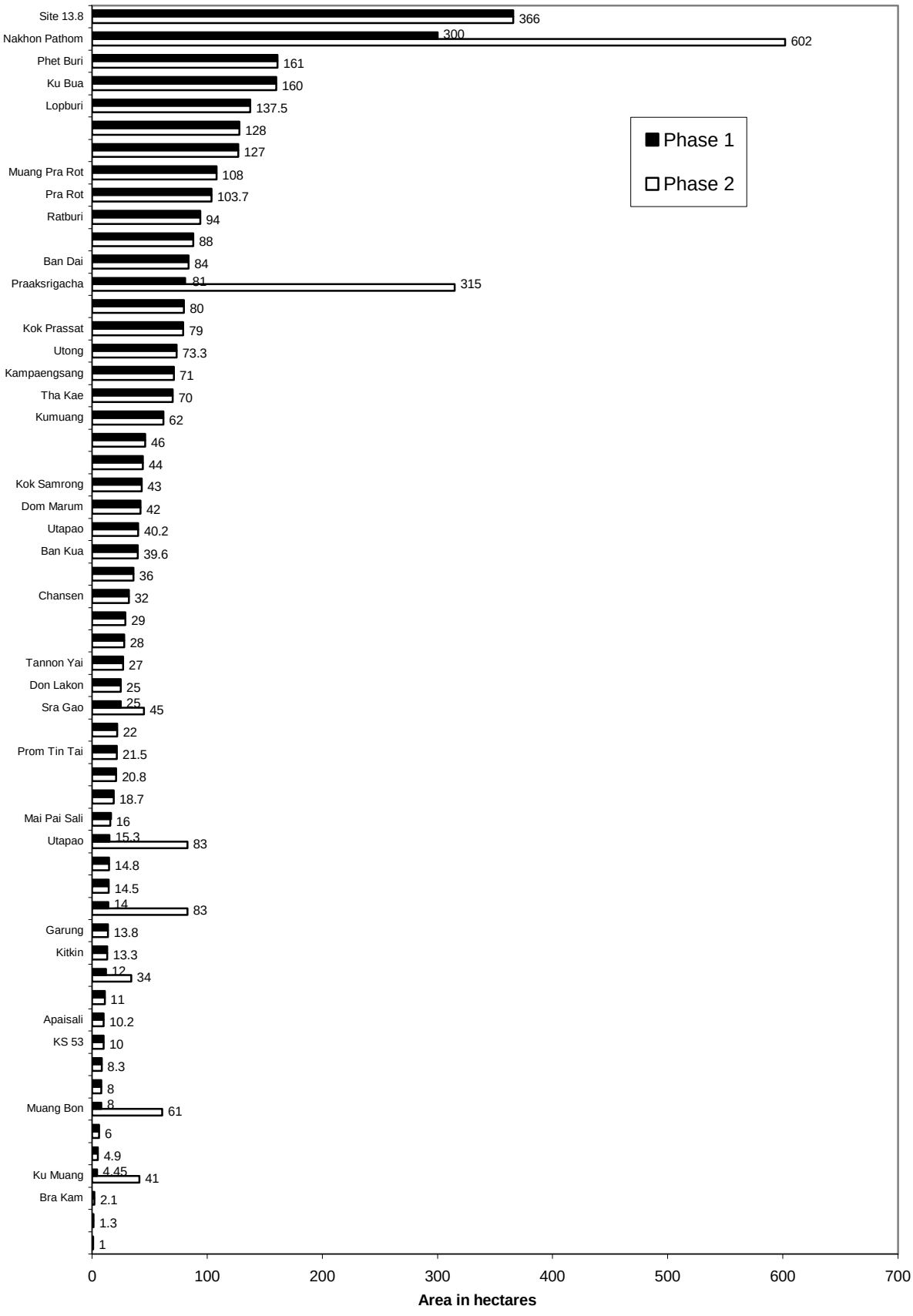

Figure 73 Chao Phraya basin enclosed sites, size hierarchy (after Mudar 1999).

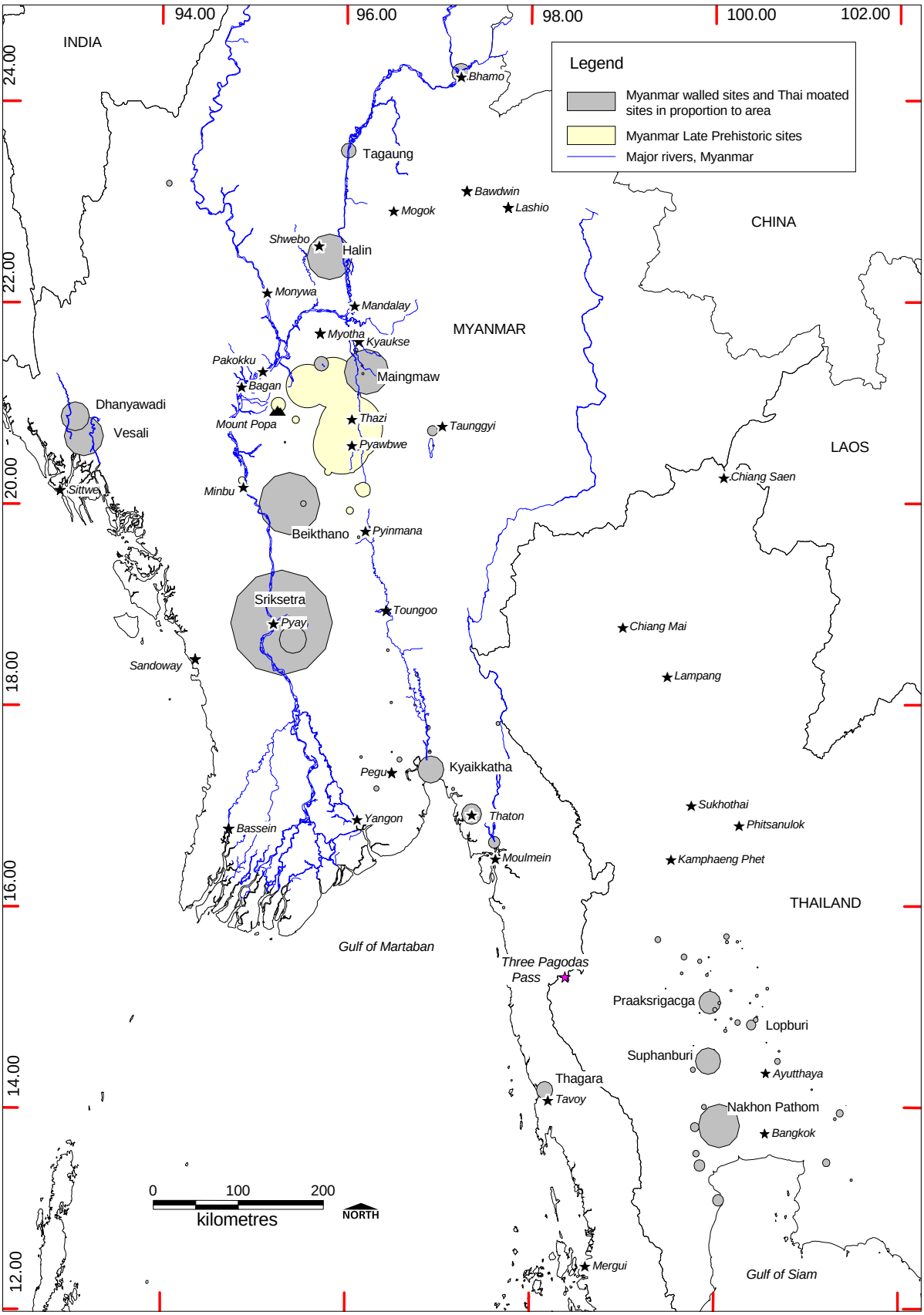

Figure 74 Enclosed sites in proportion to their areas, Myanmar and central Thailand.

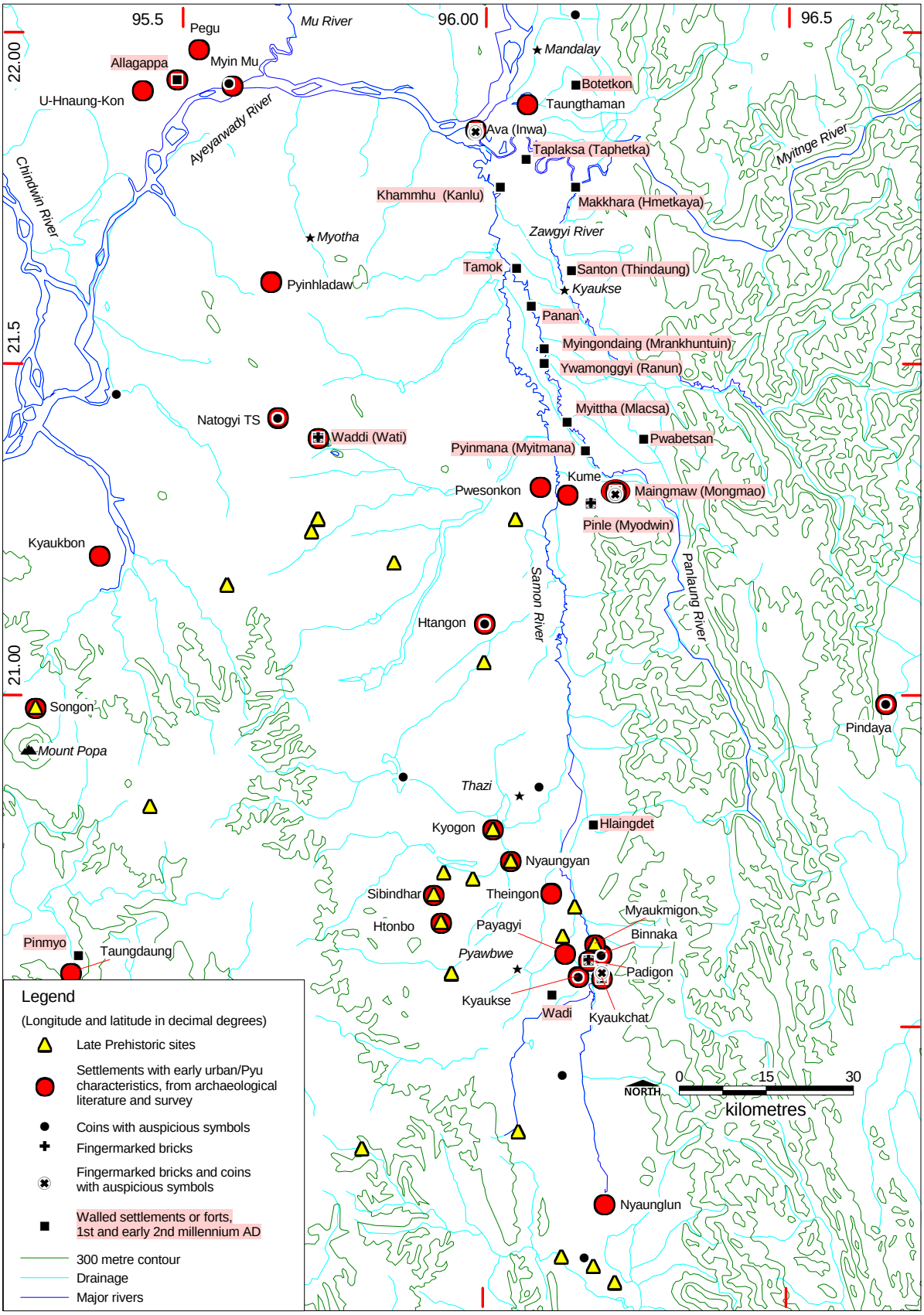

Figure 75 The Samon and Panlaung Valleys, settlement distribution.

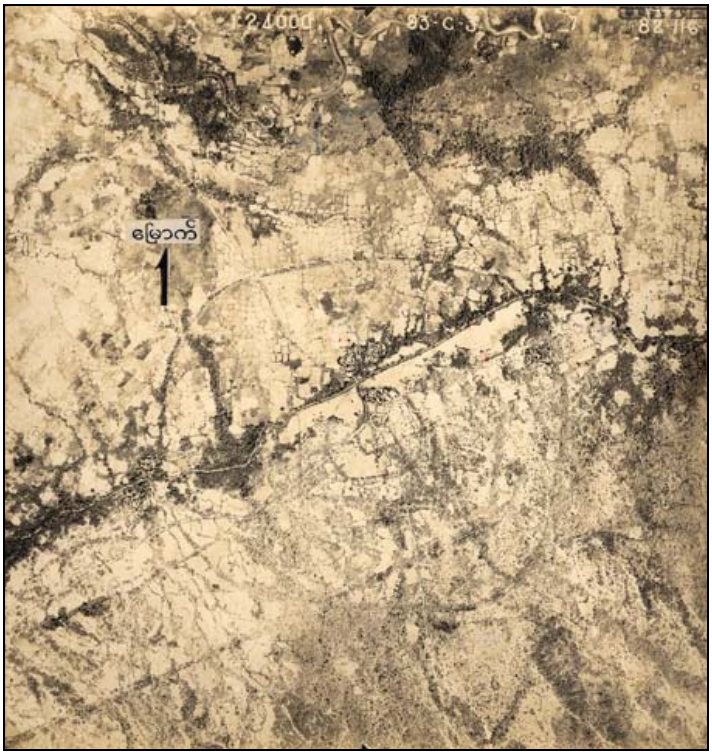

Figure 76 Maingmaw, dry season aerial photo, 1953.

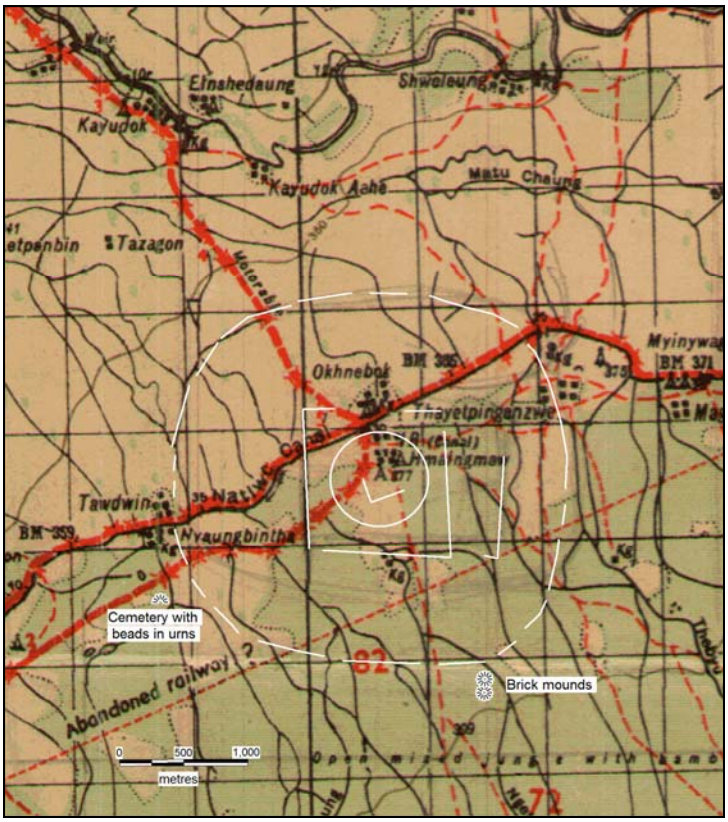

Figure 77 Maingmaw, 1944 map with wall outline overlaid.

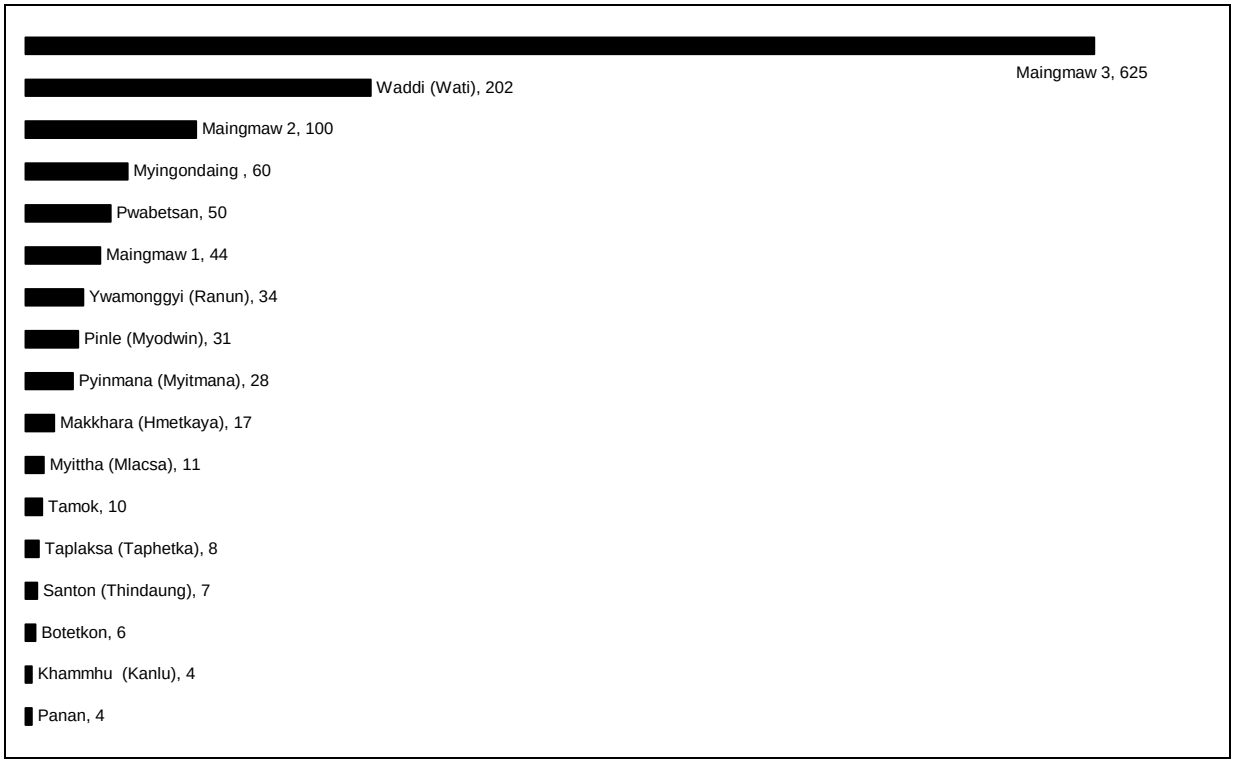

Figure 78 Maingmaw and the Panlaung Valley, size hierarchy of walled settlements, in hectares.

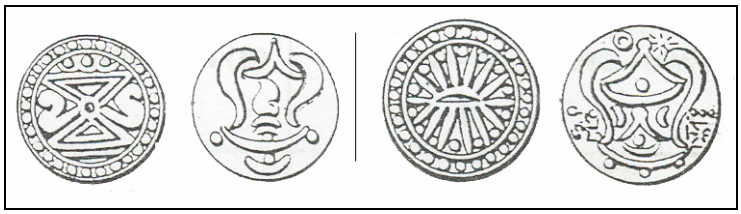

Figure 79 Coins excavated at Maingmaw (after Win Maung 2002b).

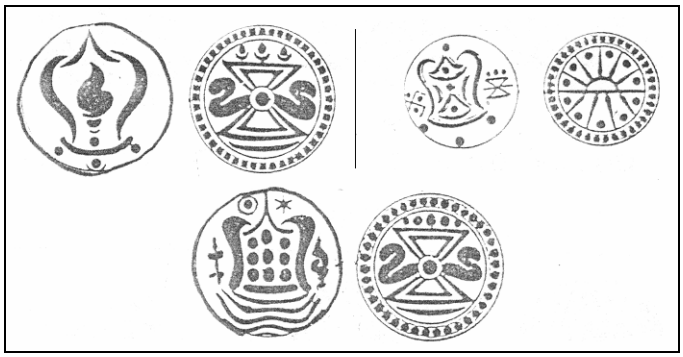

Figure 80 Coins excavated at Halin (after Win Maung 2002b).

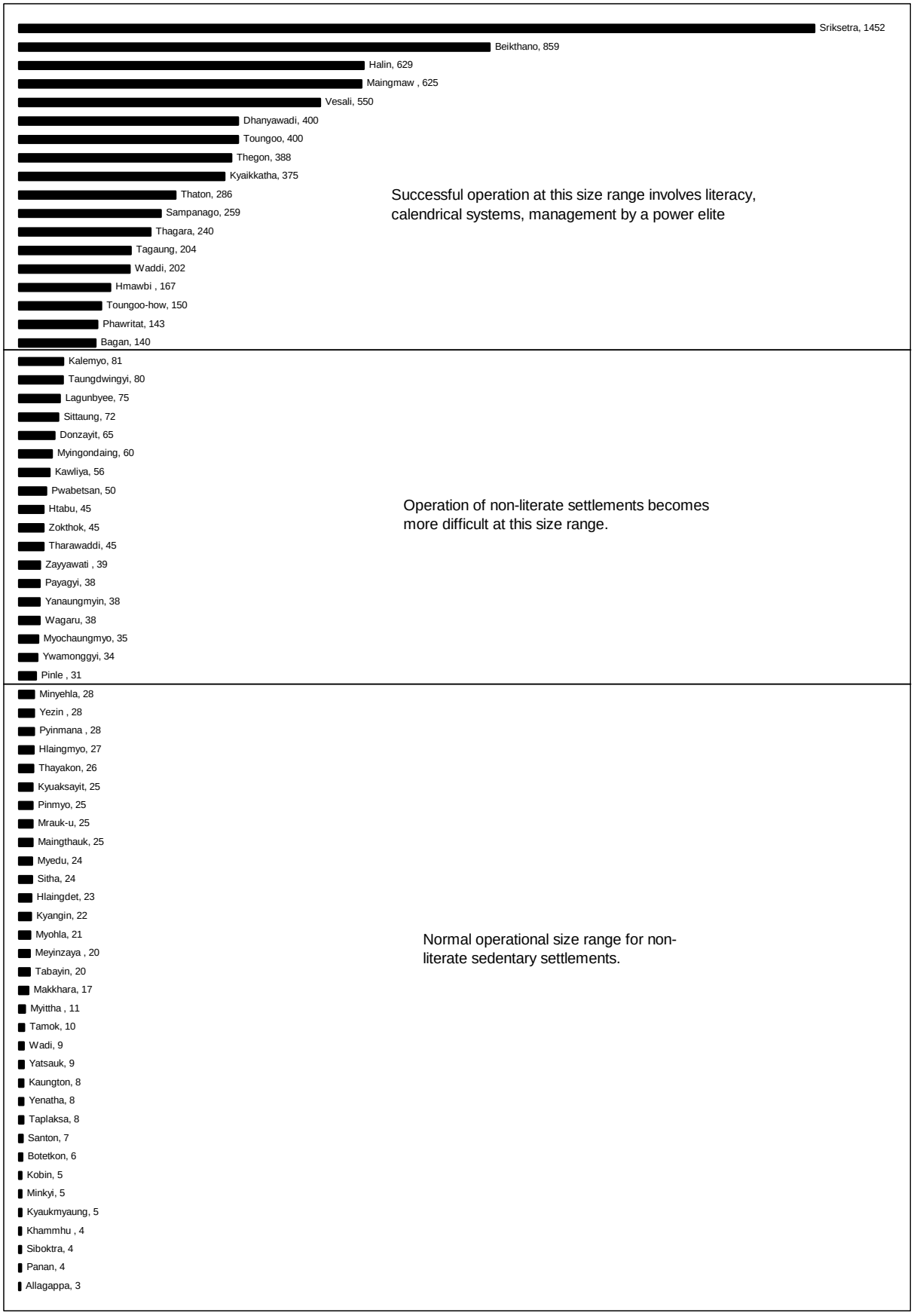

Figure 81 Myanmar walled sites, size hierarchy: areas in hectares.

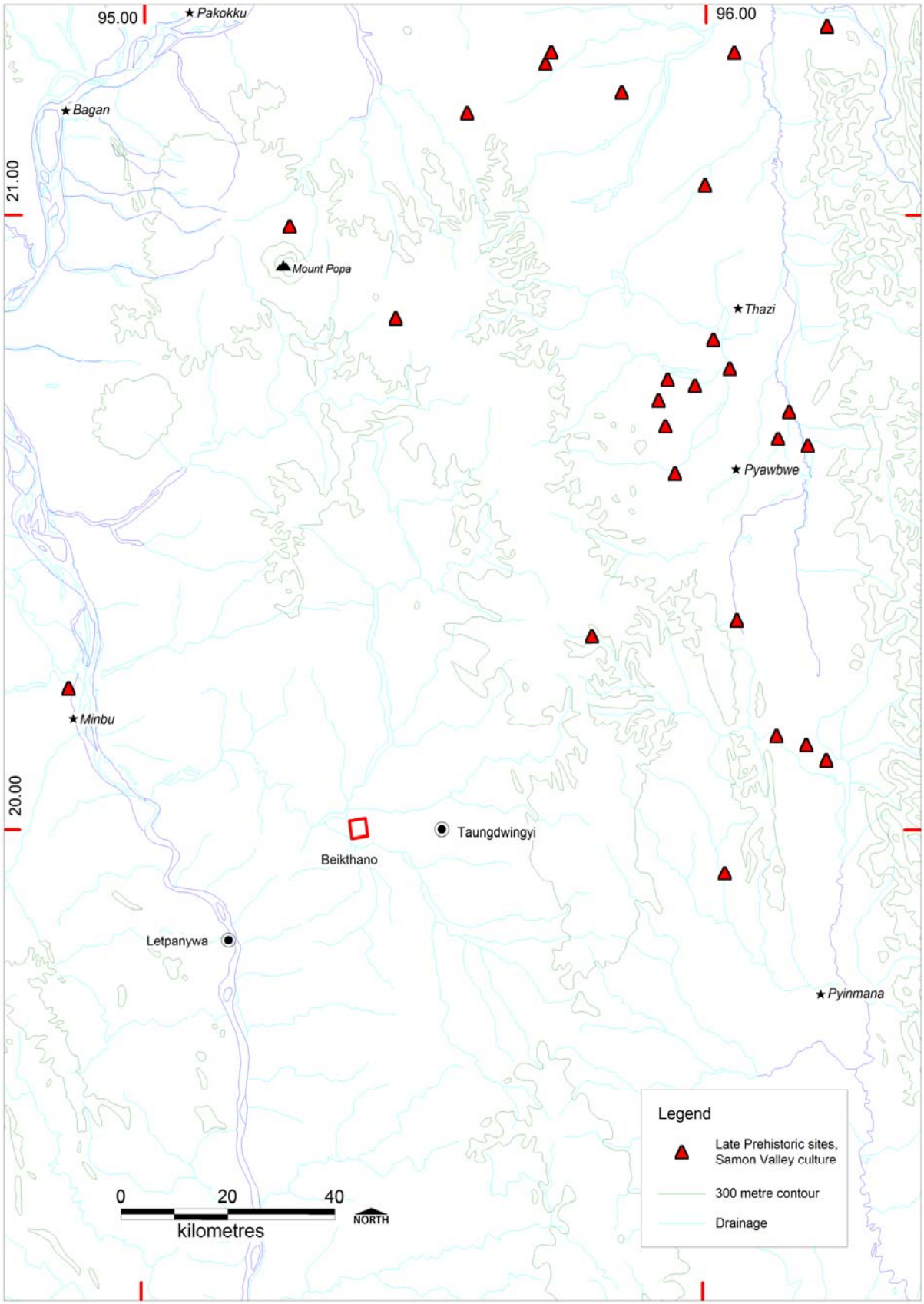

Figure 82 Beikthano and the Samon Valley, location.

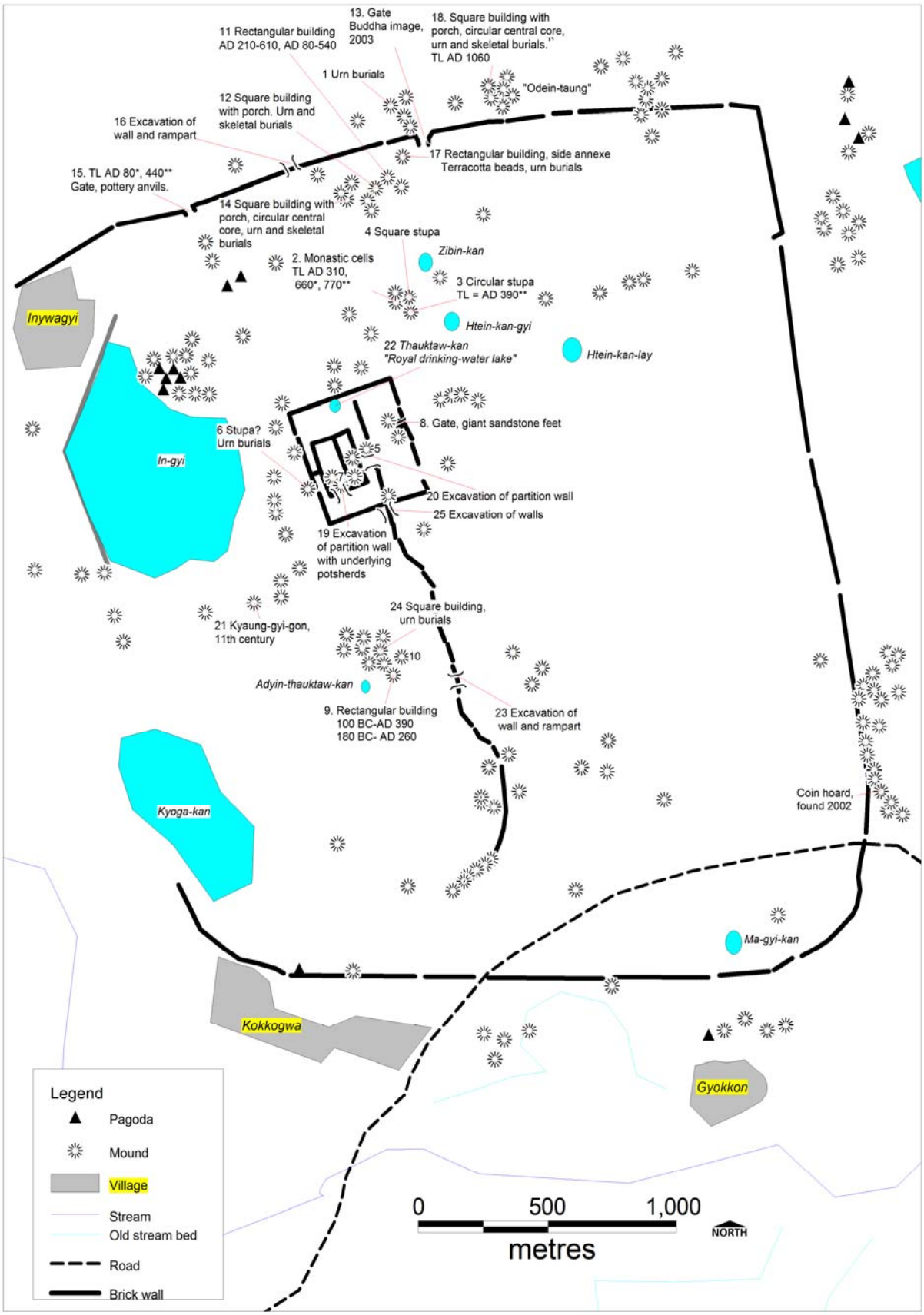

Figure 83 Beikthano, archaeological plan.

Figure 84 Beikthano coin hoard, *srivatsa* face.

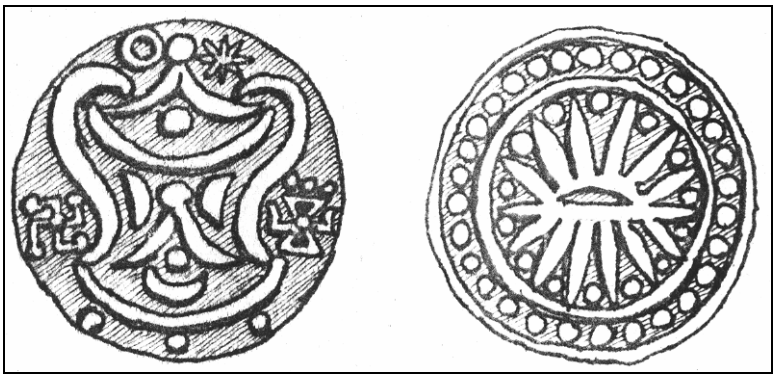

Figure 85 Characteristic "Halin" *srivatsa*/rising sun coin (Win Maung 2002b).

Figure 86 Beikthano coin hoard, rising sun face.

Figure 87 Coins excavated at Beikthano (after Aung Thaw 1968).

Figure 88 Buddha image, Kokkogwa, Beikthano 1976. 5 cm high. (Photo: Win Maung).

Figure 89 Buddha image, Beikthano, 2003. 10 cm high (Photo: Archaeology Department).

Figure 90 Brick wall and megalith, Letpanywa (Nyein Lwin).

Figure 91 Megalith and pots containing funerary deposits, Letpanywa (Nyein Lwin).

Figure 92 Anthropomorphic bronze hilt decoration, Letpanywa.

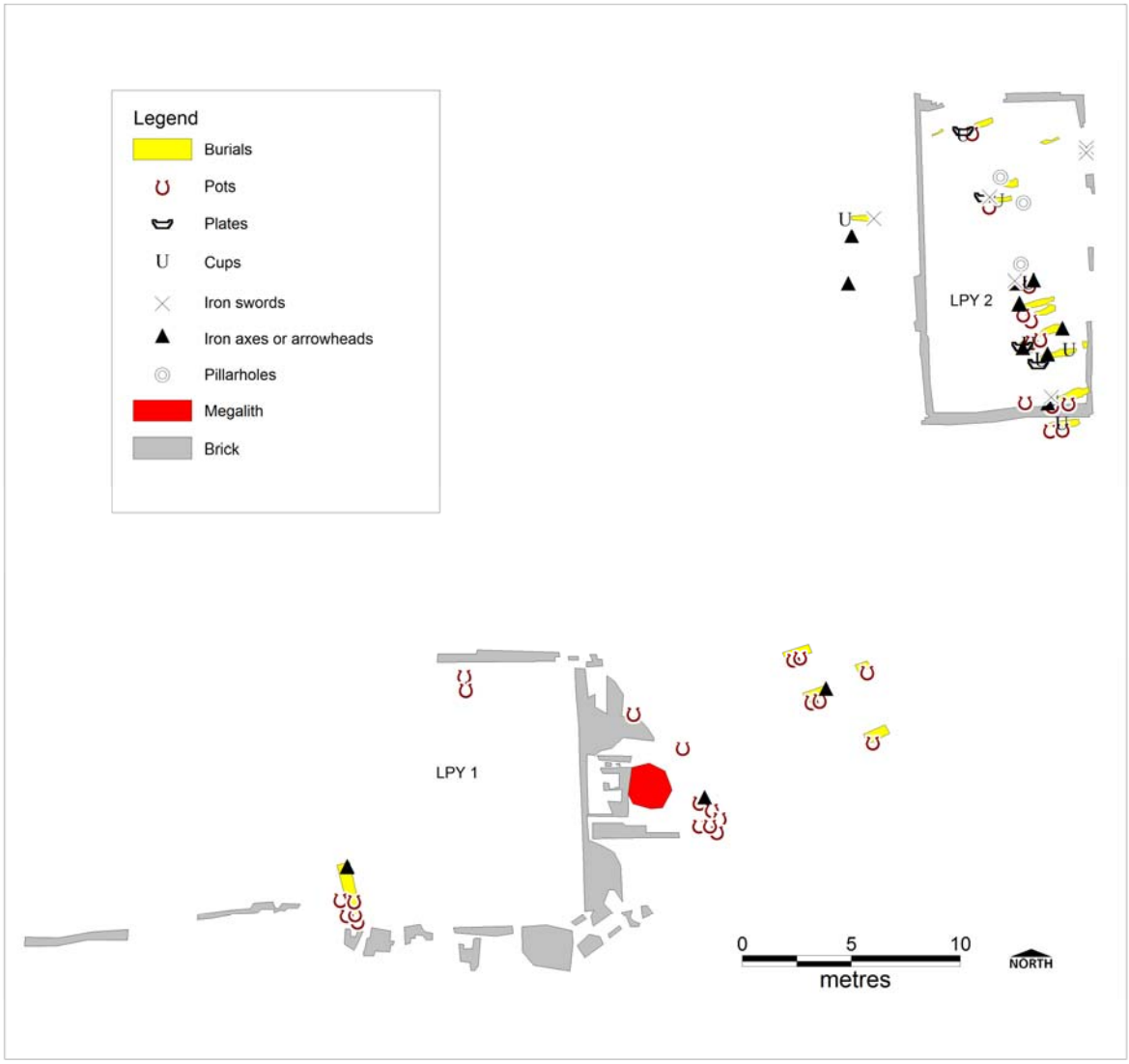

Figure 93 Letpanywa, excavation plan (after Nyein Lwin 2002, 2003).

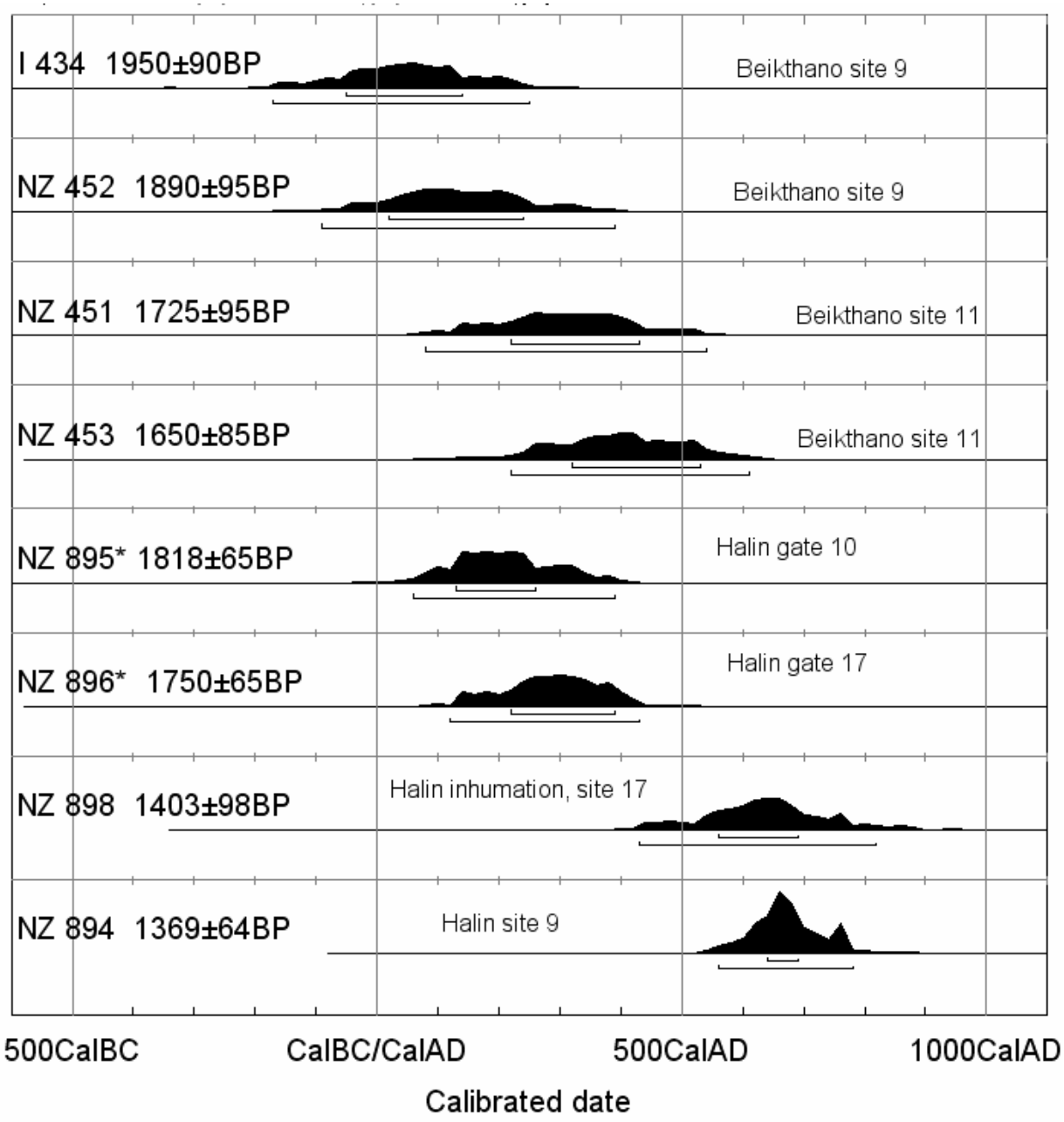

Figure 94 Radiocarbon date ranges, Beikthano and Halin.

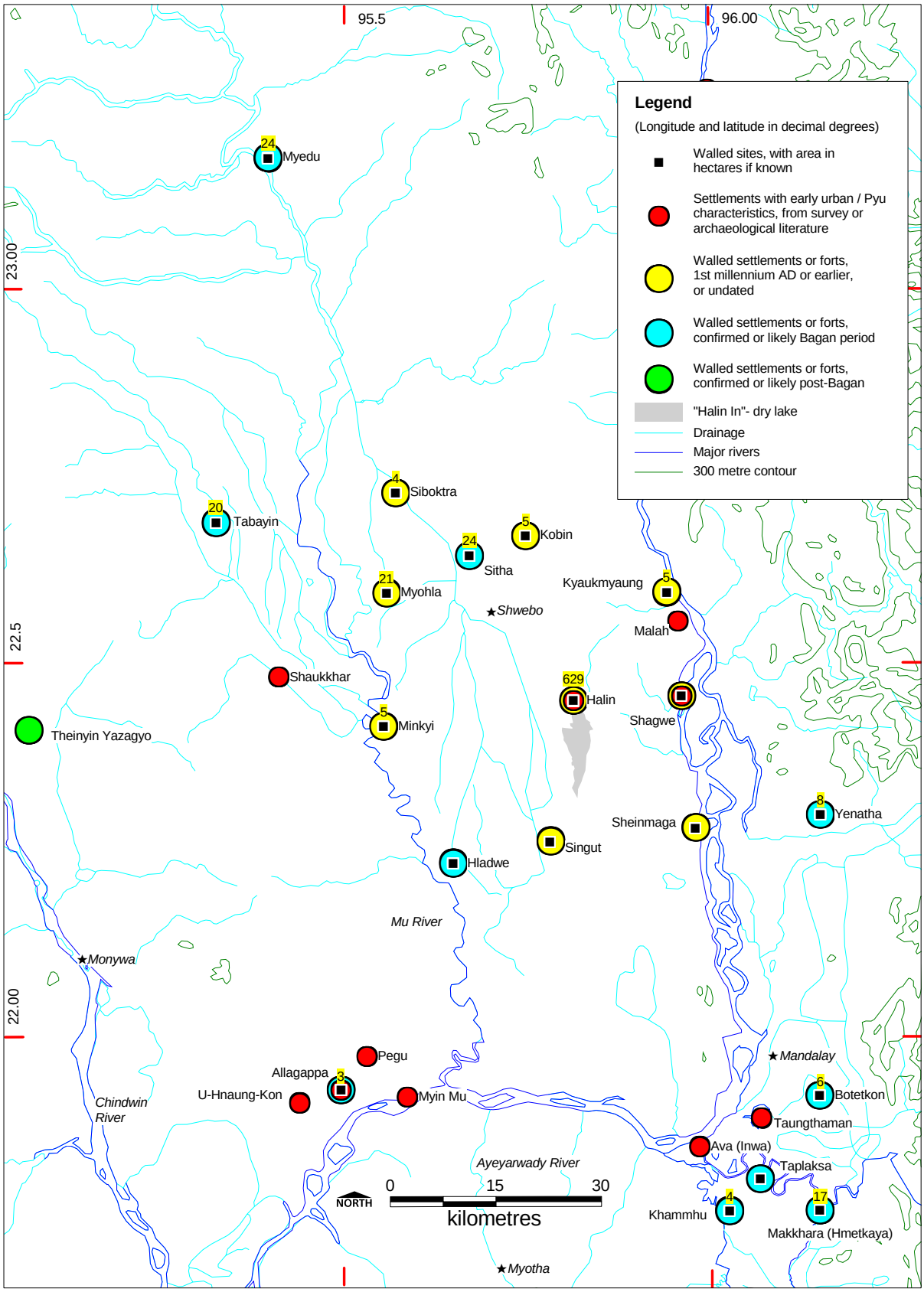

Figure 95 Halin: local region and satellites.

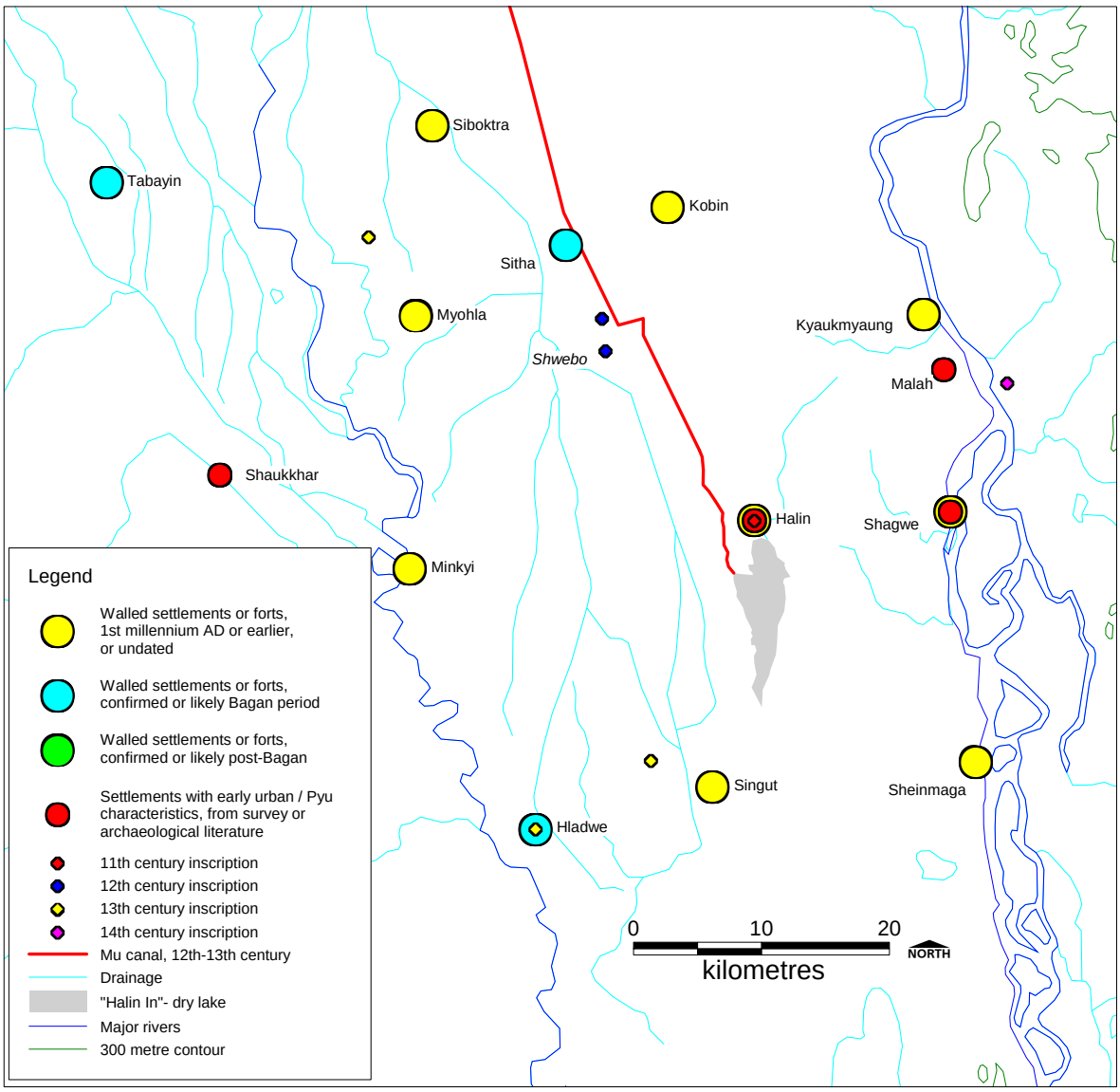

Figure 96 Halin and its satellites in the Bagan period.

Figure 97 Burial urn, Shagwe.

Figure 98 Inscribed bowl, Shagwe.

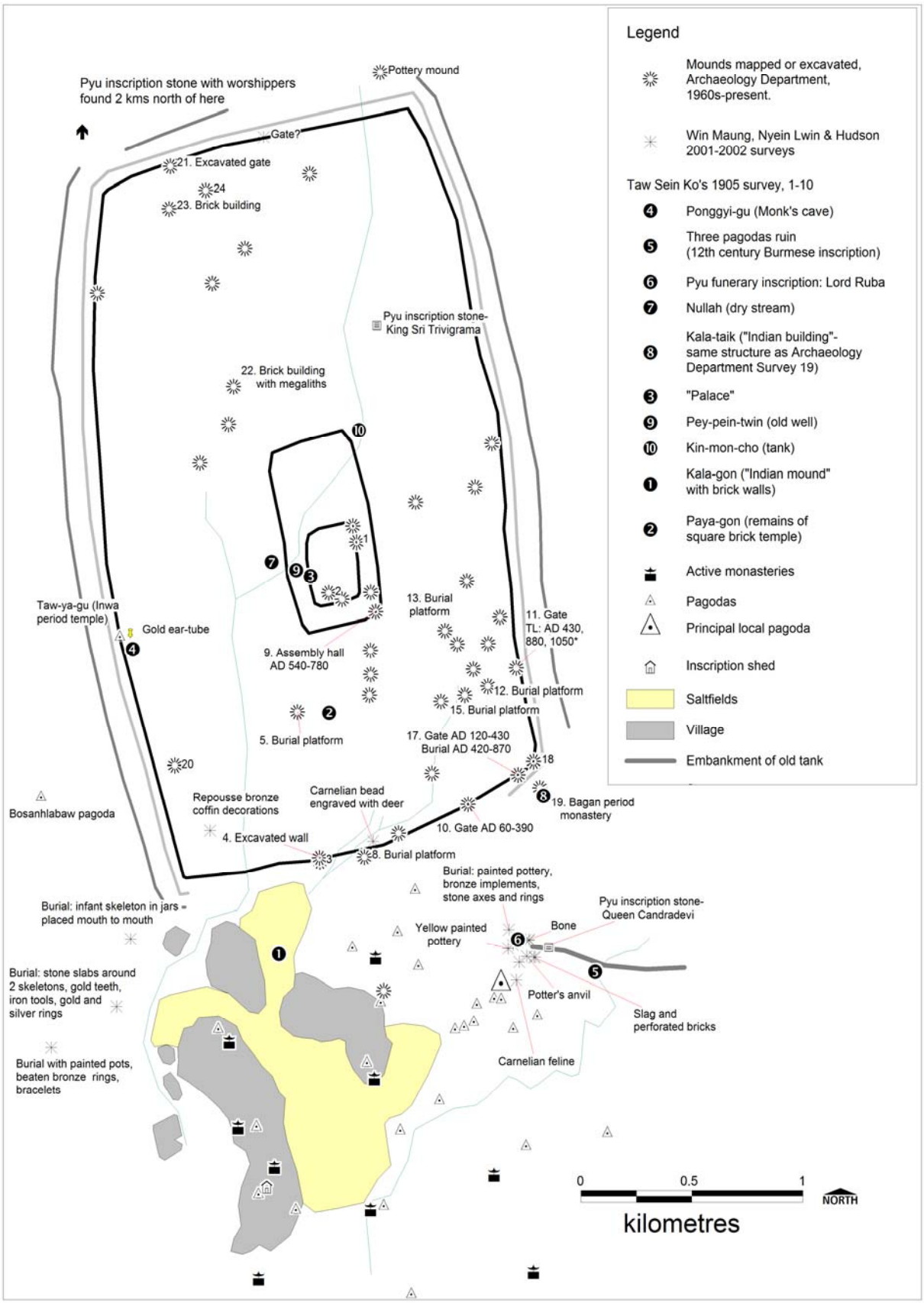

Figure 99 Halin, archaeological plan.

Figure 100 Gold-filled teeth, Halin.

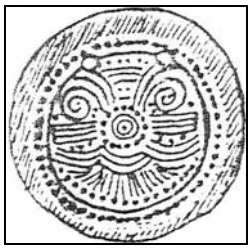

Figure 101 Coin excavated near Tagaung (Win Maung 2002b).

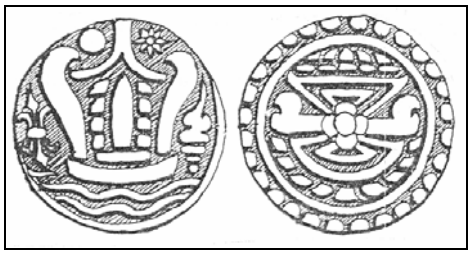

Figure 102 Characteristic "Sriksetra" *srivatsa*/*bhadrapitha* coin (Win Maung 2002b).

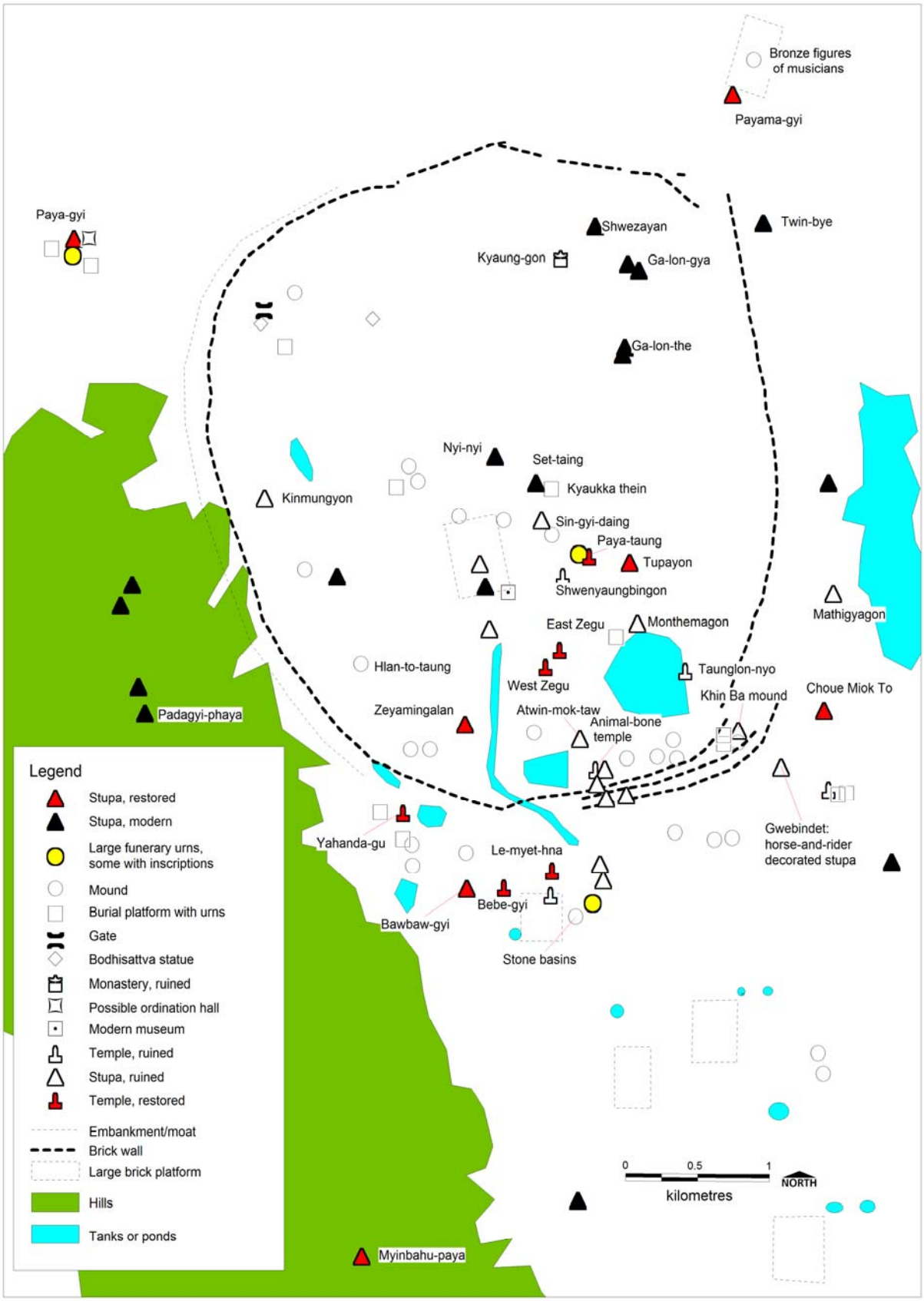

Figure 103 Sriksetra, archaeological plan.

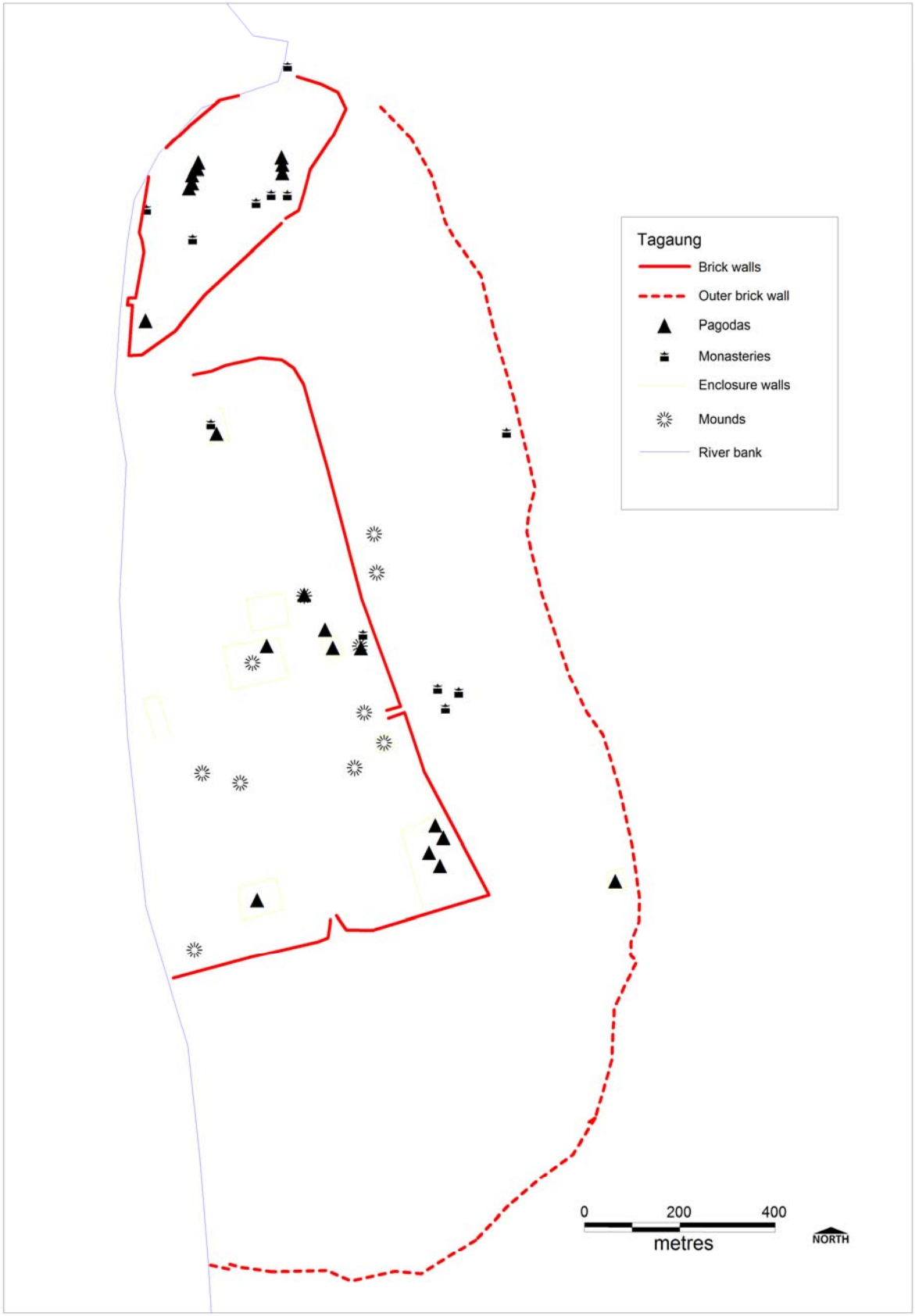

Figure 104 Tagaung, archaeological plan.

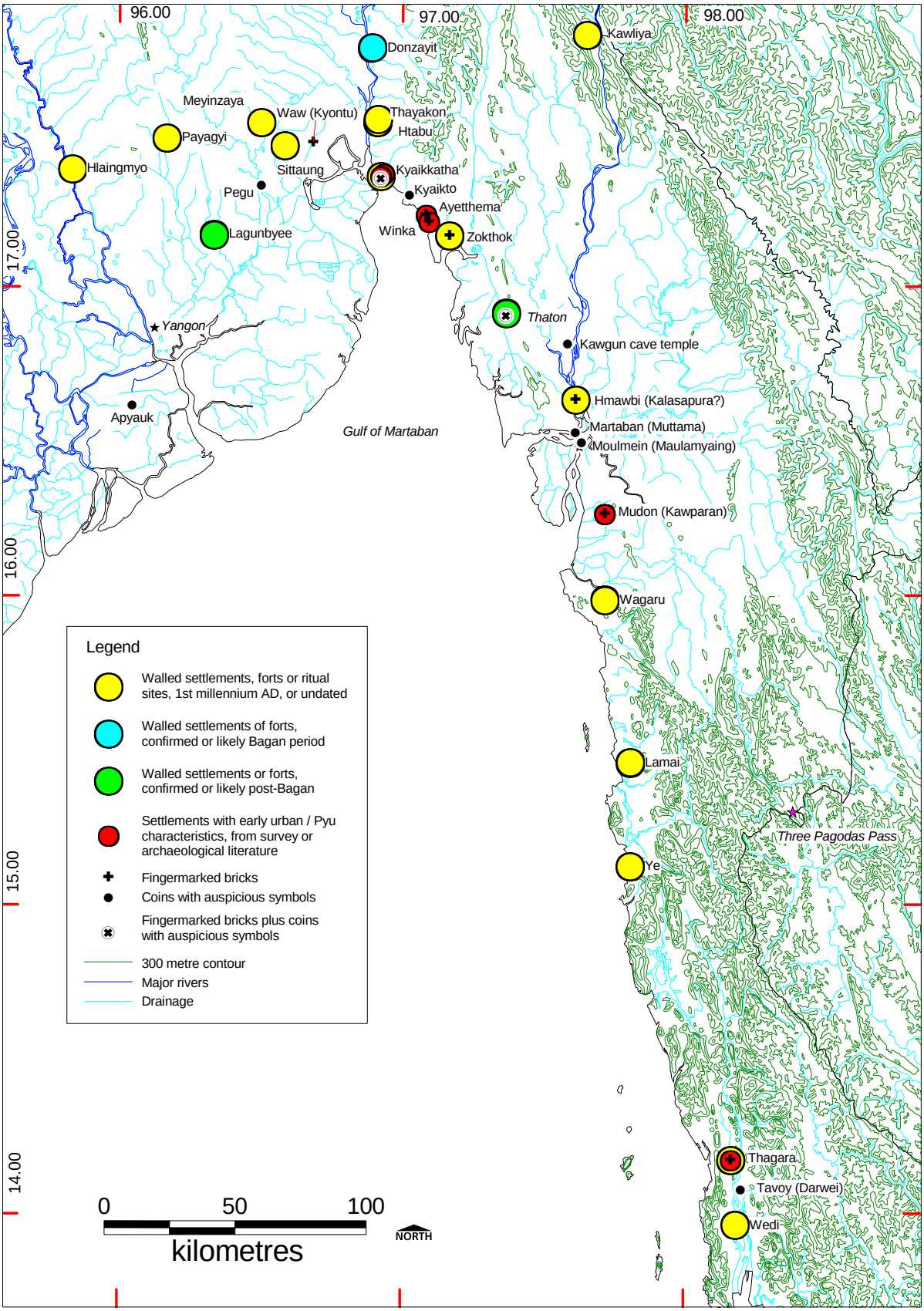

Figure 105 Gulf of Martaban and peninsular archaeological sites.

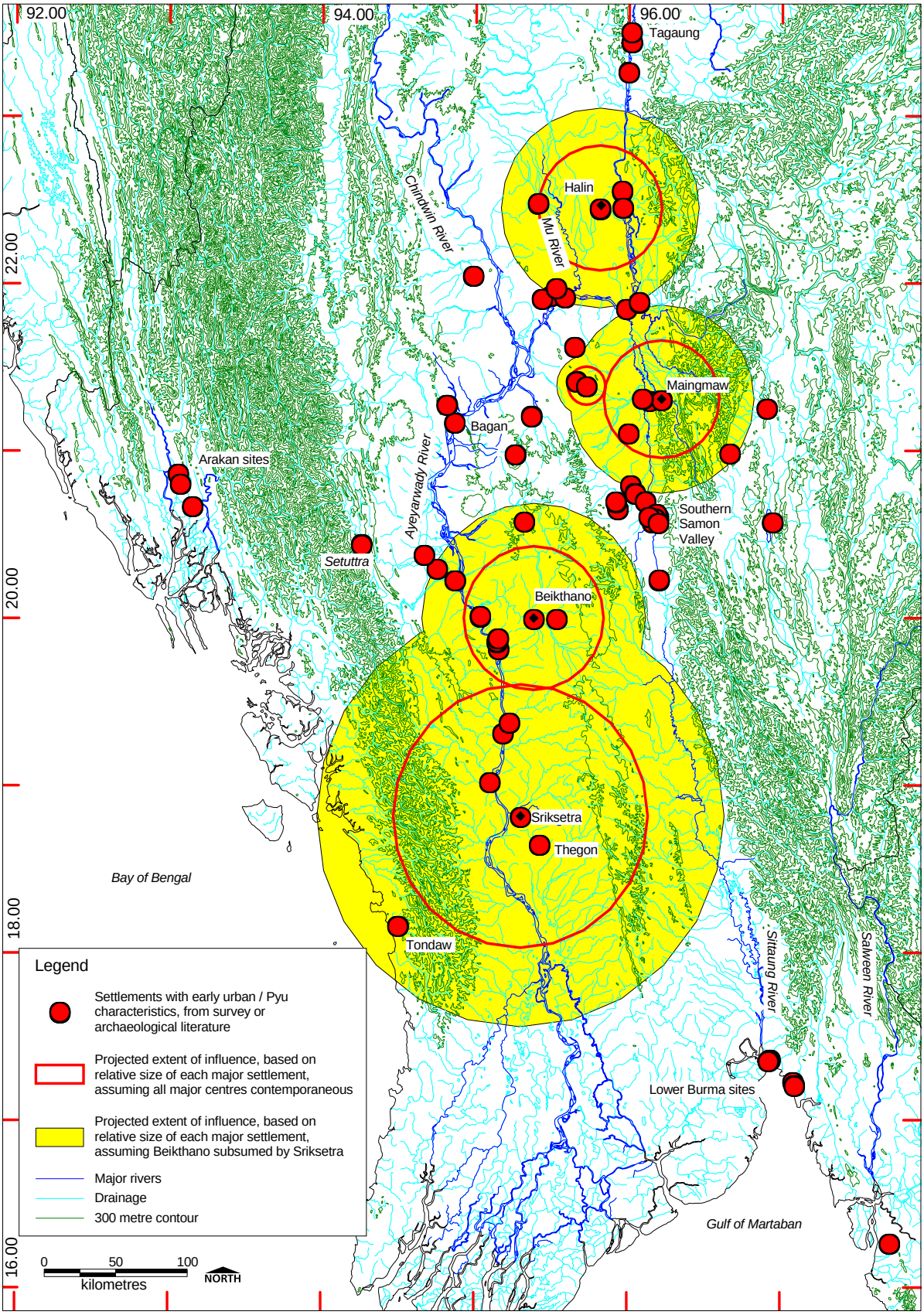

Figure 106 The main early urban centres and their projected zones of influence.

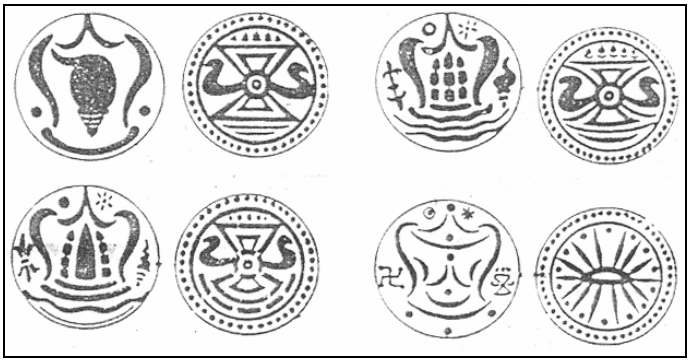

Figure 107 Coins excavated at Sriksetra (after Win Maung 2002b).

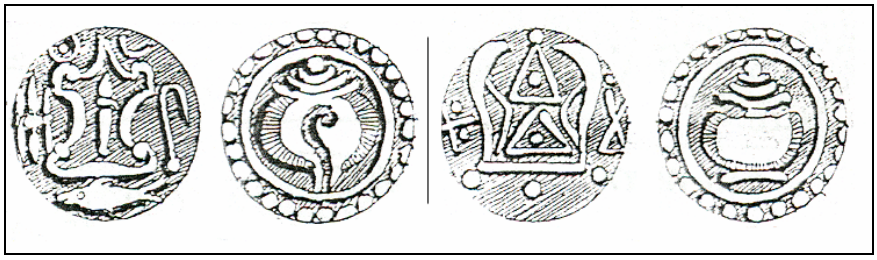

Figure 108 Coins excavated at Kyaikkatha (after Win Maung 2002b).

Figure 109 Fingermarked bricks from Tagaung, Winka and Bagan.

Figure 110 Brick scored with elephant design, Beikthano.

Figure 111 Brick scored in Pyu script, “nya-za-sri”, from building 280, Bagan.

Figure 112 Brick stamp with stupas and beindu dot design, 5 cm diameter, building 996, Bagan.

Figure 113 Brick stamp with duck design, 5 cm diameter, building 996, Bagan.

Figure 114 Brick stamped with a donor's name, "King's Servant Jar-Bu", Bagan Museum.

Figure 115 Brick stamped with the name of Salay village, Bagan Museum.

Figure 116 Fingermarked bricks, building 996, Bagan.

Figure 117 Fingermarked, stamped and animal-trodden bricks, building 996, Bagan.

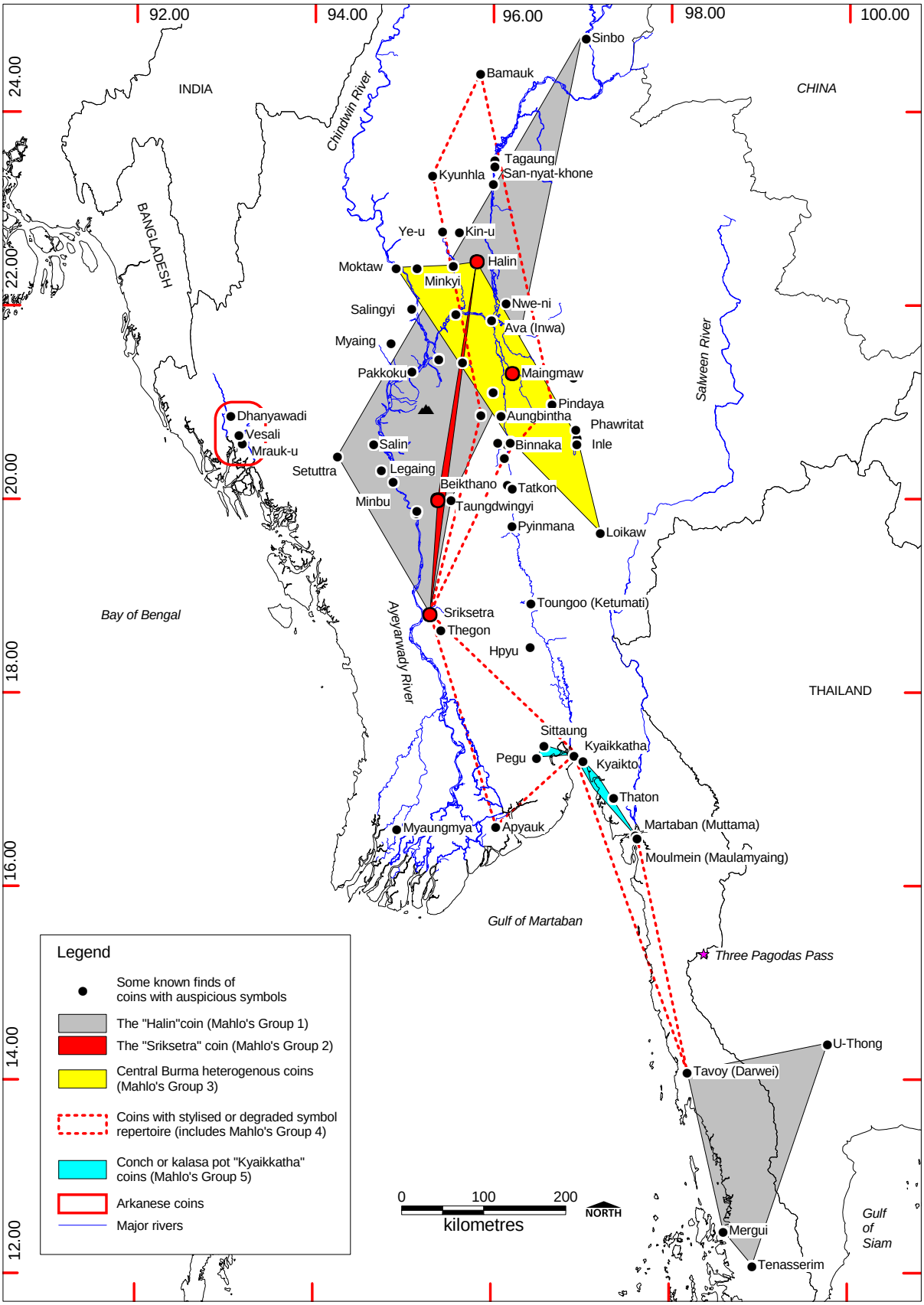

Figure 118 Distribution of coin groups, modified Mahlo system.

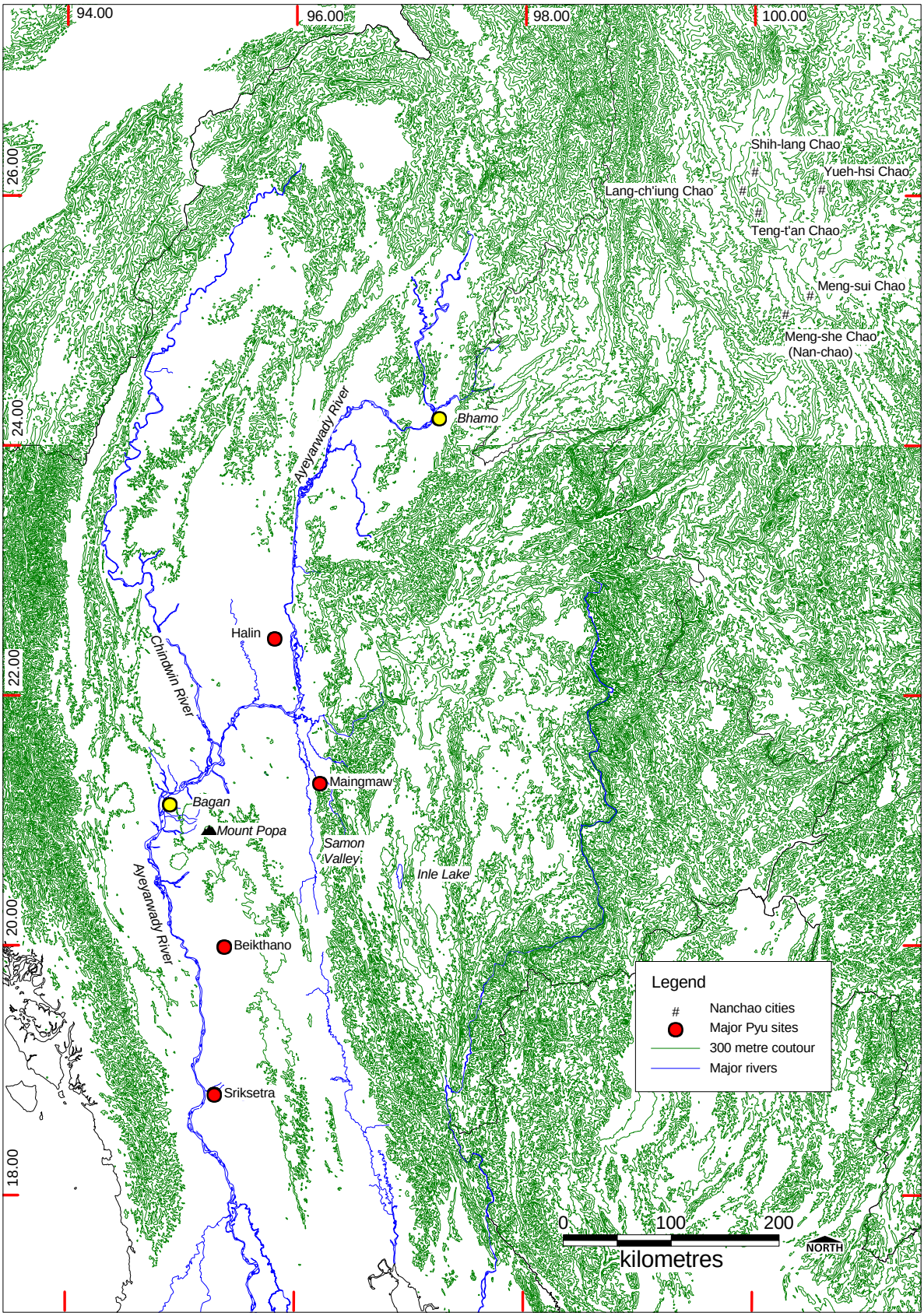

Figure 119 Nanchao and Pyu sites, location.

PART 3.
CHAPTER 6. BAGAN: CITY AND STATE.

The scene can now be set for Pyu-Bagan linkage at the regional scale. This occurs in the context of a gap which two parallel histories have attempted to bridge. The western history, the paradigm espoused by G. H. Luce and others, including the Mon paradigm, says that Bagan appeared as a regional power in the mid 11th century. This approach, while generally agreeing with Luce that the Burmans appeared on the scene in the mid 9th century, treats any historical claims at Bagan from the mid 9th to mid 11th century period as unproven. The indigenous history, which leans toward a literal interpretation of the Burmese chronicles, puts the building of Bagan, the walled centre that survives today, firmly in the mid 9th century. This history, as told in the *Glass Palace Chronicle* (page 25), also accepts the story of several "palace" sites existing around the Bagan area since the time of Pyusawhti. The *Glass Palace Chronicle* contains few hints of a Bagan empire before the mid 11th century. Monks, nats and relics move around the country and at times to or from Ceylon, but the notion of a regional administration does not seem to strike the chroniclers at all. The narrative remains generally localised at Bagan from the mythical founding date of AD 107 until the time of Anawratha (Pe Maung Tin & Luce 1923: 28-64). The western and traditional histories, therefore, both support the notion that the empire appeared in the 11th century, from a base at a city that may have existed for some time before that.

An empire by definition is the result of one centre or power group coming to dominate the population and resources of other areas. It was suggested in Chapter 5 that there was no Pyu crash in the mid 9th century. Macro-scale evidence suggests that the Bagan empire did not appear from a vacuum, but from an existing system of settlements. The regional archaeological evidence of the expansion of the Bagan state during the 11th-13th century suggests that the expansion subsumed many Pyu sites. This will be demonstrated by taking three identifiable elements of Bagan culture, (a) places specifically named in inscriptions, from a recent compilation by Aung-Thwin (The Making of Burma 2000), (b) dated epigraphs from the literature that can be linked with specific locations, and (c) recorded finds of Bagan period votary tablets (see Database CD-ROM), and examining their distribution in relation to the Pyu sites and to the indications of expansion over time.

The second part of the chapter works backwards from the relatively secure historical picture of Bagan in the 11th to 13th centuries (or more precisely, as will be shown in Chapter 7, from the *mid* 11th century) to examine the traditional account of the founding of the first phase of Bagan in the eastern hinterland of the present city. It will be proposed that in the light of archaeological evidence the traditional timescale of the second century AD given in the *Glass Palace Chronicle* (page 25) is untenable. A revision of the mytho-historical account supports a timescale closer to the 9th century. The survey of the eastern hinterland also reveals that the area contains significant structures and indications of early resource exploitation that while yet imprecisely dated, lend some support to the geographical aspects of the traditional narrative. In the third section, evidence of occupation at Bagan well before the mid 11th century will be provided from the excavation of the Otein Taung earthenware production site, where radiocarbon dates suggest that a craft centre was in operation within the perimeter of what later became the Bagan urban complex perhaps as early as the 8th century, and more certainly in the 9th. This indicates that while some of the traditional narratives of continuity from Pyu to Bagan must be rejected or modified, there is sufficient evidence to indicate that Bagan coexisted temporally with some of the major Pyu sites.

The State of Bagan.

Distribution of epigraphs and votaries, 11th-13th century: key indicators of the extent of state hegemony.

A visualisation of the spread over time of the Bagan state has been constructed by combining three classes of data. The temporal spread viewed century by century shows consistent occupation of Upper Burma in the 11th and 12th centuries, with an expansion by the 13th century that indicates hegemony over much of the area that makes up modern Myanmar. The first group of data consists of place names found in epigraphs translated by Aung-Thwin from the Burmese (Nyein Maung 1972-1998) and published electronically (The Making of Burma 2000). Not all of these are dated. The value of this dataset is to provide evidence that demarcates the 13th-14th century limits of the Burman empire. The distribution indicates that by the end of the Bagan period, the activity of recording religious dedications related to the central government extended from Ngahsaunggyan in the north, near the modern border with China, to Tenasserim in the south, covering both riverine and coastal areas (Figure 120, Figure 121 & Chart 2). For the second group, dated epigraphs, a review of the literature enables a broad chronological picture of the epigraphic evidence to be drawn. Dates for sites are drawn from a number of key compilations (Tun Nyein 1899; *Index Inscriptionum Birmanicarum* 1900; Duroiselle 1921), some of which may refer to copies rather than original, surviving stones. Sources for each site are summarised in the appendix (page 271) and full details including specific dates appear on the accompanying CD-ROM so that the validity of any individual entry can be tested.

The dated inscriptions show that in the 11th century, Bagan made its presence felt at Halin, along the lower Chindwin and Mu Valleys, and down the river as far as Pyay (Prome), where the AD 1093 Prome Shwesandaw inscription of Kyanzittha (Duroiselle 1960: 147) suggests that by this stage Pyay, on the river, may have begun to eclipse Sriksetra, a few kilometres inland, as the dominant settlement in that area. There are five outlying inscriptions, which have been left as such on the map (Figure 121) as most of them are poorly provenanced. An inscription of AD 1098 on a stone at the Kyaiktai pagoda near Ayetthema which credited King Kyanzittha with repairing and enlarging the structure, and was read *in situ* by the then superintendent of archaeology Lu Pe Win (ASB 1940-41:23), provides the best-supported instance of early Bagan interest in the Gulf of Martaban area. More problematic are three inscriptions at Inle Lake which have been seen only as copies. One, linking King Anawratha and a Shwethandaung pagoda at Inle village, was read as AD 1017, too early for Anawratha. Two others dated AD 1039 link King Anawratha and the late 12th century King Narapatisithu with the Shwe-Indein pagoda, a structure now surrounded by hundreds of smaller pagodas and a popular tourist and pilgrim destination on the western side of Inle Lake. These dates may well represent some of the copying errors mentioned by Duroiselle. The other 11th century outlier, Tilin, northwest of Bagan, which dates to AD 1091, also comes from an inscription copy (Duroiselle 1921: v, vi, 2-3, 7). Its location has been estimated on the basis of the name appearing among modern map data (NIMA 2001) as there are no correlating references available, so the degree of confidence in attributing the location is not high. However, giving these five inscriptions, particularly the last four, the benefit of the doubt, they can be seen as an indication of peripheral activity that was not maintained in the 12th century (Figure 121). The clustering of inscriptions in the Panlaung, Mu and Lower Chindwin areas, plus the Minbu area, provides a more accurate picture of Bagan's 11th century holdings. The greatest density of 11th century inscriptions is in the Panlaung Valley around Kyaukse, and indicates the early importance of this area as a key agricultural area for Bagan. A program of canal building in the Panlaung

Valley is linked to King Anawratha in the mid to late 11th century, where some of the pagodas may have been constructed specifically to provide fixed sights for estimating water levels (Aung-Thwin 1990: 14-20).

In the 12th century, the inscriptions indicate an intensification of activity at Kyaukse, in the lower Chindwin area and down the Ayeyarwady to the Minbu district including Salin, where an expansion of the Minbu irrigation works is credited to the AD 1174-1211 reign of King Narapatisithu (Aung-Thwin 1990: 20-22). Overall, the spread of the 12th century inscriptions suggests an infilling of the 11th century territories from the Mu Valley down to Minbu and in the Ayeyarwady-Samon watershed rather than any significant expansion of the state. If the 11th century outliers are viewed more critically, there even appears to be something of a compaction in the 12th century, notwithstanding the repair of the pagoda at Kyaiktai.

In the 13th century, inscriptions appear as far south as the peninsular settlements of Mergui (Myeik) and Tenasserim (Taninthaye) and north to Tagaung (see page 144) and Bhamo (see appendix, page 268) where Bagan faced Chinese incursions in the latter part of the 13th century. The polygons used to illustrate the extent of the Bagan empire by century (Figure 121) do not include sites from Aung-Thwin's list of undated inscriptions. As these would have been in place by the end of the 13th century, the extent of the Bagan state as shown on the map is a conservative estimate, and in actuality covered a broader area. The dated 13th century inscriptions make it clear that Bagan influence covered the full length of the country.

The third dataset, which along with the undated Aung-Thwin inscriptions provides broad correlation of the ultimate extent of the Bagan state, is votaries. Anawratha is believed to have marked his territories in the mid 11th century by the deposition of clay votaries (Luce 1969: 18-19, Volume 1). Votaries, while at times originating in India, were made at Sriksetra, perhaps from the 5th to 11th centuries, and Bagan, from the 11th to 13th centuries, as indicated by finds of bronze, stone and terracotta moulds (Thiripyanchi U Mya 1961, Part 1, Fig 115; Lowry 1974 Fig 24). Bagan votaries can be distinguished from Pyu (Thiripyanchi U Mya 1961; Nai Pan Hla 1996; Than Tun 2002: 53-95) and the map (Figure 120, Figure 121 & Chart 2) includes only finds that have been identified as Bagan period. While the votary tablets are not dated, their spread from a tablet signed by Anawratha at Nwatele in the north (Luce 1969: 17, Volume 1) to Tagu on the peninsula (Luce 1965: 281) parallels the spread of the inscriptions. A cautionary note on the use of votaries as archaeological evidence has been issued by Guy, who describes the removal during the 19th century restoration of the Mahabodi temple in India of hundreds of votaries which were apparently taken to Burma (Guy 2002: 31) and may well have ended up deposited as relics across the country.

When the Bagan data is viewed in association with the early urban sites, the latter shown as regions of 10 kilometres diameter for illustrative purposes (Chart 2), several areas of continuity can be seen. The four largest Pyu central places show evidence of involvement with Bagan. As discussed earlier, there are Bagan style buildings at Sriksetra (page 137), Bagan period inscriptions at Halin (page 132) and a possible 13th century Bagan style temple at Beikthano (page 128). Maingmaw is represented by an AD 1231 inscription found at Pinle (Luce 1969: 30, Volume 1), just outside the walls of the Pyu settlement. The Minbu irrigation area, the Lower Chindwin and the Mu Valley have inscriptions or votary finds that indicate more Bagan period exploitation of areas that had already been settled in the early urban period. The Kyaukse district, on this patterning of evidence, appears to be the only new territory opened up in the early Bagan period, and overall, the area of occupation of Upper Burma by Bagan looks a little more compressed compared to the occupation by the Pyu. This interpretation may be due to the methodology, the sampling and definition of sites, but it is also worth considering whether it may relate to a difference between self-management by more autonomous Pyu centres and more centralised management, with consequent problems of controlling the periphery, by Bagan. The early urban

Gulf of Martaban and peninsular sites, as discussed earlier (page 145), have characteristics that warrant a separate approach to that taken to Upper Burma, but it is clear that during the Bagan period, the empire was influential enough to leave its memorials in them. The delta sites, around Twante and Dagon, have a more straightforward relationship with Bagan. They are at the end point of the riverine infrastructure and in an area that is well recorded as being under central control during the later parts of the Bagan period (Luce 1969: 20-27, Volume 1; Aung-Thwin 1998: 60-62; Guillon 1999: 146-170; Frasch 2002: 60-67).

According to the epigraphic and other historical evidence (page 41), Bagan introduced a new system of management to Upper Burma, which involved improved irrigation techniques that used systems of canals to extend the old Pyu weir system (Aung-Thwin 1990), and perhaps benefited from regional climate change (Lieberman 2003: 100-112). As the spread of Bagan sites up and down the river (Chart 2) demonstrates, the new system saw water transport become a more significant part of the infrastructure for trade, military dominance and administration (Lubeigt 1998: 154-158), though there seems to be no evidence from wall paintings, which often portray rowing boats, that the sailing boats that later took advantage of southerly winds to go upstream (Yule 1968: 6-7) were used at Bagan. While the early urban central places were all built on subsidiary streams (page 126), there was a Pyu presence on or near the Ayeyarwady at various places from Tagaung in the north to perhaps Kyangin in the south (Chart 1). The presence of these possible way-stations suggests that the use of the river for transport may not necessarily have been a Bagan innovation. It may have been another aspect of Pyu infrastructure available for Bagan to take over and use as a basis for expansion.

While the inscriptions verify the existence of an expansionist Bagan from the 11th century, the chronicles claim that a polity was forming there in the 2nd century AD. The remainder of this chapter will examine that temporal gap and reduce it substantially.

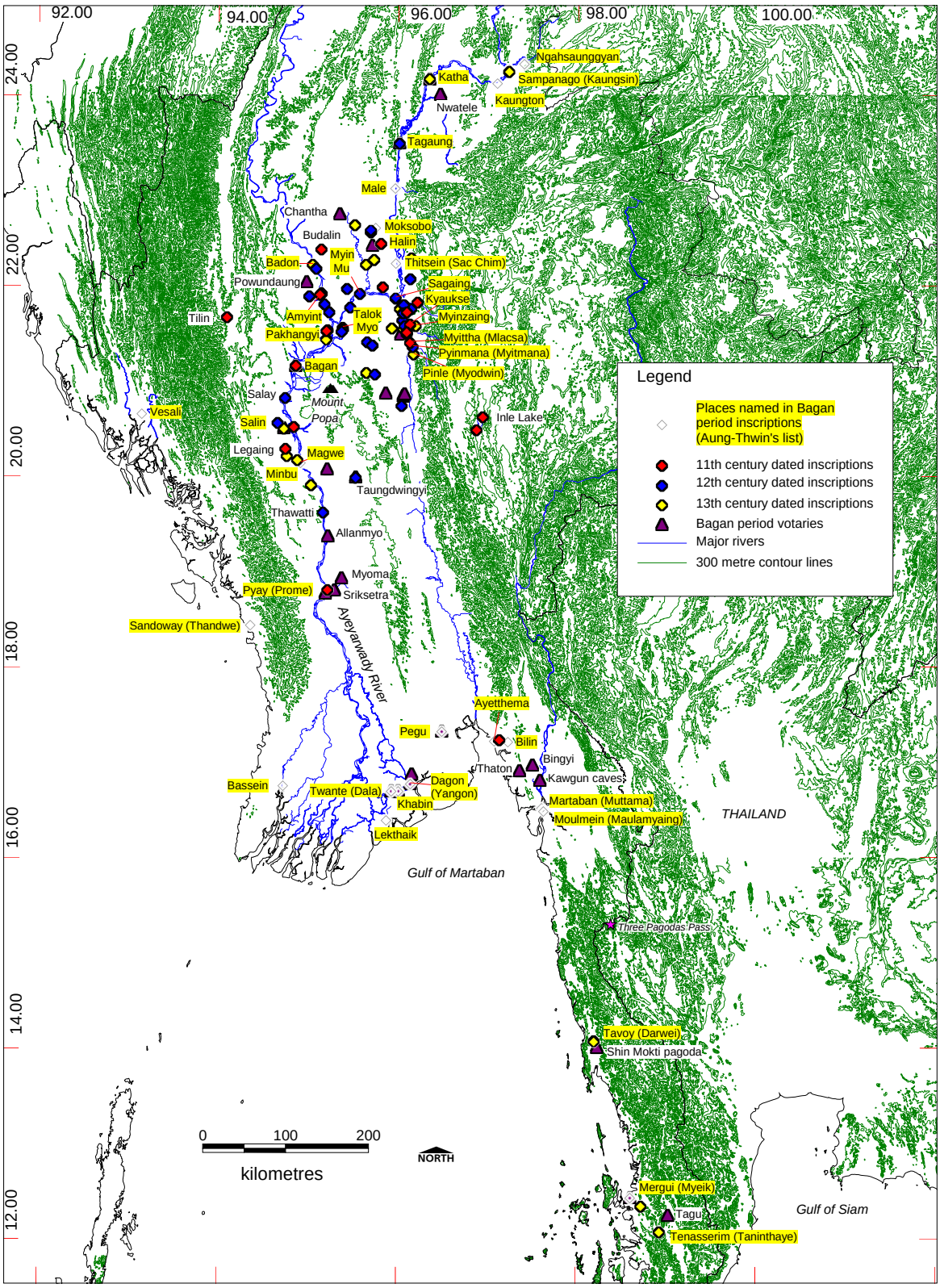

Figure 120 The Bagan state: inscriptions and votaries, 11th-13th century.

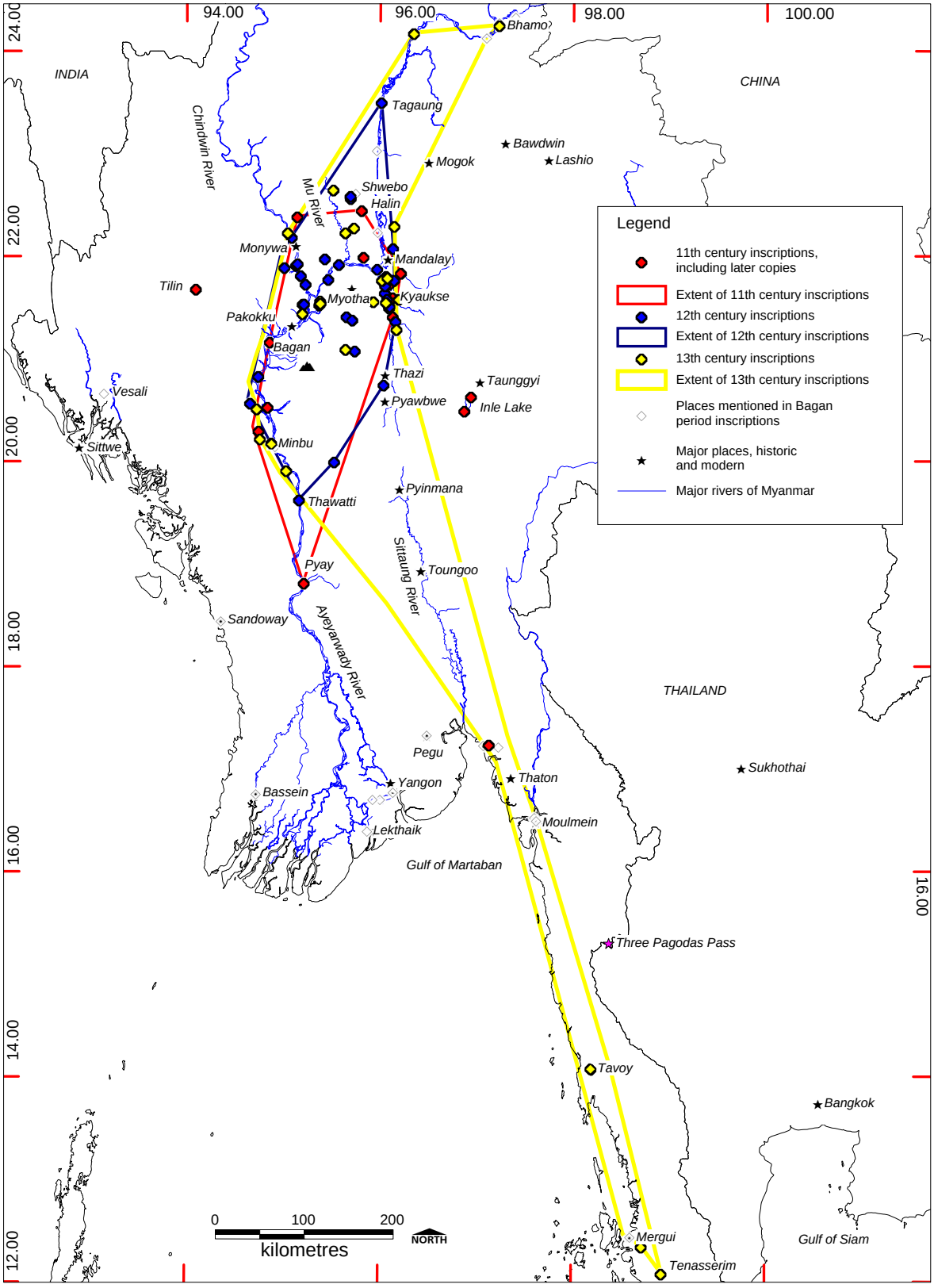

Figure 121 The Bagan state, areas of extent, 11th-13th century.

The City of Bagan 1. A new context for a traditional origin story: survey and excavation in the eastern hinterland.

Origin myths.

The traditional story of the founding of Bagan is that the initial polity was formed in the early 2nd century AD by way of an alliance of 19 villages, with the leadership based about 14 kilometres from the present city core on the north-eastern side of Mount Tuyin. A folk version of the foundation story collected orally from U Tun Yin, a local resident and landowner at Yonhlut, the site currently memorialised as the home of Bagan's first kings, explains the name of the site in this way:

> "In ancient times, some Pyu soldiers were fleeing from a war with the Queen of Beikthano. At a place where they had stopped to camp, they saw a hunter and his dogs chasing a rabbit. Suddenly the rabbit turned on the dogs, and drove them away. The soldiers decided this was a good omen, and decided to settle in that place. They called it Yon Hlut Kyun, or Free Rabbit Island".

This tale, in which the rabbit indicates a site worth defending against enemies, is an origin myth similar to that of Chiang Mai, where a family of deer provides an omen of "auspicious victory" to the founders of the settlement (Sithu Gamani Thingyan 2003: 19-26).

The founding of Bagan as described in the *Glass Palace Chronicle* might also be read as a mythologised account of settlement fission and intermittent population drift.

> "[Thamoddarit settles near Pagan, 107 AD] When the Kanyans fled, the Pyus fought among themselves and split again into three divisions. The Kyabins took one division, the Theks another. The third made their home in the country of Taungnyo. After three years they were attacked by the Talaings and spoiled. And they moved thence and founded the country Paduang Thetta and dwelt there. After six years they were attacked and spoiled once more by the Kanyans. Thence they moved and built Mindon and dwelt there for three years. Thereafter Thamoddarit began to build in the country of Yonhlutkyun in the year 29, Short Era. In the sixteenth year after Mahallaka the Brahmin abolished the old era, the kingdom of Tharehkittara perished. When the Pyus had fought with the Kanyans and dwelt in Taungnyo, Paduang Thetta and Mindon, in the twenty-ninth year Short Era (including the twelve years of interregnum) king Thamoddarit began to build a city with the dwellers in nineteen villages in Yonhlutkyun" (Pe Maung Tin & Luce 1923: 28-43).

The *Glass Palace Chronicle* narrative is overlaid with mythological tales, including battles between the teenage warrior Pyusawhti and a malicious flying squirrel and other faunal and floral totems. Pyusawhti marries the daughter of the founder Thamoddarit following his brave deeds This could be read in terms of the rise to dominance of Pyusawhti's group over local rivals. Pyusawhti has become a key symbol of Bagan. His romantic, somewhat Arthurian, bronze image graces the forecourt of Bagan's museum at the expense of the kings of the historical era. Beyond the mythical tales, there is room to consider that this legendary figure may represent a group, a phase of events, or perhaps even an actual individual.

Nanchao, Pyusawhti and early Bagan: from legend to hypothesis.

The name and legend of Pyusawhti appears to originate in Nanchao, in what is now Yunnan, in southern China. Nanchao (Figure 119) had a series of leaders whose names had a distinctive linguistic link. Successors from AD 674 to AD 902 took the last part of their predecessors' names as the first part of their own. Thus there was a progression through Hsi-nu-lo (r. AD 649-674), Lo-sheng (r. AD 674-712), Sheng-lo-pi (r. AD 712-728), P'i-lo-ko (r. AD 728-748), Ko-lo-feng (r. AD 748-778), Feng-ch'ieh-i (died before gaining the throne), I-mou-hsun (r. AD 778-808), Hsun-ko-ch'uan (r. AD 808-809), Ch'uan-lung-sheng (r. AD 809-816), Ch'uan-li (r. AD 816-824), Ch'uan-feng-yu (r. AD 824-859) (the former three were brothers), Shih-lung (r. AD 859-877), Lung-shun (r. AD 877-897) and Shun-hua-chen (r. AD 897-902) (Pelliot 1904: 164-169; Harvey 1925: 308, 312-313; Blackmore 1967: 62; Backus 1981: 58).

The same patronymic process occurred in some of the smaller principalities, the "Six Chao", that made up the Nanchao confederation. In the Lang-k'iong principality (with a terminal date of AD 794, when its capital, Chien ch'uan, was destroyed by Nanchao), there were Lo-to, To-lo-wang, Wang-p'ien, P'ien-lo-yi, and Lo-yi-lo chun. The Teng-chan principality also had a terminal date of AD 794. Its base in the Yeh-kung valley was incorporated into Nanchao at the same time as Lang-k'iong (Luce 1961: 23-29). Leaders of Teng-chan were named Fong-mei, Mei-lo-p'i, P'i-lo-teng, Teng-lo-tein, Tien-chih-t'o. In the Mong-hi principality there were K'ia-yang-tchao, Tchao-yuan, Yuan-lo (Pelliot 1904: 165). A reign name could presumably be taken by any successor, which would compensate for any departure from direct familial succession. Other ethno-historical incidences of this kind of patronymic linkage suggest that it was a characteristic cultural trait of a number of Tibeto-Burman speaking groups of Yunnan (Blackmore 1967: 66; Ford 1974).

The only other place in the region where this formula appears to have been used was in the traditional accounts of the early Pyu leaders at Bagan. Unlike the leaders of Nanchao, their chronology is unsubstantiated. According to the *Glass Palace Chronicle* (Pe Maung Tin & Luce 1923: 43-45, 50) the sequence of leaders was Pyusawhti (AD 167-242), Timinyi (AD 242-299), Yimminpaik (AD 299-324), Paikthili (AD 324-344), Thinlikyaung (AD 344-387) and Kyaungdurit (AD 387-412). "Il me paraît impossible d'expliquer par le simple hasard une pareille coïncidence", says Pelliot: it's more than a coincidence (Pelliot 1904: 166). It could be considered that in the Burmese chronicles, the mythological may have taken its cue from the historical, and the list of the early leaders of the confederation of nineteen villages refers to a group who had been in contact with Nanchao at some time during the period in which the patronymic system was in prominent use, that is to say, in the 8th or 9th century.

Not all the traditional histories are locked into the second century AD timescale for the appearance of Pyusawhti. The *Hsipaw Chronicle* puts the beginning of the turmoil that led to the founding of Bagan at AD 208 (Sai Aung Tun 2001), a century later then the timescale suggested in the *Glass Palace Chronicle.* The *Maniyadanabon of Shin Sandalinka* (page 33) puts the establishment of Bagan by Thamoddarit at AD 664, with Pyusawhti/Pyuminhti on the throne from AD 727 (Bagshawe 1981). This is paralleled by a possible alternative reading (discussed earlier, page 25) of the *Glass Palace Chronicle* (Pe Maung Tin & Luce 1923: 28). The *Jatatopum* (page 29) gives the establishment date of 23 Sakaraj (661 AD) when with the "strength of the 19 villages the great kingdom called Arimaddana was established", while Pyuminhti (= Pyusawhti) inherited the throne in 62 Sakaraj, or 700 AD (as translated from the Burmese by Michael Aung-Thwin, personal communication 2002). Pyusawhti shares the name of a legendary (legendary in Nanchao, that is) son of the Indian Buddhist king Asoka (Pelliot 1904: 167-168). The elements of the name are *Pyu* (tribal name) *saw* (signifier: prince/master) *hti* (parasol: symbol of authority). Pyusawhti is also

sometimes known as Pyuminhti, taking the Burmese word *min* (sovereign) as the middle element, rather than the Tai/Shan term *saw*. Harvey (see also page 36) suggested that the person who became known as Pyusawhti may have been a vassal of Ko-lo-feng (r. AD 748-778), involved in providing the Nanchao leader with soldiers to aid in the subjugation of the Pyu and other tribes of Upper Burma in or shortly after AD 754 (Harvey 1925: 308). The incursion by Ko-lo-feng against the P'iao (Pyu) is documented in Chinese sources (Pelliot 1904: 155-156). When the adventurer returned home, as Harvey puts it, "his share of the fighting would not lose in the telling", and he may well have adopted or been given the name Pyusawhti as appropriate to his status (Harvey 1925: 308). Harvey's hypothesis relates to the habit of the Nanchao leaders using levies from subject tribes in their armies. This was an activity seen not only in the province of Nanchao, but also in China's central government. In AD 714, for example, an edict of the Tang concerning the appointment of a commander in a campaign against the Tibetans stated that there were over 200,000 non-Chinese soldiers in that army (Pan Yihong 1997: 152). The Pyusawhti of the chronicles was immortalised in traditional Burmese drama and swathed in mythological stories, "a king of great glory and power, owning the Wayazein bow and arrows, the Ayeindama spear, the Thilawuntha sword and the White Elephant, which Thagyamin (Indra) had given him: he was the ideal of mankind" (Bagshawe 1981: 6). On this evidence the likeliest real-time origin of the Burmese folk memory of Pyusawhti, whether he was an individual or whether he was the personification of mythologised events, is the later 8th to 9th century AD. A date in the 9th century would give the influence of the patronymic system more time to spread, and coincides with recorded visits in the early 9th century by the musicians from Myanmar to the Chinese court (see page 141), and the military incursion by Nanchao against the unnamed Pyu capital (see page 149).

The 19 founding villages of Bagan: data and myths.

According to the traditional story, Pyusawhti married into the dynasty that had established itself in the eastern hinterland of Bagan at the head of the confederation of nineteen villages. It is important to examine this narrative in relation to the available archaeological evidence because as a key received history it impacts strongly on Myanmar research priorities and heritage policy. The *Glass Palace Chronicle* (Pe Maung Tin & Luce 1923: 29) lists the founding villages as Nyaung-u, Nagabo, Nagakyit, Magyigyi, Tuti, Kyaussaga, Kokkethein, Nyaungwun, Anurada, Tazaunggun, Ywamon, Kyinlo, Kokko, Taungba, Myegedwin, Tharekya, Onmya (with a quibble as to whether this should actually be Singu), Yonhlut and Ywasaik. These names and their English spellings are taken here as a guide, while providing variants from other chronicles or oral sources. One variant (allowing for differences in Burmese to English transliteration) comes in the *Maniyadanabon* (page 33), which gives the village names as Nyaung-u, Nagabo, Nagakyei, Mankyei, Htokchauk, Saga, Mutathein, Nyaungwun, Anuyada, Tazaungkyun, Shabok, Kyinlo, Kokko, Taungma, Myeihkedwin, Thayet, Ngazingu and Yonhlutkyun (Bagshawe 1981: 5).

A number of contenders for founder status have now been identified (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002) and archaeological excavation has revealed a substantial structure at one of the sites, Yonhlut, which is traditionally believed to be the founding capital (Hudson & Nyein Lwin 1999; Hudson 2000a; Hudson, Nyein Lwin & Win Maung 2002; Hudson 2003b). The archaeological and survey data can be used to test not just the villages' claims of antiquity, which as will be demonstrated here are not nearly as strong as they are presented in the chronicles, but also archaeological and geographical models of settlement origin. Collection of data on these sites has ranged from a re-examination of English and Burmese documentary sources and inch to the mile survey maps to interviews with local residents, plus archaeological excavation and radiocarbon dating. The location of places that may not easily be found again, such as

abandoned habitation sites, was pinpointed with a Global Positioning System (GPS) receiver. The sites are listed here in the order of their distance from the walled centre now known as "Old Bagan" (Figure 122).

Nagabo.

Nagobo, Nagasaing, Nagaso, Nagasit, Nagabol, Nagasate, Nagasi, Nagaaing, Bagan Myo. This site is now a palimpsest of Bagan era and later buildings, supposedly located to the east and south-east of modern Taungbe village (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Map 84 K/16. E 94.8757° N 21.1767°.

Nagakyit.

Naga Kyee. An inscription in the Shwezigon pagoda mentioned that the village, "Naga Kyitmaw" was nearby, somewhere between the Wetkyi-in stream and the Shwezigon. Some of the buildings nearby have bricks with Pyu fingermarks (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Map 84 K/16. E 94.8946° N 21.1929°

Anurada.

Anuradha, Anutara, Anurudha, Myingaba. Now called Myinkaba. Anuradha is the only Pali name found among the 19 villages. There are Pyu bricks with fingermarks or characters south and north of the present village and in the Nga-kywe-na-daung pagoda (1603) where the old village was supposed to be. A version of the *New Chronicle* says the present day "Old Bagan" was on the site of the original Anurada village; and moved when King Pyinbya founded his new capital in 846 AD (Pe Maung Tin & Luce 1923: 55; Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Map 84 K/16. E 94.8654° N 21.1552°

Ywasaik.

Yworsiet, Ywasit, Ywaseik, Ywasait, Ywasite, Thitmahti, Phwasaw, Tampawaddy. Phwasaw was the formal name of some later queens of Bagan (Aung-Thwin 1998: 103) and remains in use for villages near this spot (Chart 7). The "third palace", said to have been founded by King Thike-tine-min in 514 AD, is believed to have been located here on the perimeter of the Bagan archaeological zone. The palace site, south of West Phwasaw village, is today marked by an inscribed brick and concrete pillar. The old village (estimated location E 94.8918° N 21.15°, Map 84 K/16) is thought to have been located north of Dhamma-yazika pagoda (*Inventory* number 947). Pyu bricks with fingerstrokes are found here. A gold scroll inscribed with Pyu language and lettering was once discovered in a streambed running west of the Dhamma-yazika (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Nyaung-u.

Nyaung-oo. (Map 84 K/16. E 94.9101° N 21.2011°). A modern market town and administrative centre, Nyaung-u retains its archaic name. Housing development in the area makes new archaeological discoveries difficult, though open excavations from construction work remain potential sources of information (Hudson, Nyein Lwin & Win Maung 2002).

Kyaussaga.

Kyauk Saga, Lokananda (Map 84 K/16 E 94.8681° N 21.1277°). The village may have been east of the present day Thiripyitsaya village, south of Bagan Myothit (New Bagan) and on the southern bank of Ye-o-zin stream. Two sandstone Buddha images in the now-renovated Kyaussaga temple (1029) are said to be of pre-11th century Gupta style. The temple shares with the Bawbawgyi at Sriksetra the unusual characteristic of cross-hatched scoring of the brickwork, presumably to make the plaster adhere better. Old Pyu bricks with fingermarks are also found here (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Thiripyitsaya is said to have been the second capital, located near the Lokananda pagoda, a riverside structure that prominently marks the southern extent of the city (Chart 7). The putative site of the "second palace" is marked just west of New Bagan's main crossroad by an inscribed brick and concrete pillar. The move of the locus of power from Yonhlut to Thiripyitsaya is mentioned with a curious casualness in the *Glass Palace Chronicle*. In a saga otherwise full of dramatic deeds of men, gods and spirits we are merely told that in the reign of Thinlikyaung (344-377 AD) "the group of nineteen villages was dissolved, and he founded and built the city of Thiripyissaya at the site of Lokananda where he lived" (Pe Maung Tin & Luce 1923: 45).

Kyinlo

Krin-Lo, Kra-Lo, Krin-Lon, Jin-Lon (Map 84 K/16 E 94.9133° N 21.0792°). This site is in a cultivated field east of Kinka on the Bagan-Chauk road, and north of Kyaukkan. Potsherds, elephant-shaped pendants and spherical and barrel shaped green and orange beads have been picked up here in the past. Field survey located fingermarked bricks and old furnaces for smelting iron, with iron slagheaps (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Archaeological excavation of a ruined pagoda in a monastery compound north of Kyaukkan village early last century recovered a stone image of Buddha, stone receptacles supposed to be reliquaries, and mutilated bronze figures of a Buddha with two accompanying figures and some iron implements. The sandstone Buddha image in sitting posture was considered to be pre-eleventh century, and votary tablets also pointed to the 11th century as a terminal date for the building (ASI 1905-1906: 131-133; ASB 1907: 9).

Taungba.

Taung-pa, Taung-ma, Taung-fa, Taung-pan, Taung-mae. The present village of Taungba (E 94.9656° N 21.1259° Map 84 K/16) was relocated in modern times due to highway construction. It is now east of the Nyaung-u to Kyaukpadaung road, within view of the Tooth Relic Pagoda on Tuyin Mountain. The name Taungba suggests its location close to the mountain. There are several local sites of historic and archaeological significance.

Hti Ta Hsaung Pagoda.

The Phaya Hti Saung or Hti Ta Hsaung pagoda (E 94.9581° N 21.1329°) located one kilometre north-west of Taungba village, is the major monument extant in the eastern hinterland area of Bagan, apart from a string of monuments on Mount Tuyin. A stupa-topped temple, it is reputed to enshrine relics of the monk, Shin Arahan, who is credited with being mentor to King Anawratha (see Khin Maung Nyunt 1997). It was most recently restored in 1985 and is an active religious site with an attached monastery (Hudson, Nyein Lwin & Win Maung 2002).

Taungba pagoda.

On the southern side of Taungba village is a small pagoda (E 94.9681° N 21.1193°) that was restored in October 1907, on a Tuesday, a day after the full moon, according to an ink inscription inside (read by Nyein Lwin, 2000). There is evidence to support local opinion that it was originally a Bagan period structure. Part of a sandstone capsule or container, possibly a reliquary, was found among brick debris nearby, in a depression formed by a disused in-ground water tank. This site is recorded on the 1945 British Army Survey map 84 K/16 as a monastery, but the small pagoda and its wall are all that remain (Hudson, Nyein Lwin & Win Maung 2002).

Earthenware site.

An ash lens (E 94.9652° N 21.1209°) dense with potsherds was excavated and sampled at Taungba for AMS (Accelerator Mass Spectrometry) radiocarbon dating. The sample OZE 765 (Figure 125) had a radiocarbon age of 548 ± 35 BP. This gives a calendar date range of AD 1333-1417. The evidence suggests that this site was used for the production, by open-field or pit firing, of a diverse range of domestic earthenware products. Samples recovered included lamps and containers with rim diameters of up to 40 centimetres. No votaries or sprinkler pots, the standard ritual items of the Bagan period, were found in the ash lenses. The earthenware had a bright red, coarse fabric, with visible quartz and sand inclusions. Some pieces were burnt through, suggesting overheating during manufacture. Pottery was noted over an area of at least 100 by 200 metres. Material collected on the surface often had a much finer fabric, suggesting different phases of use of the site. Surface finds included bowl and stem fragments of smoking pipes of the 17th-19th century. This area is between the modern village and the site from which Taungba was moved when the highway was built (Hudson, Nyein Lwin & Win Maung 2002).

Ruined pagoda.

About 300 metres west of the earthenware deposits there is a mound, apparently a pagoda ruin. It is 15 metres in diameter, 2.5 metres high, with a hollow on top suggestive of past efforts to recover relics. There are pieces of worked sandstone among the debris. It fits the description of a mound “near Taungba village” excavated early last century which contained a robbed sandstone relic chamber (ASB 1915: 7, 12-13; Hudson, Nyein Lwin & Win Maung 2002).

Yonhlut.

Yon Lut, Yon Hlut, Yon Lwe, Yon Hlut Kyun. This name has been variously translated as Free Rabbit Island, Free Animal Forest, A Jungle Where Rabbits Were Set Free or The Place of the

Hare's Release. The archaic word *kyun* is still used for "jungle" in this area, though it more generally means "island". To confuse matters, an island in the Ayeyarwady opposite Bagan has also been known as Yon Hlut Kyun (Lubeigt 1998: 43, 387) although its claim to historical status barely goes back 50 years. Residents interviewed on the island in 1999 by the author and Nyein Lwin had forgotten the names of the villages on the 1945 map (84 K/16). GPS survey indicated that the location of the villages had also changed. Aerial (1:24,000, 4/65-40, 26 Feb 1953) and satellite (NASA 0-38-121-D, S-AFT-1029-1, 5 Feb 1966) photos indicate that the structure of the island has changed substantially since 1945 due to regular inundation. In severe flooding in the wet season of 2004 the island was submerged, and the villages were destroyed. The houses were either washed away or salvaged for rebuilding as the surviving population resettled itself on the west bank of the Ayeyarwady. Yonhlut, while 10 kilometres or more from the Ayeyarwady, is itself effectively an island, at least in the wet season. It sits on relatively high ground, with a seasonally active stream to its south, and what appears to be a vestigial branch of the stream to its north as shown in an aerial photograph (1:24,000, 7/67-48, 27 Feb 1953) taken before modern agriculture and irrigation, including water diversion by way of a canal to the south end of Tuyin hill, quite dramatically changed the landscape in this area.

In 1905, the archaeologists at Bagan spent 200 rupees to erect masonry pillars marking four old palace sites mentioned in the chronicles (ASB 1906). The masonry pillars were referred to in a list of "expenses sanctioned and incurred", with no explanation as to why the particular sites were chosen. A pillar placed at Yon Hlut Kyun (E 94.9647° N 21.1133°) identified it as the home of Bagan's first dynasty. A handwritten manuscript of the *New Bagan Chronicle*, by Saya Be, contains a drawing of brick foundations at Yon Hlut Kyun (Win Maung 2001a) and there appear to have been building remnants visible around the time the monument was erected. Furniwall wrote that "the walls are still pointed out, and a line of brick work can be seen which is supposed to represent them" (Furniwall 1912). The site was perfunctorily excavated in 1915, at the same time as nearby Taungba, but "nothing of importance was discovered" (ASB 1915: 13). Local people have a tradition of sprinkling a handful of earth from this auspicious spot over new construction sites, and visitors have been observed by the author taking away soil which they indicated was to be used for ritual purposes.

Excavations were conducted by the author and Nyein Lwin at Yon Hlut Kyun in 1999-2000 (Hudson & Nyein Lwin 1999; Hudson 2000a; Hudson, Nyein Lwin & Win Maung 2002; Hudson 2003b) at the suggestion of the then Director of Archaeology at Bagan, U Aung Kyaing. The brief was to find scientific evidence to prove or disprove the *Glass Palace Chronicle* story. By this time there was no above ground structure visible. The excavation program resulted in two discoveries, an abandoned habitation site and a three-sided 60 by 60 metre rectangular structure made from sun-dried or low-fired brick with remnants of roof tiles, iron nails, a pivot-stone from a doorway and earthenware pottery fragments that included kendi, or ritual sprinkler pots. The brick structure is located on the eastern approach to the city from Mount Popa, a major pilgrimage site. This is also the route to the Samon/Panlaung Valley and the Bagan period rice-growing area of Kyaukse.

Yonhlut habitation site.

A habitation site containing earthenware fragments was located to the east of the brick building. This site consists of a mound 500 metres from the datum point (the modern Yon Hlut Kyun monument) bearing 105 degrees. Potsherds can be seen in the field over an area of 150 metres by 70 metres. Soil samples were taken for phosphate analysis at 10 metre intervals along the north-south and east-west axes of the mound. Consistent high phosphate readings, indicative of human habitation (Schwartz 1967; Sjoberg 1976; Griffith 1980; Cavanagh, Buck & Litton 1988) were

found, indicating that the potsherds are habitation debris and not the result of secondary deposition.

This site can be identified with a strong degree of confidence as pre-20th Century. It is not marked on the 1:63,000 map (84 K/16) of the area, not even as an abandoned village, suggesting that it was not known or noticed by colonial era surveyors. However any attempt to push the date for this settlement back to the Bagan period must await further evidence. While the investigators recovered several bone and carbon fragments, none were in a context that would justify dating them. They were simply loose in the sub-soil. In an area where farmers annually burn off debris in the fields, carbon needs a highly specific context to be of use for dating. The presence of fragments of celadon, a trade product regionally identified with the Sukothai/Sisatchanalai kilns, also raises more questions than answers, particularly as the only samples recovered were loose on the surface (Hudson & Nyein Lwin 1999; Hudson, Nyein Lwin & Win Maung 2002).

Yonhlut monument site.

The area around the modern monument contained brick fragments and potsherds. The initial excavation was based on information from a local landowner, U Tun Yin. This elderly man, born in 1928, pointed out a spot where he remembered seeing bricks in the ground while his family was planting palm trees. He also recalled finding earthenware pots and plates in the area in the 1950s. Excavation revealed a mass of deteriorated brick. This material was as soft as the surrounding earth when the excavators dug down to it, but hardened quickly after a few minutes' exposure to air. This turned out to be the northeast corner of the walls, where a cordmarked pot KTTP (illustrated in Hudson, Nyein Lwin & Win Maung 2002), which was given the light-hearted tag of "King Thamoddarit's Toddy Pot", due to its resemblance to the pots used today to collect sugar syrup from palm trees, although its form is not identical, was located at a depth of one metre, under the deepest layer of rubble found in the excavations. Cordmarked pottery appeared in conjunction with carved paddle-impressed sherds (for an example, see Figure 126) of the general style that appears both on modern pots, and on pots excavated at Otein Taung, the Bagan period production site (see page 291, Chart 3 & Chart 4). The stratigraphy of this shallow site is disturbed by agriculture, and no significant pottery sequence could be determined. Earthenware finds included spouts from libation or sprinkler pots that were covered in a degraded but still visible red slip. Also known as kendi, these pots appear in Bagan-period wall paintings illustrating the Buddhist ritual of pouring water (see Myint Aung 1986), a ritual that according to inscriptions sometimes involved breaking the pot afterwards (Tun Nyein 1899: 96, 160).

Two other pots that were located appear to represent continuing use of the site for ritual purposes. One earthenware pot was found sitting in a discrete mass of soil and carbon fragments (Figure 127) with a distinguishable edge between this soil mass and the surrounding matrix of red earth. This suggests that a hole may have been dug, and the pot either burned or heated in the hole, or buried in the hole along with burnt material. A 20th century Chinese porcelain bowl (similar to Harrison 1995: 78) was also found in close context with burnt human bones. This material was found on the edge of the brick structure, with no overlying brick, sitting in what appeared to be a deliberately dug hole.

Auger sampling of the area over a 5 metre grid detected further walls, and these were exposed and delineated by excavation. No structural remains were seen on the western side or southwest corner, but this is the line of a slope down to the stream, so the possibility that there were walls there that may have been washed away by erosion cannot be discounted. Sections (Figure 128 is characteristic of the results) were shallow and little more than 1 metre across at the base. It is not possible to estimate how much brick was removed in the past, but field survey in the area indicated

that even in recent years, farmers have been using Bagan size bricks for ovens and chimneys to boil palm sugar. Roof tiles were larger and thicker than samples excavated at Otein Taung (page 291 & Chart 3) or held by the Archaeology Department following excavations within Bagan. Iron nails that were recovered were characteristically square in the shaft, and turned at the top. The auguring program located some pieces of sandstone near the centre of the site including a fragment that had been worked with a 22 millimetre chisel. There was a parallel row of dressed stones on the inner side of the north wall of the structure, in close proximity to some roof tiles, perhaps forming a drain or a path. A pivot stone, with an indentation to take a vertical doorpost, similar to those seen in pagodas at Bagan, was found along the eastern wall. There was at least a centimetre of secondary wear around the indentation. No carbon was found in a context that would justify radiocarbon dating (Hudson & Nyein Lwin 1999; Hudson, Nyein Lwin & Win Maung 2002; Hudson 2003b).

Interpretation.

Augering down to natural soil at 10 metre intervals across the site failed to locate any central structure, which might be expected if the wall had enclosed a temple or monastery. The rectangular compound seems to have no parallel among the buildings of Bagan. The worn pivot stone, if it was original and not recycled, suggests use of the building over a considerable period of time. Multivariate analysis suggests that the bricks used are similar to those of the Bagan period, and dissimilar to those at Pyu sites The roof tiles do not relate to tiles observed or excavated at Bagan. A tile similar to those at Yon Hlut Kyun was observed during field survey by the author in the possession of a farmer at Kwebyok, a village 15 kilometres south-east of Yon Hlut Kyun, which is surrounded by iron furnaces. This tile was 120 mm wide, 21.8 mm thick, and had a central groove on top, and a return on one end. Local people remain convinced that Yon Hlut Kyun is the palace of the first dynasties. While the assemblage is not directly comparable to Bagan materials in every respect, there are enough similarities to reject a date for the Yonhlut building much earlier than Bagan. It remains a problem for further investigation to determine whether it may be a Bagan civil outpost of some kind, a religious building, or a site involving some other kind of consolidation of social and economic resources (Hudson, Nyein Lwin & Win Maung 2002: 15).

Mye-thindwin

Mye-thintwin, Myegedwin (E 95.0024° N 21.1337°) admits, on its present site, to being only 150 years old, but the area is claimed both in chronicles and local folklore to have been the birthplace of Bagan's first king, Thamoddarit. Village elders tell of how an old Pyu couple adopted and brought up Pyusawhti, who eventually married Thamoddarit's daughter. Plots of land at Mye-thindwin retain names relating to these stories. A field (E 95.0159° N 21.1215°) east of the village, said to have been jungle only 20 years ago, is dense with potsherds, and smoking pipes and earthenware roof tiles have been recovered here by farmers. Augering and a small test pit uncovered a lens of potash, between 22 centimetres and 34 centimetres below the surface, which contained earthenware shards, suggesting a site used for the open-field firing of pottery. Furnaces for smelting iron have been located near the neighbouring village of Zi-o (E 95.0411° N 21.1087° Map 84 O/4) (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Gu Gyaung Pagoda.

The Gu Gyaung complex (E 94.9888° N 21.1504°) near Mye-thindwin features a stupa on the west side of a small temple (Figure 123). There is also a brick foundation of a rectangular structure, 8 by 10 metres. The complex sits on a brick platform, 26 by 22 metres, which appears to have remnants of an enclosure wall. Temple doorways open to the east, north and south. The temple appears to have been a vaulted chamber, with no central pillars (Figure 124). The roof of the temple has collapsed, and the structure is filled with rubble. A brick platform that presumably supported a Buddha image abuts the western wall. This would indicate that the image faced east in the conventional manner. The close juxtaposition of temple and stupa, with the stupa to the west, may indicate that the structure is commemorative, perhaps with relics of a particular individual enshrined. The relic chamber in the stupa, broken open in times beyond the memory of the local people, is lined with stone, and has a capacity of more than one cubic metre. The stupa is 5.7 metres high, though the top is damaged. A sandstone spire about a metre high, with seven multi tiered umbrellas was found here, and is now in the Bagan archaeological museum. A broken sandstone marker, possibly a sima stone denoting a monastery, remained at the site when the author last visited it in 2001. As discussed above, the bricks at Gu Gyaung cluster with bricks from Yonhlut and bricks from 12th to 14th century Bagan when subjected to multivariate analysis based on relative size (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002: 15). Gu Gyaung was repaired and conserved in 2002.

Kokko

Kote-ko, Kote-koo (E 95.0195° N 21.0989°, Map 84 O/4) was abandoned according to local land records in 1878 and families transferred to neighbouring villages including Mye-thindwin. Locals believe that Myin-kwe-min, said to have become king at Bagan in 716 AD, was the son of a wealthy man from Kokko. An unexcavated mound of potsherds up to 2 metres high has surface remains from the Bagan and Ava periods In this general area, nearer the road from Nyaung-u to Mount Popa, at Shenme (E 94.9841° N 21.0944° Map 84 K/16) south of Kokko, the author was shown two mounds (E 94.9868° N 21.0795° Map 84 K/16) by U Win Kyaing, one of the archaeologists from Bagan. Each was about 20 metres in diameter, containing bricks as well as pieces of shaped and pecked sandstone. There are two other groups of apparently early pagoda ruins south-east of Shenme, a pair 18 metres and 7 metres in diameter (E 94.9947° N 21.0848° Map 84 K/16) and a small monument known as the Shwe Anadaw Phaya (E 95.0006° N 21.0888° Map 84 K/16). Restored in 1973, it has a 9 metre diameter pagoda ruin beside it that contains dressed sandstone. The presence of sima stones, which customarily mark the site of ordination halls, around the Shwe Anadaw Phaya suggests that it may have been the site of an earlier monastery (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Kokkethein.

Residents of Panidwin (E 95.06267° N 21.03181°) interviewed in 2001 claim that Kokkethein used to exist to the south-west of their village. Panidwin is one of several villages in the eastern hinterland of Bagan surrounded by iron furnaces (see page 198).

Tuti.

Htu-te, Hton-kyauk, Tutain, Sate. Modern Suti (E 95.0163° N 20.985° Map 84 P/1) is said to have three fields nearby which contain old potsherds. Two were surveyed. An ash lens in one of these (E 95.0159° N 20.9993°), apparently an earthenware production site, had a radiocarbon date (Figure 125) at 40 centimetres between 1713 and 1905 AD with 95% probability (OZE 766: 83±34 BP). This sample was from an upper layer of ash and represents a terminal date. The ash was densely packed with potsherds which had a coarse, red fabric resembling the material from Taungba and Mye-thindwin. Another field on the eastern edge of Suti had potsherds scattered over an area of 170 by 100 metres. The village monastery is named Thanbo or "iron smelting". Local people report digging up old bronze bowls with lids. Pieces of lead interpreted as being ancient money were dug up at Suti early last century (AWB 1905 p.11; Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Nyaungwun

Tetma, Nyaung-bin. The present Tetma village is near the southernmost tip of the Tuyin mountain range (E 94.9905° N 20.9597° Map 84 L/13). Its older name was Nyaung Bin or Banyan Tree village, on account of big banyan trees that once surrounded it. A *mu-htaw*, or small pagoda, supposed to be an original from ancient times, stands about 800 metres south-east of the village (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Ywamon

Ywamone, Ywapon, Ywapu, Ywamo, Shapote, Ywahmine. This abandoned settlement (E 95.0707° N 21.2861° Map 84 O/3) known today as Shwetaung Ywahmine is just north of the village of Letpanchibaw (E 95.0627° N 21.2828° Map 84 O/3). Parts of a brick wall can be see here, eroded by the river (see the review of the Letpanchibaw site, page 61). There is a local story that a thousand Ari monks, accused in some texts of being a heretical and profligate sect, came to stay here in the Bagan period (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002). Archaeological evidence suggests continuous occupation, or regular reoccupation, from prehistoric times through to the Bagan and Konbaung periods (Myint Aung 1974; Nyein Lwin 2001).

Onmya.

Ohnmyar, Ohnmyar, Okmya, Ngasintku, Ngasingu, Sinku, Sintku, Sintku Ohnmyar, Sint-ku-ohn. There are complex arguments in the *Great Chronicle*, the *New Chronicle* and the *Glass Palace Chronicle* as to whether Onmya, which appears on map 84 I/13 as Okmya (E 94.8675° N 20.9065°), or Singu (E 94.8675° N 20.9065°) should be on the canonical list of 19 villages. Conveniently for the purposes of regional settlement analysis, at least, both are in the same geographical area in relation to Bagan (Win Maung 2001a; Hudson, Nyein Lwin & Win Maung 2002).

Magyigyi.

Although this village was mentioned as "not existing" in the *New Chronicle*, the name did appear on a later stone inscription at Bagan, one of a series of Konbaung period pillars related to the Tooth Relic Pagoda across the river on Tanggyi Taung which is originally attributed to King Anawratha (Ar Seinna). The name of the village is also claimed to appear in land records, chronicles and palm leaf manuscripts, and Win Maung suggests that it may have been in an area that has now been washed away by the encroachment of the Ayeyarwady (Win Maung 2001a). This is the fate hypothesised for the western part of the walled complex at Bagan by the geographer Daw Thin Kyi (Thin Kyi 1964). A location of E 94.8562° N 21.1808° is proposed for Magyigyi, in what is now the Ayeyarwady. This must, of course, be considered highly speculative, and perhaps the real value of a hypothetical Magyigyi may be to stimulate the further study of the 30 or so inscription stones, mainly of the early Bagan period, that were collected a century ago at the Mahabodi temple and later placed in the museum. Luce noted that these appeared to have originally come from riverside temples that had been washed away (Luce 1969: 7-8).

Tazaunggun.

The *New Pagan Chronicle* estimated that this village was near Myingyan, a considerable distance upriver from Bagan (Win Maung 2001a). Tazaung (E 95.3291° N 21.4426° Map 84 O/3), not Tazaunggun, may be the place the author had in mind, but no apparent links with antiquity have so far been detected. An elder from Nyaungdo village, which is about 9 kilometres east of "Old Bagan", expressed the belief when interviewed in 2001 that Tazaunggun had been on the western side of the river, opposite Bagan.

Tharekya.

This village was described as "not existing now" in the *New Chronicle*, and no claimants have so far been found (Win Maung 2001a).

Iron furnaces.

In 2001, an investigation was made of a number of sites known from local informants around the villages of Zi-o and Panidwin (Figure 122) to contain remains of furnaces and large quantities of ironmaking debris. The group on the initial field trip included Aung Kyaing, Deputy Director General of Archaeology for Upper Myanmar, Win Maung, Nyein Lwin and the author. The outcome was the survey and mapping of 12 separate sites which between them contain hundreds of furnaces, and the subsequent excavation of a furnace to determine its structure. Charcoal samples were recovered for future radiocarbon dating, and are held at the University of Sydney and at the Archaeology Department at Bagan.

The furnace sites surveyed fall into two main clusters, around the villages of Panidwin (which may be the Kokkethein of the chronicles, see page 196) and Zi-o (Figure 122). The sites range in size from one containing seven furnaces cut into the side of the Chaung Philar stream to mounds of iron and charcoal debris that are up to 100 metres long, which could each, by estimation, contain more than 100 furnaces. The furnaces can often be distinguished by the remains of their trapezoid upper chimney walls protruding above the slagheaps and redeposited topsoil.

These are not the only furnace sites in the area. Mount Popa, along with Maedoo, north of Shwebo, was noted in the 1850s as a major centre of iron production (Yule 1968: 346-347). Chhibber reported abandoned furnaces, which in 1934 he described as "deserted about 48 years ago", which would have put the terminal date for their use at 1886, on the western and north-western sides of Mount Popa (Chhibber 1926: 219; 1934: 106-108) in the villages of Thanbo, Chaungbya, Daungle, Sinluaing and Kywelu (Figure 122). All these can be identified on the map (84 P/1, 1945) apart from Kywelu. This site is described as being on the way to Mount Popa, and may possibly be Kwebyok, which has several furnace sites around it. A "metallurgical processing site" containing fragments of iron basins and slag was identified at Sardwingyi, 25 kilometres southwest of the Mount Popa temple complex, along with a source of surface haematite, and cordmarked pottery (Wuntha 1980). Bell (1907: 1) says that "the soldiers who followed the fortunes of King Anawratha and his successors are said to have been armed with bows and arrows, swords and spears from the iron smelted at Popa", although he quotes no source for this statement. The earliest substantial historical records of an iron industry in Burma date to AD 1613, when Portuguese settlers were appointed as blacksmiths by the king of Ava. Iron was extracted and worked in Shan State during the 19th century, and exported for sale in Mae Hong Son and Chiang Mai in what is now Thailand (Scott 1900: 299-301 Vol 2, Part 1). By the end of the 19th century, imports of iron, which had begun at least as early as the AD 1846-1853 reign of King Pagan Min, had virtually shut down the indigenous industry (Bell 1907: 1-3).

An important folkloric story involving ironworking focuses on Mount Popa. "Mr Handsome" or Nga Tin De (also called Maung Tin De), was a blacksmith at Tagaung, renowned for his great strength. A jealous king burnt him and his sister in a great fire. They became tree spirits, and their tree floated down the river until they reached Pagan (Rodrigue 1992: 26-27). As the Mahagiri nats, they are today worshipped at Mount Popa, and their statues flank the eastern gate of the walled elite centre at Old Bagan. The traditional date for the arrival of the Mahagiri nats at Popa is the reign of Thinlikyaung, AD 344-387 (Pe Maung Tin & Luce 1923: 45-46). Nats are spirit figures, frequently believed to have been humans who died violent deaths (Temple 1906; Maung Htin Aung 1956, 1959; Hsan Lwin 1984; Rodrigue 1992; Brac de la Perriere 1996; Takatani 2000). There is a temple complex with nat shrines today on top of a volcanic plug on southern slope of Mount Popa, but the plug was reported as "perfectly inaccessible" in the 19th century (Yule 1968: 326) and the antiquity of nat worship there appears to go back only to the early 20th century, when the Mount Popa area also became a centre associated with modern holy men such as Bo Mingaung (Mendelson 1963; Ferguson & Mendelson 1981). Mount Popa can be seen from Bagan and the Ayeyarwady, and could have acted as a daily reminder to the people of old Bagan that they lived in the spiritual shadow of their own Mount Meru.

The excavation at Zi-o.

A furnace (Figure 129, Figure 130 & Figure 131) on one of the larger mounds of debris near the village of Zi-o was excavated by Nyein Lwin and the author. It appears to be a natural-draft shaft furnace, which could be classified as Cleere's Group B, sub-group 2.i (Cleere 1972). Similar furnaces have been excavated in Sri Lanka (Juleff 1996, 1998). A furnace near Popa in which "no artificial blast was employed", which mixed charcoal with iron nodules, and which was dug into a bank with the front reinforced with timber and with a space at the bottom filled with a line of tuyeres held in by a temporary clay wall, was described and drawn by the geologist W. T. Blanford for *Percy's Metallurgy* in the 19th century (Percy 1864). This correlates strongly with the Zi-o furnace.

The upper part of the Zi-o furnace was made from slabs of clay in which handprints could be distinguished (Figure 134), suggesting that it had been built partly above ground. The lower part of the furnace was solid clay, indicating that as in Blandford's description, it had been dug into the ground. The debris inside was a mixture of soil, charcoal, slag and nodules of natural iron. The heavily burnt back and front walls of the furnace tapered into a wedge shape, while the side walls tapered outward toward the bottom, forming a long, narrow base. A layer of petrified (fossil) wood was wedged into the narrowing space toward the bottom, and seemed to be held in place by pre-shaped earthenware slabs which had a lip on one end (Figure 133). The most likely function of this slab of petrified wood should have been to retain the iron bloom and at the same time let slag trickle through, but this is yet to be determined. Tuyeres, fired clay tubes encased in clay slabs, with slag adhering to one side, were found around the furnace, bearing out Blandford's description of the workers making the tuyeres by plastering moist clay on round stems of wood, then cutting them into lengths and burning them. As Blandford described it, charcoal and ore were added from the top and fired, the slag was tapped over a 24 hour period from a sandy layer at the base of the furnace, and when no more slag flowed, the tuyere wall was broken away and a long, narrow piece of iron, the shape of the furnace base, was recovered. A furnace operated, or could operate, continually from January until May, producing an average of 40 kilograms of iron per firing day. The iron was mixed with impurities, but when worked on by a blacksmith the quality of the items produced was "excellent" (Percy 1864: 270-273, Volume 2). Chhibber's later description of the methods used in iron extraction confirms Blanford in general terms, though he apparently did not see a furnace in operation.

> The furnaces and the methods of extracting iron were very simple. A furnace simply consisted of a sort of circular or oval pit, 3 to 4 feet in diameter, dug in compact earth in certain raised portions of the ground, *e.g.* the bank of a stream. The pit was connected with a circular hole above, a little more than a foot in diameter, through which the smelters added subsequent supplies of charcoal. They had no opening to provide blasts. They pounded the ore to small pieces, about the size of walnuts, and arranged alternate layers of charcoal and iron ore in the pit. After igniting the charcoal they closed the mouth of the pit by means of earth to keep back the heat, and continued adding charcoal from above till the temperature was high enough to melt the ore. The fuel used was charcoal made from the wood of the local trees (Chhibber 1926: 225; 1934: 108).

It can be seen that the furnaces in the Mount Popa area were used for iron production until the 19th century, but the origin of the industry is yet to be determined. A logical timescale for iron production near Bagan would be the city's main period of construction between the 11th and 14th centuries. On Blandford's figures, production could have been around a quarter tonne of iron per week per active furnace. An earlier role for at least some of the furnaces could be hypothesised in the light of radiocarbon evidence that suggests settlement activity at Bagan well before the 11th century (see discussion from page 206 onward). The furnace sites between Bagan and Mount Popa have great potential for an archaeometallurgical study that would provide information about both chronology and technology.

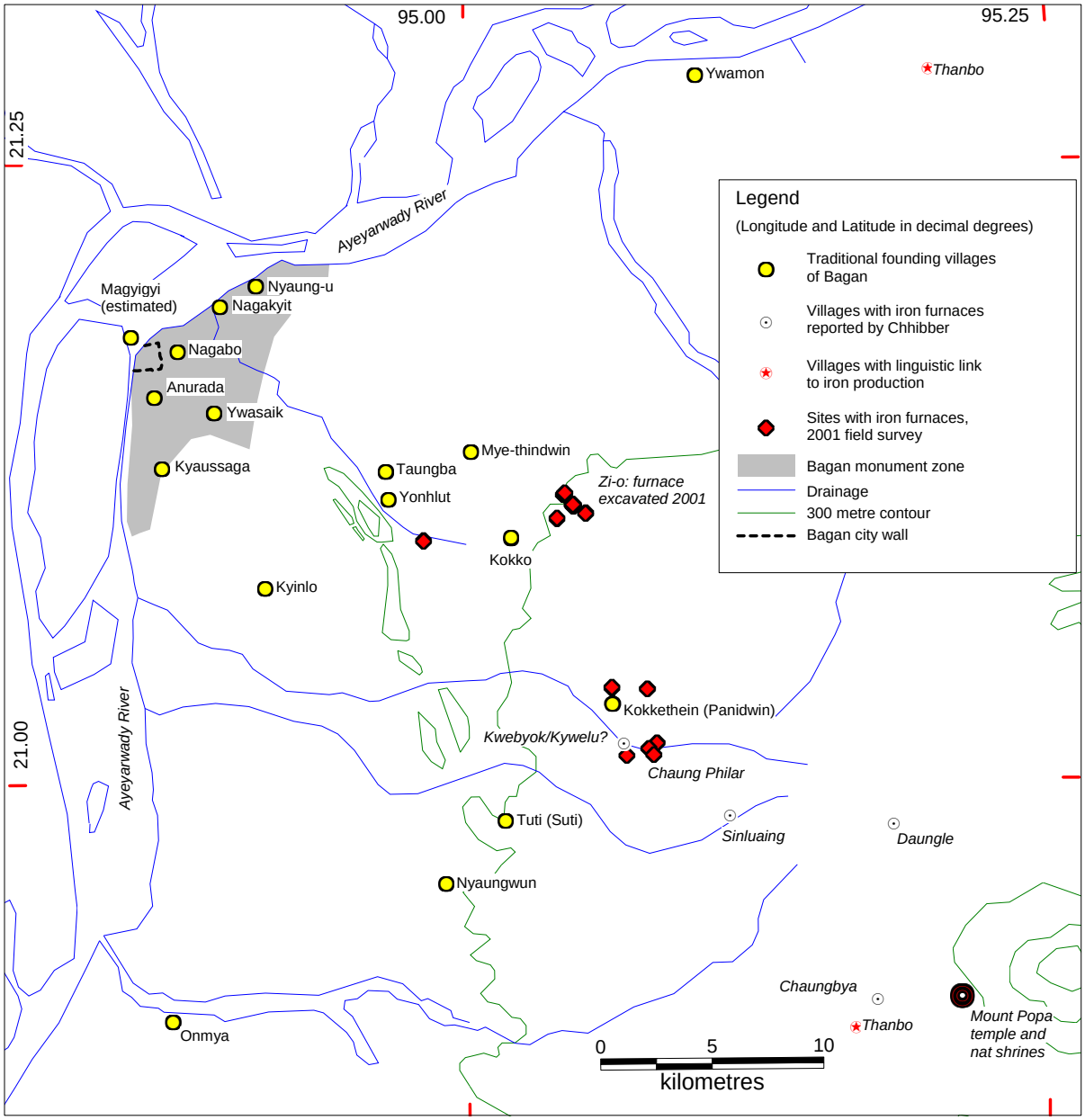

Figure 122 The eastern hinterland of Bagan.

Figure 123 Gu Gyaung temple and stupa, near Mye-thindwin.

Figure 124 Gu Gyaung temple, detail of interior brickwork.

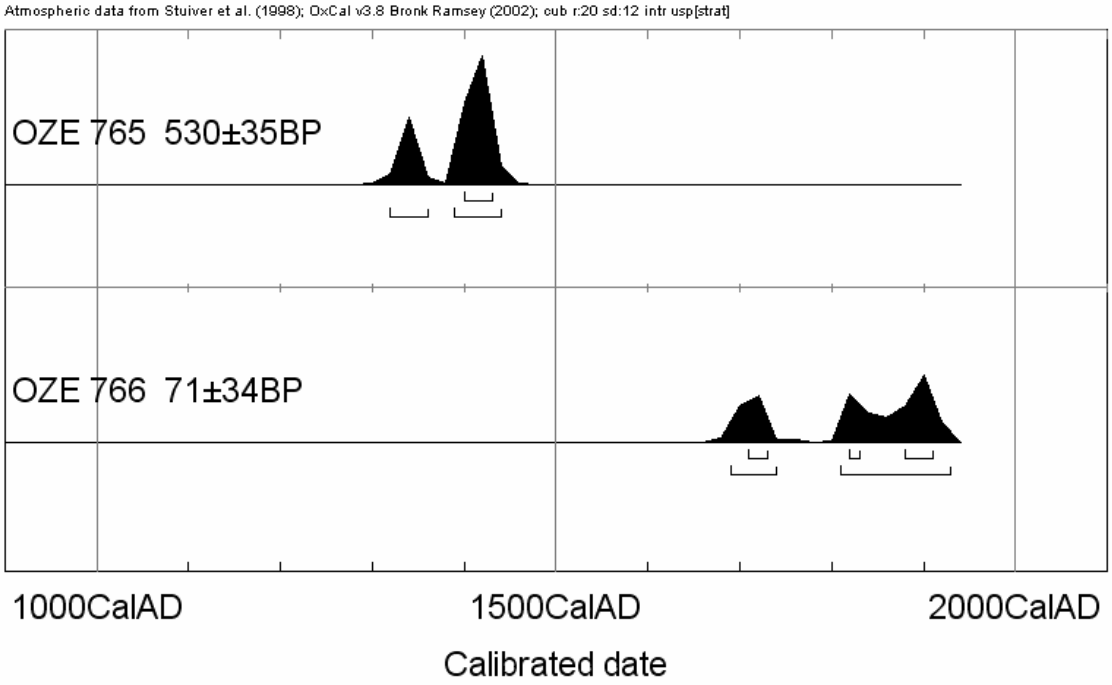

Figure 125 Radiocarbon dates, Taungba (OZE 765) and Suti (OZE 766).

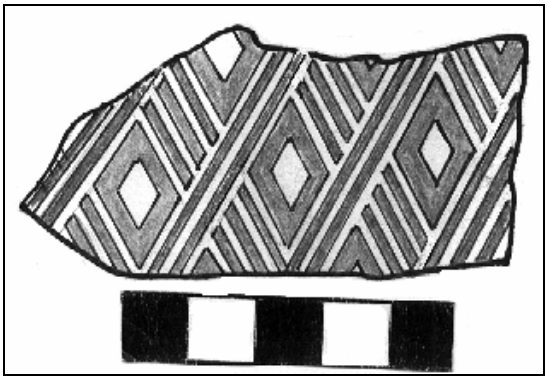

Figure 126 Potsherd with beaten geometric pattern, Yonhlut (Ma Onhmar Aung).

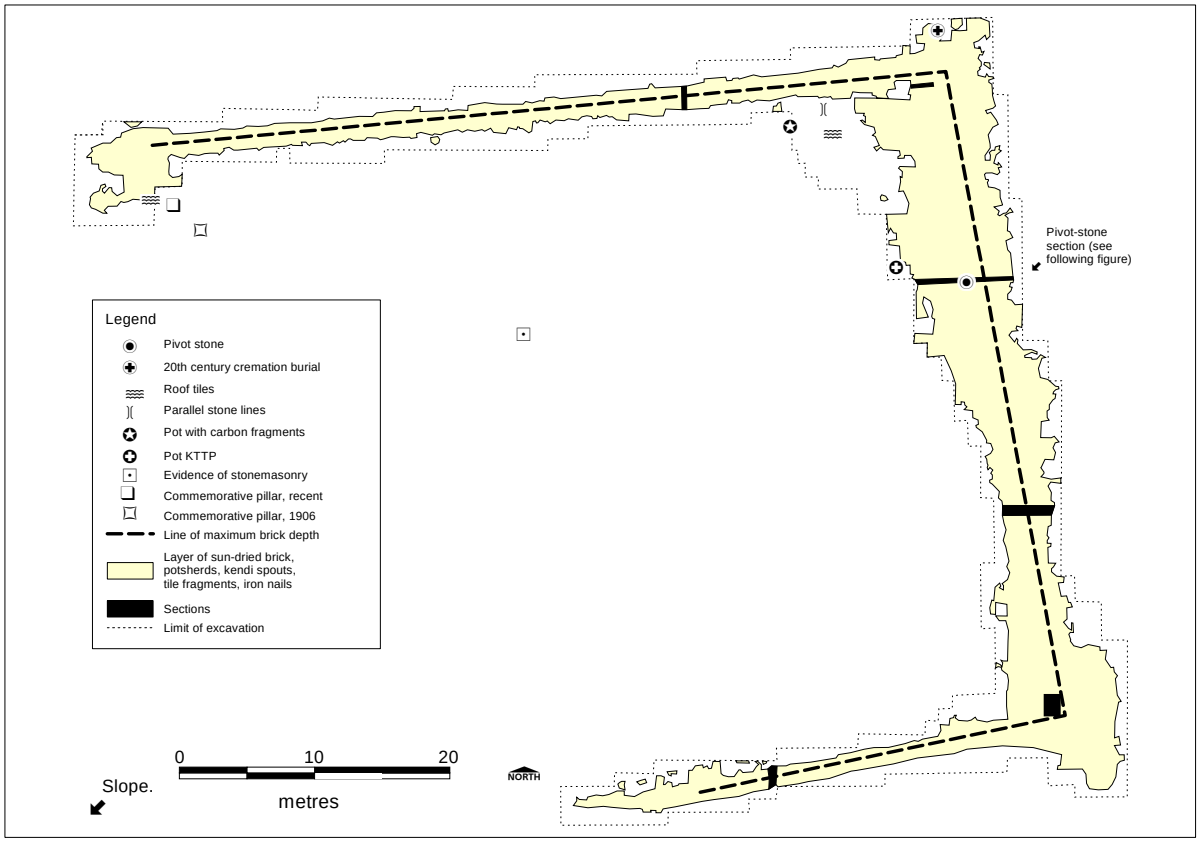

Figure 127 Plan of Yonhlut excavation.

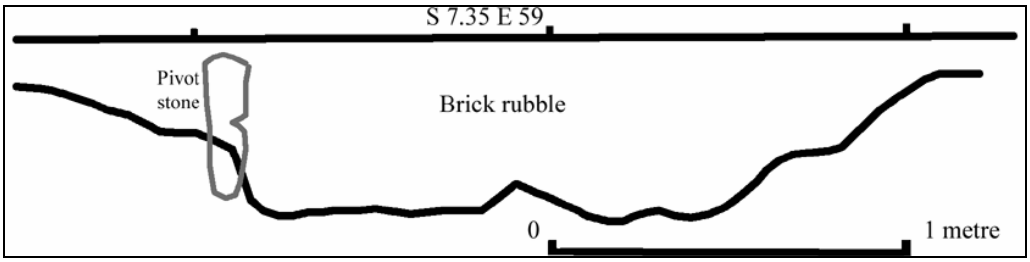

Figure 128 Section of east wall, Yonhlut.

Figure 129 Excavating shaft furnace, Zi-o.

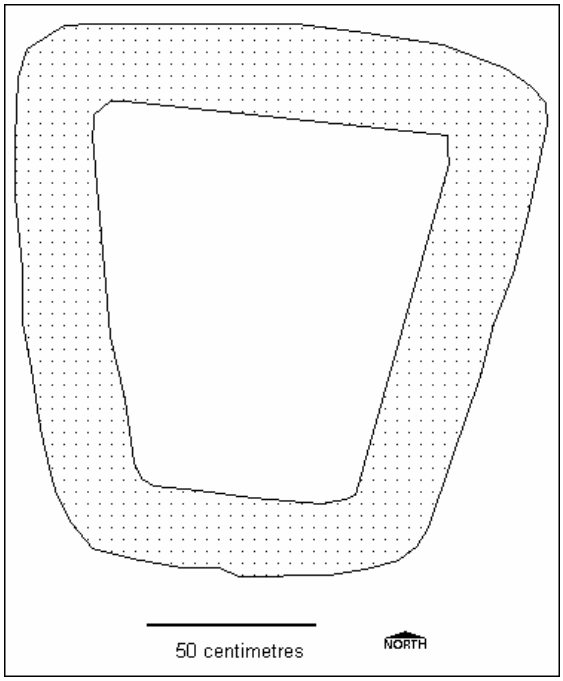

Figure 130 Shaft furnace, Zi-o: plan.

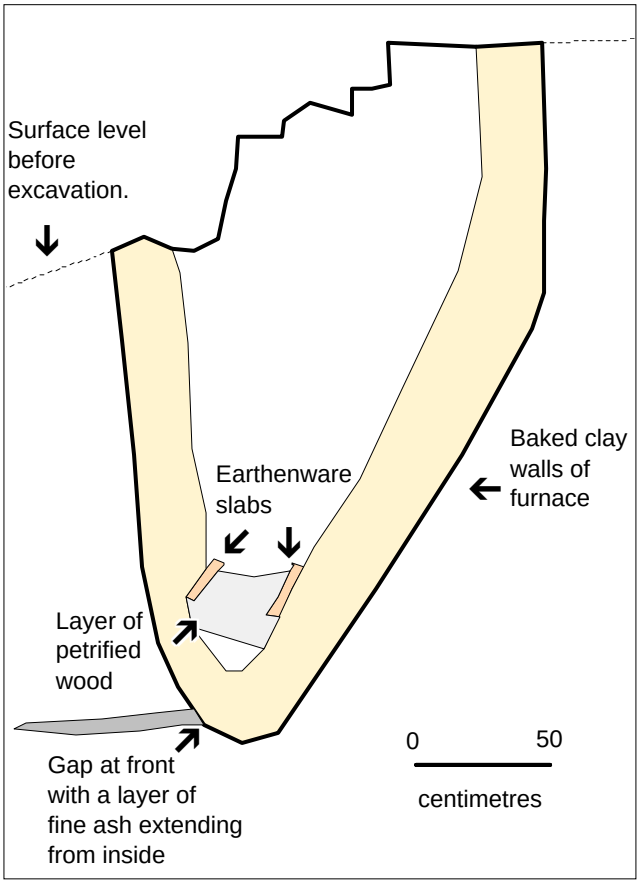

Figure 131 Shaft furnace, Zi-o: section

Figure 132 Shaft furnace, Zi-o: tuyeres.

Figure 133 Shaft furnace, Zi-o: earthenware slabs.

Figure 134 Shaft furnace, Zi-o: handprint on outer surface.

The City of Bagan 2. Earliest absolute dates: Otein Taung earthenware production site.

It was suggested above (page 188) that the legend of Pyusawhti may be a mythologised version of events that took place in the 8th or 9th century AD somewhere at Bagan. This section examines material evidence of craft activity at Bagan that can be confidently attributed to the 9th century. The accelerator mass spectrometry (AMS) dating of carbon samples from the Otein Taung earthenware mounds (Figure 138, Charts 3 & 4) indicates that production began at this site within the perimeter of the monument zone perhaps in the late 8th century, but certainly in the 9th century. This indicates an activity with the potential to supply a group of settlements with water and cooking vessels and drainage and building materials commencing two centuries before the date accepted by the western histories for proven activity at Bagan, the mid 11th century.

Background: Myanmar earthenware.

A definition is required at the outset when discussing pottery. While many authors use the broad term “ceramic” for all pottery, it is useful to distinguish earthenware, which may be patterned or plain, possibly finished with a slip or burnished, and fired below 900 degrees Celsius amid a pile of fuel in the open air, from glazeware, which involves the application of a chemical or bio-chemical coating and heating in a kiln at higher temperatures. It must be pointed out that some modern makers of earthenware in Myanmar use kilns to produce unglazed pottery. This has been observed by the author at Twante, in the Ayeyarwady delta and recorded at Sayohpho, near Inwa/Ava (Hein 1996: 185). The separate and contentious issue of glazeware across the Pyu-Bagan period is dealt with in Appendix 5.

The production of earthenware takes place in Myanmar today in a range of contexts, with no predictable manufacturing process. A common phenomenon is a specialist village or a recognised pottery making quarter of a town, where many residents make earthenware, in some cases as a full-time occupation,. Examples of these include Bassein and Twante in the delta and Sagaing near Mandalay (Lefferts 1988). In 2001 the author visited Taunggone, a village attached to the larger village of Ngathayauk, 25 kilometres east of Bagan. According to the village leaders Taunggone had 127 families. Of these, 29 were farmers and 98 specialised in pottery making. Taunggone has three large mounds on its outskirts, formed by open-field firing of earthenware. One of these, 65 by 32 metres and well over 2 metres high, was in use for firing during the visit (Figure 136). One had been used recently, and one was overgrown and had been abandoned. Pots made by a number of households were stacked up with fuel and fired (Figure 137). Potters are able to recognise their own products after firing because they use individual beater patterns. The pottery is taken by truck to markets at Nyaung-u, near Bagan, and ferried across to Pakkoku, on the western side of the Ayeyarwady (Nealie 2003).

An individual potter will own a number of different beaters and anvils of different sizes, and pots are turned on a slow hand-operated wheel. There are often local variations in production methods, even among relatively close neighbours (Reith 1997). In 2002, the town markets at Nyaung-u, at Bagan, had nine businesses specialising in the sale of pottery, while only one shop specialised in plastic buckets and other containers, suggesting that pottery production remains economically viable. The annual pagoda festival markets at Bagan also have stalls in place for several months of

the year selling pottery along with glazeware. To aid in identifying modern domestic earthenware and distinguishing it from older archaeological materials, and to gain an indication of the current function of the major pottery forms, the author photographed examples at one of the shops at Nyaung-u, and labelled the picture according to information from the vendors (Figure 135). Pots that to the casual observer are quite similar to each other are distinguished by consumers according to their traditional functions.

The Otein Taung excavations.

Between 1999-2001 the author and Nyein Lwin excavated the Otein Taung ("pottery hill") mounds at Bagan with the aim of positively identifying the area as an earthenware production site, commencing a program of pottery characterisation and analysis and, due to the obliging nature of a site where fire was a significant factor, obtaining samples for radiocarbon dating. The Otein Taung site is located two kilometres east of the Ananda temple (Chart 7). It consists of two mounds 500 metres apart, covered with dense layers of fragmented pottery, with scatters of potsherds visible around and between the mounds. The western mound is 90 metres by 35 metres, and more than 7 metres high. The eastern mound is L shaped. Each side is about 80 metres long, at least 25 metres wide and 6 metres high at the highest point. Cattle and goats regularly graze on the mounds. Ploughed areas for crops such as maize come up to the edges, but local farmers say the mounds themselves are not ploughed. On the eastern mound two holes presumably dug by people in search of saleable items revealed larger pottery fragments than had survived on the surface. The Otein Taung area contains clusters of mainly small monuments, which are attributed by the *Inventory* largely but not exclusively to the thirteenth century AD (see Database CD-ROM). Excavations were conducted on both mounds, and in a field 100 metres southwest of the eastern mound (Figure 138).

Otein Taung, eastern mound and field.

The main test excavation undertaken at the eastern mound at Otein Taung was a trench into the southern side of the mound (Chart 3 & Figure 138) while a test pit 1 metre square was dug 100 metres south-east of this. Each yielded samples which have been radiocarbon dated. A fourth test pit 100 metres north-west of the trench revealed a lens of fine grey potash 1.5 metres below the surface. Augering on and around the eastern mound suggested a consistent stratigraphy, with a metre and a half of mixed clay, wood carbon, sand, potsherds and soil typically lying above ash lenses. Sand can be used as temper for pottery. The ash lenses contained potsherds, small pieces of charcoal, visible filaments of burnt bamboo, and in the case of the trench excavation, animal bones and pigs' teeth. The generally fine consistency of these layers of potash suggests that bamboo and other grasses may have provided some of the fuel. This is consistent with a site used for open field firing of earthenware. The Otein Taung site yielded occasional surface fragments of glazed ware, some obviously modern. No slumps characteristic of overfiring in a kiln were found, nor any brick or earth structures suggesting a kiln. As for clay resources for pottery production, the subsoil at Bagan contains clay deposits which are still mined today for brickmaking. There are four tanks within 500 metres of the Otein Taung site. One of these, to the south of the Sulamani pagoda, was mined in recent times for clay, and debris indicates that bricks were made on the spot. Several earthenware anvils were excavated or found during surface collection (Chart 3: surface, 0-60 cm, 90-100 cm). These are common potters' tools, held inside the green pot while it is beaten on its outer surface with a paddle. This paddle and anvil process has been portrayed in eighteenth century

temple drawings at Bagan (Fraser-Lu 1994: 207) and recorded ethnographically in colonial Burma (Taw Sein Ko 1895).

Similarities between modern trade materials (Figure 135) and the excavated samples (Charts 3 & 4) reflect what ceramicists have portrayed as a homogenous regional tradition (Saraswati & Behura 1966; Miller 1985; Rooney 1987; Brown 1988; Guy 1989). Exploratory correspondence analysis of some key physical characteristics of the Otein Taung pottery suggests a coherence in the assemblage through the stratigraphic levels when it is compared with modern pottery and with earthenware from Taungba, a fourteenth century production site nine kilometres north-east of Otein Taung (Hudson 2000a; Hudson, Nyein Lwin & Win Maung 2002). This further supports the conclusion that Otein Taung is a production site, and not a market centre or some other kind of depository.

Perhaps the earthenware item most characteristic of early Buddhist sites in Myanmar is the sprinkler pot, or kendi. These are found across south and south-east Asia, generally dated to the first and early second millennia AD, from Pakistan (Di Crocco 1990) to Laos (Hein, Barbetti & Thongsa Sayavonghkamdy 1992) to Java (Adhyatman 1987), though it is only in the Buddhist countries that their function appears to focus on ritual libation (Myint Aung 1986; Khoo 1991). Buddhist cosmology and practice are bound up with the ritual pouring of water, reflecting the story of how Buddha, at the moment of his enlightenment, was able to call on the water he had poured in previous lives to witness his good deeds to come back and wash away the forces of evil. Inscriptions record that pots were deliberately broken during religious ceremonies to emphasise the importance of the vow made during the pouring of water (Tun Nyein 1899: 96, 160). More than 50 spouts from libation pots were recovered from surface collection at Otein Taung east and smaller numbers of spouts and necks were excavated to a depth of two metres (Chart 3). The finds in the eastern trench at Otein Taung included part of a pot caked on its inner surface with bright red dried clay, which suggests that it may have originally contained slip. Sprinkler pots would have been dipped in slip as part of the manufacturing process. The large number of sprinkler pot parts at a non-ritual site suggests that this may be where they were made. The only other identifiable religious items were a fragment of a votary and imprint of a small Buddha image in clay (Chart 3), both surface finds.

Roof tiles found at Otein Taung generally have a turned end and an incised central ridge but there were also specialist fittings with slotted sides (Chart 3). Similar but not identical roof tiles were excavated by the Bagan Archaeology Department at the “Kyanzittha palace” in the early 1990s. Tiles with a hooked end and a longitudinal channel on top were also found in a ruin (2306) at the Hsin-byu-shin monastic complex, a kilometre east of Otein Taung, which is attributed to the 14th century. However a quite different style of tile was found at a second building (2303) in the same complex. These were 8 to 11 cm wide, with hook and groove sides for interlocking (Pichard 1992-2002: 237-239 Vol 8). Open-ended earthenware tubes (Chart 3) found outside the city walls in the 1990s (Grave & Barbetti 2001) and within and south of the 2003 city excavation (page 226 & Chart 7) are represented by fragments at Otein Taung (Chart 3), which can be considered a possible manufacturing site for them. Similar tubes were recovered in 1907 at a monastery at Sisatchanalai in Thailand (*Thai Pottery and Ceramics* 1986 rear fly-sheet), and they have also been reported in east Java (Miksic & Endang Sri Hardiati Soekatno 1995). Stacks of earthenware tubes have been used to line wells in ancient India (Taddei 1977: 31) and Sri Lanka (observed by the author at the 12th century Parakramabahu complex at Polonnaruwa, 2004).

Otein Taung, western mound.

A different excavation approach was taken with the western mound. Regular levelling of the mound that can be attributed to flattening the work surface for firings can be clearly seen on the outside slopes (Chart 4). A test pit one metre square was dug from the top of the northern end of the mound, reaching natural soil at 7 metres, to try to get a picture of the stratigraphy. A fragment of a small bowl bore distinct but thin glaze on its inner surface (Chart 4: 400-450 cm) but otherwise the materials were either coated with red slip or, most commonly, left plain. Stamped pottery appears from the lowest levels (Chart 4, 650-700 cm) and an ornate stamp with circular dot patterns was recovered between 150-200 cm. Patterns produced with beater and anvil and designs featuring incised lines are found throughout the levels. Some sherds (Chart 4: 100-150 cm, first item; 350-400 cm, last 3 items) feature a stamped leaf/sword decorative element that appears at sites as diverse as Arikamedu, in India, which Wheeler ascribed to the late first century BC or early first century AD (Wheeler 1946: 50 Plate 30B) and on an Ayuthaya period pot in Thailand (Spinks 1976). The sherds recovered from the western mound seem to have more decorative variety than the material from the eastern mound, but it must be stressed that these were test excavations aimed at dating and general characterisation, and a more comprehensive analysis of pottery morphology and decoration is a future project that would involve further data collection. However the excavations yielded valuable data in samples for radiocarbon dating that provide the first hard evidence of economic and cultural activity at Bagan substantially pre-dating the 11th century.

Table 10 Radiocarbon data, Otein Taung (Australian Nuclear Science and Technology Organisation, Sydney).

Sample: code, location, stratigraphy	Percent modern carbon	One sigma error	Delta (^{13}C) assumed value 25.0	Delta (^{13}C) measured value	Radiocarbon age, rounded	Calibrated range AD (OxCal 3.9)
OZE 769 Pit in field at 1.5 m	86.22	0.36	1191±34 BP	1192±34 BP	1190±40 BP	760-980 (89.9% probability)
OZE 767 Eastern mound, top of ash lens.	92.5	0.41	626±36 BP	624±36 BP	620±40 BP	1290-1410 (95.4% probability)
OZE 768 Eastern mound, bottom of ash lens.	87.34	0.39	1088±36 BP	1086±36 BP	1090±40 BP	880-1030 (95.4% probability)
OZE 770 Western mound at 1.2 m	85.11	0.33	1295±31 BP	Not obtainable	1290±40 BP	650-830 (93.6% probability)
OZF 136 Western mound at 4.5 m	89.32	0.40	907±36 BP	Not measured	910±40 BP	1020-1220 (95.4% probability)
OZF 137 Western mound at 7m, inside furnace	89.00	0.42	936±38 BP	Not measured	940±40 BP	1010-1190 (95.4% probability)

The radiocarbon data at Otein Taung.

The radiocarbon dates for Otein Taung suggest that the site operated before and during the Bagan period, from the late 8th or 9th to 14th centuries (Table 10 &Figure 145). On the eastern side of the site, the earliest date, OZE 769 , southwest of the trench, 100 metres across an agricultural field, comes from a pit that was dug down to a 20 centimetres thick ash lens which appeared at 1.5 metres. This lens contained potsherds as well as carbon pieces. Activity is indicated within the range of AD 770-890 at 68.2% probability, AD 760-980 at 89.9% probability, or AD 710-980 at 95.4% probability (Figure 139 & Figure 145). This early phase of activity is supported by a second

date, OZE 768 (Figure 141) at the bottom of the ash lens on the eastern mound, which gives a range that effectively covers the 10th century. These two dates suggest that the firing of pottery may have taken place intermittently outside individual homes in the 9th century and then became focused in the 10th century on the eastern mound. This could indicate that by the 10th century there was sufficient pressure on land to keep firing in the same place, or that firing had become so frequent that specialists took on the job, using a set space on the edge of the village, as occurs today at Taunggone (page 206). At the top of the grey ash lens in the trench, 2.4 metres below the present surface, the date range for OZE 767 (Figure 140) sits in the 14th century. The samples from the upper and lower levels of the ash lens in the trench were selected for radiocarbon dating because they appeared to represent a continuing event, and the results do indeed suggest a secure stratigraphy. Sample OZE 767 does not necessarily represent a terminal date for production. It is the most recent date for which there is evidence, but the sample was more than two metres below the present surface of the mound.

The samples from the lower part of the western pit, OZF 136 (Figure 143) at 4.5 metres and OZF 137 (Figure 144) at 7 metres, share a date range that covers the 11th-12th century. The variety of potsherds and the accumulation of 2.5 metres of debris between these two samples is in keeping with a picture of expanded production both in volume and variety of product to service the rapidly growing city. There is now the problem of sample OZE 770 (Figure 142) from the western pit at 1.2 metres, which provides a date range in the 8th-9th century, but sits above the two other dates that are considerably later (Chart 6). There may be a simple explanation for this anomaly. It would be reasonable to expect that potters in the Bagan period would, like potters in the area today at sites such as Taunggone, have used relatively young timber along with grass and bamboo for fuel, thus not bringing into play the "old wood" problem (discussed earlier, page 132). This may not have been the case as Bagan began to decline. By the end of the 14th century, with the administration moving upriver to the confluence of the Myitnge and Ayeyarwady rivers, there was a fall-off in construction and maintenance (Aung-Thwin 1985; Hudson 1997). Frasch suggests that monasteries were regularly allowed to fall into ruin following the death of the monk they were originally built for (Frasch 1996b: 369) with a new monastery for a new monk being a more meritorious option for donors. All this would have left a supply of unwanted, unclaimed or deteriorated but chronologically old timber available for fuel. OZE 770 may have been an old beam, recycled by the potters. Whatever the explanation for the discrepancy between its radiocarbon age and its stratigraphic position, this anomaly must exclude the sample from consideration as an indicator of a date for the site earlier than the 9th century range provided by OZE 769.

Otein Taung and its implications for Bagan.

The mounds at Otein Taung were very likely on the edges of a village that was producing earthenware between the 9th and 14th centuries. From what may have been relatively limited beginnings in the 9th century, by the 10th century regular firings seem to have begun at the location of the eastern mound. Ethnographic comparison with Taunggone, and the extent of the two mounds, suggests that specialists may have been involved in the communal firing of pottery that had been shaped by individual households. By the 11th century, the radiocarbon dates indicate that a second firing site, the western mound, had come into use. Part of this mound covered a small stove or bowl furnace, much more heavily vitrified than similar charcoal-burning stoves which are used today, and which had a grate (Chart 4) remarkably similar to the grates still sold in local markets in Myanmar (Figure 135). In the 11th century, a large temple (820), redated from the *Inventory's* estimated 12th century by the Archaeology Department following restoration (Chart 4),

was built between the two mounds. This uniquely decorated building (Pichard 1992-2002: 2-3, Volume 4) may have been sponsored by the official in charge of the village. By the 13th century, the proliferation of small monuments across Bagan suggests that the religious merit that accrues from endowing a monument was accessible to a broader range of individuals (Hudson, Nyein Lwin & Win Maung 2001). Around 40 mainly small (less than 12 metres maximum external ground dimension) monuments were built in the 13th century at Otein Taung (Figure 138). The existence of a long-term, specialist, prosperous village of potters fits McIntosh's model of "urban clustering", in which a network of communities, occupied contemporaneously and in close proximity, provide services to a large hinterland. McIntosh gives as an example Jenne-jeno, a first millennium AD urban cluster in Nigeria containing one major settlement and 21 smaller satellites, many with evidence of specialist occupation. He points out that this form of clustered urban complex had also appeared in Shang China, at Cheng-chou and An-yang, where the settlements in their early phases formed networks of discrete nodules (McIntosh 1991, 1999). The essential feature of these communities is that they gravitated together while avoiding assimilation into a single entity. Mon, Burman and Pyu ethnic groups are regularly distinguished from each other at Bagan in early documents or inscriptions (Luce 1959b: 86-89) and specialist occupations such as farmer, toddy-climber, elephant-keeper, mason and potter are recorded (Luce 1940). The radiocarbon evidence at Otein Taung suggests that one of these nodules of specialists formed at Bagan in the 9th century. This supports the traditional founding date of the mid 9th century, though not on the tradition's own terms. More absolute dating at Otein Taung as well as at proposed early buildings such as temple 996 (page 246) could further test the hypothesis that Bagan was a functioning entity before the mid 11th century.

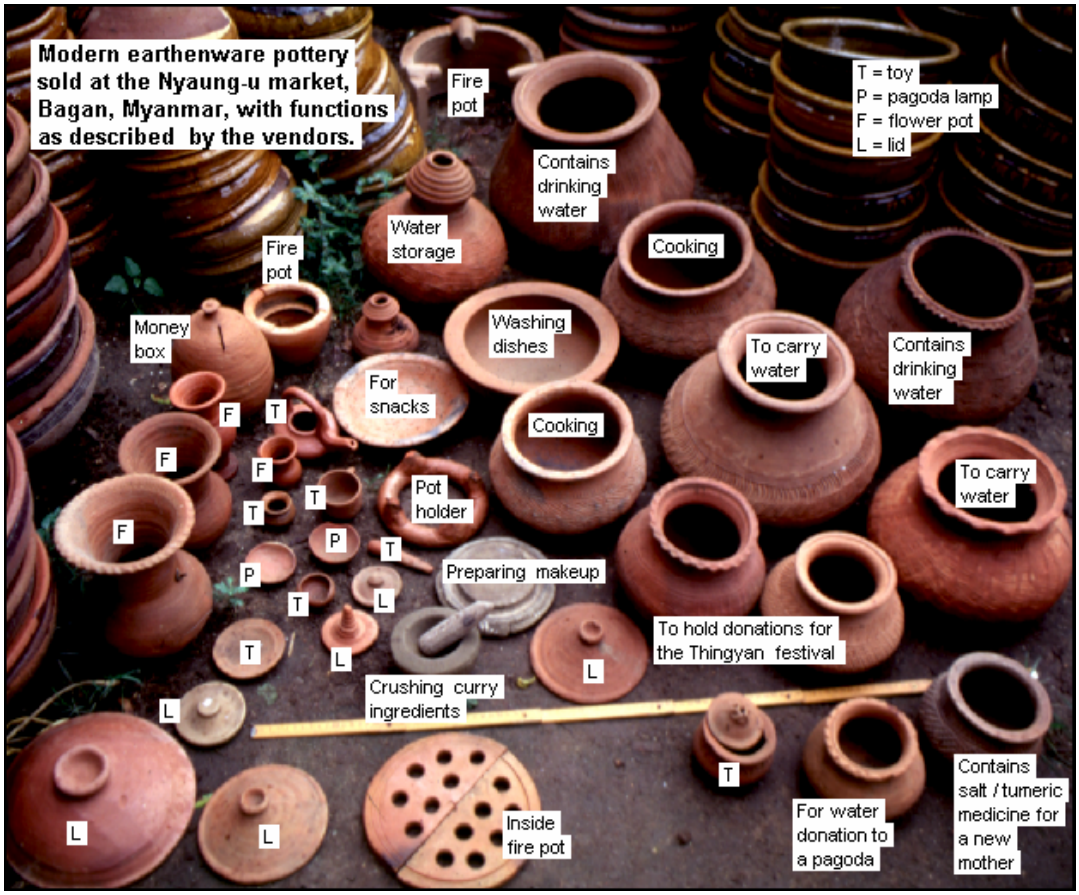

Figure 135 Modern earthenware in use at Bagan.

Figure 136 Earthenware firing site, Taunggone.

Figure 137 Preparing earthenware for firing on top of the Taunggone mound.

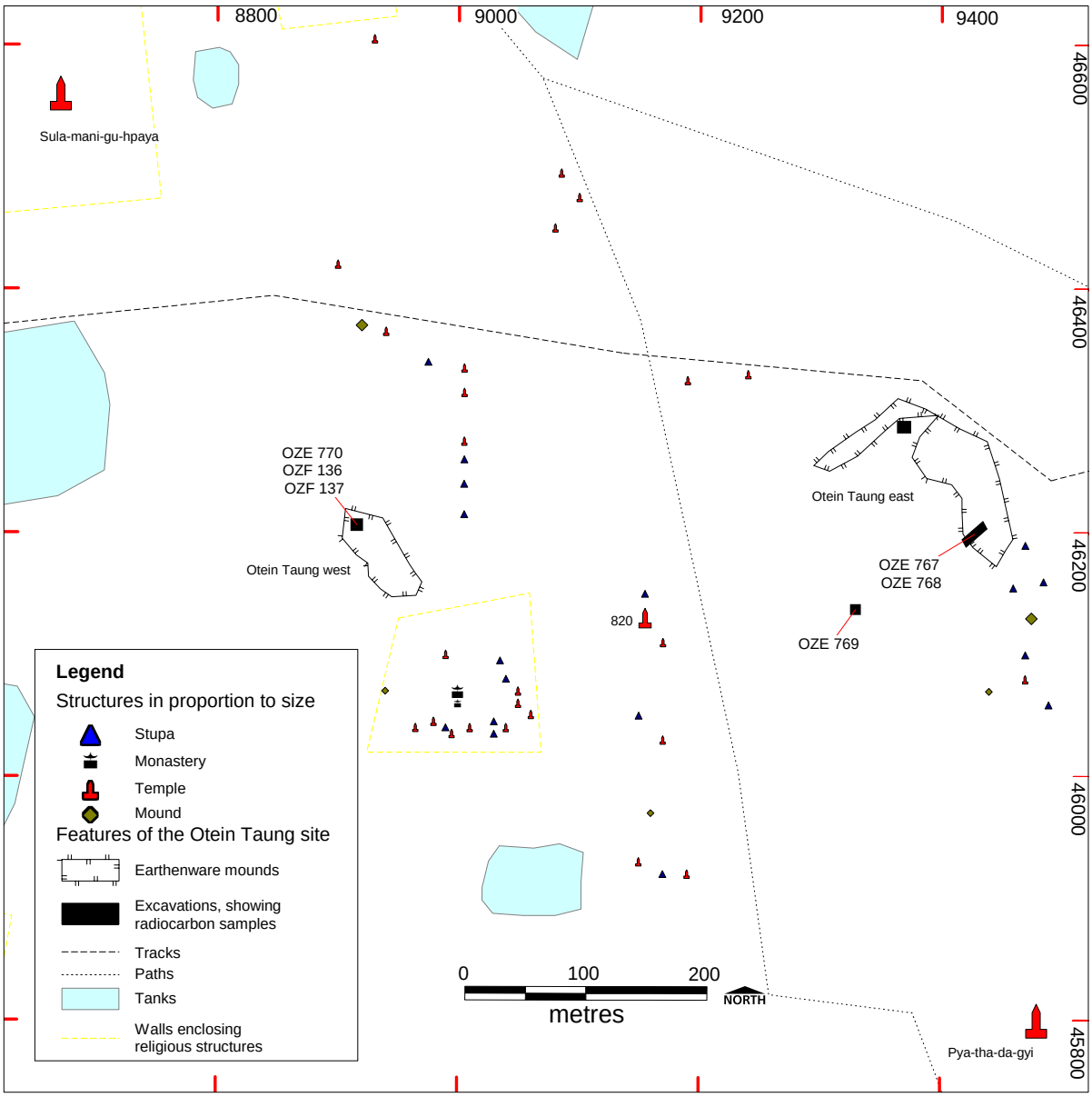

Figure 138 Otein Taung earthenware mounds: plan.

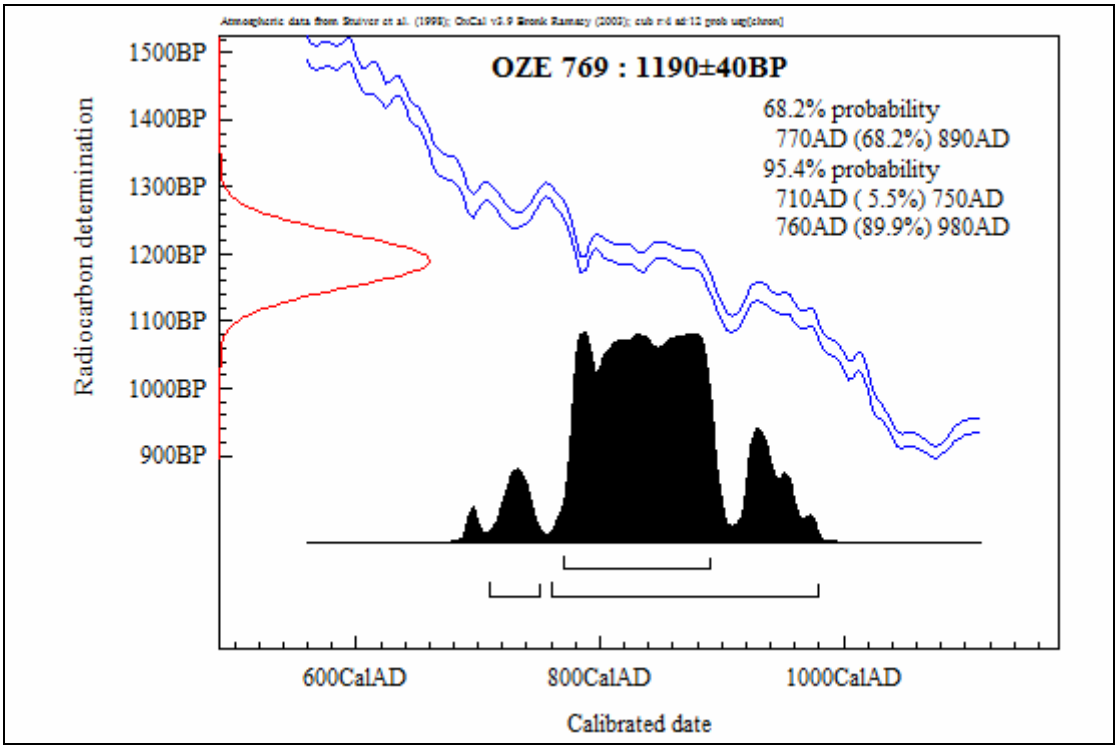

Figure 139 Otein Taung date OZE 769, pit in field at 1.5 metres.

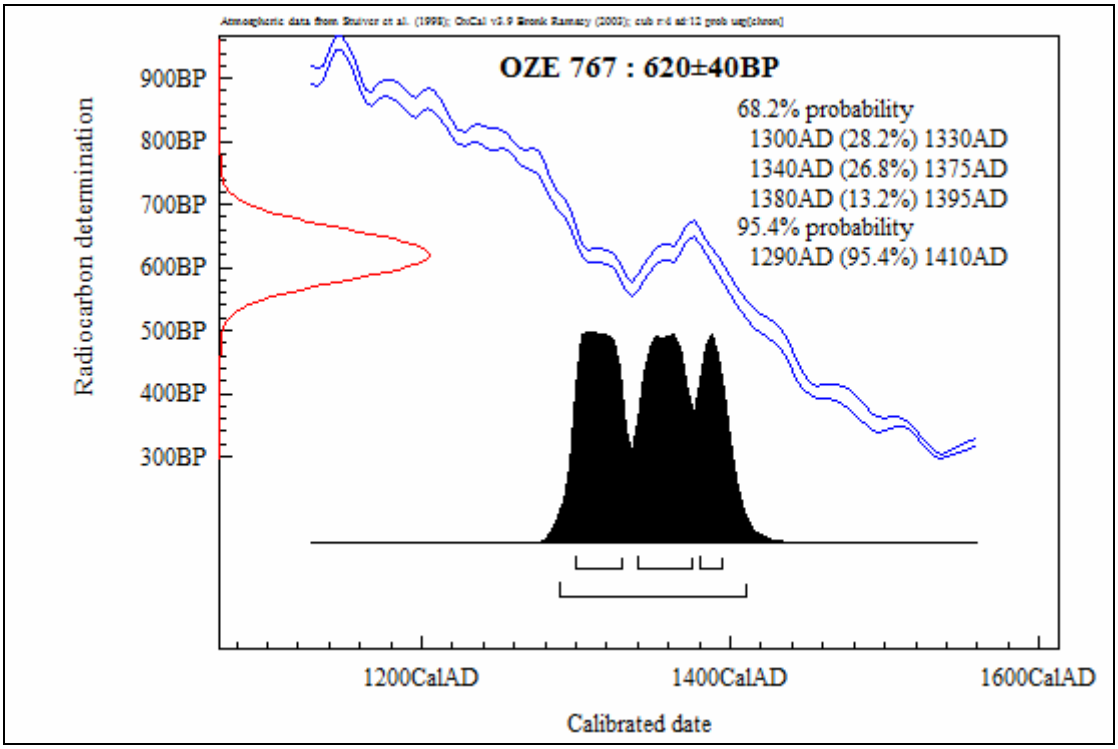

Figure 140 Otein Taung date OZE 767, top of ash lens, eastern mound.

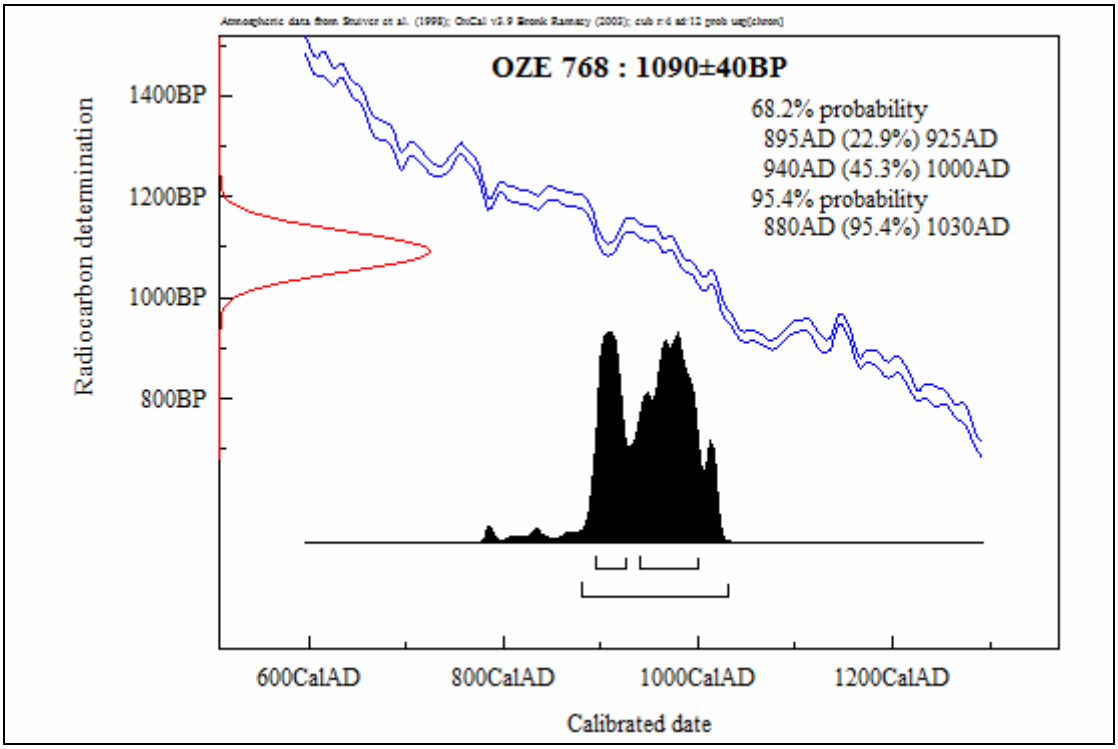

Figure 141 Otein Taung date OZE 768, bottom of ash lens, eastern mound.

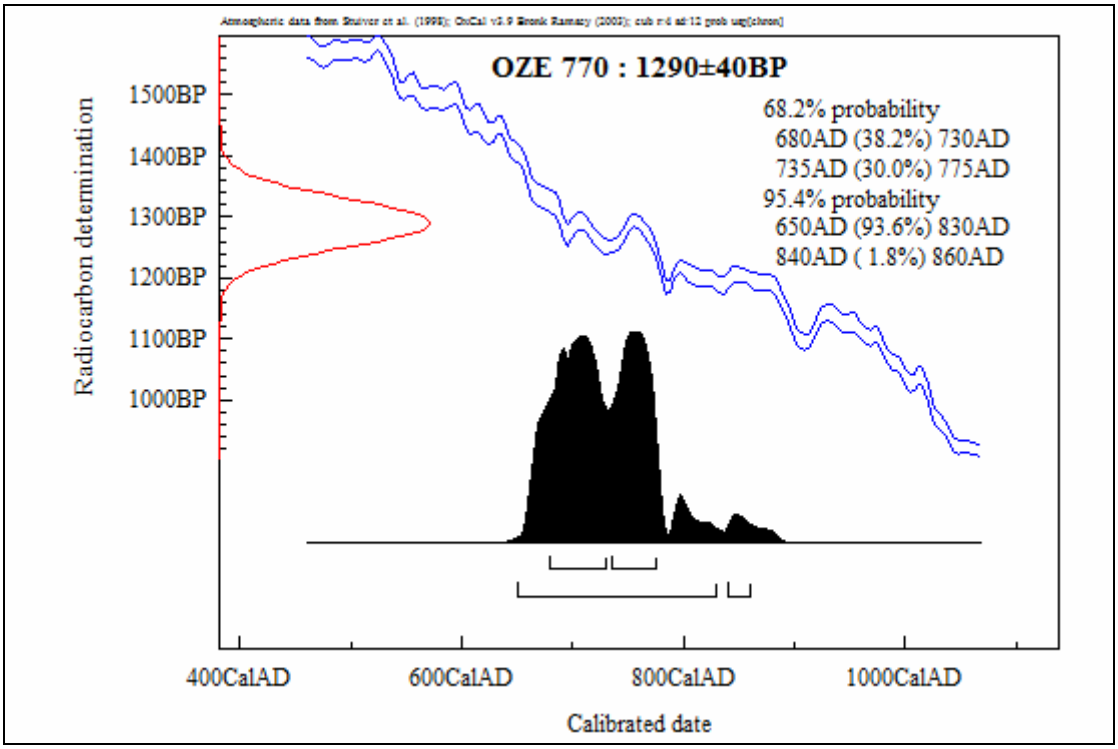

Figure 142 Otein Taung date OZE 770, western mound at 1.2 metres.

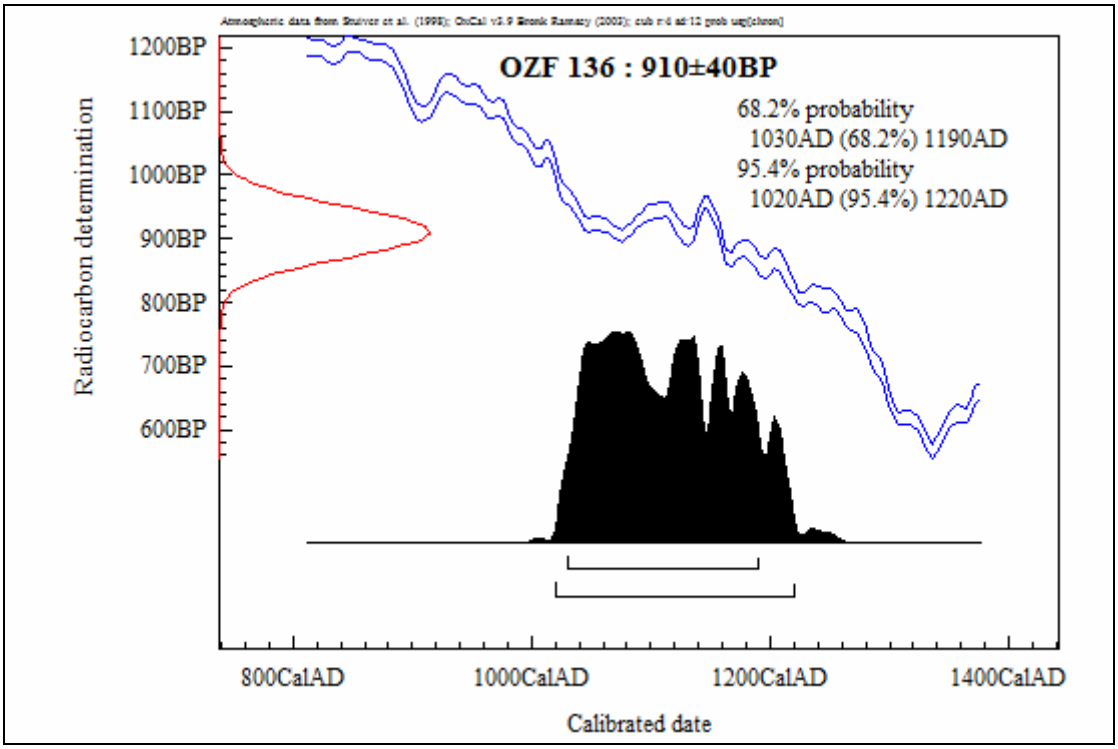

Figure 143 Otein Taung date OZF 136, western mound at 4.5 metres.

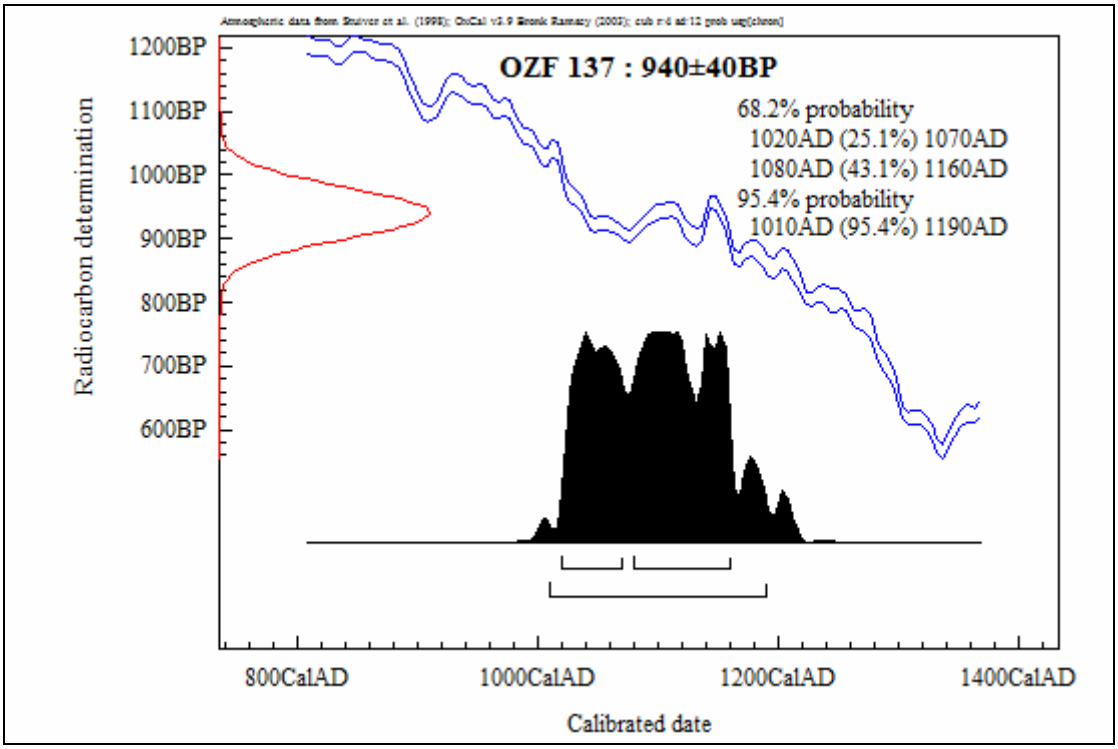

Figure 144 Otein Taung date OZF 137, western mound at 7 metres.

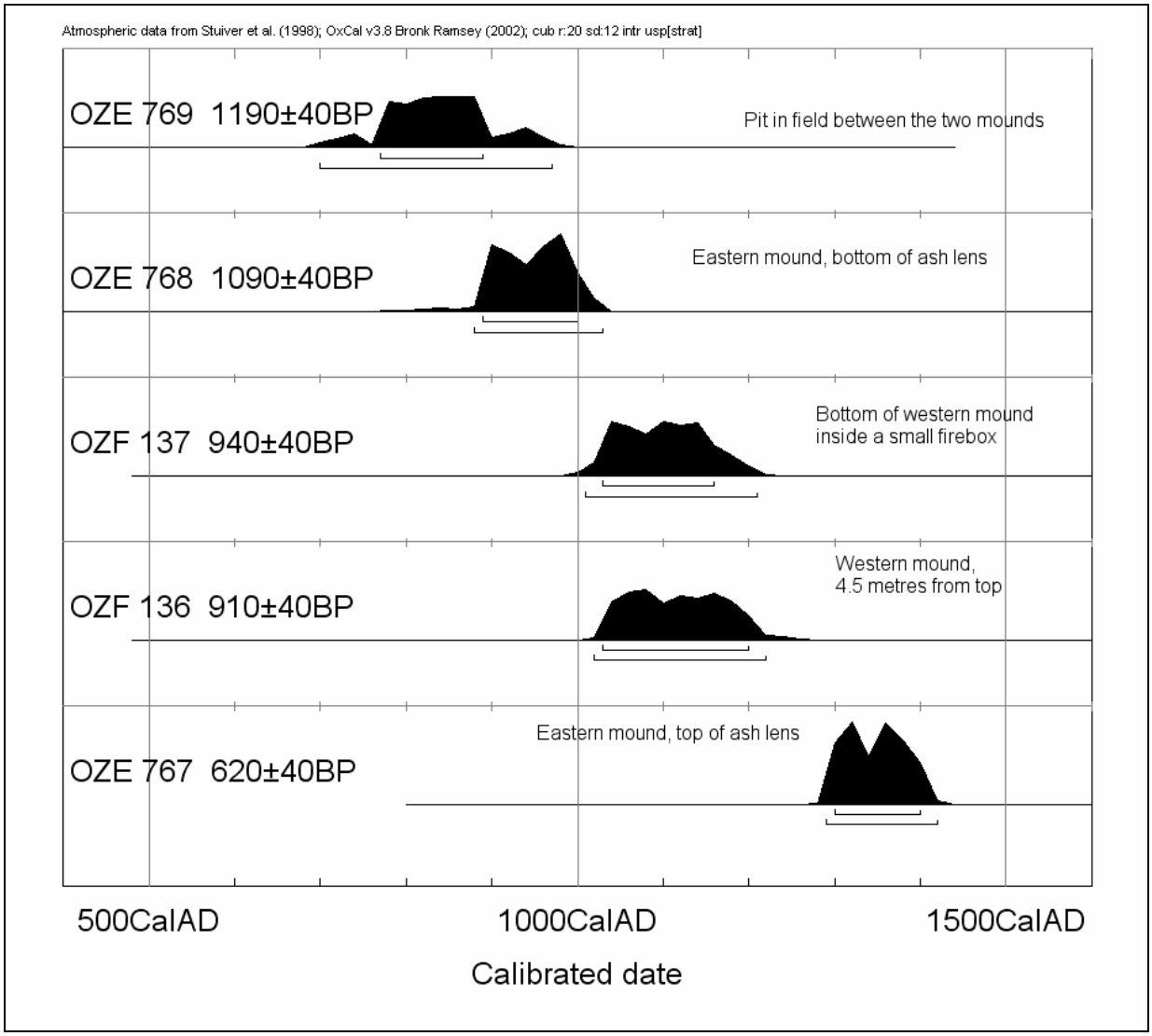

Figure 145 Otein Taung, complete date range.

Summary.

Epigraphic evidence (Figure 121) shows that in the 11th century, Bagan controlled Upper Burma down the Ayeyarwady from Halin to Pyay, with a presence in the Panlaung, Lower Mu and Lower Chindwin valleys. In the 12th century, the area of influence reached further north to Tagaung, and there was an intensification of religious dedications in the Panlaung, the lower Mu and Chindwin, and downriver to the Minbu irrigation area. In the 13th century, even by keeping strictly to dated epigraphs, it can be shown that Bagan control spread more widely north-south, from Bhamo to Tenasserim. If undated Bagan inscriptions, which must date to or before the 13th century, are also considered, then the Ayeyarwady delta can be included, with at least some incursions to the west coast. Apart from the Panlaung, which appears to have been opened up by means of extensive canal irrigation, and an expansion along the lower Chindwin, the sites occupied by Bagan generally coincide with Pyu areas (Chart 2), which would already have been subjected to centuries of landscape modification and improvement through cultivation and localised weir and tank irrigation works.

In an investigation of the mechanisms by which Bagan become the expansionist polity that the epigraphic evidence shows it to have been, the first step was to consider the traditional claim that Bagan originated in the alliance of a group of villages focused on the eastern hinterland of the present city. Archaeological evidence indicates that a number of the villages with claims to belong to the founding confederation have some antiquity, although links with the traditional founding era of the early 2nd millennium AD are, on the available evidence, not demonstrated. A case can be made for Bagan period occupation of the Mye-thindwin and Kokko areas, due to finds of structural ruins such as the Gu Gyaung pagoda and temple, and mounds south of Kokko. The structure at Yon Hlut Kyun remains intriguing, and further investigation could determine its precise relationship with Bagan. The iron furnaces, though yet undated, are at the very least positioned to have had an impact on Bagan. It was suggested earlier that the Mount Popa area was a resource centre supplying the Late Prehistoric Samon Valley with semi-precious stones (page 44). Further investigation of the iron furnaces in this area could indicate how they fit into the resource supply system, and how far back they go. Chapter 7 will propose that an origin for Bagan in some kind of cluster of settlements is not untenable. Deconstruction of the myths surrounding the foundation of Bagan suggests that these traditional stories related to the eastern hinterland make much more sense if the 2nd century AD timescale is abandoned, and the stories are seen as a mythologised narrative of events of the 8th or 9th centuries AD.

Direct evidence of early occupation and economic activity within the main monument zone at Bagan is provided by the Otein Taung excavations. Radiocarbon dates indicate that earthenware production was underway perhaps in the 8th century, and more certainly in the 9th, and continued in the same location at least until the 14th century. Domestic, ritual and construction materials were produced. The confirmed presence of one specialist village in the 9th century suggests that there may have been more, providing services to their neighbours.

CHAPTER 7. NEW APPROACHES TO THE STRUCTURE AND CHRONOLOGY OF BAGAN.

There is historical and scientific support for an origin for Bagan at least as early as the 8th or 9th century AD. The story of Pyusawhti, a mythologised account of settlement at Bagan, makes more sense if it is pushed forward in time from the 2nd to the 8th or 9th century. The evidence of radiocarbon dates at Otein Taung suggests was craft and settlement activity from the late 8th or 9th century. A more effective dating of early Bagan is both viable and necessary. Several archaeological approaches have been taken recently in an attempt to support and validate the extension of the chronology of the city backwards from the mid 11th century. Bagan is a palimpsest of post-11th century sites, and of all the early settlements in Myanmar it presents the most challenges to investigation. There are physical problems due to the density of the existing buildings, which simply does not permit excavation. There are conservation and heritage problems due to the focus on Bagan as a palladium of the modern state and also to rebuilding projects that might briefly make ground plans or original building materials more accessible for study, but can also reduce the art historical and architectural value of the buildings due to homogenous reconstructions.

The area that has been the focus of most archaeological excavation, as distinct from restoration and conservation, over the past 15 years is the walled city core. The traditional history says that the city walls were built by King Pyinbya in AD 849. The walls were substantially restored and rebuilt in the early 1990s. Archaeological investigations, spurred by information from the traditional histories and from epigraphic records, have unearthed a complex of buildings within the city walls which are widely known as the "palace" site. Indigenous political and archaeological decisions relating to these excavations have led to an overly-hurried identification of two parts of the site as the palaces of the 11th century kings, Anawratha and Kyanzittha. An analysis of available evidence on the "Kyanzittha" site by western archaeologists has rejected this conclusion and dated the complex to well after the 11th century. A review of the "Kyanzittha" site and a report on the author's work on the "Anawratha" site suggest that stratigraphic content not noticed by either side in this argument, or recently uncovered, leaves the question more open, but does not at present support the identification of the site with any individuals or with an 11th century timescale.

The focus of the search for administrative origins on the extant walled centre has tended to ignore another possibility for the origins of the city, the possibility that the traditional accounts of groups of founding villages and three earlier "palace" sites, Yonhlut, Kyaussaga and Ywasaik (Figure 122), while not necessarily reflecting geographic or historical realities, may reflect an origin in several local sites with an eventual concentration of power in the centre. The second half of this chapter presents a multi-source chronology that takes Bagan back at least to the middle of the 10th century, and suggests future research possibilities, nominating one recently uncovered building, structure 996 in the *Inventory of Monuments*, for investigation on the basis of its unique characteristics. Further evidence that Bagan pre-dates the mid 11th century should be sought. This evidence should show that the city is the result of intra-regional growth across the present monument zone rather than originating in a central complex that extended its influence outward.

The City of Bagan 3. A critical reappraisal of archaeology within the walled centre.

The walled centre of Bagan appears to have been an administrative and residential complex for the élite and the rulers of the city. Structurally, it can not be linked to the early urban system. It does not fit the physical or landscape model proposed as typically Pyu (Aung Myint 1998b). It is not enclosed by an irregular or ovoid outer brick wall. A stereoscopic study of 1:24,000 aerial photos taken on the 26th and 27th of February 1953 (Map 84-K-16: series 4, sheets 65-43 to 65-50; series 5, sheets 65-158 to 65-166; series 6, sheets 66-45 to 66-52 and series 7, sheets 67-44 to 67-53), which cover an area from the monument zone east beyond the Tuyin range, reveals only the walls abutting the riverbank at the site known as "Old Bagan". The location of the city on the edge of the Ayeyarwady, as distinct from a position at the confluence of minor streams that was characteristic of the Pyu central places (as outlined in Stargardt 1990), and the oblong structure of the existing wall, suggests a different kind of settlement behaviour. The three-sided walled centre takes up only 105 of the city's 8,000 hectares devoted to monuments. This in itself suggests that in the light of the much greater enclosed areas of the major Pyu settlements, up to 1452 hectares for Sriksetra (see Table 5), that "Old Bagan" represents an élite core, not an urban boundary. A western wall may have been washed away by the river during or after the major occupation period at Bagan (Thin Kyi 1964) A "mad water" that swept away solid pagodas, hollow pagodas and monasteries was reported in AD 1331 (Than Tun 1988: 107). Observation in the field today confirms that the Ayeyarwady is still eroding parts of the city. There are buildings collapsing into the river both upstream and downstream from the walled core, and a walk along the riverbank from Nyaung-u in the north to the Lokananda pagoda in the south reveals numerous scatters of brick. However, whether there were originally three or four sides, the size and shape of "Old Bagan" distinguish it from the Pyu settlements. The Burmese Chronicles give a founding date for the existing walled centre at Pagan of AD 849, when King Pyinbya, whose origin was supposedly Pyinbya village to the east of the Pyu city of Beikthano, is said to have built the city walls, the Tharaba gateway and the moat (*Pictorial Guide to Pagan.* 1963: e; Kan Hla 1977: 15; Khin Maung Nyunt 1989). It will be suggested below that the research focus on the walled centre, while in itself productive of data, has been a sidetrack and a restriction when it comes to modelling the origins of Bagan as a site. But first, the research within the walled centre must be put in context.

The "Pyinbya" palace.

This section will consider the application of cosmologically based historical geography to archaeological investigation in the walled Bagan core, and examine the issues of site interpretation inherent in this methodology. The case in point is a recently located *parabaik* or traditional folding book which contains a description of Bagan that includes its dimensions and the location of the founding palace of King Pyinbya. The document is held in the library of the Archaeology Department at Bagan, and has been translated into English specifically for the present research project as *A Brief History of Bagan* (Hudson 2003b: 118-128). The *parabaik* relates the geographical features of the city to idealised features found in the celestial realms, in the manner of other regional Buddhist cosmological geographies such as *The Three Worlds According to King Ruang* (Reynolds & Reynolds 1982).

A Brief History of Bagan opens with the prophecy of Buddha on Tanggyi Taung, where he indicated to the 500 disciples who accompanied him that a city would be founded across the river to the east of where they stood. It then describes a foundation ceremony, including the time of the

ceremony in AD 849 down to the very hour. The ceremony involves monks, ministers, and astrologers. A significant measurement, mentioned first, is the circumference of the city, 1142 *tar*, which the author of the *parabaik* converts to 23,982 feet. The most recent copy of the document is dated 1917, when Imperial measurement was well established in Myanmar. The conversion to feet in the proportion suggested by the document would make one tar equal to 21 feet, or 6.4 metres, and the city would have been much larger than the evidence of the remaining walls and moat indicates. Luce (1940: 291-292) suggested that 1 *tar* (or *ta*) was equal to 7 cubits. This is taken here as meaning the 20.62 inch (52.37 centimetres) classical Egyptian "royal cubit" (see Flinders Petrie 1883, Chapter 20). By this reckoning 1 *tar* would equal 3.6659 metres and the circumference of Bagan would be 4,186 metres or 13,734 feet, the north wall at 318 *tar* would be 1166 metres, and the east wall at 253 *tar* would be 927 metres. The central palace is described as being 20 tar on its east-west axis, and 50 tar north-south. A Burmese estimate of the measurement of 7 cubits as 10.5 feet, or 3.2 metres for one *tar* (Sithu Gamani Thingyan 2003: 56, footnote 181) would result in dimensions somewhat smaller than the extant walled centre, so for the purpose of mapping the data from the parabaik the "royal cubit" is used.

According to the *parabaik*, the city and palace form a rectangle within a rectangle (Figure 146). This could be viewed as an idealised design, a two-dimensional model of Mount Meru, with the central area attributed to the palace being a mountaintop, on whose slopes dwell the various guardians and officials. The rediscovery of this *parabaik* inspired the excavation over the winter of 2001-2002 of a 40 by 20 metre area outside the south wall of the A-twin-zigon (1,639) complex. The excavation by the Archaeology Department uncovered brick walls and floors. It appears on the plan (Figure 146 & Chart 5) just to the west of the area allocated by the parabaik to the Pyinbya palace. Apart from a sketch map, there appears to be no documentation available, and the excavation was not extended further.

The findings of this excavation, building foundations dissimilar to any known religious structure, add to indications of brick-based civil construction within the city walls. In itself, the *parabaik* is a useful tool for studying the Bagan area in the late 18th century and perhaps adding to the information available in the sittans or land records from that period that have already been published (Trager, Koenig & Yi Yi 1979). But with material such as *A Brief History of Bagan* available to scholars in Myanmar for at least two centuries, according to the date of AD 1790 on the *parabaik*, it is also easy to see how the specific founding date of AD 849 for the Bagan walled complex has become accepted in popular history as being supported by "documentary evidence".

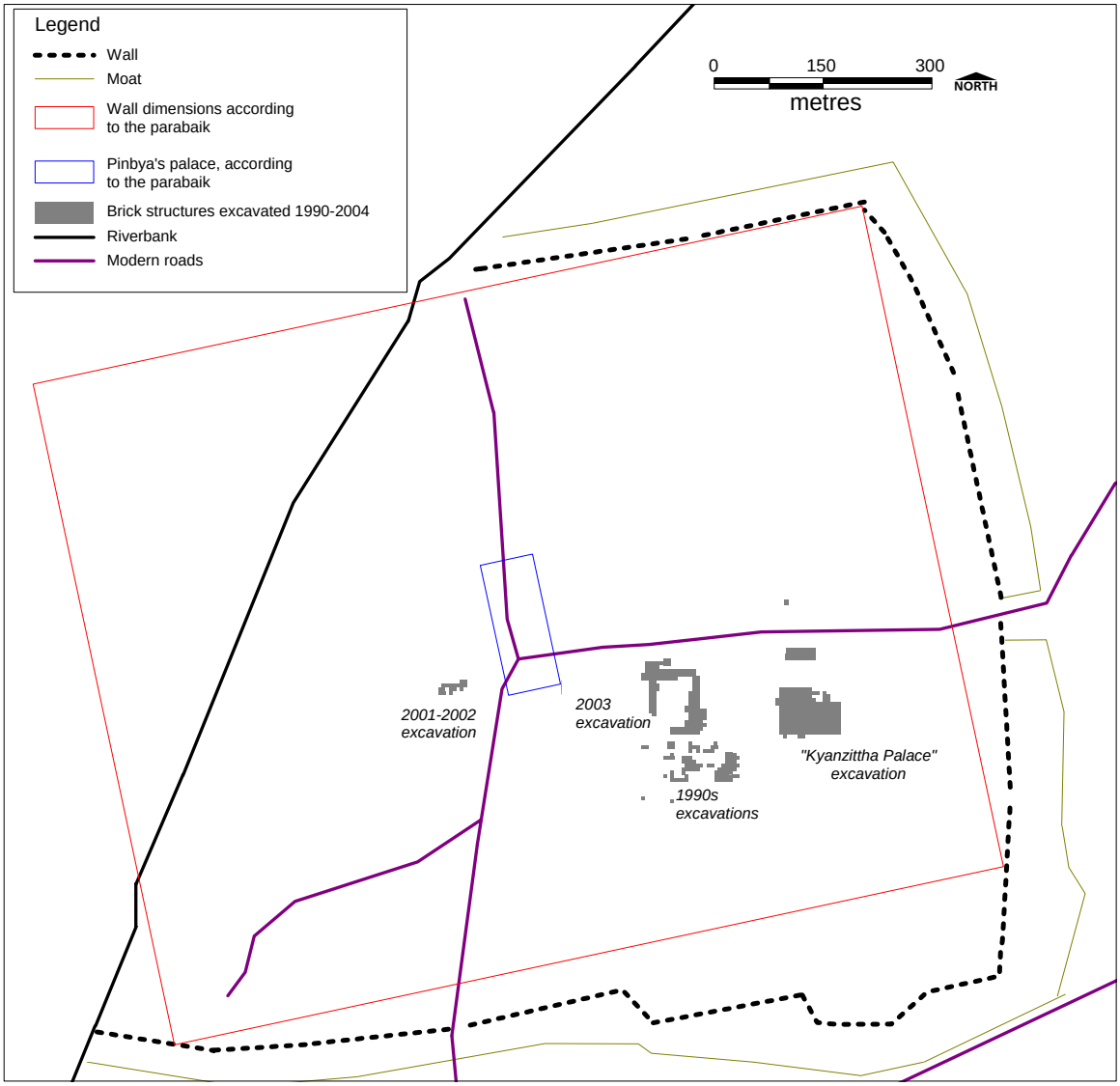

Figure 146 "Old Bagan": traditional measurements and recent excavations.

The “Anawratha” and “Kyanzittha” palaces.

The notion that the walled centre is the “original” Bagan is based on a paradigm that requires central leadership as the original motivating factor rather than as something that grew out of a coalescence of local settlements. Two excavations within the city walls have been identified in Myanmar as the palaces of early Bagan kings in support of this paradigm. These are the excavation by the Bagan Archaeology Department in the early 1990s of a complex that was dubbed the “Kyanzittha palace” and an extension in 2003 west of the excavation of the 1990s, and north of a series of walls, floors and small underground buildings that was uncovered in the early 1990s but not subjected to further investigation or analysis (Figure 146). The 2003 excavation was considered by the Ministry of Culture to be King Anawratha’s palace, and a full scale model supposed to be a replica of the palace was under construction nearby in 2003-2004 (*New Light of Myanmar, Jul 11* 2003; *New Light of Myanmar, Sep 3* 2003; *New Light of Myanmar, May 25* 2003; Khin Maung Nyunt 2003; *New Light of Myanmar, September 19* 2004). The prospect that

palace buildings should be located in this area, between the Shwe-gu-gyi (1,589) and the Pu-his-to-hpaya (1,642) pagodas, had been raised some years before the excavations on the general basis of the layout of the city and its gates (Bo Kay 1974: 36-37). However the archaeological interpretations are problematic.

The 1990-1994 "Kyanzittha palace" excavations and radiocarbon dating of the "palace" and city walls.

Bagan had not, until the 1990s, been the focus of any programs of absolute dating. Samples for radiocarbon dating were collected by Grave and Barbetti (2001) under and near the city wall, and from the "Kyanzittha palace" (Figure 149 & Chart 5). The "palace" was attributed by the Archaeology Department to Kyanzittha (r. 1084-1111) on the basis of an undated and incomplete inscription stone bearing Kyanzittha's throne name that had been found many years previously near the Tharaba gate (ASB 1912: 14-15). The inscription describes dedication ceremonies for a many-pillared palace with a central pavilion surrounded by four more pavilions and a separate ablutions building. Great attention was paid to the ritual washing and decoration of the pillars. The rituals involved monks, Brahmins and astrologers. There is a mention of Mon carrying ceremonial vessels, and a mention of Burmans carrying swords (Blagden 1923: 1-68; Luce 1969: 64-71 Vol 1).

There appears to be no written report available for the excavation, though copies of a plan are kept at the Archaeology Department. A plan published in the *Inventory of Monuments* describes the complex as a "superimposition of platforms, long walls and large rooms (?) built at different periods". The *Inventory* also points out numerous brick pits, often with a circular stone slab at the bottom (Pichard 1992-2002: 218-219 Vol 6). A variant on this plan showing a number of different features and a section was published by Grave and Barbetti (2001: 77). Both plans appear to have been based on the original drawn by the Archaeology Department, which has become somewhat outdated by subsequent work. There are more brick-lined pits visible today than are shown in the published plans. Some of these seem to have been uncovered since the original excavation. Undocumented conservation work has included the construction of brick walkways from the north side of the excavation to the centre, to allow public access. A re-survey of the site by the author in December 2003 which took the published plan and modified it to emphasise the stratigraphy and take into account the uncovering of new features clearly shows at least three construction levels (Figure 148). Transects taken with a GPS indicate that the building is not aligned as directly northward as the published plans show.

There are two main areas of the old city for which radiocarbon dates exist, the city wall and the "Kyanzittha palace". The dates are calibrated here at 95.4% probability, while the graph (Figure 150) shows the equivalent of both 1 and 2 sigma ranges (Bronk Ramsey 2002). Two samples extracted from the same matrix under the eastern city wall date to the ranges AD 1030-1300 (OZA 204) and AD 1020-1220 (SUA 2949), which averages AD 1024-1252. This part of the eastern city wall, therefore, must postdate the deposition of the ash directly underneath it some time in the 11th-13th century. Organic matter from a column composed of earthenware tubes found just outside the east side of the present wall dates AD 990-1210 AD (OZA 203). This material appears to be infill, consisting in part of rice husks, and must post-date the tubes. While the fill in the tubes dates to the 11th-12th century, its relationship with the wall is unclear. Further finds of these tubes in the 2003 excavation, which will be discussed below, suggest that they were probably wells.

Radiocarbon dating of samples from the building provides a date of AD 980-1250 (OZD 335) for a teak fragment taken from one of the brick-lined pillar holes on the western extremity of the site.

The wood dates to the 11th-13th century, and depending on the part of the tree from which the sample came, which cannot be determined, the pillar may be within this range or later. There were dates of AD 1220-1300 (Beta 106248) and AD 1320-1440 (Beta 106247) for ash debris from the south-east corner (Figure 148, sampling location marked A). Brick walls where this sample was taken had been vitrified by fire (Figure 149, at centre-right of picture). Grave and Barbetti point out that plateaux exist in the radiocarbon calibration curve for this period, seriously broadening the calendar age ranges. Their results point to construction at the eastern part of the "Kyanzittha" building "no earlier than the thirteenth and possibly during the fourteenth century" (Grave & Barbetti 2001: 81-86). The fire and subsequent infilling of the area must postdate this construction period, and predate the building of the small temple and its surrounding walls that sit on the upper layer.

This does not necessarily provide the earliest possible date for the site. The author's 2003 re-survey (Figure 148) suggests that the radiocarbon samples from the ash debris may have come from the destruction of the middle level. This is shown in black on the plan. The attribution of the pillar holes to the middle level is tentative, and a more detailed survey is needed to determine which phases of construction may have involved pillared buildings. The relationship of the walls is more clear. On the west side of the small later temple (shown in red in the centre of the plan) there is a large wall (Figure 148, labelled B) whose base is at the same level as the walls nominated as lower level, but which extends upward to just below the latest (red) level. This wall appears to have continued to be used as part of the middle level constructions, although the other lower walls to the east were built over by the middle period structure. The lower walls, shown in blue on the right of the illustration, are well below the area where the ash was sampled. The wood sample from the pillar similarly need not represent the earliest possible date, as a pillar hole can intrude into an earlier layer. The samples taken for carbon dating may relate to the second level of construction, rather than the lowest level. The link with Kyanzittha was based on an inscription found hundreds of metres away, and while the radiocarbon dates do not support a link with Kyanzittha's time, the dating of the distinctive lower level can be considered to be undetermined, but before the 13th-14th century.

Figure 147 Fingermarked bricks from stupa 1606.

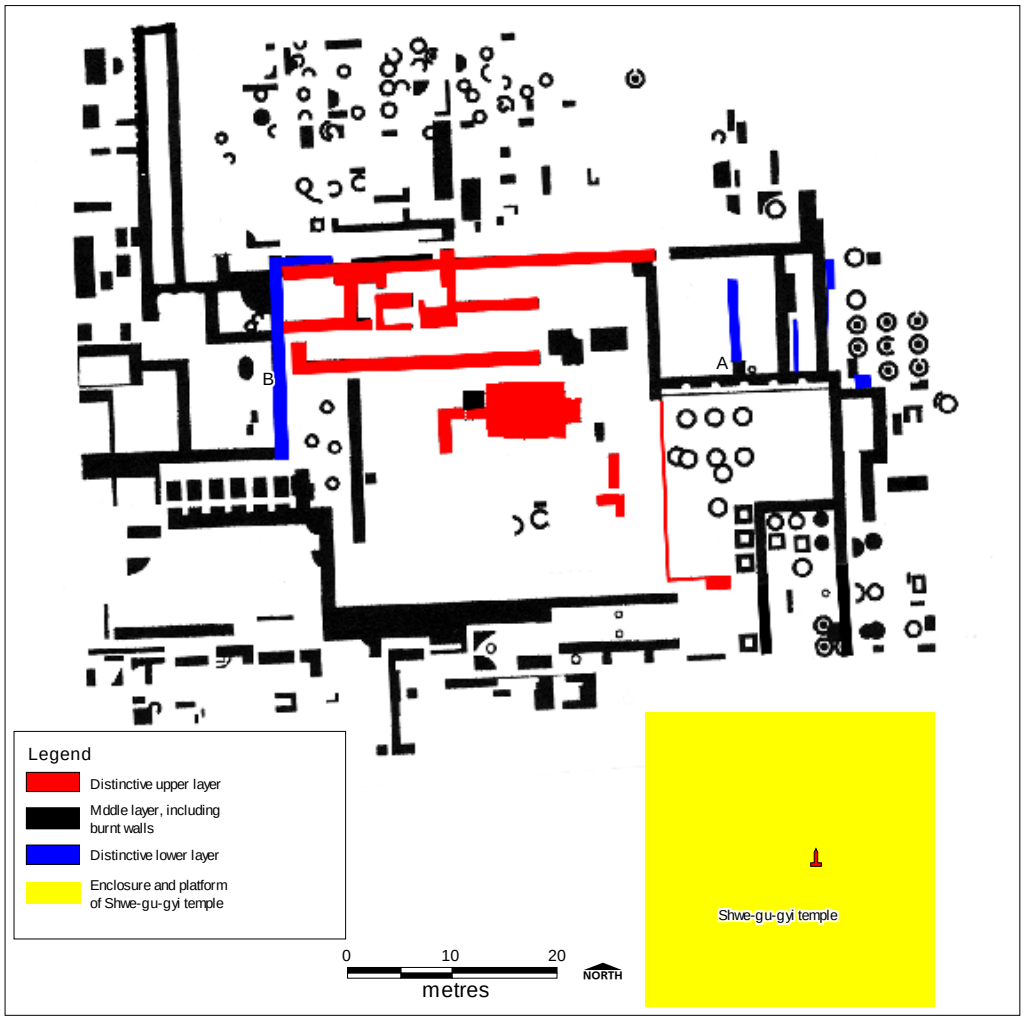

Figure 148 Bagan: "Kyanzittha palace", 2003 re-survey.

Figure 149 "Kyanzittha palace" excavation viewed from the Shwe-gu-gyi.

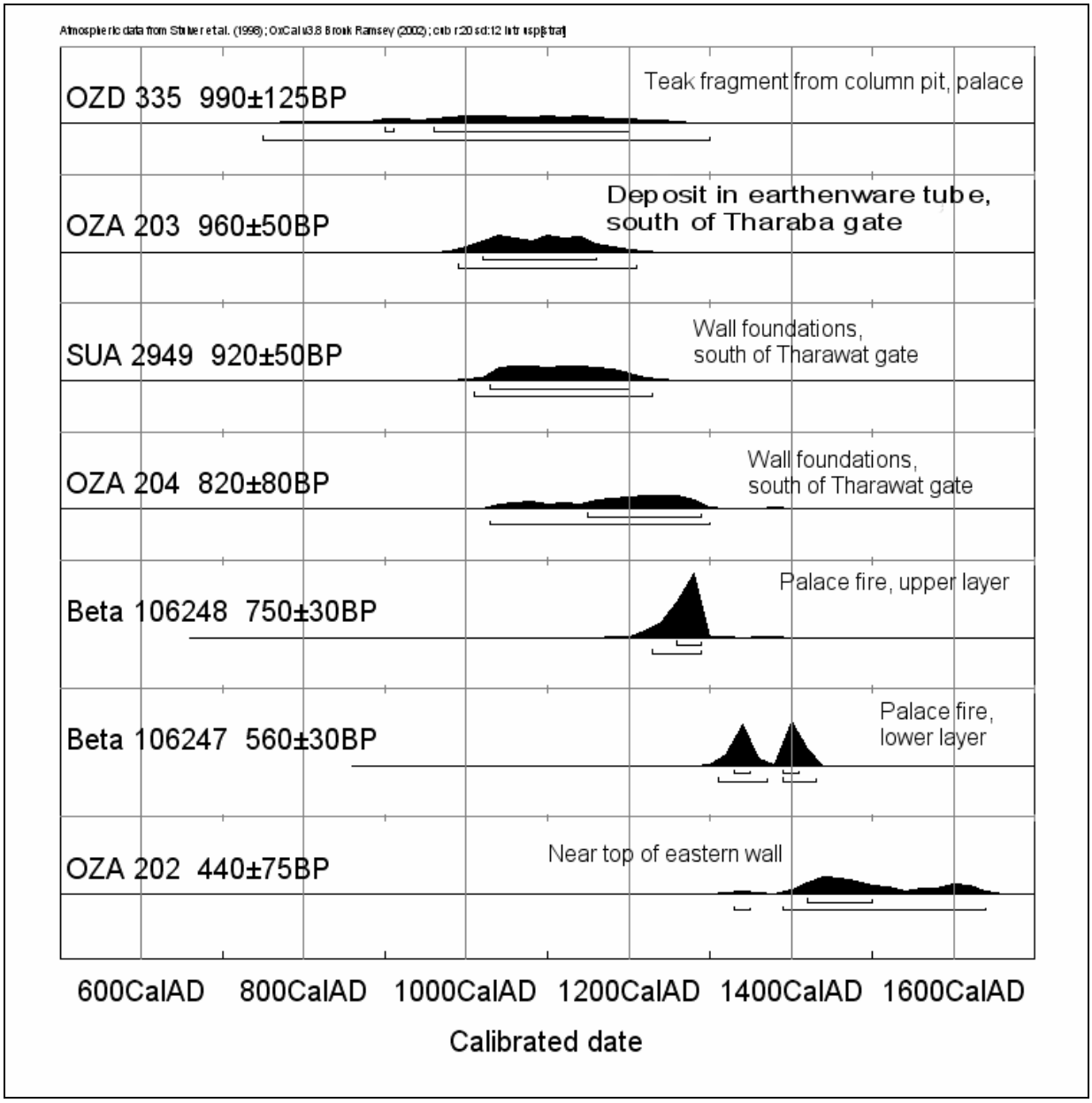

Figure 150 Radiocarbon dates for Bagan city (after Grave & Barbetti 2001).

The 2003 excavations at "Old Bagan": report.

The archaeological evidence from the 2003 excavations points more to the continuation of activity after the Bagan period than to much that can be directly considered to be "early" Bagan. As these excavations have not previously been published, they are included here as a preliminary report which will suggest that while the lowest levels of the excavation potentially have links with early Bagan, the bulk of the structure belongs to later periods.

In 2003 the possibility that brick walls protruding above the ground 120 metres west of the western end of the "Kyanzittha palace" may have been the top of a substantial buried structure led to a departmental excavation program, funded by a private sponsor. The progress was reported in July as " two big brick buildings, two small brick buildings, an 85 metres long brick wall stretching

south and north, two 40-metre long brick wall stretching east and west, brick floors, posts, the drain of Bagan period, the site assumed to be the west gatehouse of the palace of King Anawratha, earthen pots and broken earthen pots, 53 earthen pots, 73 earthen ear-plugs, unearthed utensils including earthen potsherds and earthen beads, and measures being taken for durability of the excavated things" (*New Light of Myanmar, Jul 11* 2003). In November-December, at the invitation of Nyein Lwin, who was directing the project, and the Bagan Archaeology Department, the author prepared a digital plan of this excavation (Chart 6), entering finds into a database, reviewing and analysing finds, and re-surveying the earlier excavations to create a single excavation plan of the walled city area (Chart 5). Toward the end of this period, funding ran out and the excavation effectively concluded. Departmental engineers built brick and cement walls aimed at preserving the excavation as a roofed site museum. As indicated in the news reports quoted above (page 222) the structure is assumed at official levels to be the mid-11th century palace of King Anawratha.

The complex as excavated contains several occupation levels. The Archaeology Department's method involved digging down until structures or substantial deposits of pottery or brick debris were found, retaining the structures, and conserving structures and pottery in situ. Conservation of smaller items involved enclosing them in glass cases, or treatment with chemicals. The excavation was laid out as a 10 metre grid, divided into quadrants. Several local university graduates were employed and trained to record the site data in handwritten journals and on cards. Some of that data has been used in this review of the work. The method of leaving baulks along the grid lines, used as recently as the 1990s in the "Kyanzittha" excavation, was abandoned. In order to make the plan relevant to the other structures at Bagan, the author reconciled the excavation grid with the metric grid used for the *Inventory of Monuments at Pagan* (Pichard 1992-2002: 7, Volume 1). This was done by using the centroid of building 1642, the Pu-hsi-to-hpaya (E 6,395 N 47,275), which is just to the west of the excavation, as a datum point, and measuring the distance from there to the excavation grid. Alignments were checked with a hand-held GPS and were accurate to within 1 degree. The Pu-hsi-to-hpaya is attributed to the 18th century by the *Inventory* (Pichard 1992-2002: 298 Vol 6), but according to traditional belief it is associated with Anawratha and Kyanzittha in the 11th century and is said to mark the western gate of Anawratha's palace. This review of the excavation focuses on the aspects with which the author was directly involved, and it must be stressed that this is an outline. It will be suggested that the upper layers 1 to 3 (Chart 6) postdate the 14th century AD, which is significant for the "post-empire" history of Bagan. At the lowest level that was excavated there are structures of indeterminate date which the stratigraphy suggests might be considered Bagan period, though their function and more specific dating remains a problem for future excavation.

A common feature across the site is deposits of broken pots which are often largely intact, often in groups and often accompanied by midden material such as ash and shells. This suggests the deposition of debris in holes, a phenomenon that continued until recent times. Along the north wall, an area occupied by a hotel until the early 1990s, debris including plastic bags is seen in holes that go down for more than a metre. Holes that had a clear stratigraphic relationship with occupation levels were measured down to 1.3 metres deep for level 1, and to around 1 metre deep for levels 2 and 3. In this tentative analysis of the site, and ahead of a more comprehensive recording of sections, these are taken as the characteristic depths of the holes for the purpose of periodising materials that were found within stratigraphically secure holes, and for estimating the period of materials in cases when the depth of find was recorded. The levels and some key finds are illustrated by means of a schematic section (Figure 153).

Level 1.

The upper level of the area excavated in 2003 (Chart 6) had been known for some time, and had appeared in places jutting above ground level as low walls (Figure 172). The brick walls when excavated were characteristically around 50 centimetres high, sitting on a compressed rubble base. Excavation revealed that these walls formed a partial rectangular enclosure. The east wall was connected to an underground brick building that appears to have been dug down from the level of the enclosure walls. This structure contains niches that may have been meant to hold lamps and holes that may have held floor joists. The brick floor has a row of stone fittings that appear to be pillar bases. In the northern and southern walls there are slots with a sandstone base, possibly to take a beam that would be supported by a line of pillars resting on the stone bases on the floor. There is a doorway at the north west corner, which enters a corridor parallel to the western side of the main room, at the south end of which are brick steps (Figure 173). The westernmost wall of this building partially covers a vertical stack of earthenware tubes (E 6,477 N 47,254). There are several of these stacks of tubes on the site. As mentioned above (page 220), organic material from similar tubes found outside the eastern city wall has been radiocarbon dated to the Bagan period. The function of these tubes has not been completely clear, and opinions have included latrines or wells. The fact that one of the stacks, on the south wall, reaches the present water table (Figure 153) might suggest that wells are the likeliest option, although the tubes are considerably narrower than modern wells. Parallels with earthenware tube-lined wells in India and Sri Lanka were discussed earlier (page 207).

A second brick structure in the south-east corner of the excavation, while not connected to the surrounding wall, is at the same level as the wall at the top. This chamber is partly floored with brick, and is a single room accessed by brick steps inside its western wall. To the west of this is a third, smaller brick chamber, divided into two sections (Figure 174). The stratigraphy here is less certain, though if it was designed for a person to stand up in, its original walls would have come to the same level as the surviving tops of the walls of the two larger buildings. An alcove (E 6,471 N 47,228) in the south-west corner of this building is floored with smooth, tightly aligned sandstone tiles rather than brick. The positioning of the bricks, with smooth walls inside the structures and rough, irregular layers outside, is a good indication that these buildings were constructed in holes dug in the ground. There are inscriptional references to King Kyanzittha having numerous storehouses, pointing to the redistributive focus of Bagan's economy in the 11th century (Wicks 1992: 122). Later administrators, as these structures appear to post-date the Bagan period, would presumably have also needed to store goods collected on behalf of the central government. A simpler and perhaps more prosaic explanation may be that they were cellars for drying lacquerware. This has been a common function recorded over the past century for underground buildings in Upper Burma, and particularly at Bagan (Taw Sein Ko 1912; Morris 1919; Blurton 1999).

Level 2

There were scattered patches of brick floor and walls at a consistent 70-80 centimetres below the top of the wall. In several places, notably along the south wall, these appeared underneath the level 1 wall on both sides, confirming that level 1 was later (Figure 175).

Level 2B

This level appears mainly as brick floors that are distinctly below level 2, though only by a matter of two or three thicknesses of brick. There is a large patch of floor at the southern end of the part of the west wall that was excavated and scattered instances along the rest of the western trench. Several stacked earthenware tubes cut down through the level 3 brick drain in front of the level 2B floor (Figure 176).

Level 3

This distinctive level of brick and stone floors and low walls, 1.6 metres below the top of the level 1 walls, is seen outside the southern wall and on the northwest side of the excavation, and includes an elegantly constructed brick drain (Figure 176 & Figure 177). Along the western trench, the space above and into level 3 is densely filled with potsherds, including cooking pots, and midden debris.

Level 4.

Two brick structures have been uncovered at this level, their bases 3.6 metres below ground level. A stepped structure outside and under the south wall sits directly above the present water table, which can be seen in the photograph (Figure 178) from the muddy material recovered by the excavator as he checks the natural soil layer below the bottom course of bricks. A structure in the northwest corner, the part of the excavation that has been dubbed the western gate of the Anawratha palace, has its base at a similar depth and there is a packed clay floor at its foot (Figure 179).

Distribution of Tada-u pipes as an indicator of periodisation.

Earthenware smoking pipes were found across the site, and need to be put into context, as these artifacts have been subject to considerable misinterpretation. Moulded earthenware pipes for dry smoking tobacco are commonly found in archaeological contexts in Myanmar (Hein, Barbetti & Grave 1989: 10, 12) though their function today has been replaced by cigarettes, cheroots and plainer pipes. Similar decorated earthenware pipes are found in Northern Thailand and Laos. Earthenware smoking pipes were produced in the conjoined villages of Sayohpho, which means “tobacco pipe kiln”, and Yelungyaw, near Tada-U, 17 kilometres south south-west of Mandalay, from the early 17th century (Hein 1996: 185; Myo Thant Tyn 1999: 3). There are numerous designs recorded (Hein 1997), to the extent that “choosing pipes at Tada U” is an old Burmese expression that indicates one is spoilt for choice (Singer 1990: 112-114). Pipes have also been noted in association with a pottery production site at Kyauk Taing, near Inle Lake in Shan State (Reith 1997: 53).

References in the archaeological literature have erroneously placed pipes back as far as the 5th century BC. The “exquisite ornamentation” of pipes picked up in the fields by farmers at Beikthano was credited to the time of the mythical King Duttabaung (ASB 1906: 6) and finds of pipes at Bagan and Sriksetra have been taken as evidence that the ancient inhabitants of these settlements were “greatly addicted to smoking” (ASI 1909-1910: 123). These finds do not seem to have been in any secure archaeological context. Museum curators in Myanmar still appear at times

to be under the misapprehension that pipes found at sites dated to before the period of European contact are related to the main settlement periods of those sites. In 2002 the Bagan Museum was displaying what it described as "Bagan" pipes. There is no archaeological evidence such as inclusion of pipes in relic chambers that would bear this out. As far as stimulants are concerned, the *areca* palm and its "betel" nut were widespread during the Bagan period and were mentioned in inscriptions (Luce 1940: 293-295). Bagan period artworks show betel receptacles that remained indicators of rank for centuries afterward (Yi Yi 1960) but there are no known records or illustrations of tobacco or smoking paraphernalia until the 17th century.

Tobacco is recorded as being exported from India to Burma in the early 1600s, and is documented in Burmese trade regulations from 1635. In 1637, a Royal Order prohibited public smoking of tobacco pipes in Ava as precaution against fire. This order was repeated in 1757 (Hein 1997: 74-75). The Konbaung period poetess Mei Kwei (1788-1848) said "have a smoke please" as she handed her friend a pipe, an indication that pipes were popular with both males and females. During the 1860-1885 Yatanapon, or Mandalay, period cheroots made of corn leaves became popular (Aye Myint 1993: 192, Figs 742-744, 746-753). By the late 19th century, the "Burma girl" in Rudyard Kipling's classic poem *Mandalay* (Kipling 1892) was smoking a "wackin' white cheroot" rather than a pipe. The anthropologist F. K. Lehman (personal communication 2003) has noted that clay pipes were still in use in some Kayah and Shan areas, and some remote parts of lowland Burma, in the 1930s. The appearance of tobacco and associated smoking paraphernalia in 17th century Myanmar is in keeping with its appearance among North American colonists in the late 16th century (Binford 1961; Deetz 1977: 18-20) and a consequent spread of tobacco and pipes around world trade routes. The current evidence indicates that the early 17th century marked the appearance of pipe smoking in Burma, with the habit widespread until the early 19th century and continuing on the periphery until the early 20th century. Pipes may be excluded from consideration as artifacts of Myanmar's pre-European cultures, and moreover, they can be considered part of the archaeological signature of the 17th-19th century.

The pipes found during the 2003 excavations whose depth was recorded were generally at less than 60 centimetres, with a couple of exceptions found in brick pillar holes (Figure 152). This suggests that they belong to the level 1 period, and postdate level 2. It is therefore suggested that on this evidence, the two larger underground brick buildings should belong to the 17th century or later. The distribution of pipes over the site (Figure 151) suggests that the areas along the western wall, east of the walls where there is a complex of pillar holes, and south of the 2003 excavations were all active in the 17th-18th century.

Exotic earthenware and ceramic finds as indicators of periodisation.

There were several possible chronological indicators among the pottery finds. The imprint of a Chinese coin appears on a piece of red slipped earthenware (Figure 180) found within the northeast corner of the complex at a depth of 1.9 metres (Figure 153, Chart 6). The coin reads (translation courtesy of Laichen Sun) *chong-ning tong-bao*, the era 1102-1106 of the reign of the Northern Song Emperor Hui Zong. The coin used was probably iron (Schjoth 1976: 32, 44 Illustration 627). As the image on the pot is both reversed and rotated, it is unlikely it was meant to be read, but instead was meant to be appreciated for its decorative value. Though this potsherd bears a precise date it is difficult to contextualise archaeologically. The only incontrovertible piece of information that can be gained is that the pot must have been made after the coin was minted in China at the beginning of the 12th century. The coin could have been used as a stamp, perhaps in Bagan where

as the Otein Taung excavations have shown (page 207) there was extensive manufacture and use of both stamped and red slipped ware, any time after 1102. The find, while at the depth that has been allocated here to level 3, was in an area that was not associated with any structures other than the level 1 wall, and there is no report of any other material associated with the find.

The cover of an underglazed blue circular ceramic box, a characteristic 15th-16th century product of the Chu Dau kilns, east of Hanoi (Honda & Shimazu 1993: 135; Richards 1995: 155-156; Hoanh 1997: 212, 234; Long 2001: 181) sat in a hole south of the south wall that was convincingly related stratigraphically to level 3 (Figure 153). Vietnamese ceramics were widely exported to south-east Asia in the 15th and 16th centuries, notably to the islands or seaports as part of the cargo of Dutch, Portuguese or British ships, filling the gap in the market left by a reduction of exports from Ming China (Richards 1995: 42-49; Stevenson & Guy 1997: 47-60). The identification and periodisation of this piece as 15th-16th century Vietnamese is strong. The shard was found with several dozen clay ear plugs, which were a popular personal ornament at Bagan, a bone awl and a spindle whorl. The cache (Figure 181) was retrieved outside the southern level 1 wall (Chart 6) from a sandy matrix 2.3 metres below level 1 in December 2003 shortly before a brick wall was built over the spot as part of the construction of an open-air site museum.

Two cream/white stoneware bowls were found together with a green-glazed kendi (Figure 183 & Chart 6) among midden material, ash, bone and potsherds two metres below ground level. This find was in a hole that had a clear stratigraphic relationship to level 3. The debris could be seen continuously below some level 3 flooring and on the side of the excavation baulk under the south wall. In detail, the items were:

1. A bowl (Figure 182, at right) bearing on its base what may be an early form of the Burmese letter a- ဢ and the letter hta-win-be ၎, although the latter is incomplete. The letter a-, the last letter of the Burmese alphabet, and a combination consonant and vowel, took on its present rounded shape in the 18th-19th century (*Myanmar-English Dictionary* 2001: xv, xvi, 160, 534). The letters are not centred on the surviving part of the base of the bowl, and there may be other missing letters. The letters were likely inscribed pre-firing, when the body of the pot was soft enough to do so, and they can perhaps be considered as some kind of potter's mark. Similar marks have been noted at the Lagumbyee kiln site near Bago (Hein 2003: 60), and there are very definite characters inscribed on a 15th-17th century celadon sherd from Twante (Myo Thant Tyn & Rooney 2001: 59). This bowl has a rim diameter of 22 cm. Body thickness at the rim is 4 mm. The plate should date to some time before the 18th/19th century, when ဢ took on its rounded form, and to after the beginning of domestic glazeware production which at the very least postdates Bagan (see discussion on glazeware, appendix 5).
2. A second cream/white bowl (Figure 182, at left) with a rim diameter of 20 cm, body thickness at the rim of 3 mm, and incised parallel lines under the glaze around the body.
3. A green-glazed kendi with a teapot-like spout and an ornate floral handle (Figure 183).

All three of these items have been identified as Burmese wares that should postdate the Bagan period (Don Hein, personal communication 2003). The 2003 excavations also yielded sherds of red-slipped earthenware overpainted with while lines and dots (Figure 184). Specimens were recovered widely across the site, and are similar to an example from Halin (Myint Aung 2003: 112-113).

The depths of most of the larger caches of pottery were recorded, and they are shown on the excavation plan (Chart 6) in relation to the depositional phases proposed in the schematic section (Figure 153). These deposits suggest that during the level 2 and 3 phases of the site there would have been activity in the area along what later became the level 1 eastern wall and the underground

buildings. Other significant finds are the brick pillar holes, often with a round sandstone slab below. Some of these holes partially occlude others below them, indicating either multiple construction phases or the replacement of individual pillars at various times. Further pillar holes have been exposed in the "Kyanzittha palace" excavation, just to the north of that excavation, and southeast of the 2003 excavation, as well as on the 2003 excavation's eastern side (Charts 5 & 6). The ritual dedication of pillar holes has been described in great detail in Bagan period inscriptions (see page 223). It is not clear whether the pillars supported ground-level halls or raised storehouses or a combination of the two.

The 2003 excavation: analysis.

At the 2003 excavation site, the horizontal levels indicated by widespread layers of brick floors at levels 2, 2B and 3, and the level 1 complex of walls with underground buildings are remarkably consistent. In presenting this summary, which is meant as a model for analysing the site rather than a comprehensive analysis, it must be remembered that as the excavation followed the level 1 walls, the centre of the site has not yet been fully explored, and as excavation halted when significant structures or artifact deposits were found, there is no indication what might be under, say, the extensive level 3 floors in the northwest corner. The site was generally not dug past the 2 to 2.5 metre depth at which the Vietnamese and Burmese glazed ceramics were located except to expose structures that were obviously deeper than this, the underground rooms and the stepped level 4 walls.

The underground storehouse complex of Level 1, whose deposits of Tada-u pipes sit above level 2, is not mentioned in the *Brief History of Bagan* of 1790, nor for that matter is there mention in the *parabaik* of any other surviving "royal" structure subsequent to the site attributed to Pyinbya (Hudson 2003b). This might suggest that there were no significant civil structures left when the *parabaik* was composed. On the basis of the stratigraphy of the pipes, Level 1 might be tentatively attributed to the 17th-18th century. Level 3, on the basis of the best identified of the finds, the Vietnamese lid sitting in a stratigraphically secure level 3 hole, as well as the Myanmar glazeware (page 292), might belong to the 15th-16th century. This would place level 2 and 2B in the 16th-17th century. This hypothetical position considers the evidence in its best light and ignores the possibility that the glaze wares may have been antique pieces discarded at a later date. But a model must start somewhere. If a consistent rate of deposition is assumed, the level 4 structures should date to the 13th century or earlier. There is, however, nothing to directly support a mid 11th century date that could link the building on the northwest corner with King Anawratha. The folkloric link (page 226) between these ruins and the nearby Pu-hsi-to-hpaya (1,642) pagoda is a little too convenient. The earliest phase of this group of structures remains a subject for further investigation.

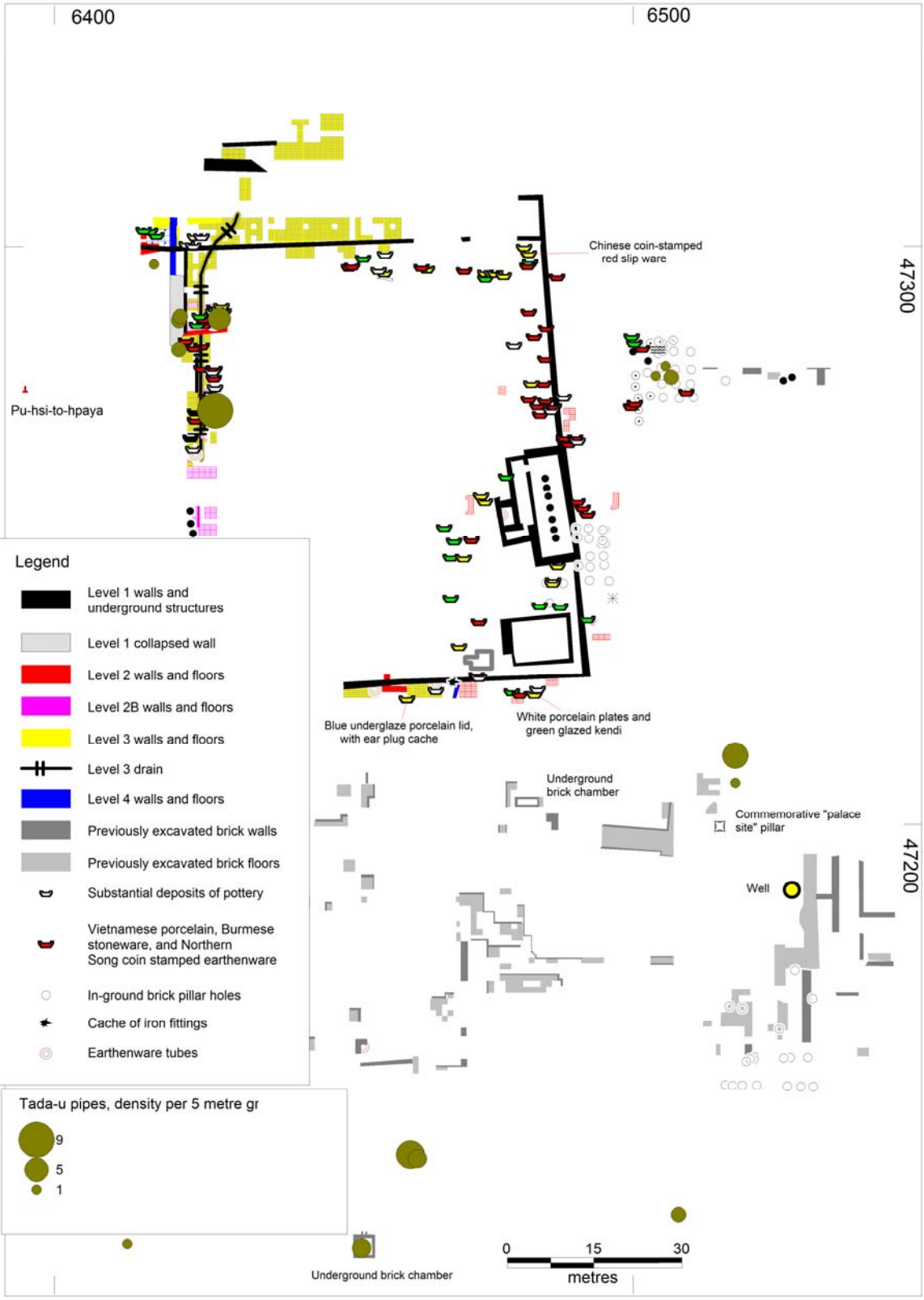

Figure 151 Excavation 2003: distribution of clay pipes.

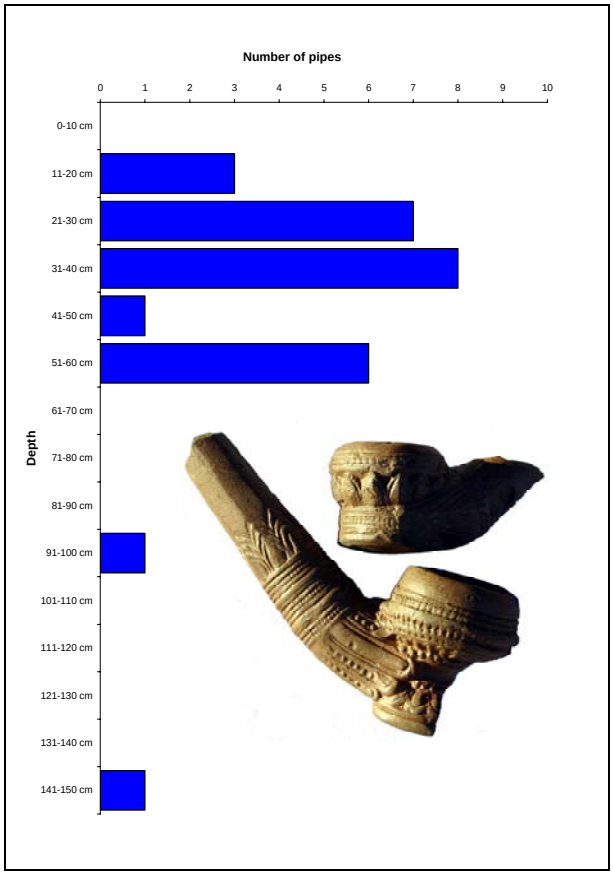

Figure 152 Excavation 2003: clay pipes, depth of finds.

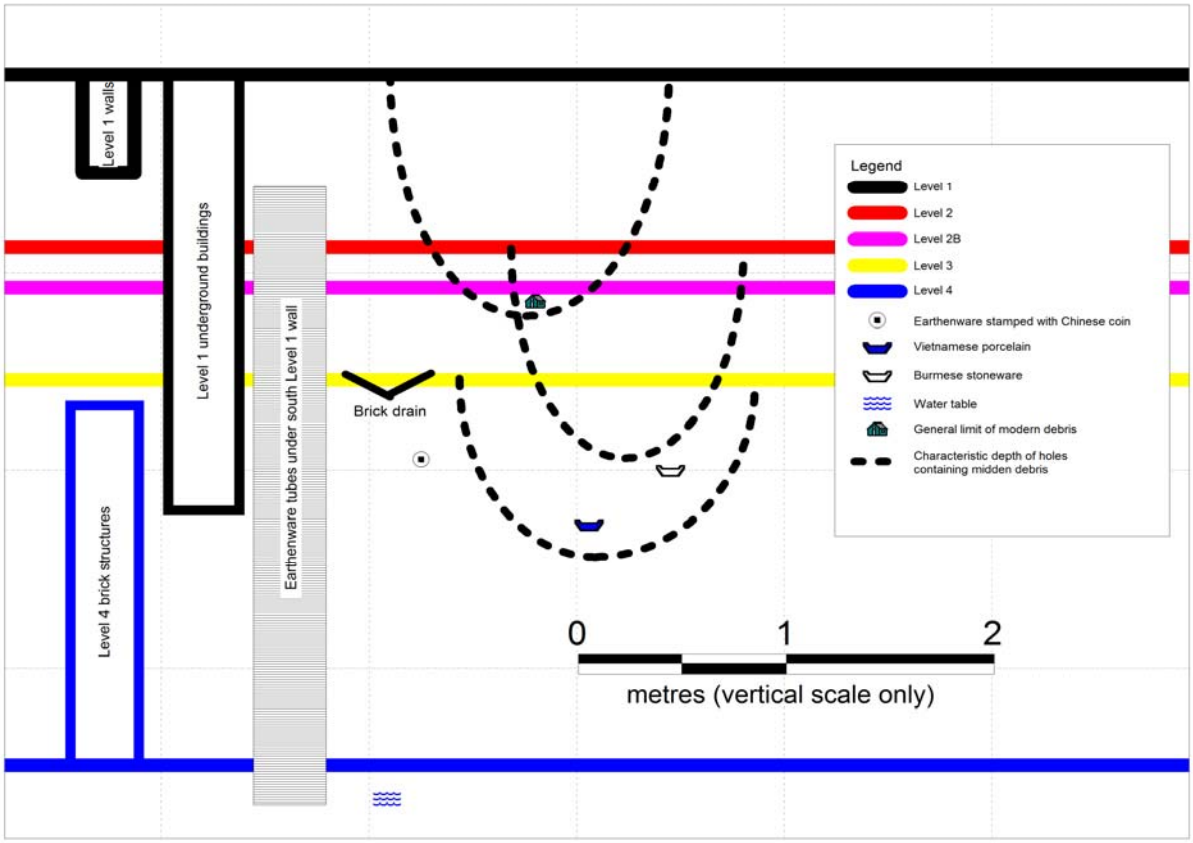

Figure 153 Excavation 2003: schematic section.

The walled city core: analysis.

The periodisation of the city walls and the "palaces" of Bagan by absolute dating is based on a small number of samples that sit on a wide plateau in the calibration curve, and the investigation would benefit from more systematic samplings (Grave & Barbetti 2001: 85-86). The radiocarbon date range for ash under the eastern wall sits broadly across the 11th to 13th centuries. This does not support the claim of the traditional histories that the Pyinbya palace and the walls were built in the mid-9th century. Radiocarbon dates for the "Kyanzittha" excavation place it considerably later than Kyanzittha, in the 13th or 14th centuries. This date does not, however, relate to the earliest known levels of the building, and the periodisation of the lower walls remains an open question. Similarly at the 2003 excavation, where the upper layers seem to be post-Bagan structures, two relatively small sections are stratigraphically Bagan period, although they need further investigation before any more specific chronology should be attributed, let alone a link with King Anawratha. The absolute dates available so far confirm what the relative dates attributed to many of the monuments within the city walls also indicate, that the walled area was a centre of activity in the 12th to 14th centuries. The 2003 excavation indicates that a large secular complex in the centre of the walled area remained active until perhaps the 18th century. An origin for this part of Bagan earlier than the mid 11th century is neither confirmed nor disproved by the radiocarbon dates.

The received history continues to dominate the interpretation of the city by the Ministry of Culture and the Archaeology Department, as witness the resources that have most recently been put into the Anawratha Palace replica (page 222). This approach relies on the proposition, as discussed in Chapter 1, that settlements are founded by, and focus on, kings, and that the palace is the original physical, spiritual and civic centre of the society. In Chapter 6, it was demonstrated that the earliest hard evidence of activity at Bagan is not at any elite complex, but at the earthenware mounds of Otein Taung. The remainder of this chapter will propose that the dominance of Bagan by the builders of the city walls and the civic buildings within them involved the consolidation of a group of several local settlements. This consolidation has been mythologised as the story of the 19 villages being brought together by Thamoddarit and his heroic son-in-law Pyusawhti. The first step in investigating how this consolidation may actually have occurred is to review the information that is currently available about the growth of Bagan over time.

The City of Bagan 4. A critical reappraisal of the archaeology of the monument zone.

The *Inventory of Monuments*.

Bagan reached its peak between the 11th and 14th Centuries AD, according to historical and epigraphic records, during which time more than 2,200 brick temples, stupas and monasteries (Table 11) were erected for the perpetuation of Buddhism and the spiritual advancement of those who sponsored the construction. The *Inventory of Monuments at Pagan* tentatively attributes 44 buildings to the 11th century, although the earliest secure date is from the early 12th century, an inscription of AD 1113 from the Kubyauk-gyi temple near Myinkaba village (Pichard 1992-2002: 242, Volume 5). The city is today a popular tourist and pilgrimage destination, a focus of Buddhist merit-making through reconstruction of ancient buildings, and a symbol of national identity and

aspiration. Its extant buildings effectively cover an area of 80 square kilometres (Hudson 1997). Ruins are still being regularly located within the archaeological zone.

The *Inventory of Monuments at Pagan*, the result of a UNESCO sponsored survey that followed a devastating earthquake in 1975, periodises the monuments according to their attributed century of construction. The *Inventory* contains a total of 2834 items. Thirteen of these (4, 5, 6, 7, 10, 14, 129, 209, 1,938, 2,008, 2,033, 2,163 and 2166) are statues, while another (2) is an indeterminate building, possibly a monastery, that was recorded in the grounds of the Shwezigon pagoda, but has since vanished. Dates for most of these have not been estimated. An ordination hall (2218) on Tuyin Taung is listed "construction period unknown". The Tanggyi Taung pagoda complex on a mountaintop on the west side of the river opposite Bagan, a prominent local feature traditionally attributed to King Anawratha in the 11th century (Ar Seinna; Myat Min Hlaing 2002: 2-3), is not included in the *Inventory*. This leaves 2,819 structures ranging from very large temples and stupas to small mounds. Apart from six small kilns (a seventh has been located since the *Inventory* was published), the remaining 2813 items are assumed to be some kind of building, though many are identified only as mounds. Some of these mounds have been excavated since the *Inventory of Monuments* was published, and structures rebuilt on the basis of their foundations. This may well have improved their characterisation, but as of 2004 there was no central record of these reconstructions available. The *Inventory* data is therefore used here as published, except that it has been adjusted by evidence from restoration by the Archaeology Department that has reallocated monument 820 from the 12th to the 11th century and redefined monument 1606 from temple to a stupa built from fingermarked and Pyu-inscribed bricks after the foundations were cleared and examined in 2003 (Figure 147 & Chart 5). The periodisation of the Pya-tha-da-gyi (803) has been shifted from the 12th to the 13th century (see page 239 ff). The *Inventory* is by design a compilation of working data. Estimated dates and construction periods of buildings are "approximate and subject to revision" (Pichard 1992-2002: 391 Vol 1). The graphs and tables refer to small, medium, large and very large sizes of buildings defined according to the largest external dimension of their ground plans by the *Inventory* (Pichard 1992-2002: 8 Vol 1). Volumes of building material are estimated to be in the proportion 1:8:40:400 relative to each of these size definitions. This broad estimate of the volume of building material is based on a more complex set of unpublished volume estimates kindly provided by Pierre Pichard (personal communication, 2000).

Table 11 Construction at Bagan, by century, according to the modified *Inventory of Monuments*.

Century	**11th**	**12th**	**13th**	**14th**	**15th**	**16th**	**17th**	**18th**	**19th**
Number of structures	44	215	2,076	277	14	11	15	99	78
Epigraphically dated		15	58	4	3			3	2

Table 12 Resources committed to building at Bagan, 11th to 14th century, according to the modified *Inventory of Monuments*.

Century	**Small buildings**	**Medium buildings**	**Large buildings**	**Very large buildings**	**Relative volume of resources used, expressed as equivalent numbers of small buildings**
11th	20	10	11	3	1,740
12th	121	54	25	9	5,153
13th	1,552	442	75	9	11,688
14th	209	46	14	2	1,937

The greatest number of buildings and associated epigraphic dates comes in the 13th century according to present attributions (Table 11). The increasing rate of survival of epigraphy from the 13th century onward may be a phenomenon of time, or it may reflect an increased use of epigraphy as the composition of the social group contributing to monument construction broadened, or as ritual requirements dictated that donors be identified. In terms of resources used, the expenditure of "economic energy" on construction trebled between the 11th and 12th centuries, then doubled again in the 13th century. During the 14th century, when Bagan is supposed to have gone into decline, resource allocation to construction still exceeded 11th century levels (Table 12).

A new approach to dating.

Epigraphic dates from the *Inventory of Monuments*.

The most conservative periodisation of the buildings comes from considering only the epigraphic dates in the *Inventory of Monuments*, which are taken directly from inscriptions (Table 13). A graph of this data (Figure 154) suggests two major construction cycles, between AD 1150-1200, and AD 1220-1290. Inscriptions between AD 1220 and 1290 indicate widespread donation of small monastic complexes and associated temples and stupas, many in the satellite monastic centre of Minnanthu. This phase has been linked to an upsurge in monastic influence (Aung-Thwin 1985) amid a proliferation of Singhala-influenced sects (Frasch 1996b, Chapter 6). Sri Lankan monks seem to have been in control of the Mahabodi complex at Bodhgaya in India during the 13th century (Karunatilaka 2003: 136) and their strong presence at the holiest of Buddhist sites may in part explain their influence at Bagan during this period. The earlier oscillation, AD 1150-1200, appears on the available evidence to be a period during which a greater volume of resources was used. However there is an immediate historical problem. This phase is much later than the attributed reign of King Anawratha (r. 1044-1077), who is credited in the chronicles with imposing Burman hegemony over much of the Ayeyarwady valley. According to the surviving epigraphy recorded in the *Inventory*, a full century passes before there is major construction of monuments. The simplest answer to this problem is that earlier construction was not recorded on foundation stones, or that stones that may have been used are lost. Other sources of data therefore need to be considered.

Table 13 Epigraphically dated buildings at Bagan according to the *Inventory of Monuments*.

Item	Name or description	Date	Type	Size
1323	Kubyauk-gyi	1113	temple	large
1589	Shwe-gu-gyi	1131	temple	large
771	Dhamma-yan-gyi	1165	temple	very large
1957	Taing-chut	1179	temple	medium
748	Sula-mani-gu-hpaya	1183	temple	very large
1743	Na-taung-ta-hpaya	1185	temple	small
767		1190	stupa	small
765	Gu-ni (south)	1190	temple	large
573		1193	monastery	small
572	Tatkale-hpaya	1193	temple	small
374	Alopi-gu-hpaya	1194	temple	medium
947	Dhamma-yazika	1196	stupa	very large

Item	Name or description	Date	Type	Size
2069		1197	temple	small
37	Thatthe-mokgu-hpaya	1197	temple	large
1391	Kubyauk-nge	1198	temple	large
155	Yat-sauk	1220	temple	small
653	(Winido group)	1221	temple	medium
447	Le-myet-hna-hpaya	1223	temple	medium
657	Than-bu-de-hpaya	1224	temple	small
598		1225	monastery	small
603		1225	monastery	medium
597	Hti-lu-gon-gu	1225	temple	small
668		1230	monastery	small
906	Hsutaung-pyi-zedi	1230	stupa	medium
667	Ma-lon-phyi-hpaya	1230	temple	medium
558	Zan-thi (east)	1233	temple	small
557	Zan-thi (west)	1233	temple	medium
633	(Aleya group)	1235	monastery	small
632	(Aleya group)	1235	temple	small
1679	So-hla-waing	1236	stupa	medium
90	Kala-kyaung	1236	temple	medium
588	Ajja-gona-hpaya	1237	temple	medium
2244		1238	monastery	large
766	Gu-ni (north)	1241	temple	large
711	Let-put-kan	1241	temple	medium
2094		1242	monastery	small
2095	Tan-hsaung-hpaya	1242	temple	medium
1831	Eim-ya-kyaung Nga-myet-hna	1242	temple	medium
785	Ze-ya-thut	1243	temple	medium
483	Po-ka-lon-hpaya	1243	temple	large
712	Thin-kan-yon	1244	temple	medium
635	(Aleya group)	1245	temple	medium
539	Nara-thi-ha-pa-te	1248	temple	large
491	A-saw-kywan	1248	temple	medium
358		1250	temple	small
802		1253	monastery	small
862	Pein-ne-taing	1253	temple	medium
801	Than-pyin-swa	1253	temple	large
575		1255	monastery	small
602	Ma-thuza-gu	1255	temple	small
482	Thambula-hpaya	1255	temple	large
1481	Pe-nan-tha-gu	1259	temple	small
844	Tha-mu-ti-hpaya	1260	temple	large
926	Tha-ma-thi-hpaya	1261	temple	small
925		1261	monastery	small
671		1262	monastery	medium
670	Nga-lu-gu	1262	temple	small
682		1265	monastery	medium
845	Ku-tha-hpaya	1265	temple	large
680	Min-waing-hpaya	1265	temple	medium
552		1266	inscription house	small
676	So-hla-wun-hpaya	1269	temple	medium

Item	Name or description	Date	Type	Size
677		1269	monastery	small
681		1269	stupa	small
675		1269	temple	small
600	Maung-yon-gu	1271	temple	small
489	Tuyin-pahto-kyaung (north)	1273	monastery	medium
665		1274	monastery	medium
664	Ma-la-phyi-hpaya	1274	temple	large
555	Tha-man-hpaya	1275	temple	small
1439	Mingla-zedi	1285	stupa	very large
487	Tuyin-pahto	1289	temple	medium
1998	Ein-da-pyit-saya-hpaya	1292	temple	medium
610	Sa-thin-gu	1299	temple	medium
896	A-deik-htan-hpaya	1310	temple	medium
697	Hsin-byu-shin-hpaya	1330	temple	large
918	Thisa-wadi	1334	temple	large
709		1342	inscription house	small
299	Tain-hsaung-kyaung	1408	monastery	medium
225	Mya-daung-ok-kyaung	1442	monastery	medium
367	Khe-ma-wa-ya-hpaya	1445	temple	small
22	Hti-taw-kyauk-sa-gu	1768	inscription house	small
2162	Ananda-ok-kyaung	1785	monastery	medium
2121	Upali-thein	1794	ordination hall	medium
62	Pitakat-taik	1824	temple	small
95	Aung-mye-bontha	1872	stupa	medium

Attributed dates: extending the timescale.

The dating of Bagan is beset by a major historiographical issue, the application of the Mon paradigm (page 39) which effectively attributes all buildings to the mid 11th century or later. The *Inventory of Monuments* lists 44 buildings as possibly dating to the 11th century, but whenever it gets more specific than this, it estimates a date at the later part or end of the 11th century. All buildings treated in this way carry a reference to Luce, and appear to follow his chronology. Luce, despite his commitment to the Mon paradigm in analysing building styles and artistic content, actually suggests that half a dozen of the 11th century buildings might precede AD 1057 (Table 14) as do various other sources ranging from chronicle stories to inscriptions. Dates from a variety of sources outside the stricture of the *Inventory's* recorded epigraphs suggest that a timescale at Bagan that goes back into the mid 10th century. These will be examined in detail, then the spatial patterning of the putative early buildings that are within the Bagan monument zone will be examined, and suggestions will be made as to which areas of the city, or which specific structures, might best lend themselves to investigation of the origins of construction. For the purposes of illustration in the graph (Figure 155) the equivalent of 8 small monuments, or one medium size monument, has been attributed to some of the events involving construction where the dimensions of the buildings are not clear from the references. The list which is examined below in chronological order includes construction activities initiated by Bagan at other locations, plus historical incidents that are credited to the period before the mid 11th century. Buildings or events that are used as examples on the graph are shown in bold type.

- Radiocarbon dates at the Otein Taung pottery mounds within the present Bagan monument area suggest craft activity, presumably servicing a settlement, within the date range AD 770-890 at 68.2% probability (page 206).
- The **Patho-hta-mya** (1,605), a large temple within the southern wall of Bagan, is one of **five buildings** traditionally attributed to King Saw Rahan (*Pictorial Guide to Pagan.* 1963: 26; Myat Min Hlaing 2002: 32) who is said to have reigned AD 956-1001. Strachan suggests the early 12th century for the Patho-hta-mya (Strachan 1989: 54-56) while Luce dates the building to c. AD 1080 due to its Mon writings and paintings, which are based on Buddhist texts that Luce says could not have reached Bagan from Sri Lanka until the end of Anawratha's reign (Luce 1969: 302-309, Volume 1). If the constraints of the Mon paradigm are removed, the Saw Rahan buildings can be returned, for the purposes of this exercise, to Saw Rahan's reign. In the absence of specific dates, the equivalent of a medium sized building has been tentatively attributed to each decade of this period.
- Luce accepts the attribution of a now-lost ***sima***, or ordination hall, on top of Tuyin Taung to Saw Rahan, with the *sima* originally dated "about" AD 1000 (Luce 1969: 283, Volume 1). This is taken here as being building **2,218**, which is undated by the *Inventory*. The surviving medium size platform has a modern stupa and pavilion built on it.
- The Bu-hpaya (1,657), estimated as 11th century in the Inventory, is suggested by Luce as being "pre-Burman" (Table 14).
- In AD 1003-1004, according to copies of inscriptions, the **Hngetpittaung** monastery (180), east of Nyaung-u, plus a **cave temple** and another **monastery** were built, while land was dedicated to a third **monastery** (Duroiselle 1921: 2). Duroiselle, it should be noted, was doubtful of the accuracy of some of the dates on the copies he listed (ASB 1917: 16-17; Duroiselle 1921: vi).The Hngetpittaung complex has strong folkloric links to the stories of Pyusawhti (Bo Kay 1974: 23-24).
- In AD 1004, Chinese records note a P'u-kan embassy to the court of the Song emperor at Kaifeng (Singer 1990: 109) with nine missions recorded up to 1061 and another in 1106 (sources quoted in Aung-Thwin 2004, Chapter 7). Tribute missions such as these have been suggested as indicative of a regime seeking external recognition to bolster its authority and enforce its claims to legitimacy, rather than necessarily demonstrating direct Chinese control (Smith 1979b).
- In AD 1016-1018 inscription copies mention the construction of a **Shwethandaung pagoda** at Inle Lake and a **Puttalin pagoda** at Bagan, the latter presumably named for the settlement now anglicised as Budalin, in the Chindwin district (Duroiselle 1921: 3). The Potta-lin (1,593) stupa just inside the city wall at Bagan, near the Tharawat gate, is estimated as 12th century by the *Inventory of Monuments* (Pichard 1992-2002: 222 Vol 6).
- In AD 1035, a mission from Bagan left an inscription on a copper-gilt **umbrella at the Mahabodi temple at Bodhgaya**. There were subsequent visits recorded in 1079 and 1086 according to the most recent reading of the dates by Aung-Thwin (2004, Chapter 8). The **1086 Bodhgaya mission**, led by a senior monk, was sent to restore the temple and supply it with a permanent work force and income from land, as described afterward in Kyanzittha's Prome inscription of 1093 (Duroiselle 1960: 163-164). In the light of the description, the equivalent of 40 small monuments worth of construction material has been attributed to this effort.
- The **Myinkaba-zedi** (1,328) is dated by Luce to shortly after the accession of Anawratha in AD 1044 (Luce 1969: 259).

- A Letthe-she pagoda is mentioned in an original inscription dated AD 1058 (Duroiselle 1921: 5). Also in AD 1058, an inscription attributes a building called **Lak Sai Rhe Bhura** to Anawratha (Nyein Maung 1972-1998: 321 Vol 1, translation courtesy of Michael Aung-Thwin). Given the coincidence of date, these are plotted here as one instance rather than two.
- In AD 1067, an inscription attributes a temple built at Bagan to the donor Manuha (Nyein Maung 1972-1998: 322 Vol 1, translation courtesy of Michael Aung-Thwin). This is taken as being the **Ma-nu-ha-hpaya** (1,240).
- The *Inventory* places the **Naga-yon-hpaya** (1,192) in the "late 11th century". This appears in the graph attributed to the decade 1080-1090.
- An inscription of AD 1081 attributes a building at Bagan to the donor **Ton Kha Ci**, and an inscription of AD 1082 attributes construction at Halin to the donor **Man Ba Trya** (Nyein Maung 1972-1998: 324-332 Vol 1, translation courtesy of Michael Aung-Thwin)

It is illustrative of the difficulty of dating Bagan that of the 18 structures defined by the *Inventory* as "very large", and therefore consuming the most resources at least by volume, only four, the **Dhamma-yan-gyi**, **Sulamani**, **Dhamma-yazika** and **Mingla-zedi** can be dated with epigraphy. The sample presented here excludes the "Kyanzittha palace" (1,590), which is attributed to the 11th to 14th centuries, and the city wall (1,634) which is attributed to the 12th to 14th centuries, as their entries in the *Inventory* represent ongoing construction. Their recurrent appearance in the *Inventory* accounts for the total of 23 "very large" buildings rather than 18 over the 11th to 14th century period (Table 12). The sample also excludes the Hmya-tha-umin (171), the Thami-hwet-umin (172), monastery 745 on the north side of the Sulamani and monastery 1,371 south-east of the Minglazedi, because they are either underground structures or monastic cells spread over a wide area which is predominantly non-construction space. Despite fitting the *Inventory's* definition of "very large" based on site area they do not represent the same commitment of resources as the big temples and stupas. This leaves for inclusion eight more "very large" buildings which do represent a substantial expenditure of resources.

- The **Shwe-hsan-daw** (1,568) is nominated as 11th century by the *Inventory*. It is widely attributed to Anawratha (r. 1044-1077) and linked to his visit to Sriksetra (*Pictorial Guide to Pagan.* 1963: 32; Bo Kay 1974: 47; *Glimpses of Glorious Bagan* 1996: 33). Votive tablets bearing Anawratha's name have been found there, some used as part of the inner construction, bonded into the brickwork. There were also fragments of glazed Jataka plaques. There is a series of brick chambers within the stupa (Strachan 1989: 42-44) which would have allowed regular deposition of votive offerings. It has been suggested that this stupa was the principal place of worship for Pyu residents of Bagan (Than Tun 1978: 6; Frasch 2002: 69). It is allocated here to the decade 1060-1069 of Anawratha's reign (Luce 1969: 261 Vol 1).
- The **Shwezigon** (1) is attributed by the Inventory to the "late 11th century". It has been tentatively allocated to the decade 1080-1090. Burmese tradition attributes the beginning of construction of the Shwezigon to Anawratha in 1076 (*Inventory of ancient monuments* 1998: 1-4) or even earlier. According to the *Brief History of Bagan* "in the year of 163 Buddhist Dispensation Era, corresponding with Myanmar Chronological Era of 419 (AD 1057), on the 10th waxing moon of Da-boh-dwae, corresponding with February, on Thursday and when the moon was shining along with Kyatt-bi-ka constellation, at the times when the crab zodiac sign is at its lag, from the astrological point of view, King Anawratha built the great golden pagoda of Shwezigon after enshrining the frontal bone, the left collarbone and a duplicated form of the sacred tooth-replica of Gautama Buddha. The sacrosanct relics are imperishable, kept in a gem-studded casket" (Hudson 2003b: 124).

- The *Inventory* places the **Ananda** (2,171) in the "early 12th century" although traditional accounts say 1090 (*Glimpses of Glorious Bagan* 1996: 16; Hudson 2003b: 126) The *Inventory's* more conservative estimate is accepted here, and the period 1111-1119 is suggested.
- The **That-byin-nyu** (1,597) is attributed to AD 1144, in the reign of Alaungsithu (Bo Kay 1974: 39; Myat Min Hlaing 2002: 8).
- The **Gawdawpalin** (1,622) is attributed by the *Inventory* to the "late 12th century". Tradition says it was built after the Sulamani, which dates to 1183, in the AD 1174-1211 reign of Narapatisithu (*Glimpses of Glorious Bagan* 1996: 29; Hudson 2003b: 128). It has been allocated to the period 1190-1199, although a later date during the reign of Narapatisithu, 1203, with completion in 1226 by Nadaungmya has also been suggested (Bo Kay 1974: 42).
- The **Hti-lo-min-lo** (1,812) is attributed to Nadaungmya whose regnal dates are AD 1211-1234 (*Pictorial Guide to Pagan.* 1963: 10; Bo Kay 1974: 31; *Glimpses of Glorious Bagan* 1996: 13; Hudson 2003b: 128). The *Pictorial Guide* dates it to "about" 1211, and it is allocated to the decade 1210-1219.
- The **Sitana-gyi-hpaya** (987), a stupa on the southern extremity of the Bagan monument zone with a decorative frieze of elephant heads around the base, an access corridor to a central inner area and extensive deposits of votary tablets, is considered 13th century "or earlier" by the *Inventory*. It has a Sri Lankan style square crowning block above the dome. It is mentioned in an inscription of AD 1248, which provides a *terminus ad quem* or upper limiting date (Luce 1969: 235, Vol 1 footnote 69). The *Brief History of Bagan* (Hudson 2003b: 128) attributes it to Nadaungmya (r. 1211-1234), as does Bo Kay (1974: 62) and on this basis it has been tentatively assigned to the middle decade of his reign.
- The **Pya-tha-da-gyi** (803) was completed structurally, though with no upper storeys apart from a small building on an otherwise flat roof. It was left undecorated. The *Inventory* attributes it to the 12th century, but chronicle accounts attribute it to King Kyazwa, who reigned AD 1235-1249 (Bo Kay 1974: 51-52). Luce attributes it to King Kyazwa in 1248 (Luce 1969: 252, Volume 1) and this date is tentatively accepted, modifying the *Inventory* entry. Failure to complete the building in the mid 13th century might have been directly due to the death of the king, but it might also be seen as symptomatic of the over-commitment of resources to construction and maintenance during that period (Aung-Thwin 1985; Hudson 1997: 101-103).

When this data is represented graphically (Figure 155) it shows that the commitment of resources to very large buildings, structures that one would expect to be sponsored at the highest level of the élite at Bagan, is spread evenly over the period AD 1060-1290. The dedication of resources to substantial monuments during the early phase of an urban centre has been proposed as an indicator of a move to "consolidate new social, political and economic formations" (Trigger 1990: 128) and it can be suggested that this is such a phase, fuelled and extended over more than two centuries by Buddhist merit-making and lasting until resources became over-committed in the 13th century. Going on Trigger's general model, the consolidation of authority and economic power at Bagan and the commencement of construction of large monuments can reasonably be accepted to have occurred in the middle of the 11th century, confirming the broad thrust of the historical account, if not its details. However if this activity is to be viewed as consolidation, then there should, unless population and resources suddenly appeared as a result of migration, be evidence of earlier unconsolidated settlements and economic activities. As the graph shows, there are indications from a number of sources that construction of monuments at Bagan, and by Bagan both in India and in other parts of Myanmar, predated the mid 11th century. It has already been demonstrated (page 206) that settlement and craft activity at Otein Taung was getting under way in the 9th century, and

was well established on the eastern mound by the 10th century, making Otein Taung perhaps part of a group of early settlements whose religious monuments or other remains may be identifiable beneath the palimpsest of Bagan. The next section will suggest where these buildings and settlements may have been, or where their remains may still be, and one specific building will be nominated as an important candidate for investigation.

Table 14 Buildings at Bagan attributed to the 11th century by the *Inventory of Monuments*..

Inventory number	**Name**	**Type**	**Size**	***Inventory of Monuments:* specific comments**	**Luce attribution and comments from *Old Burma, Early Pagan* Volume 1**
1	Shwe-zigon	stupa	very large	Last quarter	AD 1086 (p 267)
12	Hsutaung-pyi-hpaya	temple	small	End	
34	Tho-kha-mauk-hpaya	stupa	small	Estimated	
46	Shwe-zedi-hpaya	stupa	small	Estimated	
74	Tawa-gu	temple	small	Estimated	
154	Kyauk-ku-umin	temple	large	Estimated	AD 1057-1060 (p 288-290)
*820		temple	large	(**Redated from 12th century by Archaeology Dept 2001*)	
996	Paw-daw-mu	temple	medium	Estimated	
1023	Loka-nanda	stupa	large	Estimated	
1030	Hpet-leik (east)	stupa	large	Estimated	Originally **pre-Anawratha** (p 262)
1031	Hpet-leik (west)	stupa	large	Estimated	Originally **pre-Anawratha** (p 262)
1059		stupa	small	Contained Anawratha votaries	
1179		stupa	small	Estimated	
1192	Naga-yon-hpaya	temple	large	Late	AD 1090 (p 311)
1193	Po-daw-mu-hpaya	stupa	small	Estimated	Late
1198		stupa	small	Late	AD 1090 (p 279)
1202	Abe-ya-dana-hpaya	temple	small	Late	Kyanzittha's Indian Queen (p 222-224)
1236		stupa	small	Late	AD 1090 (p 279)
1239	Nan-hpaya	temple	medium	Estimated	AD 1060-1070 (p 286-289)-attributed to captive Mon king.
1240	Ma-nu-ha-hpaya	temple	medium	?	AD 1060 (p 286)-attributed to captive Mon king
1328	Myinkaba-zedi	stupa	medium	Estimated	AD **1044** according to Anawratha chronicle story. (p 259)
1339	Paung-ku-hpaya	stupa	large		Anawratha (p 294-296)
1493	Myin-pya-gu	temple	large	Late	Anawratha or Caw Lu (p 292-294)
1565		temple	small	?	Early Ava period
1567		temple	medium	?	
1568	Shwe-hsan-daw	stupa	very large		AD 1060 (p 261)
1569		temple	small	?	
1570	Shin-bin-thalyaung	temple	large		Anawratha (p 285-286)
1587	Pitakat-taik	library	medium	Chronicles link to Anawratha	AD 1057 Built for Thaton booty. (p 285)
1590	"Kyanzittha" palace	palace	very large	11th to 14th century (ongoing)	Construction: AD 1101 (p 269)
1600	Nat-hlaung-kyaung	temple	medium		**Pre-Anawratha - Saw Rahan?** (p 283)
1603	Nga-kywe-na-daung	stupa	medium		Possibly Kyanzittha (p 258-259)
1605	Patho-hta-mya	temple	large	Late	AD 1080 (p 303)
1653	Pebin-kyaung-patho	temple	small		**Pre-Anawratha** (p 283-5)
1657	Bu-hpaya	stupa	small	?	**Pre-Burmese** (p 239)
1662	Gu-bi-za-gyi	temple	large		Pre-Kyanzittha (p 283)
1924	Min-o-chan-ta	stupa	small		AD 1110 (p 276)
1925	Min-o-chan-ta group	stupa	small		AD 1110 (p 276)

Inventory number	Name	Type	Size	*Inventory of Monuments:* specific comments	Luce attribution and comments from *Old Burma, Early Pagan* Volume 1
1926	Min-o-chan-ta group	stupa	small		AD 1110 (p 276)
1927	Min-o-chan-ta group	stupa	small		AD 1110 (p 276)
1928	Min-o-chan-ta group	stupa	small		AD 1110 (p 276)
1930	Min-o-chan-ta group	stupa	small		AD 1110 (p 276)
2217	Tuyin-taung-zedi	stupa	medium	Traditionally linked to Anawratha	
2241	Mya-kan stone library	mound	medium		Kyanzittha (p 345-6)

Predicting the location of earlier buildings.

One of the aims of the hinterland survey (page 189) was to try to illuminate some possible trajectories toward settlement at Bagan. On the available evidence, the idea that there were nineteen specific founding villages across the region, of which eighteen, as shown in Chapter 6, have some claim to pioneer status on the basis of folklore or the presence of undifferentiated archaeological remains, is untenable. However, the architectural and archaeological evidence does point to the agglomeration of a number of settlements at Bagan. In the 11th century, according to the dates for the city's buildings proposed in the *Inventory*, monuments were constructed along the riverside from the Kyauk-ku-umin down to Thiripyitsaya, a distance of 15 kilometres. The initial patterning (Figure 156 & Chart 7) suggests that several local centres may have been involved in the move to monumentality. Two of the areas credited in the *Inventory* with 11th century buildings can considered to be specialist religious localities and less likely to have "belonged" to a local community. These are the Kyauk-ku-umin, which sits in what Forchhammer described as an "almost unapproachable ravine" (Forchhammer 1964: 1) along the riverbank north of Nyaung-oo, and the Mya-kan stone library and Tuyin-taung stupa southeast of the city. This leaves four reasonably distinctive clusters of monuments that may represent individual settlements. These are, from north to south, the area around the Shwe-zigon, the area inside and south of the city walls, the cluster two kilometres south of this around Myinkaba, and the cluster a further three kilometres down the river near Thiripyitsaya and the Loka-nanda. In the light of the subsequent clustering of monuments around the central group, within and outside the extant walled enclosure, it could be suggested that construction may have been encouraged by this central group to draw other communities further into monument-building behaviour, and thus increase social cohesion under central sponsorship. The physical consequence was that, as indicated by the patterning of monuments by the twelfth century (Chart 7), buildings began to cluster around what may by then have become the administrative centre, and the city did not grow up or down the river much beyond the vertical limit that had already been defined. By the thirteenth century, the area around what is now called "Old Bagan" had become so densely packed that new nodes developed several kilometres to the east (Chart 7) at the largely monastic centres of Minnanthu, just past the Otein Taung earthenware mounds, and the area around the Dhamma-yazika stupa. Construction in the 14th century infilled the city even further (Chart 7). The *Inventory* indicates that during the 13th century there was a significant upsurge in the building of monasteries and associated small structures (Hudson 1997). This cycle has been linked both to dwindling economic resources, hence the smaller buildings, and to a broadening of monastic influence, hence the clustering of the buildings around monastic complexes and often within walled monastic compounds (Aung-Thwin 1985). Changes in the religious or social constraints on donors of religious buildings in this period might also have been a significant element in the construction of these small buildings. It was suggested in Chapter 6 that a broadening of the parameters of donor activity may be seen in the construction of small monuments around Otein Taung in the 13th century.

Given that the historical attribution of the buildings at Bagan to the mid-11th century or later relies on the Mon paradigm, which is now under question, the dating of the site is up for reassessment (Hudson 2003d). There are only 77 published dates for the 12-14th century period, the great majority in the 13th century. There are also potentially around 50 dates not yet published, from foundation stones unearthed during recent restorations, although not all these stones bear dates. Two which were in the process of being excavated were read in the field by the author and Nyein Lwin in 2004 as dating to the 13th century.

There is no point replacing suspect dates claimed under the historical account with the untested claims of tradition, which at times go back to the 3rd century AD (*Pictorial Guide to Pagan.* 1963: 29). If there are earlier buildings than the *Inventory* allows, which would confirm some of the traditional accounts, the question arises of where they could be expected to be. Any of the areas containing buildings currently considered to be earliest, at Otein Taung, in and around the walled centre, at Myinkaba, and around the Lokananda pagoda and the putative founding village of Kyaussaga, could provide evidence of buildings or other settlement activity preceding the mid-11th century. In the previous section, the discovery of likely Bagan period structures, previously unknown, at the lowest known level of the 2003 "Anawratha palace" excavation was described. These will be difficult to investigate further as the site has been turned into an open-air museum. The area around the Shwezigon is within Nyaung-u town limits, and an active pilgrimage site, and the early buildings at Myinkaba similarly sit within a dense housing and commercial area. One of the more accessible areas for future investigation of an early sub-settlement is the southern extremity of the monument zone (Chart 7 & Figure 156).

Thiripyitsaya/Kyaussaga: an early sub-settlement?

The south end of the monument zone contains several buildings attributed to the 11th century (Chart 7, Table 14, Figure 159 & Figure 158). Part of this area is included in a land grant for the Tanggyi-taung tooth relic pagoda, on the west side of the river. A Konbaung period inscription of AD 1763 refers to an earlier inscription granting land, and a Konbaung marble pillar marking the southeast corner of the grant is still in situ (E 94.85133° N 21.12145°). The area involved in the donation covers both sides of the river (Figure 157). Farmers living within this area were to give one tenth of their income to maintain the pagoda. The Konbaung period document traces the royal instructions back from King Mindon to Bodawpaya, Thalun (donor of the Kyaung Mu Daw pagoda at Sagaing), Mohnyin-min (r. 1426-1438, and named anachronistically in the document as donor of the 13th century Sitana-gyi at Bagan- perhaps he repaired it), Alaungsithu and Kyanzittha to Anawratha (Ar Seinna). In this area there are also some clusters of as-yet-unexcavated circular mounds marked with fossilised wood which may be a cemetery (see page 78). In 2002 the author surveyed a pottery production site in this area, a mound 40 metres long and more than two metres high, 150 metres south-west of the Tha-wa-ya-te-hpaya (998), which would lend itself to future investigation, including AMS dating.

The historical geographer Lubeigt has suggested that two linked, rectangular tanks near the Lokananda formed a port, entered from the Yeosin Chaung, and was one of several ports that included Nyaung-u, Wetkyi-in and Myinkaba (Chart 7). He suggests that the Lokananda area, being furthest south, may have received merchants and goods from down river, perhaps including India and Sri Lanka (Lubeigt 1998: 99-108, and map in end papers). The rectangular tanks at the Lokananda and further north at Myinkaba, another area with early buildings, would appear to be superfluous as reservoirs, since they are only metres from the Ayeyarwady. The possibility that they were used as ports at a time when the river was higher is worth investigating, and would give

these areas an increased significance in the Bagan economy. However it could be argued that digging out a permanent quay where river height fluctuated annually may have been superfluous when the same result could be obtained by pulling boats directly alongside the riverbank or against a pontoon, or rafting several boats to one nearest the bank, as is done today. There is a possibility that what are now sedimented tanks were originally brick pits used as a source of clay. This issue remains unresolved. However in this area is also one of the most uncharacteristic structures at Bagan in terms of its shape, its construction material, and some of its iconography, temple 996.

Temple 996.

Structure 996, which has been called the Paw-daw-mu (recently uncovered) or Gu-byauk (decorated), simple descriptive titles that are no indication of an original name, consists of two temples, one covering the other (Figure 160). They were partially excavated and conserved by engineers from the Archaeology Department between 1995-2002, but no analysis or report was done, and the origin of artifacts recovered is unrecorded. The bases of both buildings are buried 80 centimetres below the present ground level. This can be measured because a tunnel dug by treasure hunters on the north side goes through and under both structures. The lower torsos of brick Buddha images can just be seen at ground level on two projections on the east side. Brick and plaster Buddha images in caitya niches on the outside wall (Figure 161) would have been at a religiously acceptable eye level height before the surrounding area was filled in. The top of the inner building has been exposed and covered with a roof for conservation (Figure 163). The visible upper part of the inner building has slumped heavily toward the east, along with its casing of later bricks, suggesting that the motivation for constructing the outer temple over the inner one was not the collapse of the earlier building, as both seem to have collapsed together. The inner building carries ornate stucco (Figure 162), and has niches containing sandstone Buddha images at what would originally have been head height from the ground. The remains of six of these images are stored on site, and at least two remain in situ, partially visible through openings in the outer wall (Figure 164). A votive tablet recovered during the conservation of the site bears the regnal name of the son of Anawratha, King Sawlu (r. 1077-1084). The text reads “this votive tablet was done by King Sri-wajara-barana to stop the samsara, by his hand” (translated by U Aung Kyaing, 2003). The votive is now in the Bagan museum. One unusual feature of the stucco on the top of the north lintel of the inner building (Figure 163) is an anthropomorphised *naga* or snake (Figure 165), which brings to mind the early snake cults of south and southeast Asia (De Casparis & Mabbett 1999: 285).

The building seems to have been decorated with glazed fittings (Figure 166), but as mentioned above, the provenance of finds is poor. One unusual feature is a very simple, almost cartoonish *bilu*, or ogre head (Figure 166). Several of these were found. The first accurately dated *bilu* appear in low relief stucco on the Kubyauk-gyi (1323), which was dedicated in AD 1113 (Pichard 1992-2002: 244 Vol 5). These are a common decorative element across southeast Asia. The examples from 996 seem to have no counterpart among the other much more stylised *bilu* at Bagan (see, for example, San Shwe 1998). Another unique feature of 996 is the range and variety of stamped bricks. Circular figurative stamps 4 to 5 centimetres diameter include stupas (Figure 112), flowers (Figure 167) and birds (Figure 113). These stamps do not appear to have been found on bricks at any other building at Bagan. Flowers are among the auspicious symbols of Buddha (Sailer 1999) and floral design is a characteristic of Bagan art (Bautze-Picron 2003: 119-155). Fingermarked bricks, widely found at Bagan (see page 247) also occur at 996, including examples that may bear the Burmese letters Ka-gyi ကြ and Ga-nge ဂ (Figure 116 & Figure 117).

This structure is unusual in terms of its plan, its decoration and its construction materials. Its survival has been helped by its out of the way location, and the fact that it was buried under debris

until quite recently. There is an intriguing note in the *Inventory* that a stone inscription was recorded as existing in 1901 but has since been lost (Pichard 1992-2002: 224 Volume 4). The Sawlu votary suggests that the building dates back at least to the 11th century, though there is no record to indicate whether the votary was linked to the earlier or later layer of the temple. The unusual features of this building suggest that it may be a good candidate for absolute dating to determine whether it predates its neighbours, and to what extent. Thermoluminescence dating of the bricks is one possibility. There is access to the bricks from both construction phases under the foundations. There are also bricks at 996 with vegetable matter mixed into their fabric (Figure 168), which could potentially be extracted for AMS dating.

The origins and periodisation of Bagan.

The radiocarbon dates for Otein Taung suggest that earthenware was produced by firing in the open in the 9th century, while by the 10th century firing had become focused on a regular spot, the eastern mound, where production continued until the 14th century. It was suggested in Chapter 6 that this, on the basis of ethnographic parallels with the current earthenware site at Taunggone, reflects specialisation on the part of those doing the firing, and a pattern of land occupation consistent with a village of potters. The absolute dates are supported by the revised dating of the Pyusawhti story to the 9th century (page 188). This compression of the traditional timescale coincides with the mid 9th century chronicle date for King Pyinbya and the construction of the city wall, but does not automatically support it. The Pyusawhti revision is historiographical, while the Pyinbya tale is a literal reading of the very document, the *Glass Palace Chronicle*, that was unpacked to create the hypothesis of a new timescale not for Pyusawhti the individual, if he existed at all, but for the entrenchment in folk memory of significant events related to settlement activity at Bagan, events that became embodied in the Pyusawhti story. Nonetheless, the 9th century AD can be proposed as a period in which further evidence of settlement activity at Bagan, beyond earthenware production, might be found.

In the review of the early urban central places and their periodisation (Chapter 5) it was suggested that there are chronological overlaps between the early urban sites and 11th century Bagan. If this is the case, and if the hypothesis of activity broader than earthenware production at 9th century Bagan is to stand, then there should also be evidence from 9th and 10th century Bagan. By the 9th century, as indicated by the extension of extramural activity at Sriksetra (page 137), it is likely that the characteristic brick enclosure walls with their inward-turning corridor gates were no longer in use, and therefore cannot be expected at Bagan at this time. A Pyu building feature that seems to have continued at Bagan was the use of fingermarked bricks, though this dataset needs to be viewed with caution. Aung Myint (Moore & Aung Myint 1993) some years ago noted the presence of fingermarked bricks at Bagan, as distinct from bricks scored or stamped in Old Burmese script with the names of donors or donor villages. The more widespread presence at Bagan of these distinctive bricks, which are also found in the Gulf and Peninsula (see page 121), has become evident during the past few years as hundreds of buildings were renovated or rebuilt (Hudson 2000b). Field survey of buildings under renovation at Bagan along with finds already recorded in the *Inventory of Monuments* has revealed more than 50 structures with bricks that carry fingermarked designs (Figure 169). However these bricks are found in buildings across the 11th to 14th century time span (Hudson, Nyein Lwin & Win Maung 2001; Win Maung 2001a) so they are not necessarily diagnostic of any particular time period. The 2003 excavations within the city walls (page 232) revealed what may have been recycled fingermarked bricks in one of the level 1 storehouses, a building that is probably only a few centuries old. A brick bearing a name in Pyu

script from Bagan (Figure 111), currently in the collection of the Universities Historical Research Centre in Yangon, suggests an overlap with the better known Bagan bricks stamped in Burmese script (Figure 114, Figure 115).

Earthenware vessels described as "Pyu" were found early last century at Myinpagan, south of the walled core, during the digging of a well at a depth of 8 metres (ASB 1917: 42). Of "elongated shape and antique pattern", they were identified by government archaeologists who, while not specifically seeking Pyu material at Bagan, would have been familiar with it from their excavations at Sriksetra. Pyu-style bronze Buddha images, reliefs and votive tablets including images of Maitreya, the Buddha of the future eras, have been found in relic chambers at Bagan. Pyu votives were found at the Shwe-hsan-daw (1,568), the Kya-zin-hpaya (1,219) near Myinkaba, in a temple "west of" the Sin-pahto (377) and a mound near the riverbank west of the Nan-hpaya (1,239) (Luce 1969: 100 Volume 1, Plates 443-444 Volume 3). Gutman (1996) suggests that the Maitreya artifacts may represent a Messianic-type cult that emerged in Sriksetra, and was continued, possibly by Pyu slaves or artisans, at Bagan. Frasch suggests that burial urns found under the Min-o-chan-ta stupa complex (1,924) east of the city wall indicate the continuing Pyu tradition of group burial at a memorial site, adapted to Buddhism by burying them under a stupa rather than the *pyu-taik* or platform characteristically seen at Sriksetra (Frasch 1996b Ch 1). All this suggests a long-term presence of people with "Pyu" skills and products, and the continuation at Bagan of cultural markers of the early urban system.

Summary.

There is an extensive complex of what appear to be secular buildings within the walled city at Bagan. Buildings exposed so far stretch along the south side of the main road through the old city, although there have also been isolated finds of brick pillar holes north of the road and of brick foundations and floors south of the A-twin-zigon pagoda complex (Chart 5). The buildings south of the road have been identified by the Archaeology Department and Ministry of Culture as the palaces of Anawratha and Kyanzittha, and have been attributed to the mid 11th to early 12th century. However there is no radiocarbon data that would support this. The eastern city wall of "Old Bagan" postdates deposits of ash which date broadly across the 11th to 13th centuries. Radiocarbon dates from the so-called "Kyanzittha Palace" indicate that the part of the complex that was dated is 13th or 14th century, later than the late 11th- early 12th century period of Kyanzittha's reign. The radiocarbon dates stretch across a broad timescale due to the calibration curve (Grave & Barbetti 2001). However a re-survey of the "Kyanzittha" site by the author in 2003 suggests that the radiocarbon dating is not representative of what are currently the lowest visible levels, and the origin of the complex remains an open issue.

In 2003, the excavation of a series of brick walls, floors and chambers west of the "Kyanzittha" site led to the declaration by the Ministry of Culture that the 11th century palace of Anawratha had been found. An analysis of this excavation reveals material which largely post-dates the Bagan period. Structures found at the lowest level of the excavation might be attributed to the Bagan period, but a precise timescale is yet to be determined. While in popular opinion in Myanmar the two excavated sites are incontrovertibly the palaces of the early kings, evidence presented to support this claim is based on misinterpretation of the archaeological data. At the same time, evidence that *could* support claims of an origin in the 11th century or even earlier for this complex remains to be tested.

A review of the given dates for the monuments at Bagan can sit at various levels of confidence. The epigraphy from known stone inscriptions places the beginning of construction in AD 1113. By

incorporating traditional dates, less secure inscription copies, and data from historical studies, a broader chronology can be obtained. This extended timescale posits a substantial commitment of resources to monument building from the mid-11th to late 13th centuries. It also raises the possibility that Bagan was involved locally and regionally in monument construction as far back as the mid 10th century. This begins to close the gap between the secure epigraphic dates of the early 12th century as provided by inscriptions, and the radiocarbon dates that indicate activity at Otein Taung as early as the 9th century, the latter being the period in which tradition asserts that the current walled city was founded.

A different approach to the foundation of the city comes out of a review of the earliest known buildings. It is suggested that several locations spaced a few kilometres from each other were involved initially in monument construction. These include the area now surrounded by city walls, the site of Myinkaba village, and the area at the south end of the present monument zone. An examination of surviving buildings such as the unique temple 996, and potential buildings that may yet be uncovered, requires a major revision of the dating of Bagan. The fact that major construction took place in the 12th and 13th centuries is not disputed. But the beginnings of monumentalism, though unsupported by any surviving epigraphy and until recently forced into a historical mould by the Mon paradigm, are likely to precede western history's given date of the mid-11th century, putting Bagan's origins in a cluster of settlements which included a 9th century earthenware production site.

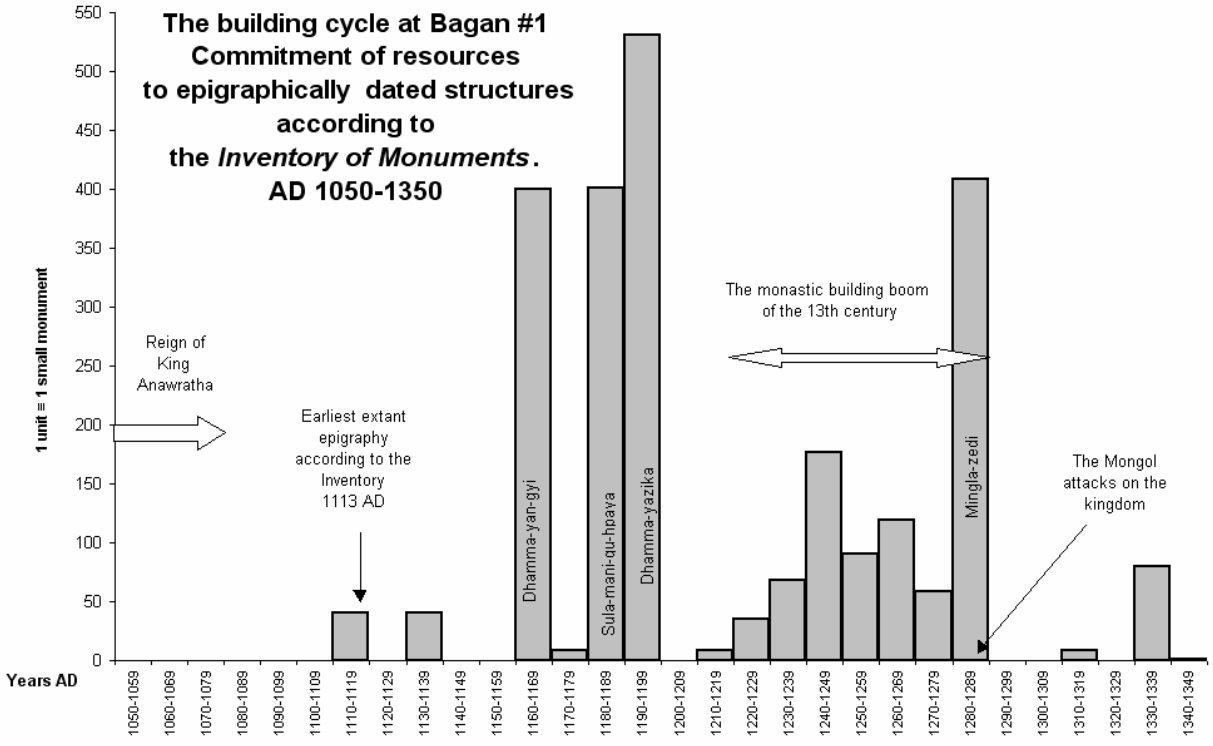

Figure 154 Building cycle at Bagan 1.

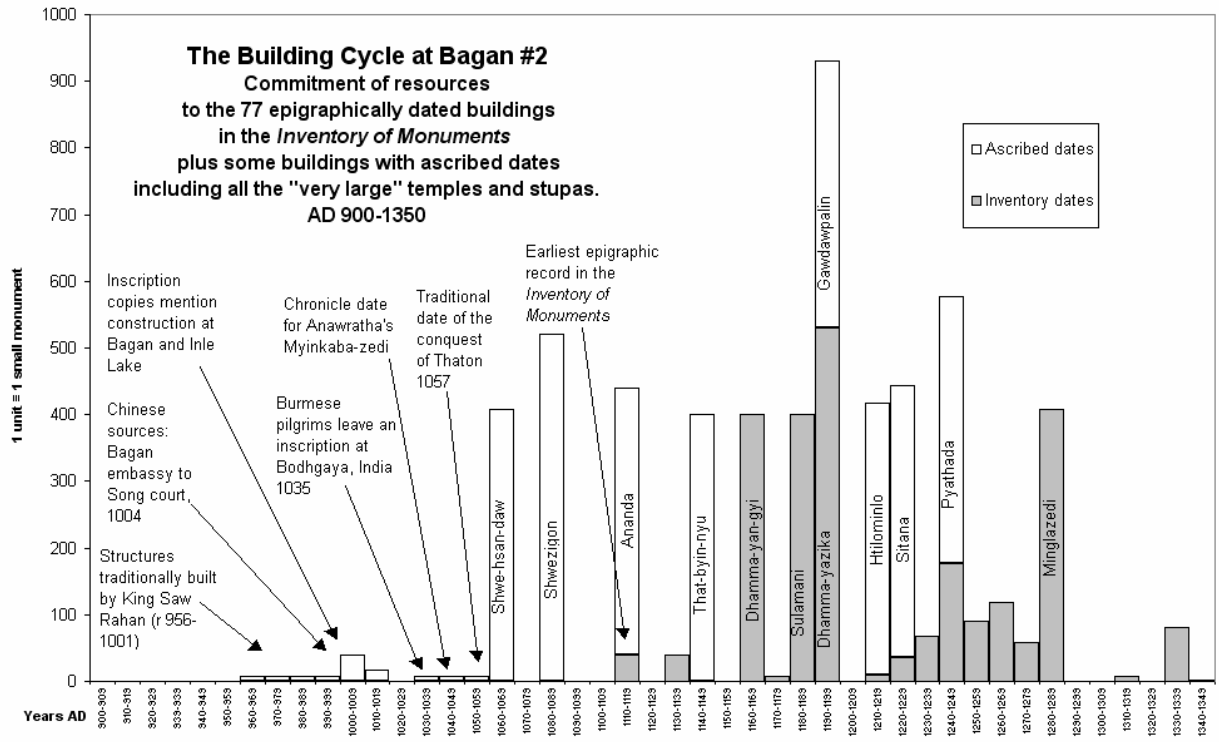

Figure 155 Building cycle at Bagan 2.

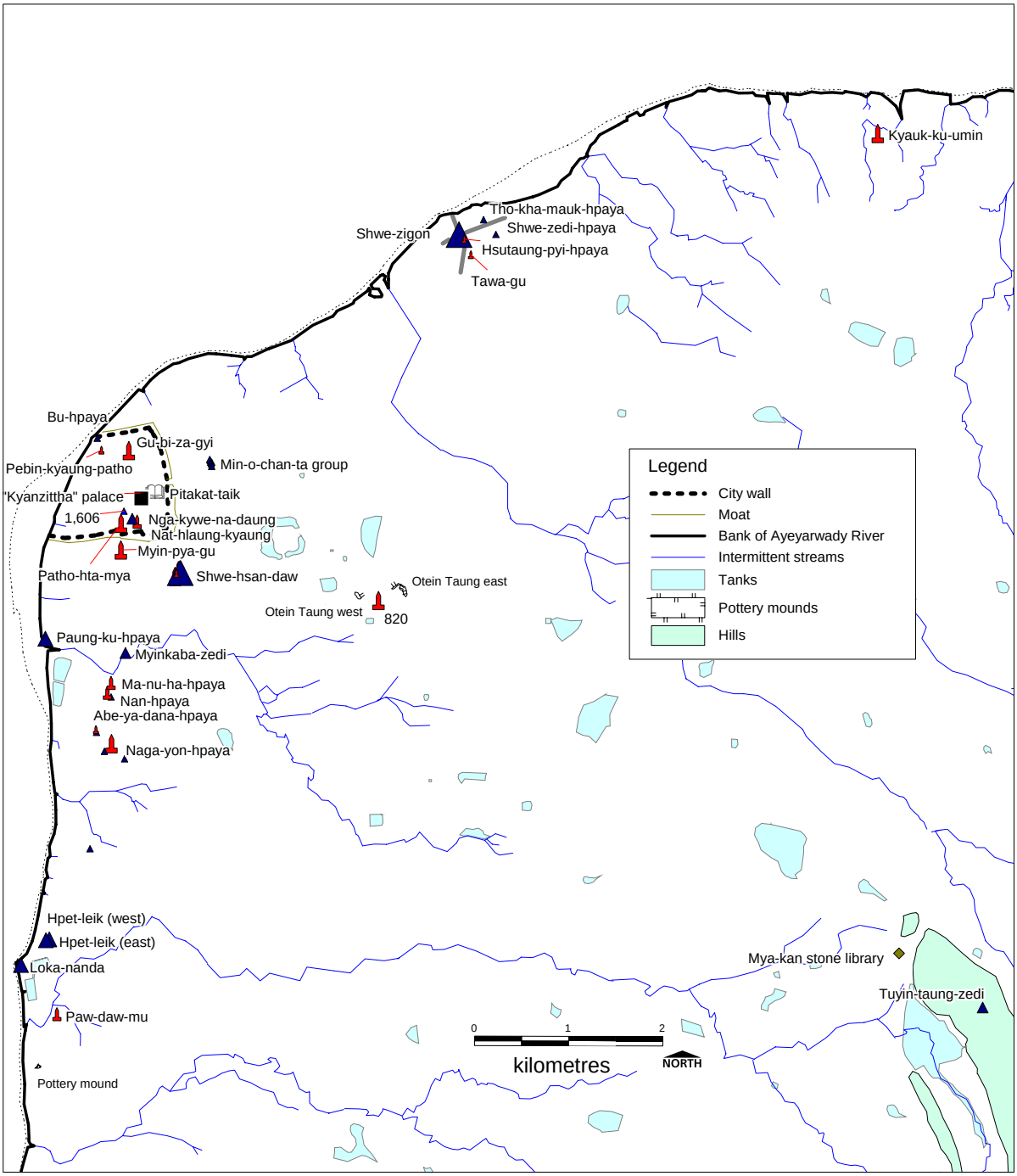

Figure 156 Bagan: location and identification of buildings linked to the 11th century.

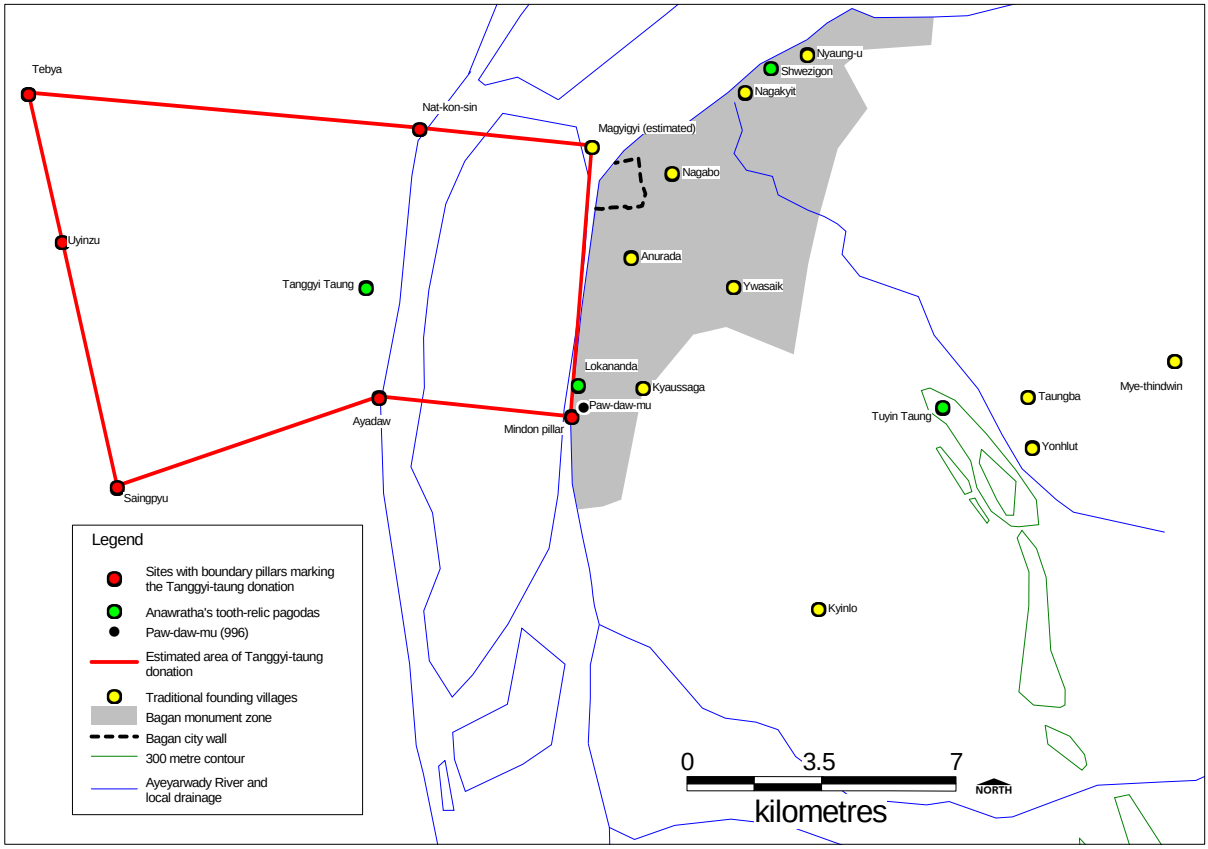

Figure 157 The Tanggyi-taung donation and the tooth relic pagodas.

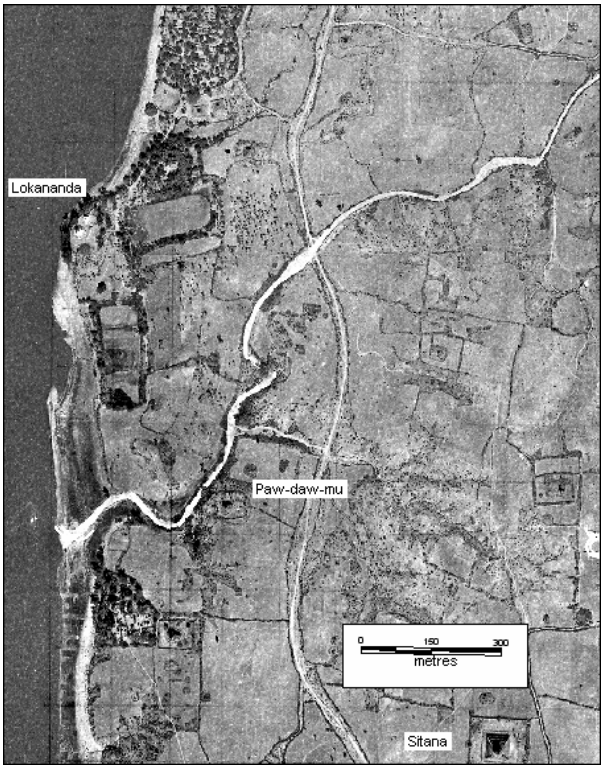

Figure 158 Loka-nanda to Sitana, aerial photo.

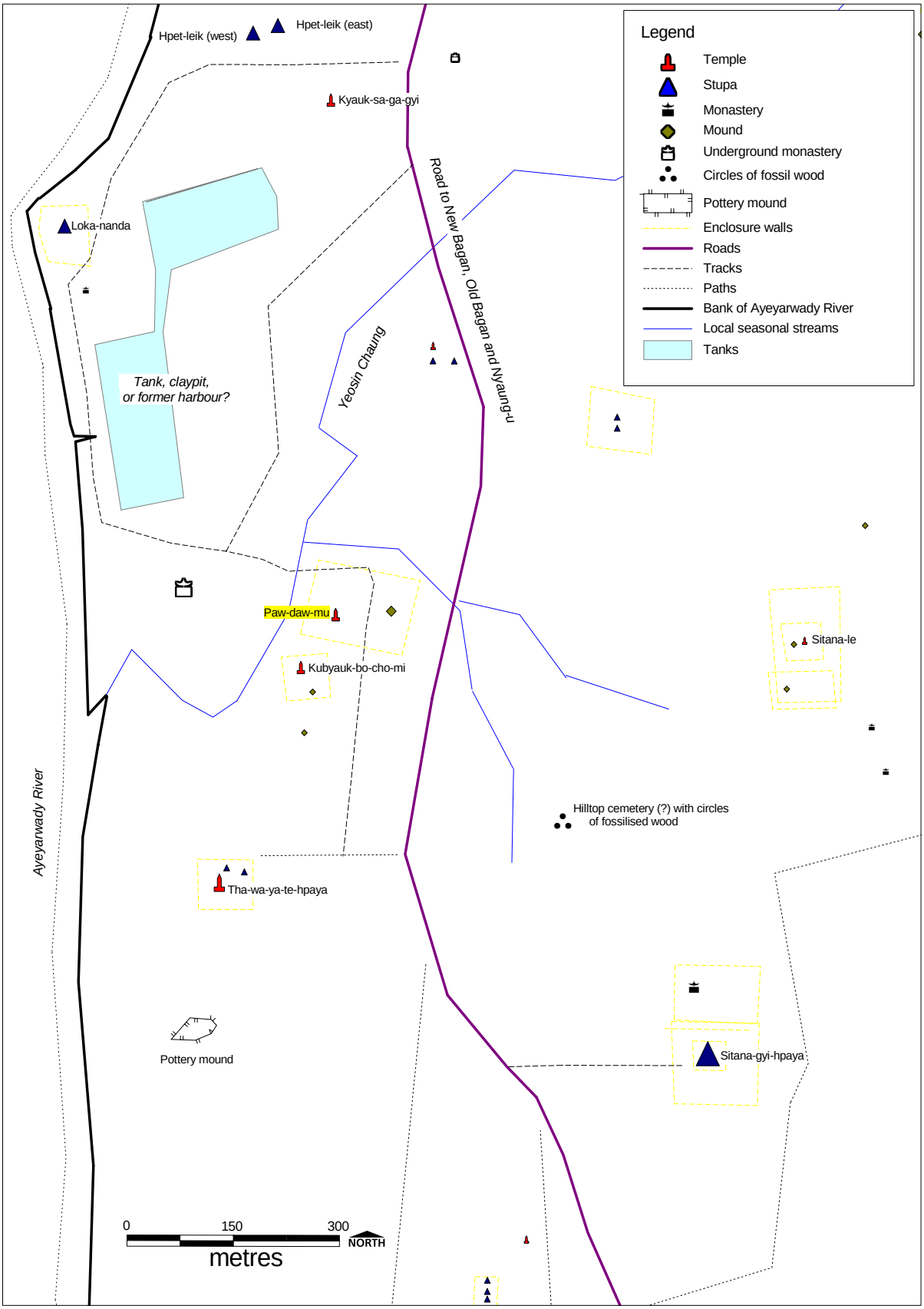

Figure 159 Bagan: Lokananda, Paw-daw-mu and southern river bank.

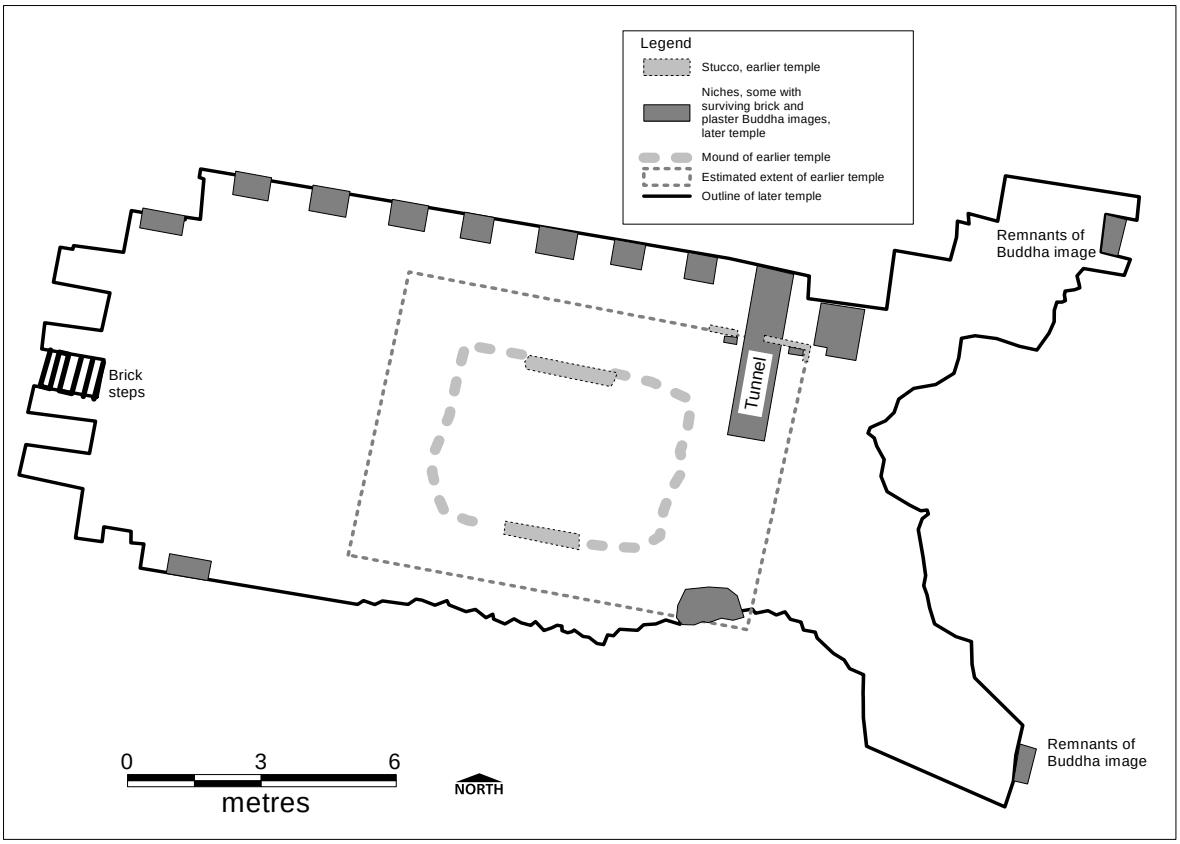

Figure 160 Paw-daw-mu (996): plan.

Figure 161 Paw-daw-mu, northwest corner. Top of earlier temple is sheltered by the tin roof.

Figure 162 Paw-daw-mu, stuccoed northeast corner of inner building.

Figure 163 Paw-daw-mu, inner building, north face (anthropomorphic naga at top left).

Figure 164 Paw-daw-mu, image in niche of inner temple.

Figure 165 Paw-daw-mu, anthropomorphic naga, detail.

Figure 166 Paw-daw-mu, bilu head and glazed fitting.

Figure 167 Paw-daw-mu: brick stamp with floral design.

Figure 168 Paw-daw-mu: brick with vegetable inclusions, detail.

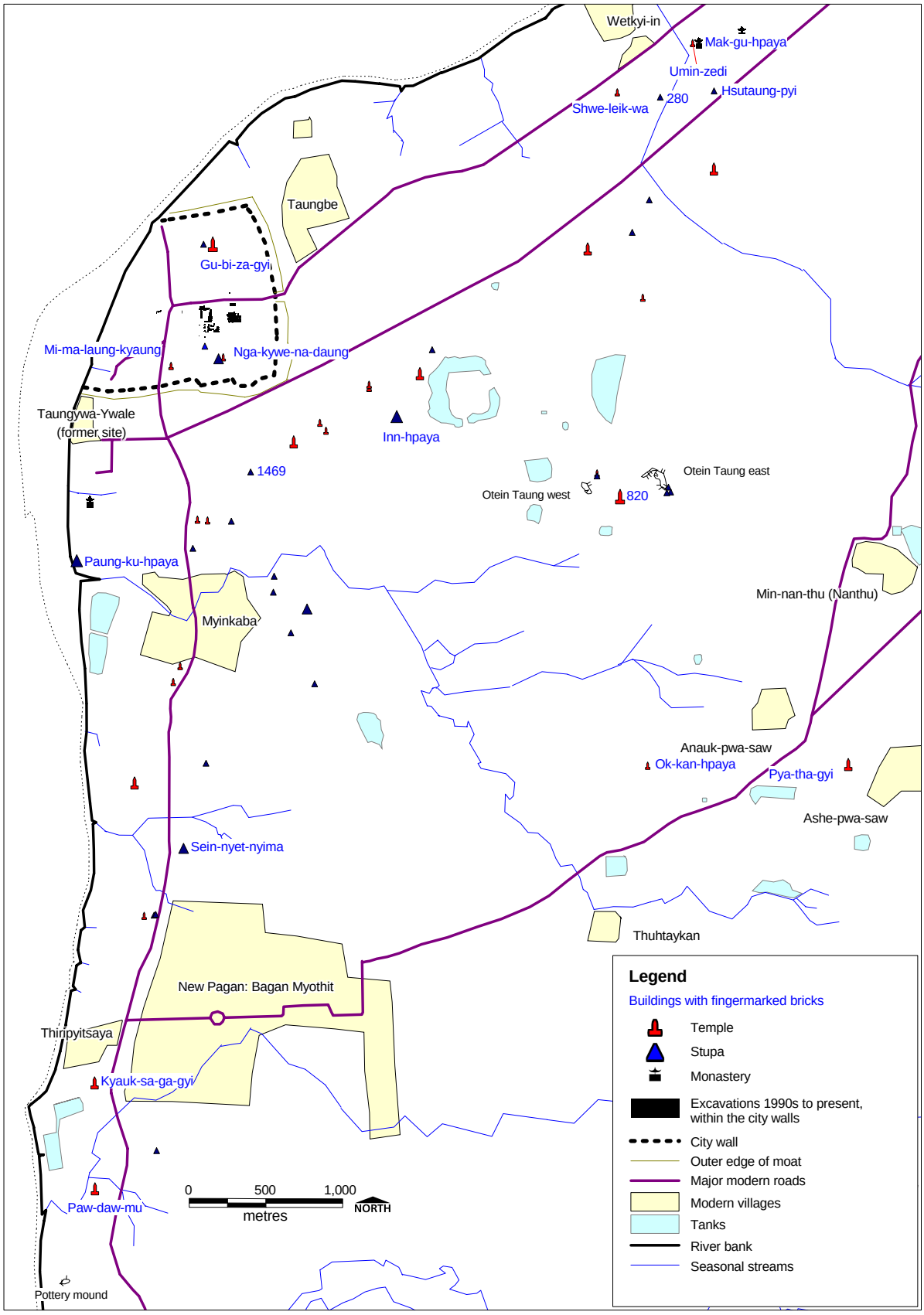

Figure 169 Bagan: buildings with fingermarked bricks.

CHAPTER 8. CONCLUSION. CONTINUITY IN A CULTURAL LANDSCAPE, FROM THE SAMON VALLEY TO BAGAN.

The archaeology of Upper Burma presents a picture of expansion from a core area in the Samon Valley in the Late Prehistoric period, with agricultural settlements spreading up and down the Ayeyarwady valley from the Samon in the early urban phase and encompassing much of present-day Myanmar by the end of the Bagan period. A system of small but economically dominant settlements appears in the Samon area from the middle of the first millennium BC. Across Upper Burma up to this time there is evidence of a common pre-iron culture whose artifacts include polished stone rings, bronze spear and arrow heads, bronze axes, burials involving megaliths and earthenware distillation bowls (Chapter 3). But a much broader range of artifact classes can be seen, according to the available evidence, in the Samon Valley and at Halin. These artifact groups are beaten bronze coffin decorations, bronze wire packets, bronze bracelets, bronze-handled iron swords, *symbolic* bronze spearheads, bronze bells, blue glass bracelets and carnelian tiger beads (Chapter 4 & Figure 170). The increasing economic wealth in the Samon Valley can be credited to the successful exploitation of natural resources such as agricultural land and minerals, and the dominance of trade routes. The expanding variety of grave goods seems to relate to social differentiation. Some individual burials, such as the burial excavated by the French team at Ywahtinkon (page 88), contain a range and quantity of goods far greater than those around them. The clustering of burials in groups to which coffins were added from time to time suggests a system of kin-based chiefdoms, with each group dominating a small, easy to manage village amid a network of similar villages densely packed on the landscape. Evidence such as the appearance of carnelian beads among the grave goods suggests that this society was functioning in the middle of the first millennium BC, when carnelian began to arrive in southeast Asia from India.

This is not a “Bronze Age” culture, despite the prevalence of bronze among the metal grave goods, although the earlier phases may well relate to the broader pre-iron culture across Upper Burma. In the Late Prehistoric phase of the Samon Valley, from around 500 BC, it is more a matter of “iron for hoe, bronze for show”. The adoption of iron for tools and weapons means increasing economic efficiency. Pottery with rice husk inclusions is part of the mortuary assemblages of the Samon culture, suggesting that rice agriculture was contributing to economic growth. The wealth resulting from this expanding economic efficiency is shown in imported bronze display goods such as a southern Chinese *sheng* flute from Myaukmigon, which may date to between the 3rd and 1st centuries BC (page 87). Carnelian tiger beads, which it has been suggested appeared from around 200 BC modelled on the Qin Dynasty tallies of China (page 83), seem to have been highly valued among the people of the Samon Valley, and were attractive enough beyond their local significance to appeal to people down the trade routes toward the Malay peninsula. There is anecdotal evidence of finds of tiger pendants at Hmawbi and Moulmein, near the mouth of the Salween. This data has not been considered firm enough to include in the database, but if confirmed, it would help fill out a picture of cultural similarities and contact between Upper Burma and peninsular/Thai sites that has already been suggested by the common use of fingermarked bricks and the distribution of coins bearing auspicious symbols. Some, but not all, of these symbols are derived from India. Further imports from China to the Samon Valley are hinted at by a putative Han Dynasty bronze horse from Pyawbwe (see page 83 & Figure 64).

The appearance of Chinese bronzes and the use of the Qin tally tiger as a model for carnelian beads suggests that the Late Prehistoric society of the Samon valley had active trade links with China as well as with India, the original source of carnelian beads. As far as can be seen, the carnelian tigers fell into disuse as items of personal decoration as the early urban system developed. Very few tiger beads seem to have been found at Pyu sites. There have been two reported at Halin, but Halin, it has already been suggested, was probably part of the Samon system, servicing it with salt and sharing the same Late Prehistoric archaeological signature. If the early urban system represented a society that was "under new management", and the tigers were marks of status in the old system, then it might be expected that most tigers should be found in Late Prehistoric contexts in the Samon Valley apart from a few that were traded elsewhere. Any regional trade in the tiger beads may have been related to their value as objects rather than as symbols.

The Late Prehistoric settlement system of the Samon area involved small, closely packed sites (page 92). None more than 4 hectares in area are known so far. Modern settlements around Pyawbwe are a mean distance of one kilometre apart, giving village residents the opportunity to work their fields without needing to invest too many economic resources in transport. The settlement density and consistent settlement size suggests economically productive land occupied by small groups. This stable system locked up land use during the second half of the first millennium BC and perhaps the early part of the first millennium AD.

By the first half of the first millennium AD, perhaps the 2nd to 4th centuries according to the only absolute dates available for wall construction (at Halin, see page 121), large walled central places had begun to appear at consistent distances from the Samon Valley (Chapter 5). It is unlikely that these were the front line of a new settlement system. Smaller places might better be expected to have been the pioneers. Letpanywa, with its rectangular brick structures and associated burials, may fit the typological gap between settlements which featured inhumation burials accompanied by grave goods but without ritual structures, such as Myohla in the Samon Valley, and settlements where burials involved ritual buildings with urns, and communal burial structures became an increasing feature, as seen at the central places. The movement of people and farming skills into these new areas might have been stimulated by population pressure. Intra-regional migration is a recurring theme in the Burmese chronicles (Chapter 1). This population drift need not necessarily be seen as the simple Malthusian pressure of growing population on sparse resources. It may have involved pressure from a segment of the population that was becoming exposed to imported Indic notions of kingship and wanted to be leaders, but found themselves locked into an old established system where there was no room for expansion. The practice of brick construction is an indicator of the adoption and adaptation of Indic practices which remains highly visible in the archaeological record. An accessible resource that could be used to examine these proposed population movements of 2000 years ago is the DNA of the contemporary rural population (see note, page 93).

The establishment of central places at Maingmaw, Beikthano, Waddi and probably Halin on the geographical edge of the old system and within an expanding framework of Indic architecture and Brahmanical kingship can be seen as a means for new societal managers to attract and retain followers. A mechanism for this may have been an adaptation of founder's cults (Lehman 2003; O'Connor 2003) that had existed in the Samon homeland, as witness the differential burials there. The archaeological evidence at Beikthano points to a number of pre-Buddhist shrines in which the Indic traditions of cremation and urn burial were beginning to replace inhumation, at least for those who merited burial within the ancestor shrines (page 128). The leaders of the new settlements adopted Indian auspicious symbols which were circulated on stamped coins (page 122). Some of these symbols also appear on the pottery, such as a rising sun stamped on a potsherd

observed by the author in 2001 at the Nine Banyan Trees Monastery museum at Halin. The combinations of these symbols on coins may have served to differentiate individuals or polities or both. Given the earlier presence of Chinese cultural influences, as shown by the trade in bronze artifacts and the adoption of the tally tiger form for carnelian pendants, the choice of Indian, rather than Chinese, modes of social management looks much more like the deliberate selection of something new and useful than the acceptance of something imposed from outside. This fits the model of active rather than passive "Indianisation" that was outlined in the introduction (page 19).

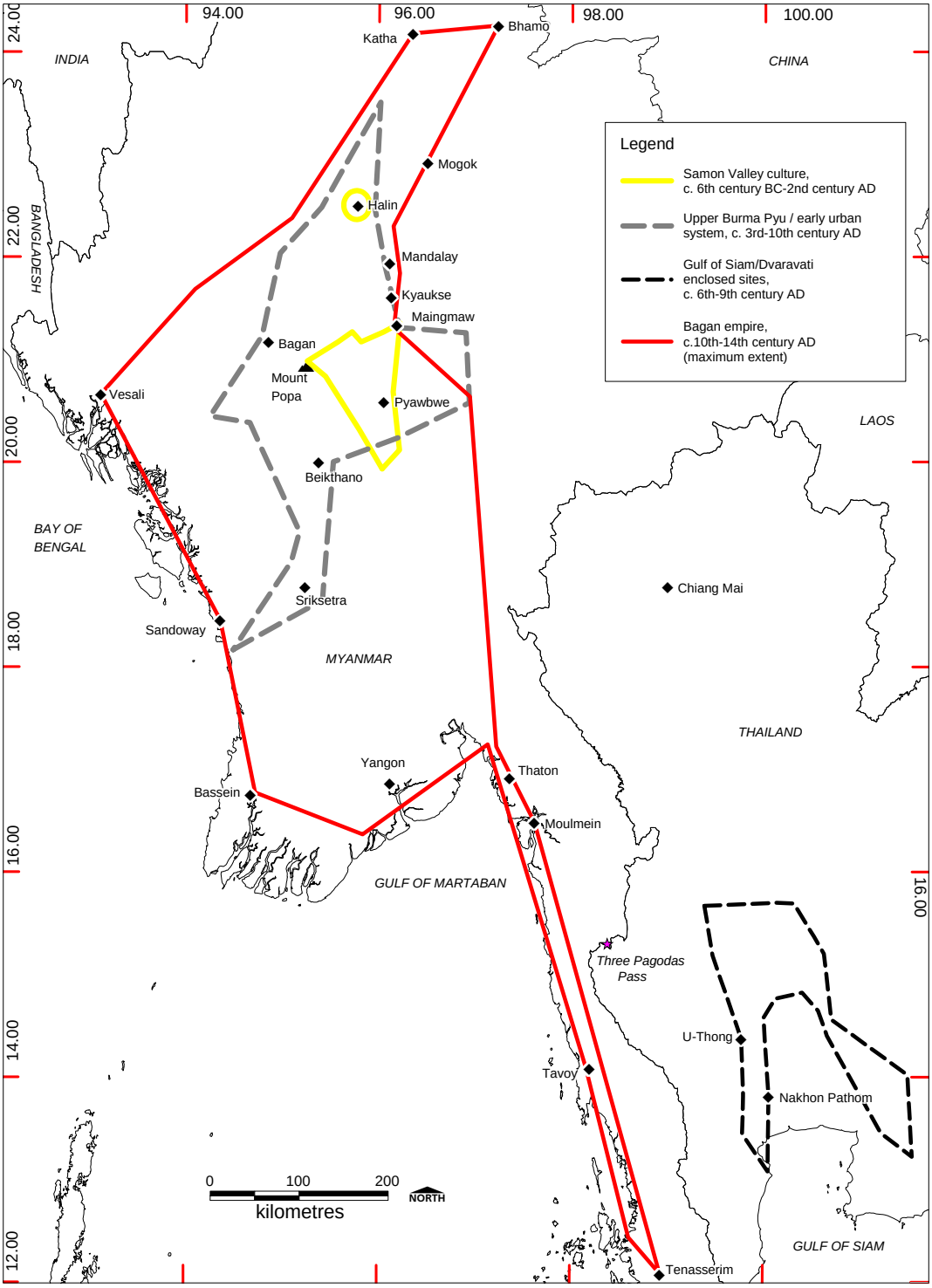

Figure 170 Extent of settlement areas, Samon Late Prehistoric to Bagan.

The recurring pattern noted at the Pyu central places is one of extensive burial and large scale fortification (Moore 2004: 18). Burial of the population within and around the settlement walls might suggest strong local identification, both with the place and with its leaders. It is a repeat of the burial behaviour identified at Taungthaman, where burials are reported to have been part of the settlement (page 86). This also seems to be the case at some of the mounds in the Samon valley, such as the Myohla pagoda site, though formal excavations are needed to test the hypothesis that what are currently mounds being pillaged for beads and other antiquities were settlements rather than single-function cemeteries.

The speed of the development of the early urban system might be indicated by the single phase of wall construction and what may have been the equally speedy redundancy of the walls. While structural modifications such as the addition of an eastern wall to Sriksetra to replace a silted or dried-out tank that appears to have originally formed the boundary were made, none of the Pyu centres, except perhaps for an early phase of Maingmaw, needed to expand their defences beyond the areas covered by initial construction. By contrast, Nakhon Pathom, the dominant central place in the Dvaravati system around the old Gulf of Siam, doubled the extent of its fortifications, and seven other settlements in that system also appear to have substantially expanded the areas enclosed by building a second phase of walls (page 119 & Figure 73). The simplest explanation for the Pyu walls is that they were for defence, although once the walls and particularly the characteristic inward-turning corridor gates were constructed, the physical structure of the city was also set up for a form of access control beyond what would be immediately needed in times of conflict. The corridors suggest that the "owners" of the city were deeply concerned over who was allowed in and out. If population was a scarce economic resource then the city was physically capable of controlling this resource, as well as maintaining social controls over population movement through the use of centralised ancestor shrines.

If the pattern of establishment of settlements is taken to have radiated outward from the Samon Valley, in sheer terms of distance from the homeland Sriksetra (Chapter 5) would have been the last of the major central places to establish itself in the system. The warrior stelae, proposed as 5th century (Table 15), may represent founders. In the late 7th and early 8th centuries, the names of the Vikrama dynasty appear on burial urns and also on a Buddha statue, with an inscription that mentions another leader with a Sanskrit name. The earliest names on the Vikrama list might suggest a previous dynasty. Sriksetra is twice the size of the other central places of the system. While it is physically the dominant centre, it maintains a respectful distance locationally from the other members of the system. Its size may relate to the circumstances of its later construction, perhaps the need to hold a larger population. Sriksetra also has the largest amount of extramural ritual activity of all the centres, with some of the Vikrama urns buried outside the walls, along with other élite burials and mass burials. It was suggested above (page 147) that at some stage the brick walls surrounding the cities became redundant. Changes in military technology that included the introduction of cavalry, as indicated by the portrayal of sword-wielding riders on brick reliefs at Maingmaw and Halin, may have reduced the value of walls for defence. If the Vikramas ruled Sriksetra at the turn of the 7th-8th centuries, but ignored the walls that defined the city when they enshrined some of their ancestors outside, it may be because the Pyu walls were redundant by this time. The likeliest external source of new military methods or technology that may have disrupted the wall-based defence system is Nanchao, which in the 8th and 9th centuries was known both for attacking the Pyu and for incorporating Pyu levies into its armies (page 149).

While the intermittent predations of Nanchao contributed to the destabilisation of the Pyu system, there was no sudden "fall" of a Pyu empire, because despite the prejudices of later Chinese chroniclers working within a paradigm of imperial rule, there was no Pyu empire or kingdom to fall. There was a system of largely autonomous walled sites with a shared culture, whose walls

gradually diminished in significance as practical machines for defence and as symbolic enclosures of powerful kin groups. As the world religion, Buddhism, changed the rules, the Pyu leaders could no longer rely on maintaining power through Brahmanical modes of kingship. This may also be seen in the disappearance or at times the incorporation into Buddhism of many of the Brahmanical symbols such as the *srivatsa*, the *bhadrapitha*, the thunderbolt and the swastika which had been graphical representations of the authority of the Pyu élite and their relationship with the heavens and the spirits of the land. The Pyu ethnic group did not disappear along with "their" symbols, because the symbols were not the symbols of the majority of the population. The Pyu continue to be mentioned until after the Bagan period in inscriptions. But the symbols no longer worked for the old leadership. This may be why the symbol repertoire seems to disappear quite quickly. The coin studies indicate, as exemplified by the "degraded" symbols appearing on later coins, that people forgot the old symbols and their meaning. Just as this would have been easier to do if the symbol structure was one imposed by, or exclusive to, the leaders, so the drift of people who had once identified as Pyu to new or more amorphous ethnic or other social identities may have been a simple matter of adaptation to new circumstances and new leaders.

There is increasing evidence that Beikthano, Halin and Sriksetra remained active through to the Bagan period (Table 15). Halin became the well-defended administrative centre of a newly opened up zone of irrigated farmlands, fed by the Mu canal. Sriksetra maintained a ritual role, as seen by the construction of religious buildings there in the Bagan period, although it may have been replaced as the local focus of Bagan administration by Prome (Pyay), a few kilometres from the walled city on the edge of the river, which would have benefited from being part of Bagan's expanded riverine transport infrastructure. A Bagan period monastery at Beikthano indicates continuing occupation there (Moore 2004: 17).

Table 15 Some chronological markers at major urban sites, 2nd century BC to 14th century AD.

Period	Beikthano.	Halin	Sriksetra	Bagan
199-100 BC	Outer early limit of radiocarbon date range, 180 BC at site 9.			
99-1 BC				
AD 1-99		Earliest extent of radiocarbon date range, AD 60 at gate 10.		
AD 100-199				
AD 200-299				
AD 300-399	Site 3, TL date, AD 390.	Lord Ruba inscription?		
AD 400-499	Site 15, TL date, AD 440.	Site 11, TL date, AD 430.	The warrior-stelae, suggested period.	
AD 500-599				
AD 600-699	Latest extent of radiocarbon date range, AD 610, site 11.		Kan-wet-khaung-gon inscription AD 650-679. Vikrama dynasty burial urns (c. AD 670-720). Artworks similar to Dvaravati.	
AD 700-799	Site 2, TL date AD 770.	Sri Trivikrama inscription, 8^{th}-9^{th} century?	Site 13, TL date, AD 710. Artworks similar to Dvaravati.	Earliest part of radiocarbon date range at Otein Taung, AD 770.

Period	Beikthano.	Halin	Sriksetra	Bagan
AD 800-899		Latest extent of radiocarbon date range, AD 870, burial at site 17. Site 11, TL date, AD 880.		Radiocarbon dated earthenware production in a field at Otein Taung.
AD 900-999				Radiocarbon dated earthenware production at Otein Taung eastern mound.
AD 1000-1099	Site 18, brick, TL date AD 1060.	Site 11 TL date AD 1050. Bagan period inscriptions, 1081, 1082, 1086.	Anawratha deposits a votary at the Bawbawgyi.	44 monuments built, according to the *Inventory*.
AD 1100-1199		Bagan period inscription at TSK 5		216 monuments built, according to the *Inventory*.
AD 1200-1299	The Kyaung-gyi-gon, site 21: an 11th – 13th century monastic building according to Aung Thaw, but decoration is comparable to 13th century Bagan.		20 "Bagan style" buildings located by Zaini's survey. The period is unclear, but 171 other downriver Bagan temples or stupas seem to date to the 13th century (p. 143).	2,074 monuments built, according to the *Inventory*.
AD 1300-1399			(*Later* TL date for potsherd, AD 1410)	277 monuments built, according to the *Inventory*. Earthenware production continuing at Otein Taung eastern mound.

The dominance of the country by Bagan, as the spread of epigraphs from the 11th century (Chapter 6) indicates, had been explained in the romanticised, Eurocentric terms of a soldierly Burman ethnic group, though not too soldierly to develop agricultural holdings in Kyaukse, becoming almost instantly civilised by Buddhism, art and architecture through contact with the Mon, specifically by invading Thaton, in the mid 11th century (page 39). This "civilising" process involved an aptitude for empire that viewed from the perspective of the historiographer is uncomfortably close to modernist thinking. There may be simpler structural explanations. Just as the Pyu settlements seem to have continued to operate in some form into the Bagan period, there is evidence that Bagan was a participant in the geopolitical scene before its supposed time of blossoming. Geographically, Bagan had the advantage of being on the main river system, and therefore of being in a position to take advantage of developments in the water transport infrastructure. Politically, it had the advantage of being on the periphery of the early urban system, well out of practical administrative or military range of any of the central places.

The proposition of a gradual emergence of Bagan has been tested in several ways. The application of archaeological survey methods to the traditional account of a confederation of villages forming, out of which Bagan eventually becomes the dominant central place (Chapter 1), finds no evidence to support the traditional chronology of this happening in the 2nd century AD. However a revision of the history suggests that aspects of the traditional founder's story, the tale of Pyusawhti, may

reasonably be attached to Bagan in the 8th or 9th century due to similarities with founder stories in Nanchao (Chapter 6). The eastern hinterland of Bagan, the traditional home of Pyusawhti, has been identified as a major source of iron resources and production that will bear further investigation as to the relationship of these sites with Bagan, and it is shown to be the location of an unusual brick compound at a site traditionally identified with Bagan's early leadership. In the city itself (Chapter 7), a revisionist approach to the dating of Bagan's early buildings has pointed to one specific building, 996, that is quite unlike its neighbours, and merits further examination, while a more general approach to the chronology has pointed out that the allocation of the earliest of Bagan's buildings to the latter half of the 11th century may be a historiographical construct.

The dating of the élite centre within the walls of Bagan has been a contentious issue for more than a decade. The findings of Grave and Barbetti (2001) contradict the traditional account that makes the easternmost part of the excavated area the palace of Kyanzittha (page 220). An analysis of the 2003 city excavation, while providing strong evidence of continuing civil activity at Bagan as a provincial centre in the later system that was administered from Ava, Sagaing, Amarapura and Mandalay, similarly rejects this site as the palace of King Anawratha, though two partially excavated structures at the lowest level of this site exposed so far may one day have their own tale to tell. The most solid evidence so far of activity at Bagan in the misty period before Anawratha and Kyanzittha is the activity of potters at Otein Taung (Chapter 6) from the 8th or 9th century. This suggest that other activity, including the construction of monuments, can validly be sought in the centuries before the appearance of epigraphically attested kings, in the time suggested by some of the traditional accounts, and in a time shared with some of the early urban sites that had dominated the landscape for so many centuries, centres whose agricultural lands and irrigation systems continued virtually without interruption to support Bagan's new, centralised, royal administration.

Local continuity and settlement expansion are the keys to the prehistory and history of Myanmar from the middle of the first millennium BC to the 14th century AD. Rice agriculture and resource exploitation contributed to increasing wealth that can be seen in the grave goods of the Samon Valley in the Late Prehistoric period. A need for defence of individual or communal property is suggested by finds of bronze-handled iron swords in graves. Trade goods from India and China show that there was both an economic surplus to acquire such goods, and an interest in new and exotic items which in the case of Indic modes of kingship also applied to new and exotic ways of thinking and behaving. The early urban system, whose huge fortified cities suggest both the prospect of conflict and the means to retreat from it, radiates up and down the Ayeyarwady Valley from the Samon. This system, which placed great reliance on the presence of ancestors within its walled cities, seems to have maintained internal coherence from the early centuries AD until the 8th or 9th centuries. Internal factors such as the siltation of waterways and tanks, the increasing influence of popular Buddhism and the consequent decline in the effectiveness of traditional chiefdoms that had been bolstered by Brahmanical cults may have diminished the hold of the old chiefs over their followers. The geopolitical destabilisation wrought by Nanchao was a further shock to the system. A cluster of settlements at Bagan, economically active from at least the 9th century, became centralised by the 11th century under a leadership that seems to have been more adaptable to a syncretic religious environment that mixed Theravada Buddhism with the older Brahmanical traditions. As Bagan expanded, initially subsuming much of the existing Pyu agricultural land, the role of the early urban central places diminished, leaving them as provincial branches of the new administration. The expansion of Bagan eventually encompassed much of modern Myanmar until events of the 14th century saw it, too, end up as a provincial centre within new kingdoms that were centred upriver around Mandalay for most of the time until European colonisation in the 19th century.

APPENDICES.

1. Database construction.

Archaeologists looking for data in Southeast Asia that will lend itself readily to analysis via Geographical Information Systems (GIS) applications don't have an easy task. Cambodia is probably the best supplied source at present. Substantial projects involving new technology are underway at Angkor and Angkor Borei. Radar flyovers of the Angkor region by the US space shuttle and survey aircraft have supplied exciting new material which is now becoming available in digital form. International and local agencies in Angkor and Phnom Penh have extensive records, due both to work done during Cambodia's post-Khmer Rouge reconstruction and to scholarship during the French colonial period, which continues today through the involvement of the EFEO (Acker 1988; Engelhardt 1996; Stark 1998; Pottier 1999; Stark, Griffin, Chuch Phoeurn *et al.* 1999; Fletcher 2001a, 2001b). A survey of Thailand's archaeological sites of the pre-Sukothai period (Thiva Supajanya & Vanasin 1983) has only been available as a series of photographs and maps individually reproduced and encased in plastic folders among photocopied data sheets. Laos is busy trying to cope with issues of maintaining its national monuments and key archaeological sites such as the Plain of Jars (Thongsa Sayavongkhamdy 1996), Lao Pakao (*Vientiane Times January 5-11* 1996; Karlström & Källén 1997) and the Tum Ting cave shrines (Johnson 1997) in the face of rapidly expanding tourism. The Director of Antiquities in Vientiane, Thongsa Sayavonghkamdy, told the author in 2000 that Laos would welcome efforts by international scholars to help collate electronic data on its archaeological and historical sites that could contribute to a computerised heritage management system.

Bagan digital database.

The development of a digital archaeological settlement database for Myanmar/Burma started with the author's study of the buildings at Bagan which used the UNESCO-funded *Inventory of Monuments at Pagan* as a key resource. Tabular data supplied with these multiple volumes, which characterised the city building by building in considerable detail, was entered into a spreadsheet. Variables include building size and type, decorative elements, estimated century of construction, and epigraphically recorded date, which was available for about 80 of the city's two and a half thousand or more structures. The site had been mapped using an arbitrary, non-earth grid. Each structure, virtually every one a Buddhist pagoda or monastery, had a metric easting and northing on its page in the Inventory, and these locations were also entered into the spreadsheet (Hudson 1997 Appendix 3). The data was then exported to MapInfo, a GIS computer program, and displayed over the UNESCO map. The 1938 Burma One-Inch series map of Pagan, 85 K/16, was used to cross-check the data, although as this series is Latitude/Longitude, and its projection is unstated, it was not usable for detailed corrections. Photographs from Burmese aerial surveys of the early 1950s (at 1:6,000 and 1:24,000 scale) were found more useful to check the accuracy of the maps and building locations. Due to the vast numbers of buildings at Bagan, it was possible to ortho-rectify the photographs with surveyed locations quite accurately, in some instances using 30 or 40 reference points per photograph. Topics examined in the author's BA (Hons) thesis (Hudson

1997) had included size, class and distance relationships among the buildings, the expansion and contraction of the city over time, and the formation of monastic settlement nodes in the east of Bagan during the 13th century. The Bagan database is continuously expandable, though not without difficulties. Data collection has not been possible, for example, on the restoration program in the city where over the past few years more than 1,000 buildings have been repaired or in some cases rebuilt speculatively from little more than their foundations. This program raises serious issues in relation to archaeology, art history, cultural resource management and Bagan's pending application for UNESCO World Heritage status (see page 45). As of 2003, the Archaeology Department at Bagan had no central record of these restorations, although details of some individual jobs, essentially records of expenses, have been kept on paper and filed away. Departmental officers also estimate that around 50 inscription stones found during the restorations are awaiting translation.

Digital Myanmar.

The author's interest in Bagan, a low-density, spread-out site sharing a number of spatial characteristics with its south-east Asian contemporaries Sukothai, in Thailand, and the much more extensive Angkor, in Cambodia, led to the issue of how Bagan fitted in with Myanmar's earlier urban centres. Halin, Mongmao (Maingmaw), Beikthano and Thayekittaya (Sriksetra) are brick-wall enclosed settlements ranging in size from around 600 to over 1400 hectares. In comparison, Bagan's monuments cover an open area of 8,000 hectares, with enclosure taking the form of a 140 hectare walled elite centre. The walled and/or moated Pyu settlements have regional parallels in Vietnam, Cambodia and Thailand (see page 146). A key data source for Myanmar became available with the publication, in Burmese, of *Ancient Myanmar Cities in Aerial Photos* (Aung Myint 1999a). Aung Myint has published around 30 sites, all with some kind of enclosure, and says he has a second volume in waiting. Many of these sites have not been formally dated, and some have not even been surveyed at ground level. U Aung Myint's pet term for them, which is both poetic and academically cautious, is "archaeological scars". There are certainly more walled or enclosed settlements still to be located and characterised. There are passing references to walled sites and fortresses in Shan State that can be "counted almost by the score" (Scott 1921: 333-334), such as a 0.6 hectare circular site near Laikha which had acquired a legendary history of being involved in conflicts among the Shan (Slater 1941: 112). Enclosure is, of course, only one variable, but it is a valuable one in that it is relatively easy to identify and quantify, and it lends itself to comparison with other sites that share this characteristic.

Vital material for this database came from Michael Aung-Thwin, of the University of Hawaii, who has collated site locations based on textual studies and inscriptions. His contributions are attributed (see page 266 and accompanying CD-ROM) to "MAT". Another major collaborator is "Tanpawady" Win Maung, "WM" in the database reference column. He is a Mandalay-based antiquarian, nicknamed for the suburb he lives in to distinguish him from other Win Maungs, who is an indefatigable collector of information on Myanmar's prehistoric sites. Other original field surveys have involved U Nyein Lwin, a senior research officer at Bagan. With this new data, and a new look at source material including British colonial era gazetteers and government archaeological reports, the *Journal of Burma Research Society* (which spanned the pre and post-colonial eras), the works of the mid 20th century doyen of Burma studies G. H. Luce, and the *Myanmar Historical Research Journal*, published in Yangon since 1995, well over 400 archaeological sites and/or pre-modern settlements, with 125 variables such as presence of different classes of artifacts recorded, have been identified. The problem of compiling the database

can now be divided into two key areas: accurate geographical location of the sites, and their characterisation.

Location.

In order to create a GIS-friendly list of archaeological sites and settlements, the longitudes and latitudes of known places were converted to decimal degrees and added to a digital base map (Digital Chart of the World 1993). The *Digital Chart of the World* (DCW) is an Environmental Systems Research Institute, Inc. (ESRI) product originally developed for the US Defence Mapping Agency. The digital data is satisfactory for large scale studies, although it can reveal inaccuracies when zoomed in to local areas. To map Myanmar's archaeological sites, British army survey maps from the 1940s (the "Burma One Inch" series) were digitised and used as a basis to modify the DCW where necessary, particularly in making landform and major geographical points more clear. Unlike in Cambodia, where detailed maps from the Vietnamese occupation period of the 1980s are on sale in the central Phnom Penh market, or in Thailand, where the "Krom Pantii" or military mapping department is these days something of a public business enterprise, official supplies of current Burmese-language maps in Myanmar, produced at inch to the mile scale or finer, have eluded the author despite many years of persistent inquiry and applications. However older colonial period maps in English, improved by air survey during World War II, are available in Australian and British libraries.

The inch to the mile maps come with inbuilt and uncorrectable inaccuracies when introduced into computer mapping. This is due to the projection used, and to the inability of mapping programs to cope with the projection. The Survey of India (British Royal Engineers) established the INDIA Zones IIB, IIIB, and IVB in 1905 for the Burma area. The grids are based on the Lambert Conical Orthomorphic projection defined with a Latitude of Origin and a Scale Factor at Origin. Although all three of these British Grids were secant Lamberts (2 standard parallels), the actual standard parallels were never published. MapInfo software does not accommodate the British definition of a Lambert Zone based on these parameters. It implements the American (and French) definition (Personal communication 2003, Clifford J. Mugnier, Centre for GeoInformatics, Louisiana State University USA). Equations to convert from British definition parameters to American definition parameters do not appear to exist.

Using old maps, despite inaccuracies, has an inbuilt advantage for the archaeologist, as they tend to filter out some of the "noise" of construction and development, which has been substantial in post-war Myanmar, notably in terms of the expansion of agriculture and the construction of villages and irrigation works in agricultural areas. A disadvantage is that it is possible to miss changes brought about by large-scale irrigation projects or river movements. The landscape of the eastern hinterland of Bagan, for example, an area containing buildings and sites that appear to be of the Bagan period (see Chapter 6) has been radically changed in recent decades by a canal (Hudson & Nyein Lwin 1999).

The digital map data available also contains discrepancies. The georeferencing of sites for this project was aided by two databases which between them contain more than 45,000 Burmese place names and their locations (CALLE 2001; NIMA 2001). Discrepancies among the electronic data sources became apparent even before they were cross-checked with maps. Villages from the NIMA/CALLE databases often pop up in the middle of the *Digital Chart of the World's* rivers. On the basis of cross-checks between the *Digital Chart of the World* and the inch to the mile survey maps, and points recorded with a GPS with reported inaccuracies of less than 30 metres, the digital databases and inch to the mile maps proved accurate only to within 500 to 1,000 metres. This is

adequate for national-scale archaeological analysis. For the location of specific sites, archaeological deposits or buildings, GPS references are accurate enough to lead an investigator to a given point. Overall accuracy in mapping, therefore, may be considered functional and adequate.

The early settlement known today as Sampenago is an example of one of the more complex places to locate and to define. Its geographical and historical importance is emphasised in a traditional saying: *Sampenago nwa-ma baung jo, Nyaung-u kam-pa byo kya*, literally "Sampenago cow-leg broken, Nyaung-u riverbank is collapsed", meaning that if Sampenago is damaged, Bagan is affected. Sampenago was described in Archaeological Survey reports (ASI 1925-26: 11; ASB 1925: 17) as a walled and moated site covering one square mile, or 259 hectares, north of Bhamo (Map 92 H/3), a regional centre on the upper Ayeyarwady. Archaeological sites surveyed in Myanmar over the past century or more have often been named after existing villages, and there is a Sampenago pretty much where it would be expected. The type of bricks found at Sampenago suggested to the colonial-era archaeologists that it dated from the 13th to 15th centuries, and for the initial database entry a square shape was tentatively attributed to the settlement on the grounds that post-Bagan era walled towns tended to be square. A visit by Nyein Lwin bore out the prediction of the combined map and literature search. He was of the opinion that the structure may have been a special-purpose fort, rather then a walled town (U Nyein Lwin, personal communication 2002). Further details can be added from the literature. The Nan-chao kingdom built a river-stockade in the 8th or 9th century somewhere in this area, according to Chinese sources (Luce 1969: 28-29, Vol 1). Luce suggested the river junction at Bhamo, which would be overlooked by the fortress at Sampenago, as the likely site of Kaungsin, which was captured by the Mongols in 1283 (Luce 1969: 36, Vol 1). This village name still exists, though today it is opposite Sampenago on the west side of the river. The archaeological status of Kaungsin and Sampenago in the archaeological record, including the question of whether they are two separate places or two names for the same place, is a problem for future research.

Changes in village names can be rapid. Without ground truthing, which is not possible in all cases for reasons that range from a lack of time and resources to security restrictions imposed by the Myanmar authorities, sites can be obscured from view. For example in 1922 Charles Duroiselle reported on archaeological explorations near Thazi, at the villages of Sameikshe, Aungbintha "a few miles to the south of Sameikshe" and Nyaungbingan "about ¾ mile west of Sameikshe", locating what appeared to be Bagan period ruins at each site (ASI 1922: 90-91; ASB 1922: 9-11). Luce (1969: 17, Vol 1) mentions that Bagan period votaries featuring 10 Buddhas had been found at "Hsameikshe". The difference in Anglicisation is inconsequential. Luce (1969: 138, Vol 1) separately described Nyaungbingan as the site of a votary find 2 miles (3.2 km) south of Thazi. On the inch to the mile map (93 D/1, 1938) Sameikshe is 3.5 kilometres north-east of Thazi, and Aungbintha is 1 kilometre south-south-east of Sameikshe. Nyaungbingan does not appear on the map. Duroiselle was reporting on a field trip to the sites, while Luce was not specific about whether he had actually been to Nyaungbingan, so it would appear preferable to accept Duroiselle's locations. However his distances are not in keeping with the sites as mapped. The result for the database is that Sameikshe and Aungbintha have been located at their mapped positions, and Nyaungbingan has been tentatively placed just west of Sameikshe, at the distance indicated by Duroiselle, at a spot where the map indicates graves. Duroiselle would have been walking the area, or riding in a bullock cart at the best, as the villages were then linked only by cart tracks, so he may have overestimated the distances. The village ¾ mile west of Sameikshe is called Pyungan on the map. Nyaungbingan may be a local name for Pyungan, or there might be some other kind of error dating to the time of the survey. This conclusion could be improved by ground survey. The indication is, however, that there is a cluster of apparent Bagan period ruins in the area of Sameikshe-Aungbintha that would be worth future investigation.

Multiple names for the same site are common. The Burmese administrative system copes with this by referring to the district and township in which a town or village is located. For example Paungsin, a Bagan period site with ruined temples and finds of votary tablets, is a name that appears twice in the electronic map databases, both villages being downriver from Bagan. A clue provided by Luce that the Paungsin in question is in the Minbu district (Luce 1969: 17, Vol 1) allows it to be located more precisely.

Characterisation.

A major task of the database has been to provide sufficient data to determine the distribution of different classes of artifacts, with the aim of establishing a tentative chronology for a region where there is a very limited corpus of absolute dates. The focus has therefore been on the empirical recording of artifacts, including large artifacts such as buildings and walled settlements. In field surveys much data has come from items recovered by farmers ploughing their land or digging wells or foundations. A farmer will keep turning up artifacts in his fields, and the word eventually reaches the appropriate authorities. If word reaches middlemen scouting for the antique trade, they may be sold. The relative wealth of carnelian or black and white line decorated beads, early "Pyu" coins, at least some of them genuine, and other ancient objects offered to visitors to antique shops and stalls in Myanmar is an indication that many old sites are known informally. While these "found" artifacts can be identified as polished stone adzes, bronze bracelets, Pyu-style burial pots, or even the ubiquitous tobacco smoking pipes of the era of European trade, their stratigraphic relationship to other items found in the same area is very difficult to determine. However visits to potential ancient sites can still prove fruitful. People who find ancient objects often keep them as a curiosity, so the place where they were found can at least be pinpointed. At times, the survey has involved visiting the sites of finds with farmers, who have then been able to point out the depth and perhaps the relationship of multiple finds. A Burmese village will frequently turn out to have a resident history buff who may collect ancient artifacts or know who holds collections. Retired schoolteachers often seem to take on this role. Archaeological finds may also turn up in the local monastery, particularly if they are considered to be Buddhist relics, or objects that might relate to the spirit world, and are therefore better off in the hands of an expert such as the village abbot.

Criteria for selecting sites have needed to be subjective and quantitative. For example, a small bronze image of the Mahayana Buddhist goddess Tara, attributed to between the 9^{th} and 11^{th} centuries, was found in a "ruined temple" near Manawgon village, Myothit township, Magwe district (Luce 1969: 198, Vol 1). This may well have been part of a reliquary deposit at the founding of a Bagan period temple, but a single piece of portable art is mobile, and cannot be considered diagnostic. A different approach might have been taken if a relic chamber with a number of items identifiable with a particular time period had been unearthed. The location is well within the range of the early Pyu centres of Beikthano and Sriksetra, and later Bagan settlements, but again, geographic coincidence is insufficient evidence. This particular find emphasises that the site database needs to be seen, and used, as material for sampling, rather than as a comprehensive catalogue.

A potentially useful piece of linguistic evidence cropped up during database compilation. Myanmar has a body of common village names that appear regularly across the country. Many of these are descriptive of some local feature. Taungba, for example, means "near a hill", Taungtha means "pleasant hill", and Nyaungbintha means "pleasant banyan tree" (Maung 1956: 182). It is not unusual to find neighbouring villages that are within a few kilometres of each other sharing a name. According to the combined CALLE and NIMA databases, plus data from inch to the mile maps, and a *Gazetteer of Burma* (an undated 574 page listing, title page missing, of Burmese

towns and villages by name, description, map sheet, latitude, longitude and grid reference, in the private collection of Win Maung), there are at least 68 villages, streams or hills in Myanmar named Thanbo, or a variant of this, which means an “iron camp”, or place where iron is worked. One of the Thanbos, 25 kilometres south-west of Binnaka, was visited by a group of investigators from Mandalay and was found to contain old furnaces (Win Maung, personal communication 2001). Another Thanbo, on the west side of Mount Popa, also has old iron furnaces (Bell 1907; Chhibber 1926, 1934). Others may well be named not for modern activities, as village blacksmiths in Myanmar these days obtain their iron commercially, and work in small, individual cottage workshops, but for ancient iron furnaces or slag heaps (see Figure 5).

2. The Myanmar Archaeological Settlement Database.

This list of placenames, locations and references is a summary of the detailed database, with variables, that appears on the accompanying CD. The database on the CD is a key digital resource for mapping and analysis in this thesis, but this extract serves the particular purpose of linking placenames with references. Published sources appear in brackets, and are listed in the bibliography. Information from unpublished data collections or field notes is credited to those who have supplied them. Abbreviations are used for frequent contributors “Tanpawady” Win Maung (WM), and Ernelle Berliet (EB) and for the author’s own field survey data (BH).

Table 16 Myanmar Archaeological Settlement Database.

Site	East	North	References and notes on data sources.
Aingdaung	94.9829	22.352	WM
Allagappa	95.4902	21.9306	(Stargardt 2001b) BH/WM
Allanmyo (Myayde)	95.2256	19.3797	(ASB 1939-40: 18 ; Luce 1969: 99, Vol 1) EB
Alon	95.0891	22.1931	(Duroiselle 1921)
Amarapura	96.0698	21.917	
Amyint	95.1499	21.9316	(Duroiselle 1921)
Anein	95.3751	21.5305	(Duroiselle 1921)
Anurada	94.8654	21.1552	BH
Apyauk	96.0457	16.6197	WM
Aungbintha	96.0905	20.8639	(ASI 1922:10-11; ASB)
Aungswa	95.3488	23.2242	WM
Ava (Inwa)	95.9831	21.8547	(*Index Inscriptionum Birmanicarum* 1900; Ohmmar Myo 2003) WM
Ayadaw	94.8031	21.1256	(Ar Seinna)
Ayethayar	95.9818	20.7236	WM
Ayetthema	97.0833	17.2333	(Aung-Thwin 1983; Myint Aung 1999) EB
Badinkon	95.2163	22.2376	WM
Badon	95.05	22.2333	(Duroiselle 1921; The Making of Burma 2000)
Bagan	94.8639	21.1717	(Duroiselle 1921; Aung-Thwin & Stark 2001)
Bamauk	95.8525	24.3988	WM
Ban Don Ta Phet	99.7358	14.1839	(Glover 1990; Higham 2002) *Thailand*
Bassein	94.7333	16.7666	(The Making of Burma 2000)
Beikthano	95.3833	20	(Aung Thaw 1968; Bronson 1969; Stargardt 1990; Than Shwe, Sein Maung Oo, Aung Thaw *et al.* 1993; Stargardt 1994; The Making of Burma 2000)
Bhamo	97.2316	24.2548	(Luce 1965: 278)
Bilin	97.2379	17.2194	(The Making of Burma 2000)

Site	East	North	References and notes on data sources.
Bingyi	97.5122	16.9792	(ASB 1920:24)
Binnaka (Beindaga)	96.1938	20.6094	(Win Maung 1981; Aung-Thwin 1983: 16-17; Win Maung 2001b)
Bokpyin	98.7956	11.2404	(Aung-Thwin 2001b)
"Bronze age" cemetery (?), Bagan	94.8578	21.1226	BH/WM
Budalin	95.1454	22.3937	(Duroiselle 1921) WM
Bulugon	96.0071	21.2755	WM
Byin	94.8989	21.2798	WM
Chantha	95.3502	22.7656	(Luce 1969: 17 Vol 1)
Chauk	94.8267	20.9075	(Aung-Thwin 2001b)
Chaung-u	95.8317	21.9992	(Duroiselle 1921)
Chaung-u township	95.2737	21.9569	Archaeology Department, Mandalay
Chinbyitkyin	95.9355	20.4747	WM
Chingon	95.2986	23.9644	(Aung-Thwin 2001b)
Dagon (Yangon, Henbuiw)	96.1496	16.7828	(Luce 1969: 20, 134 Vol 1; The Making of Burma 2000)
Dahatkon	96.1291	20.1539	WM
Danupyu	95.5833	17.25	(The Making of Burma 2000)
Dhanyawadi	93.0576	20.8667	(San Tha Aung 1979)
Donzayit	96.8917	17.775	(Aung Myint 1999a: 185; Myo Thant Tyn 1999; The Making of Burma 2000)
Ebya	96.1407	21.7716	(Win Maung 2003b)
Ein-she	94.8282	21.2131	(Ar Seinna)
Gu Gyaung	94.9888	21.1504	BH
Gweywa	96.0333	21.5	(ASB 1923: 33)
Gyogon	94.7979	19.314	(Morris 1938)
Halin	95.8109	22.451	(Myint Aung 1970, 1979; Pauk Pauk 1999b; The Making of Burma 2000; Nyo Win 2001b, 2001a; Pauk Pauk 2001b) BH WM
Hkrit	93.2125	20.7048	(Thin Kyi 1970)
Hladwe	95.6451	22.2337	(Duroiselle 1921) WM
Hlaingdet	96.1805	20.8068	(Aung Myint 1999a: 235; The Making of Burma 2000) EB
Hlaingmyo	95.8333	17.3833	(Aung Myint 1999a: 199)
Hlwazin	95.8151	20.3702	WM
Hmawbi (Kalasapura?)	97.6125	16.6362	(Aung Myint & Moore 1991; Aung Myint 1999a: 225)
Hmwedon	94.8402	21.8639	WM
Hnawkan	95.714	21.2476	(Pautreau, Pauk Pauk & Domett 2001; Ko Ko Kyaing 2003: 55; Moore 2003b) WM
Hota	97.7004	21.2827	(Morris 1938)
Hpyu	96.4259	18.4749	WM
Hsale	94.8282	20.5487	(Pagan Newsletter 1986)
Hsenwi	97.9762	23.3078	(Morris 1938)
Hsindat	96.9333	17.3667	(Aung-Thwin 1983: 18)
Hsindat Myindat	97.1646	17.1523	(Myint Aung 1977)
Hsipaw	97.3939	22.6347	(Aung-Thwin 2001b)
Htabu	96.9106	17.5339	(Aung Myint 1999a: 279)
Htangon	96	21.1094	(Sein Maung U 1981)
Htonbo	95.9294	20.658	WM
Inde	95.383	21.2709	(Ko Ko Kyaing 2003: 52) Archaeology Department, Mandalay WM
Indein	96.8351	20.4491	BH

Site	East	North	References and notes on data sources.
Inle	96.9462	20.6365	(Duroiselle 1921) WM
Kadu	95.7326	22.2822	(Duroiselle 1921)
Kalagyaung	96.1971	21.5914	(ASB 1940-41: 32; Duroiselle 1921)
Kalaw	96.5642	20.6348	(Aung-Thwin 2001b)
Kalemyo	94.0705	23.1823	(Aung Myint 1999a: 243; Aung Myint 1999b; The Making of Burma 2000)
Kamma	95.0989	19.023	WM
Kanthat	94.3471	22.0655	WM
Kanthonsint	93.0727	20.8069	(Thin Kyi 1970)
Katha	96.3476	24.1791	(Luce 1969: 36, 49 Vol 1; The Making of Burma 2000) WM
Katku	97.1338	20.4505	BH
Kaungsin	97.18	24.2705	(Luce 1969: 36 Vol 1) EB.
Kaungton	97.1	24.1333	(The Making of Burma 2000) EB
Kawgun caves	97.5951	16.8163	(Luce 1969: 137 Vol 1)
Kawgyaung	95.1827	21.8161	(ASB 1938: 13)
Kawliya	97.65	17.8167	(Aung Myint 1999a: 161)
Khabin	96.0164	16.7095	(Luce 1969: 20 Vol 1) MAT
Khabo	95.8907	21.6277	(Win Maung 2000a)
Khahlaing	94.8869	19.8698	WM
Khammhu (Kanlu)	96.0239	21.7687	(Luce 1959b; Win Maung 2000b)
Khuan Lukpad	99.1472	7.92303	(Mayuree Veraprasert 1992) *Thailand*
Kin-u	95.6195	22.769	WM
Kobin	95.7454	22.6714	WM
Kokko	95.0195	21.0989	BH
Kokkogon	95.9413	20.756	WM
Kokkokhala	95.8502	21.2004	WM
Kume	96.136	21.3041	(Sein Maung U 1981)
Kuntha	95.1332	21.9166	(ASB 1938: 13)
Kyaikkatha	96.9226	17.3594	(Aung-Thwin 1983: 18; Ko Ko 1987; Aung Myint 1999a: 101)
Kyaiktai pagoda	97.1408	17.2433	(ASB 1940-41: 23)
Kyaikto	97.0237	17.3003	WM
Kyangin	95.2332	18.3447	EB
Kyannyat	95.9961	23.2682	(Win Maung 1997; Sein Myint 2000)
Kyaukbon	95.3645	21.2119	WM
Kyaukchat	96.1948	20.5743	WM
Kyaukhpyar	96.2799	20.5782	WM
Kyaukka	95.2502	22.1663	(Ba Maw 1999; Sein Myint 1999a)
Kyaukmyaung	95.9395	22.5958	WM
Kyaukmyet	95.0906	22.1405	(Sein Myint 1999a)
Kyaukpadaung	95.1324	20.8425	(Movius 1948; Aung-Thwin 2001b)
Kyauksauk	94.9572	21.5357	(ASB 1919: 40-41)
Kyaukse	96.1344	21.6047	(Duroiselle 1921; Luce 1959b; Aung-Thwin 2001b)
Kyaukse	96.1559	20.5768	WM
Kyauktu	94.2163	21.1655	WM
Kyaungdwin	95.2182	21.5435	(Duroiselle 1921)
Kyaussaga	94.8681	21.1278	BH
Kyinlo	94.9133	21.0791	BH
Kyitainggon	95.7766	20.6145	WM
Kyiywa	95.9127	20.6625	WM
Kyizu	96.1959	20.5352	WM
Kyogon	96.0145	20.7988	WM

Site	East	North	References and notes on data sources.
Kyuaksayit	96.6968	18.1662	(Aung Myint 1999a: 179)
Kyuntaw	95.1098	19.0393	(ASB 1910: 2; Pagan Newsletter 1986)
Kyunhla	95.3167	23.3492	WM
Kyutkan	96.0504	21.2658	WM
Lagunbyee	96.334	17.1705	(Aung Myint 1999a: 141; Aye Aye Thinn 1999; Thaw Kaung 2003)
Laikha	97.6750	21.2687	(Scott 1900)
Laikha old fort	97.7002	21.1690	(Slater 1941)
Lamai	97.8086	15.4617	San Win
Lashio	97.7477	22.9393	(Aung-Thwin 2001b)
Launggret	93.2468	20.5338	(Shwe Zan 1995; Gutman 2001b)
Lebu	95.4978	20.3936	WM
Lebyinma	96.0377	19.9307	WM
Ledaunggan	95.744	21.0813	(Duroiselle 1921)
Legaing	94.7508	20.3002	(Duroiselle 1921) WM
Lekthaik	95.8833	16.4	MAT
Letpanchibaw (Shwedaung)	95.0628	21.2829	(Myint Aung 1974; Nyein Lwin 2001) WM
Letpanywa	95.1539	19.8203	(Nyein Lwin 2002) WM
Linzinkon	96.052	21.8939	(Singer 1990)
Loikaw	97.2099	19.6595	WM
Loilem	97.5711	20.9128	(Aung-Thwin 2001b)
Lokananda	94.853	21.1283	(Pe Maung Tin & Luce 1923)
Madaya township	96.1103	22.2087	Archaeology Department, Mandalay
Magari (Tabumyo)	95.9333	17.5333	(The Making of Burma 2000)
Magwe	94.9213	20.1508	(Movius 1948; The Making of Burma 2000; Aung-Thwin 2001b)
Magyigyi (estimated)	94.8562	21.1808	(Ar Seinna) BH
Mahlaing township	95.6493	21.0973	(Duroiselle 1921; Luce 1969: 109 Vol 1) Archaeology Department, Mandalay
Maingmaw (Mongmao)	96.2152	21.3084	(Sein Maung U 1981; Aung-Thwin 1983: 20; Aung Myint & Moore 1991; Aung Myint 1999a: 23)
Maingthauk	96.9417	20.5767	(Aung Myint 1999a: 217) WM
Makkhara (Hmetkaya)	96.1479	21.7691	(Luce 1969: 30 Vol 1; Win Maung 2000b) BH
Malah	95.9546	22.5576	Archaeology Department, Mandalay WM
Male	95.9667	23.0333	(The Making of Burma 2000)
Malun	95.0367	19.9181	(Duroiselle 1921; Myint Aung 2001)
Manawkon	95.2167	20.0833	(ASB 1918: 31)
Mandalay	96.0837	21.9745	
Mandalay airport	95.9772	21.7	(Ba Maw 1999) WM
Martaban (Muttama)	97.6116	16.5315	(The Making of Burma 2000)
Maung Di pagoda	96.0159	16.6984	(Luce 1969: 20 Vol 1)
Maunglaw	98.769	12.3149	(Luce 1969: 26 Vol 1)
Mebekon	94.8679	20.2309	WM
Meiktila	95.8664	20.8786	(Luce 1969: 17 Vol 1; Aung-Thwin 2001b) Archaeology Department, Mandalay
Merancara	96.5	17.5333	(The Making of Burma 2000)
Mergui (Myeik)	98.6085	12.4394	(Luce 1969: 27 Vol 1; The Making of Burma 2000)
Meyinzaya (Mayinzaya, Mayinsaya)	96.5	17.5333	(Aung Myint 1999a: 155)

Site	East	North	References and notes on data sources.
Minbu	94.8831	20.183	(Duroiselle 1921; Movius 1948; The Making of Burma 2000; Aung-Thwin 2001b) WM
Mindon pillar	94.8513	21.1214	(Ar Seinna) NL BH
Mingun	96.0209	22.054	(Aung-Thwin 2001b)
Mingwedaunt	94.9955	22.3572	WM
Minkyi	95.5498	22.4168	WM
Minyehla	96.7467	18	(Aung Myint 1999a: 167)
Moatpale	96.0776	21.8395	WM
Mogaung	96.2658	20.5993	WM
Mogok	96.5054	22.9212	(Aung-Thwin 2001b)
Mogyobyin	95.0515	22.0625	(Ba Maw, Than Tun Aung, Pe Nyein *et al.* 1998; Ba Maw, Than Tun Aung, Pe Nyein *et al*. 1999; Sein Myint 1999a, 1999b; Nyunt Han, Win Maung & Moore 2002)
Moksobo	95.75	22.6167	(The Making of Burma 2000)
Moktaw	94.9108	22.392	WM
Mokti	98.2334	14.0157	(Luce 1969: 26, 100 Vol 1) EB
Mong Mit	96.6707	23.1127	(Morris 1938; Aung-Thwin 2001b)
Monhtoo	95.2339	22.324	(Ni Ni Myint 1998; Sein Myint 1999a, 1999b; Ko Ko Kyaing 2003: 52) WM Archaeology Department, Mandalay
Monywa	95.1383	22.1068	(Aung-Thwin 2001b)
Moulmein (Maulamyaing)	97.6333	16.5	(The Making of Burma 2000)
Mrauk-u	93.1881	20.5849	(Gutman 2001b)
Mudon (Kawparan)	97.7167	16.2667	(Aung Myint & Moore 1991)
Muthin	97.1992	17.1336	
Myaing	94.8561	21.6148	WM
Myaukmigon	96.1832	20.6259	(Nyunt Han, Win Maung & Moore 2002) WM BH
Myaungmya	94.9327	16.5968	(Guy 1989; Myo Thant Tyn 1999; The Making of Burma 2000)
Myaungzongyi	96.057	21.7214	(Luce 1969: 32 Vol 1)
Mye-thindwin, pottery	95.0159	21.1217	BH
Myedu	95.3929	23.1768	EB
Myegedwin (Mye-thindwin)	95.0024	21.1338	BH
Myenu	94.8889	21.5152	WM
Myin Mu	95.5759	21.9251	(Duroiselle 1921; Sein Maung U 1981; Frasch 1996b; The Making of Burma 2000)
Myin-oo-hle	95.5749	21.1672	(Ko Ko Kyaing 2003: 53; Moore 2003b) WM
Myingondaing (Mrankhuntuin)	96.0972	21.5249	(Duroiselle 1921; Luce 1959b)
Myingun	95.034	20.016	(Pagan Newsletter 1986) WM
Myingyan	95.3917	21.456	(Aung-Thwin 2001b)
Myinhmwe	95.9017	21.9338	(Myo Thant Tyn 1999; Aung-Thwin 2001b)
Myinzaing	96.198	21.5885	(ASB 1940-41: 32; Duroiselle 1921) *Za-bu-kon-cha* (page 29 & Appendix 4)
Myinzi	95.5189	22.6504	(Duroiselle 1921)
Myittha (Mlacsa)	96.1353	21.4139	(Duroiselle 1921; Luce 1959b; Luce 1969: 38 Vol 1)
Myochaungmyo (Yenwe, Myokhaung)	96.4917	18.025	(Aung Myint 1999a: 173; The Making of Burma 2000) MAT.
Myogon	95.7243	21.2666	WM
Myohla	95.5546	22.595	WM
Myohla	96.0493	20.3499	(Coupey 2004) BH WM
Myohla pagodas	96.0576	20.3421	WM BH

Site	East	North	References and notes on data sources.
Myoma	95.3798	18.9422	(ASB 1940-41: 24)
Nabegon	96.1176	20.6106	WM
Nagabo	94.8757	21.1767	BH
Nagakyit	94.8946	21.1929	BH
Nam Lwi	98.1614	21.9491	(Morris 1938)
Nam Pang	98.65	22.4475	(Morris 1938)
Namkham	97.6818	23.831	(Ba Maw 1999)
Namtu	97.4004	23.0936	(Aung-Thwin 2001b)
Nat-kon-sin	94.8131	21.1847	(Ar Seinna)
Natmauk	95.401	20.3324	WM
Natogyi township	95.6578	21.4199	(Duroiselle 1921; Frasch 1996b) Archaeology Department, Mandalay
Nebugon	96.1628	20.6497	WM
Neolithic quarry	95.214	21.5624	BH NL
Neolithic site	94.9047	21.727	WM
Ngahsaunggyan	97.4	24.3333	MAT
Ngakin	95.5342	22.1161	WM
Ngamyagyi	95.468	21.7826	(Duroiselle 1921)
Ngathayauk	95.1443	21.1476	(Nealie 2003) BH NL
Ngayantgyikon	95.9352	21.2785	WM
Nwatele (Nga-o)	96.4666	24.0164	(Luce 1969: 17 Vol 1)
Nwe-ni	96.1468	22.0284	WM
Nyaung-u	94.9101	21.2011	(Movius 1948; Aung-Thwin 2001b)
Nyaungbingan	96.0756	20.8721	(ASI 1922; ASB 1922: 10-11; Luce 1969: 138 Vol 1)
Nyaunggan	95.0695	22.4308	(Kyi Kyi Hla 1998; Kyaw Han 1999; Pauk Pauk 1999a; Sein Myint 1999a; San Nyein 2000; Tayles, Domett & Pauk Pauk 2001)
Nyaunggan burial site	95.0695	22.4144	(Kyi Kyi Hla 1998; Kyaw Han 1999; Pauk Pauk 1999a; Sein Myint 1999a; San Nyein 2000; Tayles, Domett & Pauk Pauk 2001; Ko Ko Kyaing 2003: 50-52)
Nyaunggon	96.6681	20.6666	WM
Nyaunglun	96.2	20.2333	(AWB 1904: 5; Harvey 1925: 309)
Nyaungshwe	96.9348	20.6539	(Aung-Thwin 2001b)
Nyaungwun	94.9905	20.9597	BH
Nyaungyan	96.0438	20.751	(Luce 1969: 38 Vol 1)
Odeindaung	96.0797	21.7989	(Luce 1969: 32 Vol 1)
Ohnmin	96.1301	20.6374	WM
Ok-aing	95.0576	22.4037	(Ni Ni Myint 1998)
Okhmonyo	95.4487	20.833	WM
Okpo	96.0285	20.4703	WM
Ondon	96.0277	21.6624	WM
Onmya	94.8675	20.9065	BH
Oshitkaung	95.6003	20.5666	WM
Otein Taung	94.8904	21.162	BH
Padah-lin caves	96.3526	21.1381	(Aung Thaw 1971) BH WM
Padigon	96.1731	20.6006	WM
Pailthin	94.9632	21.5438	WM
Pakhangyi	95.205	21.5365	(Duroiselle 1921; The Making of Burma 2000) WM BH
Pakkoku	95.0916	21.3264	(Aung-Thwin 2001b) WM
Panan	96.0758	21.5886	(Luce 1959b)
Parein	93.2393	20.5661	(Thin Kyi 1970)
Patikkara?	91.1338	23.4578	(ASB 1922: 61-62; Luce 1969: 119 Vol 1)

Site	East	North	References and notes on data sources.
Patiphyu	95.9985	23.2827	(Win Maung 1997; Sein Myint 2000)
Pauk	94.468	21.4492	(Aung-Thwin 2001b)
Paukseikkon	95.0773	22.4233	
Paunglaung	95.2011	21.4486	(ASB 1938: 13)
Paunglin	94.7323	20.5161	(Duroiselle 1921; Luce 1969: 17 Vol 1)
Payagyi	95.7167	21.3833	(ASB 1904:4, 1938-39: 11)
Payagyi	96.1667	17.4833	(Aung Myint 1999a: 149)
Payagyi	96.1339	20.6117	WM
Payeinma	95.2346	21.7337	(Duroiselle 1921)
Pebinshe	96.1679	20.4547	WM
Pedaw	96.1819	20.1391	WM
Pegu	95.5258	21.9759	WM
Pegu (Bago, Hanthawaddy)	96.5	17.3333	(The Making of Burma 2000)
Phawritat	96.932	20.7242	(ASB 1912: 18; Aung Myint 1999a: 207)
Phaya Hti Saung	94.9581	21.133	BH
Pinchaungwa	94.844	20.5336	(Duroiselle 1921)
Pindaya	96.662	20.9886	WM BH
Pinetaunggyi (Htaukmagon)	95.0972	21.9771	(Sein Myint 1999b) WM
Pinle	95.5268	21.696	WM Archaeology Department, Mandalay
Pinle (Myodwin)	96.1747	21.2904	(Luce 1969: 30 Vol 1; Win Maung 2000b) BH
Pinmyo	95.3318	20.6092	WM
Pinthaung	96.1966	20.6342	(Nyunt Han, Win Maung & Moore 2002)
Pinya	95.9781	21.7972	
Pondaung range	94.2436	22.2484	WM
Potsherd deposits	97.6173	16.5252	(Myo Thant Tyn 1999)
Pottery mound	94.8517	21.118	BH WM
Powundaung	94.9833	22.05	(ASI 1914-1915; Harvey 1925: 309; Luce 1969: 99 Vol 1)
Putao	97.4117	27.3748	(Ba Maw 1999)
Pwabetsan	96.2616	21.3885	WM
Pwesonkon	96.0909	21.3159	WM
Pwethin	95.9333	20.7333	WM BH
Pwinbyu	94.6672	20.3816	WM
Pyaswe	95.9333	21.2153	WM
Pyay (Prome)	95.2222	18.8202	(Duroiselle 1921; Luce 1969: 55 Vol 1; Aung-Thwin 2001b)
Pye Daw Thar island	95.143	19.864	WM
Pyinbya	96.2516	20.3461	WM
Pyinhladaw	95.6459	21.6252	WM
Pyinmana	96.2198	19.7307	(Aung-Thwin 2001b) WM
Pyinmana (Myitmana)	96.1652	21.3714	(ASB 1940-41: 32)
Pyugan	95.7008	21.1333	WM
Ruined pagoda	96.1008	21.5171	(Luce 1969: 30 Vol 1; Frasch 1996b; Win Maung 2000b)
Sabe	94.8123	21.2807	WM
Sagaing	95.9741	21.8812	(Duroiselle 1921; The Making of Burma 2000; Aung-Thwin 2001b)
Sagu	94.7662	20.2253	(Duroiselle 1921)
Saingpyu	94.7376	21.1059	(Ar Seinna)
Salay	94.7461	20.8343	(Duroiselle 1921; Pagan Newsletter 1986; Aung-Thwin 2001b) BH

Site	East	North	References and notes on data sources.
Salin	94.6634	20.5759	(Duroiselle 1921; The Making of Burma 2000; Aung-Thwin 2001b)
Salingyi	95.0847	21.9771	(ASB 1938:13; Moore 2003b) WM
Sama	96.0639	21.5574	(Duroiselle 1921)
Sambawak (Pyinsa)	93.2667	20.3833	(Thin Kyi 1970)
Sameikshe	96.084	20.8737	(ASI 1922; ASB 1922:10-11)
Sampanago	97.2317	24.2799	(ASI 1925-26; Luce 1969: 34-36 Vol 1)
San-nyat-khone	96.0156	23.4452	(Win Maung 1997; Min Han 2003a)
Sandoway (Thandwe)	94.3667	18.45	(The Making of Burma 2000)
Santon (Thindaung)	96.1416	21.6432	(Win Maung 2000b)
Sanyaung	94.7037	21.2122	(Ar Seinna)
Sayohpho	95.9966	21.8364	(Hein 1996: 185)
Sele	95.7161	20.4003	WM
Setuttra	94.2572	20.4445	WM
Shagwe	95.9592	22.4681	WM
Shaukkhar	95.406	22.483	WM
Shawbin	95.999	21.0502	WM
Shawbyugon	96.1497	20.6815	BH
Sheinmaga	95.9848	22.2822	WM
Shenme	94.9841	21.0944	(Hudson, Nyein Lwin & Win Maung 2002)
Shenme pagoda mounds	94.9868	21.0795	(Hudson, Nyein Lwin & Win Maung 2002)
Shenme pagoda mounds	94.9947	21.0848	(Hudson, Nyein Lwin & Win Maung 2002)
Shinbinsakjou	94.7464	20.7832	Sale Archaeology Department BH
Shwe Anadaw Phaya	95.0006	21.0889	BH
Shwe-gu-tamok-gyi	96.0548	21.6426	(Win Maung 2000b) BH WM
Shwe-in-dein pagoda	96.8776	20.4967	(Duroiselle 1921)
Shwebo	95.6984	22.5703	(Duroiselle 1921; Aung-Thwin 2001b)
Shwegu	96.802	24.212	WM
Shwenyaungbu	96.1955	20.5865	(ASB 1907: 14) WM
Shweyinma	95.4333	21.9833	(Duroiselle 1921)
Shwezayan	96.2177	21.8385	(Duroiselle 1921; Myint Aung 2002: 26) Archaeology Department, Mandalay
Shwezigon	94.897	21.1954	(Pe Maung Tin & Luce 1923; Pichard 1992-2002)
Sibindhar	95.9171	20.6999	WM
Siboktra	95.5672	22.7289	WM
Sin-shin	94.7804	21.9648	EB
Sinbaungwe	95.1649	19.7229	(Aung-Thwin 2001b)
Sinbo	97.0353	24.7693	WM
Sinde	95.2	18.7833	(ASB 1919: 42)
Singaing	96.1004	21.7335	(Duroiselle 1921)
Singu	94.8603	20.9404	(Movius 1948) BH
Singu (A-chen-kuo)	96.0028	22.5478	(Luce 1969: 35, 37 Vol 1)
Singut	95.7843	22.2489	WM
Sitha	95.6684	22.6447	EB
Sittaung	96.5833	17.4583	(Aung Myint 1999a: 193)
Songon	95.2595	20.9824	WM BH NL
Spirit Cave	98.0141	19.5264	(Gorman 1970; Spies 2001) *Thailand*

Site	East	North	References and notes on data sources.
Sriksetra	95.3	18.8167	(Aung Myint 1999a: 67; Stargardt 2000; Campbell-Cole 2003) WM BH
Syriam	96.2423	16.7674	(Gutman 2001c)
Tabayin	95.3204	22.6891	EB
Tadagale	96.1667	16.8833	(ASB 1939: 5)
Tagaung	96.0145	23.5062	(Ka Tha Kan Set; Pe Maung Tin & Luce 1921; Luce 1969: 36 Vol 1; Aung Myint & Moore 1991; Than Shwe, Sein Maung Oo, Aung Thaw *et al.* 1993; Win Maung 1997; Sein Myint 2000; Chit San Win 2003; Einda Swe 2003; Min Han 2003a, 2003b)
Tagu	99.0292	12.2507	(Luce 1965: 281)
Taikkala	97.0909	17.2219	(Myint Aung 1977)
Talok Myo	95.3854	21.57	(Duroiselle 1921; The Making of Burma 2000)
Tamok	96.0514	21.6465	(Luce 1969: 30 Vol 1; Win Maung 2000b)
Tanggyi Taung	94.7998	21.1498	(Ar Seinna) BH
Taplaksa (Taphetka)	96.0662	21.8112	(Luce 1959b)
Tatkon	96.2174	20.1146	(Nyunt Han, Win Maung & Moore 2002)
Taung-oo	95.4899	20.8006	WM
Taungba	94.9656	21.1259	(Hudson, Nyein Lwin & Win Maung 2002)
Taungba pagoda	94.9681	21.1193	(Hudson, Nyein Lwin & Win Maung 2002)
Taungba pottery site	94.9653	21.121	(Hudson, Nyein Lwin & Win Maung 2002)
Taungbyongyi	96.1359	22.0832	(Duroiselle 1921; Luce 1969: 35, 37 Vol 1)
Taungdaung	95.3192	20.5822	WM
Taungdwingyi	95.5333	20	(Duroiselle 1921; Aung Myint 1999a: 342)
Taunggaing	96.1396	21.8013	(Aung-Thwin 2001b) WM Archaeology Department, Mandalay
Taunggwin	95.1507	19.8831	WM
Taunggyi	95.7997	20.3168	WM
Taunggyi	97.039	20.7801	(Aung-Thwin 2001b)
Taungle	95.6863	18.8831	(Aung-Thwin 2001b)
Taungtha TS	95.4455	21.2752	Archaeology Department, Mandalay
Taungthaman	96.0679	21.8927	(Scott 1900: 242 Vol 5; Stargardt 1990; Moore & Aung Myint 1993; The Making of Burma 2000)
Tavoy (Darwei)	98.2019	14.0824	(Luce 1965: 278; The Making of Burma 2000)
Tazaung	95.3291	21.4426	BH
Tebya	94.715	21.1924	(Ar Seinna)
Telebin	95.7989	20.6507	WM
Tenasserim (Taninthaye)	98.9333	12.0833	(Luce 1965: 282; Aung Myint & Moore 1991; The Making of Burma 2000)
Thabeikkyin	95.9795	22.8831	(Aung-Thwin 2001b)
Thagara	98.1667	14.175	(Ngwe Ngwe Soe 2000)
Thaminthat	94.7331	22.2491	(Morris 1938)
Thanbo	95.1665	20.8987	WM
Thanbo	95.5834	21.7168	WM
Thanbo	94.7509	21.4265	WM
Thanbo	95.2007	21.2862	WM
Thanbo	95.3485	19.7555	WM
Thanbo	95.9501	20.4502	WM
Thanbo	95.6799	22.7382	WM
Thandok	98.7266	12.3484	(Luce 1965: 280; Luce 1969: 27 Vol 1)
Thaputtaw	95.6958	22.5933	(Duroiselle 1921)
Tharawaddi (Tharyarwati)	96.7667	18.3	(Aung Myint 1999a: 297; The Making of Burma 2000)

Site	East	North	References and notes on data sources.
Thaton	97.3667	16.9167	(Luce 1969: 134 Vol 1; Aung Myint & Moore 1991; Baby 2000)
Thawatti	95.1715	19.6324	(Duroiselle 1921)
Thayakon	96.9125	17.5444	(Aung Myint 1999a: 279; The Making of Burma 2000)
Thayet	95.1839	19.3164	(Aung-Thwin 2001b) WM
Thazi	96.0623	20.8524	Archaeology Department, Mandalay
Thegon	95.4238	18.6504	(Aung Myint & Moore 1991; Aung Myint 1999a: 89)
Theingon	96.1108	20.7028	WM
Theinyin Yazago	95.0625	22.4117	(Kyi Kyi Hla 1998; Moore & Pauk Pauk 2001)
Thetpan	95.9347	21.5671	(Duroiselle 1921)
Thinban	95.9489	21.8172	*Za-bu-kon-cha*
Thitsein (Sac Chim)	95.95	22.4182	(Aung-Thwin 1998: 76; The Making of Burma 2000)
Thitsongyi	95.8627	20.4569	WM
Tilin	94.0983	21.6841	(Duroiselle 1921)
Tondaw	94.5	18.1667	(Luce 1985: 50 Vol 1)
Tonngel	96.0172	23.5835	(Sein Myint 2000)
Toungoo (Ketumati)	96.4333	18.9333	(Luce 1969: 38 Vol 1; Aung Myint 1998a; Aung Myint 1999a: 309)
Toungoo Neyinzara	93.2618	20.5989	(Thin Kyi 1970)
Toungoo-how	96.3167	18.9333	(Aung Myint 1998a; Aung Myint 1999a: 323)
Tuti (Suti)	95.0163	20.985	BH
Tuti (Suti) ash lens	95.0159	20.9993	BH
Tuyin Taung	94.9443	21.1235	(Pichard 1992-2002) BH
Twante (Dala)	95.9398	16.708	(Luce 1969: 20 Vol 1; Myo Thant Tyn 1999)
Twinywa	94.8526	21.1094	(ASB 1917)
U-Hnaung-Kon	95.4333	21.9136	(Sein Maung U 1981) WM
Uyinzu	94.7236	21.1598	(Ar Seinna)
Vesali	93.1516	20.6719	(San Tha Aung 1979; The Making of Burma 2000; Gutman 2001b)
Waddi (Wati)	95.7246	21.3893	(Frasch 1996b; Aung Myint 1999a: 39)
Wadi	96.1125	20.5497	WM
Wagaru	97.7174	15.9882	(Myint Aung 1977; Aung-Thwin 1983: 18; Aung Myint 1999a: 227)
Waiponla Cave	97.7143	16.9301	(Tin Thein, Aung Naing Soe, Soe Thura Tun *et al.* 2001)
Waw (Kyontu)	96.6833	17.4667	(Aung Myint & Moore 1991)
Wedi	98.1833	13.9667	EB
West Twintaung	94.9668	22.2811	WM
Wetchanyo	96.1671	20.153	(Nyunt Han, Win Maung & Moore 2002: 3) Archaeology Department, Mandalay
Wetlet	95.7923	22.3646	WM
Winka	97.0929	17.2119	(Myint Aung 1977; Aung-Thwin 1983; Aung Myint & Moore 1991; Myint Aung 1999)
Wunbye	95.5491	21.9364	(*New Light of Myanmar, March 27* 2004)
Wundwin TS	96.0347	21.094	Archaeology Department, Mandalay
Yamethin	96.1303	20.4284	(ASB 1922; Aung-Thwin 2001b) WM
Yanaungmyin	96.1333	19.6667	(Scott 1900: 377 Vol 5; Aung Myint 1999a: 265; *New Light of Myanmar, March 15* 2004)
Yanbo	96.7234	23.5347	WM
Yatsauk	96.9038	21.2583	WM
Ye	97.8089	15.1258	San Win
Ye-u	95.4314	22.7692	WM
Yelungyaw	96.0043	21.8329	(Hein 1996: 185)
Yemein	95.013	21.8994	(Duroiselle 1921)

Site	East	North	References and notes on data sources.
Yenangyaung	94.8775	20.4606	(Swinhoe 1903; Morris 1936b; Movius 1948; Aung-Thwin 2001b)
Yenatha	96.1498	22.2984	(Luce 1969: 35, 37 Vol 1) EB
Yezin (Thayetkhon)	96.25	19.7667	(Aung Myint 1999a: 273)
Yindaw	95.7138	22.4318	(ASB 1940-41: 25)
Yonhlut	94.9667	21.1147	(Hudson & Nyein Lwin 1999; Hudson, Nyein Lwin & Win Maung 2002)
Ywahtinkon	95.9467	20.5809	(Ko Ko Kyaing 2003: 55-56; Pautreau, Mornais, Coupey *et al.* 2003) WM
Ywalay	95.488	21.7649	WM
Ywamonggyi (Ranun)	96.0973	21.503	(Luce 1969: 30 Vol 1)
Ywasaik	94.8918	21.15	BH
Ywasin	95.3879	21.5514	(Duroiselle 1921)
Ywatha	95.0799	22.4147	(Sein Myint 1999b)
Ywatha Wetchaung	94.9037	22.4389	WM
Ywethi	96.1059	21.0742	WM
Zagyandaung	96.1386	20.5748	WM
Zagyangon	96.015	21.1196	(Win Maung 2003b)
Zayyawati (Zeyawadi)	96.4536	18.5442	(Aung Myint 1998a: 43-44; Aung Myint 1999a: 333)
Zi-o	95.0411	21.1087	BH NL
Zokthok	97.1656	17.1666	(Aung Myint & Moore 1991; Moore 2003a)

3. Myanmar thermoluminescence dates.

In 1975, Pamela Gutman, who was undertaking a PhD, submitted 21 pottery and brick samples for thermoluminescence dating at the Australian National University. The results were not used in her thesis, but they were reported to the archaeologists in (then) Burma who had been involved in the sampling, and at least one has been published (Myint Aung 1999). Dr David Price, the lab supervisor at the time, who now runs the thermoluminescence dating laboratory at the University of Wollongong, stressed in a meeting in December 2003 with Dr Gutman and the author that this data must be viewed in terms of the relatively experimental stage of thermoluminescence dating at the time. The samples and their matrices were not tested at the time of sampling for gamma radiation levels. Age is estimated at three levels of confidence, with two asterisks the greatest.

Table 17 Myanmar thermoluminescence dates.

No.	Site	Site details	TL plateau reliability	TL age BP (P=AD 2000)	Age	Age*	Age**	Lab notes	References
1001	**Shwezaryan**	Site 3, trench D3	1/3 1/3 ? ?	5000 5565 3820 3230*	**3000 BC** **3565 BC** **1820 BC**	**1230 BC**		Retest	
1002	**Shwezaryan**	Site 5, trench E4	3/3	2120 1980*	**120 BC**	**AD 20**			
1003	**Shwezaryan**	Site 8, trench B6	4/4	2270 2210*	**270 BC**	**210 BC**			

No.	Site	Site details	TL plateau reliability	TL age BP (P=AD 2000)	Age	Age*	Age**	Lab notes	References
1004	**Shwezaryan**	Site 2, trench D2	2/3	2240*		**240 BC**			
1005	**Taungthaman 3**	Trench A2, Sherds with skeleton 3	1/3	2360 2560*	**360 BC**	**560 BC**			Other Taungthaman samples were tested at Oxford (Fleming 1979: 122, 127; Stargardt 1990: 16)
1006	**Taungthaman 5**	Trench C2, hearth sherds	1.5/3 2/3 3/6	_ 1340* 1140*		**AD 660** **AD 860**			
1007	**Taungthaman 7**	Trench B3, foot of skeleton 5	2/3 3/3 4/4	_ _ 2150*		**150 BC**			
1008	**Tauk-ma-gon**	Site 2, trench E10	2/3 2/3 3/3	2420 2680* 2560*	**420 BC**	**680 BC** **560 BC**			
1009	**Beikthano**	Brick, KKG 18, C6/2	3/3 2/2	940	**1060 AD**			Fading test OK	(Aung Thaw 1968; Bronson 1969)
1010	**Beikthano**	Sherd rim, KKG 2, DA/2	3/4 3/3 3/3 6/6	_ 1230** 1690 1340*	**AD 310**	**AD 660**	**AD 770**	Later test	
1011	**Beikthano**	Sherd, KKG 15, B5/3	2/3 4/4	1920* 1560**		**AD 80**	**AD 440**		
1012	**Beikthano**	Sherd, KKG 3, G9/3	3/3 6/6	1610**			**AD 390**	Mean value	
1013	**Sriksetra**	Sherd, HMA 13, G6/4	2/3 6/6	2190 1290*	**190 BC**	**AD 710**			
1014	**Sriksetra**	Sherd, HMA 10, E7/3	6/6	590*		**AD 1410**			
1015	**Halin**	Sherd, HL 11, I3/3	3/3 6/6	1120 950*	**AD 880**	**AD 1050**		Mean value	(Myint Aung 1970)
1016	**Halin**	Sherd, HL 11, D3/2	3/3	1570	**AD 430**				
1017	**Ayetthema (mound)**	Sherd, AYT 1, XXVI-XXIX/11	3/3 3/3	~500	**AD 1500**				Results published (Myint Aung 1999)
1018	**Ayetthema (mound)**	Sherd, AYT 1, XXVI-XXIX/11	2/2 6/6 6/6	_ 270* 290	**AD 1710**	**AD 1730**		Later test	Results published (Myint Aung 1999)
1019	**Padah-lin**	Sherd PDL2B/TR11	3/3 6/6 6/6	2250 2400++ 2680++*	**250 BC** **400 BC**	**680 BC**		Assume + 1% K2O ++ 2% K2O	(Aung Thaw 1969, 1971; Myint Aung 2000)

No.	Site	Site details	TL plateau reliability	TL age BP (P=AD 2000)	Age	Age*	Age**	Lab notes	References
1020	**Padah-lin**	Sherd PDL 1AV/44	3/3 3/3	2200+ 2480+ +*	**200 BC**	**480 BC**		Assume + 1% K2O ++ 2% K2O	
1021	**Dhanyawadi, Arakan**	Brick, base of Maha-muni temple	3/3 3/3	_ 1040	**AD 960**				(Gutman 2001b, 2001a)

4. The Za-bu-kon-cha, or Net of the Southern Islands.

Early Burmese documents were written initially on strips of palm-leaf with a metal scriber, and later on parabaiks, folding books made from paper. Parabaiks survive from the Konbaung period, 1752-1885, onward (Herbert 1999), while existing examples of palm-leaf documents have been dated to the fourteenth century AD (Singer 1991). The English mariner Ralph Fitch, in the late 16th century, visited Pegu (Bago) and described "supplications written in the leaves of a tree with the point of an iron bigger than a bodkin. These leaves are an ell long (114 cms) and about two inches (5 cms) broad; they are also double" (Fitch 1981). The palm-leaf form, reproduced and preserved as gold sheets, appears in Burma much earlier, in the middle of the first millennium AD (Stargardt 1995). The traditional account has it that the Buddhist scriptures were first written down on palm leaves in Ceylon, in 94 BC (Pe Maung Tin & Luce 1923: 28). A definitive study of traditional documents can be found in Thaw Kaung (1997). Two traditional documents have been translated into English for the purposes of this thesis; both, as far as the author is aware, for the first time. A translation of a parabaik held at the Archaeology Department at Bagan, *A Brief History of Bagan*, has already been published (Hudson 2003b: 111-133). The second translation, a chapter of a palm-leaf manuscript version of the *Za-bu-kon-cha*, appears below.

The *Za-bu-kon-cha* is attributed to Po Yaza (Wun Zin Min Yaza), tutor to crown prince (later King) Min Khaung, whose father Minkyiswa Sawke reigned 1368-1401. A version titled *Zambu Kungya Po Yaza Mu Haung*, dating to 1825, is held on microfilm at the India Office in London. A "new" version of this chronicle was mentioned in a bibliography compiled by the librarian of the Mandalay palace in the 19th century (Tet Htoot 1961: 50-62). A handwritten copy of the *Za-bu-kon-cha* used for this translation was made in 1959 by the scholar U Pe from a manuscript in the library of the Archaeology Department in Mandalay. Section Two of this, the history of the early cities, has been translated into English. It differs quite dramatically from the standard histories of U Kala and the *Glass Palace Chronicle* (see Chapter 1). In particular, it accords considerable importance to Halin and Maingmaw, sites which are linked archaeologically to the pre-Burman era, but which were effectively ignored in the major historical documents. The remaining ten sections of the 1959 Mandalay copy deal with legendary Buddhist history, the histories of specific pagodas and small towns, taxation matters, and the later histories of Sagaing and Ava (Inwa).

A note at the end of the second section says that "this chronology has been complied in brief after having been excerpted from a number of chronicles so that it might be remembered easily". The parabaik goes into great detail over the legendary names of cities, and its author has used the dramatic device of holding back the familiar name of a site until the very end of the section. For the convenience of the reader, this has been pre-empted by the use of sub-headings. The translation

by Thaung Lwin, with editorial input by Win Maung, has kept to the syntax and language of the original Burmese. It was considered preferable to retain what are occasionally quaint renderings rather than to risk losing the meaning by trying to Anglicise the text too strongly. Metric measurements, dates in years AD and explanatory words or phrases in parentheses have been added in an attempt to enhance and clarify, or at times comment on, the meaning.

The Za-bu-kon-cha, Part 2.

Halin

In the earliest times of the world cycle lived Pyu inhabitants along the Ayeyarwady River in the Glorious City of Hanthawady. The first monarch, known as Ya-htaung (literally, King One Hundred-One Thousand), ruled over the city of the Pyu kingdom. Afterwards, another Pyu king Ka-ta-ra reigned in the capital city. The last Pyu king was Ban-da-wa. There was a long line of eight hundred kings who ruled over the city of Hanthawady, starting from the Pyu king Ya-htaung. During the reign of King Let-khine-sao-yan-nit rains of treasure poured twice. The first rain fell to the depth of the palmyra tree in the state of horizon. The following rain poured down to the depth of knee level. During the rule of Pyu king Ban-da-wa, his younger brother Pyonn-minn-htee had seven significant smiles and there had been rains of treasure seven times. On account of such extraordinary fame, the southern side commander-in-chief was sent to observe the site by Nga-taung-ngae. Pyonn-minn-htee, younger brother of King Ban-da-wa, got to know that his elder brother's spouse had committed sexual misconduct with a dog, by his divine eyes, and therefore he felt uneasy and he did not make a smile. Rain of treasure also ceased to fall down. The elder brother, Pyu king Ban-da-wa, realised that his younger brother did not smile even when dignitary from alien nation came for observation, and he became angry not to have significant rain of treasure and later he executed his own younger brother.

The attendants were in the opinion that if their king was so ruthless that he even killed his own younger brother, who was a powerful personage, they might also face such baneful incidents, and so they fled from the city. So did the *nagas*. Therefore the place from where the dragons (serpents) ran away by struggling has been called Na-ga-yon up until now. The place from which the dragons fled gradually was called Nyaung-ywei. The ruler and the ancient city were swallowed by the earth and Hanthawady ceased to be the seat of the kingdom.

The reason why the city was known as Hanthawady was that Kakusandha Buddha, the first enlightened one of this world cycle, became a *hamsa*, a kind of Brahminy shell duck in one of his previous existences. During the reign of Let-khine-sao-yan-nit there appeared Kakusandha Buddha himself. The ancient city was known as Hanthawady. During the lifetime of Kakusandha Buddha it was named Mit-hsi-ma, and the city was also called Hanthanagara. It was called Gamawady when Kassapa Buddha appeared. When Prince Siddhartha became Gautama Buddha the city was under the name of Halin. Especially when the Pyu ethnic groups ruled over the city it was popularly known as Hanlin.

Ava (Inwa).

From the city of Hanthawady, it later became Ya-da-na-pura-thu-na-pran-ta. In that glorious city ruled the first monarch Pa-don-ma-san-dha-thu-ri-ya. The last ruler was Ka-la-bu. Starting

from King Pa-don-ma-san-dha-thu-ri-ya right up to King ka-la-bu there was a long line of rulers numbering one hundred and ten. There appeared three rains of treasure during the reign of King Pa-don-ma-san-dha-thu-ri-ya. Rains of treasure fell twice when Wa-rohn-na became king. There was one rain of treasure in the time of King Wa-thu-ba. King Ka-la-bu committed the sin of making schism among the free, independent people from all walks of life. Among them were one would-be lesser Buddha and two Buddhist holy saints. That king also committed sin by insulting a hermit by the name of Khan-ti-wa during his trip to the royal gardens. Since a number of sins were committed by that king against holy dignitaries held in great veneration, he was swallowed up by the earth, right to hell. A devastating onslaught of double-edged sword was made by ancient kings, and the inhabitants were dispersed into three groups, and there became three different settlement areas. It was the fall of the city. One group went to Rakhine Dhanyawadi, another group to Ta-ninn-tha-yee (Tenasserim) and the third group to Da-wae (Tavoy). Therefore there became three different residential settlements of destiny. The place where the king was swallowed by the earth has been known as Nga-yin-gwae up to now. The place which was vividly seen as a mound was named Taung-ba-lu. Thrir-san-dha, minister of the king, left only after washing the holy hermit. The surviving ground was partly known as Man-dha-gi-ri, which implies Kyet-yet Hill. Another settlement was named Hnget-kyee-htee-hline-ga, which means Htee-hline-shin cave. Another site was named Chinthe (the Burmese word for lion), later known as Tada-U. The fourth place was Taung-ba-lu. These four settlement areas were in equal portions. When they fell, the unjust unscrupulous persons also fell with their ruined cities. Only good-natured kind-hearted people survived. Ya-da-na-pura-thu-na-pran-ta city was also damaged.

At the time of King Pa-don-ma-san-dha-thu-ri-ya the city was called Ayeyarwady Kam-pa-dha-na. When Wa-rohn-na ruled as the king, it was called Pu-ran-tup-pa. During the lifetime of Kakusandha Buddha, the city was called Ya-da-na-pura-thu-na-pran-ta. When Konagamana Buddha appeared, it was called Ka-ma-wa-sa-ra. The city was known as Aye-tha-ta during Kassapa Buddha's time. When our fourth and most recent enlightened one, Gautama Buddha, was alive, it was the city of Tam-pa-dee-pa. The city became Ava (Inwa) in the reign of King Da-zee-shin. During the rule of Tha-doe-minn-phya the city was popularly known as Yadanapura Ava.

Makkhara (Hmetkaya).

Indra (Sakka, the Hindu lord of thunder), in the hope that a new settlement area would be established so that the monarchy line could not be stopped, let Minister Thi-ri-san-dha set up the city of Mag-ga-da-rit to the eastern side of the city of Yadanapura. In the beginning King Thi-ri-san-dha rules over the city and the last monarch was Sao-oo-zwa. A long line of 160 kings ruled over the city. In the reign of Gya-binn-sao-yan-nit there appeared four auspicious trees of variety and bountifulness. When well-wishers who had already performed meritorious deeds approached these significant trees, the branches lowered themselves towards those who made works of merit. On the other hand, if those trees were approached by pagan, unscrupulous persons, they were struck by the branches like an elephant's trunk.

The city of Mag-ga-da-rit ceased to be the royal capital after it had existed for a long time with law and order and justice. It was called Mag-ga-da-rit when Kakusandha Buddha appeared. During the lifetime of Konagamana Buddha it was the city of Ma-ha-ga-rit. It was known as Mak-kha-da-rit at the time of Kassapa Buddha. It became Mak-kha-ya (Hmetkaya) when Gautama Buddha, the fourth and most recent enlightened one of this world cycle, appeared. The place was the very one where the four enlightened ones were in their previous existences.

Pinle (Maingmaw).

From the city of Mag-ga-da-rit the capital moved to Ost-shin-pyin-sar-li-rit, which was founded by King Wa-na-ta-ka-lu-toppa. The last monarch was named Sei-teik-tha. The number of kings of the dynasty was 97 in total. Dham-ma-thon-dha was in search of a holy person who would administer the law with money numbering one thousand but he was not successful. He handed over the ruling authority to his spouse and the minister, and left alone. Thereupon Pan-du-ga-ba-la, the emerald stone slab seat of Indra became stiff, and the god had a vision of King Dham-ma-thon-dha looking for one who would deliver the law. Indra transformed himself into an ogre (*bilu*) and administered the law to that king, and later the king was brought to the abode of the celestial beings in the upper realm. On his return to the level of the human beings and his entrance to the royal city silver rains fell eight times. He was also presented a spouse, daughter of U-tee-bwa, ruler of the Chinese province.

A flying white elephant named Sad-dan was also offered by Indra, chieftain of the celestial beings, and he even reached right up to the outer wall of the universe three times. During the reign of Sei-teik-tha taxes were to be paid on the demise of the minister, and a legacy was also asked upon passing away of the commoner. All the worker people were in the process of misery. Indra, chief of celestial beings, descended from the abode in the upper realm to the level of human beings in order to offer words of advice. Indra had to face jealousy and therefore he called upon the guardian spirit of the ocean to over-run that city. Guardian spirits of the ocean came bringing in gigantic waves so as to destroy the city. King Sei-teik-tha made a request not to ruin the city and he offered his beloved daughter. The guardian spirits refused to take the daughter since they considered it was not appropriate to receive the gift of a human being. Instead they advised the king to follow Indra's words of suggestion. The sea level rose high up and the city was ruined. King Sei-thik-tha, after his passing away, suffered in one of the four lower levels of hell. The unjust, unscrupulous persons also floated in the current in disorder, flowing from the sea. Only those who had justice and peace survived. During the lifetime of Kakusandha Buddha the city was known as Na-ma. When Konagamana Buddha appeared the city was called Na-ma-patt-hta-ka. It was later named Ut-ta-ra in Kassapa Buddha's time. It was also called Ut-yaung-pyin-sa-la-rit. In the time of the Pyu inhabitants the city was known as Pinle (Pinle is a today a village on the edge of the walled Pyu complex which is known as Maingmaw, the name of another village there).

Kaungsin.

Ut-shin-pyin-sa-la-rit ceased to be the city and another one followed, named Kaung-sin. The first ruler of this city was King Peik-pa-li-ta-na-ra and the last monarch was King Tha-hatt-tha. Thirty kings ruled over the city. During the reign of the king of evil Tha-hatt-tha elderly persons were called to the royal court and their hair strands were untied, certain traditional concoctions were poured on the hair and they were treated mercilessly. Marks were also made on every commoner and they were identified ruthlessly. On account of the unbearable misery of the worker people, the whole city boiled over and the celestial beings reported to Indra, their chieftain. When the advance troops of 900,000 got to Rakhine, the Rakhine inhabitants unitedly made *ya-da-ya*, performed to ward off evil, in the creek of Paung-ton-tha-lu. On account of this performance, the Chinese troops dared not approach and went back home. They died somewhere between Myanmar and China. And it was the fall of the city of Kaung-sin-gan-dha-la-rit.

Allagappa.

After the fall of the city of Kaungsin, Ala-ka-pa became the city where U-da-ka was the first king and Pa-pa-ta ruled as the last monarch. There were 26 rulers in that dynasty. At the time of King Pa-pa-ta, 90,000 ministers served under that king and he executed 10,000 of them and taxes had to be submitted to the ruler. The remaining 80,000 were afraid of execution and there was rebellion in the kingdom. The ogre Nga-wet-taung destroyed the city and therefore there was no enthronement for 200 years. After 200 years A-tha-ka became king and made great donations after opening the treasury and the barns kept by a line of 26 kings. The king gave away gold and money to all walks of life in his kingdom. He contributed properties to the working people for seven years and seven months and the properties were automatically multiplied. The king sent his messengers to hear the real voice of the people regarding the success of his rule, and the whole kingdom was at peace. Tradition has it that there was no guard nor patrol needed for security purposes. The king heard about this and stretched out his arm and thereupon rains of treasure fell six times. The *nagas* felt satisfied and spat out the finest quality of gold. It was known as Inn-gyee-khin-bin up to the present time. A-tha-ka lived up to 500 years. From King A-tha-ka up to King Ka-ya-na there was a long line of 50 kings who ruled over the city. King Ka-ya-na he made a revolution in his administration, putting outsiders into the royal court and vice versa. The rank of minister was conferred to the commander-in-chief and vice versa. The status of the richest was offered to the have-nots, and the richest were presented the status of have-nots. There was no justice, no stability, no law and order and therefore there was no truthfulness. Owing to this unjust ruling, there was drought for three years. There were no certain rules and regulations in judicial affairs and the working people were suffering from hunger. Since that king was an unjust ruler, a rain of fire fell down. Ala-kaw-than-bi was destroyed by the ogre. The city was known as Att-tha-kan during Kakusandha Buddha's time, called as Wa-ra-dee-pa in the time of Konagamana Buddha, named Ha-ru-pa-ti in Kassapa Buddha's appearance and was named Ala-ka-pa-kaw-tham-bi during Gautama Buddha's lifetime. During the Pyu nationals' time it was known as Ywa-pu-gyi.

Legaing.

After Allagappa fell, the capital became Pu-ran-tapp-pa. The first king was Ya-za-dham-ma and the last monarch was King Thu-datt-tha-na. Forty kings ruled over the city. As justice reigned, hierarchy ceased in Pu-ran-tapp-pa city. It was known as Wa-ma-hatt-hta during Kakusandha Buddha's time, as Pa-pa-wun-ta in Konagamana Buddha's time, as Pa-pa-li-ta during Kassapa Buddha's time and as Pu-ran-tapp-pa in Gautama Buddha's time. When the Pyu national races ruled it was named Legaing.

Tagaung.

After Pu-ran-tapp-pa city was damaged, Thin-tha-ra city also emerged. The first king was Tha-doe-taing-ya and the last one was Tha-doe-minn-htee. Seventy seven kings ruled over the city. Of these, 32 ruled for just seven days each, and they were struck dead by the *naga*. There were four rains of treasure during King Tha-doe-taing-ya's time. Two rains of treasure fell during the reign of Tha-doe-shwe-yit. King Tha-doe-taing-ya planned to build the royal palace. It took three years and seven months. Gold plates were put under all the posts located in the central court, and silver plates were placed under all the surrounding support posts. For the top of each post in the main palace, two Buddhist saints had to perform religious rites, chanting discourse

on benevolence. The saints were supplied with a ruby pot and a gold pot. For the top of each surrounding post, ordinary Buddhist monks performed religious duties of reciting a sermon about loving-kindness with one silver pot and one earthen pot each. For the upper post, *nagas* and celestial beings performed the necessary arrangements. All of the dots, plaques, columns and captions were made by celestial beings. For the lower portions, necessary things were managed by the inhabitants of sixteen settlement areas of Thaw-la-tha-na-goh, and all the dots, plaques and the writings were done by human beings. In the middle were a thousand pavilions, each with nine tiers. In the central palace main hall were placed each with four faces on the interior. On all four sides were kept two Buddha images for interior and two for exterior according to the corresponding planets. On the western face, right hand side and left, causeways were built for the celebration of Thingyan, the festival of water meant for the transitional period from the old year into the new one. When the king was so as to perform the significant ceremony of enthronement, the necessary arrangement was made with a royal palace made of earth. Causeways were also erected for Thingyan celebrations. For the auspicious Thin-gyan water festival clean clear water from the five great rivers, namely Na-wa-datt lake, Thi-da etc. was brought by celestial beings. The crystal clear water from these five great rivers was mixed with that of the Ayeyarwady River and the festival of water was held in a grand scale with the chief queen, lesser queens and other attendants. The working people had to celebrate and mark Thingyan, the change when water festivities were celebrated on that same day.

After holding the Thingyan festival, the king ascended the earthen royal palace. On the king's ascension to the royal palace the chief of the gods, Brahma, and the leader of the *nagas* were seated on the right hand side whereas Indra, the chief of the celestial beings and the guardian spirit of rain were placed on the left. Prophets, court astrologers holding aloft the eight conches and making a clockwise circle performed the significant, auspicious coronation ceremony. That monarch together with commander-in-chief, soldiers and ministers numbering 100,000, two chief queens, 7,000 lesser queens, 900 white umbrellas and best-bred Thein-daw horses numbering 1,800 accompanied by the envoys and the followers ascended the earthen royal palace. After stepping up the earthen royal palace, the king continued to the central royal palace hall and had a coronation ceremony. After the coronation ceremony, the king partook of the royal steamed rice in the court. Golden pots for steamed rice numbering 770 and the same number of gold pots for curries had to be managed. These steamed rice and curries were to be prepared on the Manao plates numbering seventeen and these portions of steamed rice were offered to the corresponding Buddha images according to the planetary post. In addition, offerings were also made dedicated to the governing spirit of Indra, the *nat* spirit guarding the royal umbrella, and those guardian spirits of the royal palace and the capital city. The offerings were also scattered on to the floor of the front section of the royal palace to let them be eaten by two cats. The king also caused two of his attendants to have a portion. The human beings and the cats had to eat the steamed rice and curry with one hour's wait between men and cats. Only when it was one hour after the men had taken their share, the king started having steamed rice and curry. The crown prince and all the court members ate as much as they could. Tha-doe-taing-ya lived up to 500 years. He had got two sons and ten daughters from his two chief queens. He had his sons and daughters married. There were 700 queens who bore sons. The great drum of the host was presented by angels. Two *mu-yoe* drums had been hung, one on each side of the white umbrella which was something special. One pauk-cho drum, one kan-byinn drum, one drum made from Indian magnolia, one rose-wood drum and one drum made from teak wood were measured (1.8 metres) on both ends. The king also possessed five large bells, namely nar-daw-shaw, nar-daw-tin, nar-daw-bar, nar-daw-zaunt and nar-daw-than. King Tha-doe-taing-ya lived for 500 years.

Tha-doe-hsin-deinn, the last king, had eight Brahmin court astrologers. He caused a schism among the Brahmins, nat spirit mediums, pagoda slaves, monastery slaves and among those who had been set free from royal punishment. All the remaining inhabitants transferred to the place named Ton-ngae. This locality was known as Thin-tha-ya in Kakusandha Buddha's time, as Rat-hta in Konagamana Buddha's time, as Thinn-dwae in Kassapa Buddha's time and it was named Tagaung during the lifetime of Gautama Buddha.

Sriksetra.

After the fall of Thin-tha-ya Tagaung city there appeared the city of hermits. The first monarch named Ma-ha-tham-ba-wa ruled over the city and the last ruler was called Thu-pyin-nya-na-ga-ra-hsein-na. There were 26 rulers in that dynasty. The famous powerful king Duttabaung after ascending the Thu-na-gi-ri-pabb-ba-ta-ra royal palace and having glimpses of the sky upwards, rains of treasure fell down five times. During the reign of King Nga-da-bar there were two rains of treasure. On account of not being able to utilise gold and silver, a large number of stupas were built of bricks. Indra, Lord of Thunder, could foresee the disaster as regards four different kinds of warfare and destroyed the stupa, dropping it into the ocean. The king, having regret not to perform works of great merit, replaced the gold and silver, keeping on 30 female elephants and finally putting them into the *pandal* (a temporary structure for religious functions). At the time of King Thu-pyin-nya-na-ga-ra-hsein-na the city of the hermits was destroyed according to the prophecy of being destroyed by the traditional sieve (the "winnowing tray" legend and the story of the hermit are detailed in the *Glass Palace Chronicle*). The city was known as Pa-pon-na-wady during Kakusandha Buddha's time, and later known as Sriksetra in the lifetime of Gautama Buddha. The city was called "hermit's kingdom" only during the reign of the holy hermit, brother-in-law of the king of Tagaung.

Bagan.

After the hermit's kingdom was destroyed the glorious city of Bagan was established. The founder of the glorious Bagan dynasty was King Thamoddarit and the last king was Sao-mon-nit. There was a long line of 55 kings who ruled over the glorious city of Bagan. During the reign of the founder, King Thamoddarit, there appeared a rain of treasure. At the time of his son-in-law Pyu-min-hti (Pyusawhti), after having celebrated the auspicious coronation ceremony and ascended the throne of Bagan, the people of Bagan experienced rains of treasure three times. During the royal administration of King Thinlikyaung, guardian *nat* spirits, who were elder brother and younger sister, arrived at the ancient city of Bagan. Their statues were kept at Mount Popa. The city had experienced rains of treasure four times. After the fall of the city of Bagan there was no more auspicious rain of treasure.

Myinzaing, Makkhara, Pinle, Ava and Pinya.

After the fall of the Bagan empire, in Myinzaing reigned three brothers of Pyau-their-ga-bo origin. Simultaneously Ya-za-thinn-gyan ruled in Myinzaing, A-thin-kha-ya was the ruler of Makkhara and in Pinle ruled king Thi-ha-thu. After Ya-za-thinn-gyan and A-thin-kha-ya expired, Thi-ha-thu shifted to Myinzaing and ruled there. Thi-ha-thu was of the opinion that if he resided in that place, it would be like restraining a bullock on the way up a mountain, and he

organised to have a large number of servicemen after having settled down his many troops. The number of people was 20½ million. His enormous army and the city of Ava were flooded. After the floodwaters receded a g*u-daw-thit* (new cave temple) was built. After the completion of that cave temple, the city of Ava had been established. The city was flooded three times. The first time, it was destroyed by turtles and the water level rose right up to the level of the floral decorated metal umbrellas on the pagodas. The second time it was destroyed by fish. The water level rose up to the level of the lotus flower-decorated *myuta* pots. The third time it was destroyed by a *bilu* wearing a red flower on his head. The ogre entered by way of the Win-ma-nar and Kyun-u gateways and he tore down the bricks. The people were shocked and they fell down to the ground. Out of 20,500,000 people who were affected by the flooding about 100,000 were killed. Messengers carrying circular gong were sent and ordered to strike those gongs hard. The sound made after beating gongs said that it would be the best to shift towards the southern cardinal direction. The king, having heard the sound made after striking gongs, went to Thinban. He prepared to set up Pinya, and dug up the earth at the spot of Shwezigon. After the excavation had been made, he found that the earth was the colour of gold. In addition, around 1,000 gold plates were unearthed. It was known as Pinya (Pann-yah) in the ancient times.

Sagaing.

From Pinya, the city was transferred to Sagaing. It was called Ut-ta-ra-pyin-sa at the time of Sagaing San-dha-thu-ri-ya. It was named Khi-na-tha-wa in the lifetime of Kakusandha Buddha. At the time of Konagamana Buddha it was known as Nei-la. At the time of Kassapa Buddha it was called Kau-pa. In the lifetime of Gautama Buddha the city was called Ya-da-na. Right at this time, the city is popularly known as Sagaing.

Sagaing was established by King Thi-ha-thu, the “Lord of One” or owner of one white elephant. The year was 689 Myanmar Chronological Era (AD 1327). The father king let his son A-thin-kha-ya-sao-ywan succeed him. After a line of six kings in Pinya and seven kings in Sagaing, the hierarchical line was destroyed. Sagaing and Pinya were destroyed by the Shan ethnic group in 702 MCE (AD 1340). The king of Sagaing was Minn-byauk, a descendant of a minister (hence not of royal blood). His wife was Soe-minn-ko-daw-gyee, the daughter of King A-thin-kha-ya-sao-ywan. She had previously been married to King Tha-doe-hsin-deinn of Tagaung, with whom she had a son, Tha-doe-minn-phaya. He succeeded his father as king of Tagaung. During the reign of Minn-byauk, the king of Pinya, Narathu asked to Mao-Shans to destroy the city of Sagaing, offering them the treasures of the city. The inhabitants of Sagaing moved to Kya-khatt-wa-ya, leaving behind only three elderly persons. They Shan became angry because there was no treasure, and they attacked Pinya. When the whole city of Pinya was destroyed Oks-sa-na-pyaung, elder brother of Narathu, was made ruler. Tha-doe-minn-phaya fought against his stepfather Minn-byauk in the village of Kya-khatt-wa-ya and became ruler of the population of Sagaing. Tha-doe-minn-phaya then came from Kya-khatt-wa-ya and executed Pinya Oks-sa-na-pyaung and ruled over the city. The king decided that Pinya could not be defended in war, and he moved his capital to Ava.

Ava.

Tha-doe-minn-phaya set up his royal hut at Nga-ra-wa. He considered himself to be a missionary monarch and he resided in the golden hall. He lived on the floor, leaning against the post of the royal golden hut. A python, as wide as a bamboo mat, mover under the ground.

When the python moved, the post in the golden hut vibrated. The king wondered why his golden hut was affected. He let his assistants search for the cause and consequently found the python. The python moved gradually, a movement described by the Myanmar word *athar*, which implies slowly, gradually, and in another context also means pleasant or auspicious. The king read this as an omen.

He ascended the throne of Ava in the year 726 MCE (AD 1364), the same year in which he had established the city of Ava. The king told his messengers strike a gong toward the south. The sound of the gong seemed to say "it is slim and small in size, at the junction of the two rivers, but with longevity". The king read in this omen that his royal city would be one with floating boats and floating oars and thus making economy and business. The king also thought of the establishment of Sagaing, and in this direction let his messengers beat the gong. This time, the gong beat seemed to say that "the female nether garment would be demanded and the feet would be good enough". The king interpreted this as meaning that the people would earn their livelihood depending on their own feet and there would be no rich men. One of his ministers reported that the ground level of the golden royal capital city was low. The king said that what the minister said was absolutely true, but that the ground level would rise due to the ashes from fires. On account of this saying, there was quite a number of fires in the city of Ava.

Ava had eight different names. The first was Ayeyarwady Tampatana. At the time of king Wa-rohn-na the city excelled in the aspect of attaining good, ethical conduct and therefore it was widely known as Pu-ran-tapp-pa. In the lifetime of Kakusandha Buddha the city was known as Ratanapura Thu-na-pran-ta, as valuable treasures and properties were abundant. It was famed as Ka-ma-wa-sa-ra during the lifetime of Konagamana Buddha because the glorious city was like that of the six abodes or levels of the celestial beings. In the time of Kassapa Buddha the city was called Ei-tha-ba, because it was more magnificent than all the other cities. The city was known as Tam-pa-dee-pa during the lifetime of Gautama Buddha since it was one of the great sixteen regions. During the reign of King Hsin-byu, the owner of the white elephant, it was known as Ava because the city was located where a number of lakes and rivers met together. During the time of King Tha-doe-minn-phaya the glorious city was named Ratanapura Ava, on the aspects that it had been called Ratanapura at the time of Kakusandha Buddha. It had been called Ka-ma-wa-sa-ra at the time of Konagamana Buddha because the glorious city was situated right at the water. Thus there are eight titles related to the city of Ava, now known as Inwa.

5. Glaze ware up to the Bagan period: some problematic issues.

Observations in the colonial period.

Pottery, like all other economic activities, was of interest to Burma's colonial administrators. In the late 19th century it was noted that production of earthenware and/or glazeware was taking place in centres from Shwebo in the north to Twante in the delta, and to the east in Shan state. The work was done in the dry season, and potters needed to follow other occupations, mainly agriculture, during the rains. Unglazed ware was made on a slow wheel, and shaped with a clay anvil and wooden beater. Glazing with lead slag, galena (natural lead sulphide) or copper sulphate was observed (Taw Sein Ko 1895; Scott 1900: 399-405, Vol 2, Part 1). Some centres specialised in

particular products, such as monks' bowls, baked in a kiln with carbon introduced into the atmosphere to create a black surface. One of these centres was Letthi, on the Myitnge River near Ava. The use of ash glaze to create a grey-green colour, the process used in Sung Dynasty China (AD 930 to 1280) and Sukothai/Sisatchanalai in early second millennium Thailand to produce celadon, was noted at Mong Kung (E 97.5298° N 21.6045°) in Shan State. The cost of timber for fuel was seen as the major expense for potters, and experiments were under way to use paddy husks instead (Morris 1918).

Research on early glaze wares.

The large brown-glazed containers from Myanmar known as Martaban jars were well known trade items across south and south-east Asia between the 14th and 18th centuries (Gutman 2001c). In the 1980s, discoveries of trade ceramics such as red, white or green lead-glazed ware, brown and green glazed stoneware, and earthenware with black, red or white infill decoration in hilltop gravesites between Myanmar and Thailand led to a new interest in Myanmar as a source for some of these goods (Brown 1988: 100-103; Hein, Barbetti & Grave 1989). Surveys in the 1990s located or confirmed a dozen areas from Upper Burma to the Ayeyarwady delta which appear to have glazeware production sites. The three most extensive sites, Myaungmya, Lagunbyee and Twante are all in the delta (Myo Thant Tyn 1999). Hundreds of apparent glazeware kilns on more than 30 sites were found around Twante, west of Yangon, in an area that in recent years has been better known for earthenware production. Finds included tubular firing supports for stacking pots inside the kilns, a technology previously thought to be unique to the Sisatchanalai and Sukothai kilns in Thailand (Rooney 1999: 5-6; Myo Thant Tyn & Rooney 2001). A kiln was excavated revealing bright green wares which were attributed to the 15th-17th centuries (Baby 1999). There were thought to be more than 100 possible kilns around Lagunbyee, an old walled centre (Aung Myint 1999a: 143-145) between Yangon and Pegu (Bago). One of the kilns was excavated and was found to share characteristics with the Sisatchanalai kilns (Hein, Barbetti & Grave 1989: 9, 17-18; Aye Aye Thinn 1999). Samples from several sites were tested to reveal that lead, tin, iron and copper, in that order, were the main elements used in glazing, a result that in itself was not surprising, but the initial analysis gave a heartening indication that the resources and personnel were available and in use in Myanmar for elemental analysis of glazeware (Htun Hlaing & Tun Khin 1999). A subsequent study suggested that tin-glazed white-green samples from Twante could be distinguished from samples from Lagunbyee and Myaungmya and several other sites, indicating that Twante may have had a unique source of materials, set of techniques or period of manufacture (Htun Hlaing & Tun Khin 2003). In 2004, another group of delta kilnsites was reported at Pathein/Bassein (*Southeast Asian Ceramics Museum Newsletter* 2004).

Myanmar today is a major domestic consumer and user of both earthenware and glazeware. Large glazed water pots are seen in virtually every village home, and in many dwellings in towns as well (Brown 1988 p.99). Water pots produced at Kyaukmyaung on the Ayeyarwady River above Mandalay are still floated to downstream centres such Bagan lashed together in the form a giant raft which is then completely dismantled. Glazeware production at Kyaukmyaung dates to the 18th century (Adhyatman 1985: 10-11; Than Tun 2002: 25) so on the available evidence, the post-Bagan south remains a likelier era and region of origin for glazed domestic ceramics.

Glazed wares at Sriksetra- a recycled misconception?

There is no secure archaeological evidence of glazeware in any of the Pyu cities, nothing to support the oft-repeated descriptions that quote Chinese documents in describing city walls at Sriksetra made of "green bricks" or "glazed brick", or the manufacture of "glazed ware" or "glazed jars" by the Pyu that were supposedly traded with their neighbours, including Nanchao (Luce 1969: 242, Vol 1; Guy 1989: 5). Chen Yi-Sein (2000: 10) makes a convincing case that mistranslation by Luce of the Chinese words relating to bricks and glazed tiles led to this notion and to a subsequent over-reliance by scholars on this specific secondary source. Absence of evidence is never a completely convincing argument, but had the walls of Sriksetra been faced with glazed bricks, then exploration or excavation should by now have located some. There is a report of a small greyish-green glazed jar found at Sriksetra during the excavations of 1964-1968 (Gutman 2001c: 109, 116) but no further information about the context seems to have been published. Grey-green glazeware, including Buddhist ritual material, was produced in China during the first millennium AD (Vainker 1991), but as it is becoming increasingly clear that Sriksetra was still occupied during the Bagan period (page 143), there are various possibilities regarding both the origin and dating of this very limited sample.

Glazeware at Bagan.

Decorative items such as glazed terracotta wall plaques and tiles and glazed sandstone discs are part of the architectural assemblage of 11th to 13th century AD Bagan, and may attest to a specialist industry, although only 25 of the more than 2300 structures dating to this period carry these items. It is difficult to put a timescale to the appearance of the glazed fittings. Unglazed Jataka plaques appear on the Shwe-hsan-daw (1568), and the East (1030) and West (1031) Hpet-leik pagodas, which are all attributed to the 11th century. However the Nga-kywe-na-daung (1063), a bulbous "Pyu-style" pagoda also attributed to the 11th century, is covered in green glazed tiles. The Paw-daw-mu (page 245) has some green glazed decorations, but it is not clear whether these are from the earlier or later structure. The earliest glaze-decorated building for which there is a secure epigraphic date is the Shwe-gu-gyi (1589) at AD 1131. The decorative ceramics at the Shwe-gu-gyi were not recorded during the compilation of the *Inventory of Monuments*, but came to the attention of the Archaeology Department more recently (Pichard 1992-2002: 217, Vol 6 ; Aung Kyaing 1999). Five buildings attributed to the 11th century have glazed decorations, eleven from the 12th century and nine from the 13th century.

Green lead-glazed Jataka plaques, illustrations of the 550 or so traditional tales of Buddha's previous lives (Cowell 1895-1913; Luce 1956, 1975; Brown 1997), are found at the Ananda (2171), the Mingla-zedi (1268), the Dhamma-yazika (947) and the Shwe-zigon (1). While the plaques appear on only a few temples, there are several thousand of them. Some have been removed for curation or stolen. Bagan plaques appear in international museums, on the world art market and in private collections (Guy 1989: 7, Fig 7; Hasson 1993: 98). Decorating pagodas with glazed plaques continued beyond the Bagan period to Khabin (Di Crocco 1999), Hanthawady and Toungoo in the delta region, and to Pinya and the area around Mandalay up to the 18th-19th century Konbaung period (Singer 1990: 111; Aung Bo 1999). Mandalay's best known plaques were perhaps those made for the Mingun pagoda. Based on the plaques at the Ananda in Bagan, they were never installed, and the whereabouts of most of them is no longer known (Stadtner 2003).

Panels and fittings made from glazed sandstone appear on the Shwe-zigon (1), the Hti-lo-min-lo (1812), the Sula-mani-gu-hpaya (748), the Tayok-pyi-hpaya-gyi (539) and an unnamed temple

1756. Glazed sandstone has at times been described as the product of a lost technology (Luce 1969: 241, Vol 1) but the process of bonding lead glaze to feldspathic sandstone has been successfully replicated by Thecla Cooler in a laboratory experiment. She agrees with Luce that sandstone may have been used for the glazed plaques due to the perceived permanence of stone, and suggests that the process was abandoned when spalling of the friable sandstone beneath the glaze led to the relatively rapid deterioration of the plaques (Cooler 1981: 17-19, 24-27).

Attributing manufacture of glazed pagoda decorations in general has been problematic. Seven "beehive-shaped" kilns have been found at Bagan since the early 1960s, some containing glazed potsherds (Dello Strogolo 1963; Dello Strogolo & Kyaw Nyein 1963; Pichard 1992-2002 Vol 8, Items 2597, 2601, 2603, 2603, 2618, 2667; Hein 1996). All the known kilns are around or to the south of Myinkaba. Dark blue glassy residue is apparent on several of the kilns and lumps of blue glass have been reported. Beadmaking has been suggested as one possible use of these kilns (Hein 1996: 181). The most recent kiln found (or rediscovered), number 7 (E 6,225 metres N 44,732 metres on the Bagan grid, not in the *Inventory of Monuments*), in front of the Abe-ya-dana temple, contained sherds with a white glaze mainly on their inner surface when the author inspected it in 2002. As Hein (2003) has pointed out with regard to similar finds in kiln 1, these are likely to represent deposition after the kilns fell into disuse. In 1989, a local resident who had been illegally digging at this spot reported finding what would appear to have been the same kiln, which was subsequently reburied, with shards of large turquoise glazed jars, and many beads, tubes and lumps of green, blue, yellow, black and brown coloured glass nearby (Hein 2003). A search through the spoil heaps of the partially excavated kiln 7 in 2002 did not unearth any slumped examples of glazeware, which could attest to high temperature firing of containers at that particular site. None of the kilns seem to have provided any broken or misfired decorative plaques that would attest to their production at Bagan, nor do the known kilns appear to have any special relationship with temples which carry glazed decorations. Nearest neighbour analysis (Johnson 1996: 269) indicates that Bagan's glaze decorated buildings are a mean distance of 2.1 kilometres from any known kiln site, with some up to 5.8 kilometres away. While it must be stressed that these distances are based on the seven kilns that are currently known, the evidence supports Hein's suggestion that the kilns may have served some function other than being purpose-built to supply the glaze-decorated structures (Hein 1996: 184).

Other finds involving glazed ceramics at Bagan need to be approached with equal caution. For example, two large glazed storage jars that were dug up and found to contain cremation remains are displayed as Bagan-period pieces in the museum (Aung Kyaing 1999: 5-6). The contents are undated, and it would be rash to accept these jars as belonging to the Bagan period. One of them was found in an area near the now-vanished village of Taungywa, just south of the city wall (Chart 7), that was in use as a cemetery until the 1960s (Thin Kyi 1964: 186). If these jars had been in use during the Bagan period, one would expect them to have been portrayed in artworks of the time, where the presence of water containers and other pottery in social tableaux is widely represented, and the major types of container are identified by name (Guy 1989: 9). On the available evidence from wall paintings, statuary and Jataka plaques, the pottery containers used at Bagan were much smaller than Martaban jars, and not in the same morphological range (Duroiselle 1962, Figs 6, 64, 78, 92, 93, 94, 95, 129, 134, 140, 162; Lu Pe Win 1966: 97; Shorto 1966: 159, Plates 15, 16, 17; Luce 1969, Vol 3 Plates 106a, 107d, 199d, 204a, 204b, 279b, 279c, 279d, 287a, 287b, 313a, 315c, 326d, 333f; Aung Kyaing 1997: 121, 182-183; Gutman 2001c: 110-111). Earthenware was locally produced in at least two places, Otein Taung (see page 291) and a site 250 metres south-south-west of the Tha-ya-wa-te-hpaya (988) in the south of Bagan, where there is a large mound of production debris, 40 metres long and at least two metres high, that on surface examination in 2002 appeared similar to the material at Otein Taung. There is no evidence among the debris excavated at Otein

Taung of the manufacture of earthenware water pots the size of the museum Martabans. At the same time, there are no local kilns known that could fit such large jars for glazing. The Bagan Museum Martabans were most likely imported to Bagan some time after the Bagan period. The 16th century has been suggested as a likely manufacturing period (Adhyatman 1985: 8)

Despite the presence of glazed Jataka plaques and architectural decorations at Bagan there have so far been insufficient finds of glazeware in a secure Bagan period context to suggest that glazed domestic or ritual utensils were in use. There was a link between Bagan and Twante, a site known to have been involved in glazeware production *after* the Bagan period. Twante-style containers appear at Bagan, and Bagan votary tablets were deposited at Twante (Guy 1989: 7) but these materials are all earthenware. In 2000-2001, the author reviewed the finds from the Archaeology Department's "Kyanzittha palace" excavation which were kept in the departmental store. Some of the material had been sorted and labelled. A large pile of debris had been left in the yard at the back of the store and the author arranged for this "non-museum quality" material to be sorted and stored, and photographed and recorded some of the finds, in particular those that appeared relevant to the excavations at Yonhlut (see page 192) and Otein Taung, which are discussed below. But even in the debris of this major élite centre there were only a few glazed potsherds with green decoration which may well have come from the same artifact, and whose origin both within the excavation and as products remains unclear, particularly in the light of the evidence from the 2003 excavation (page 226) that indicates continued occupation of the city centre in the post-Bagan period.

To sum up, there are glazed architectural materials, all in a religious context, associated with a number of buildings of the Bagan period. There have also been finds of potsherds with what appears to be predominantly internal glazing deposited in at least two of the seven small kilns known at Bagan. This deposition presumably occurred some time after these structures, estimated in the *Inventory of Monuments* (Pichard 1992-2002, Vol 8) to be 13th century, but with no absolute dates available, fell into disuse. The curious thing is that these potsherds do not seem to have appeared anywhere else, and it may be possible to speculate that they might have been related to production rather than to end products. On the current evidence it appears that the people of Bagan, while familiar with glazed decorative materials, did not adopt this technology for domestic purposes. At the same time, the source of the glazed decorations that appear on a small number of structures in Bagan between the 11th and 13th centuries is by no means clear.

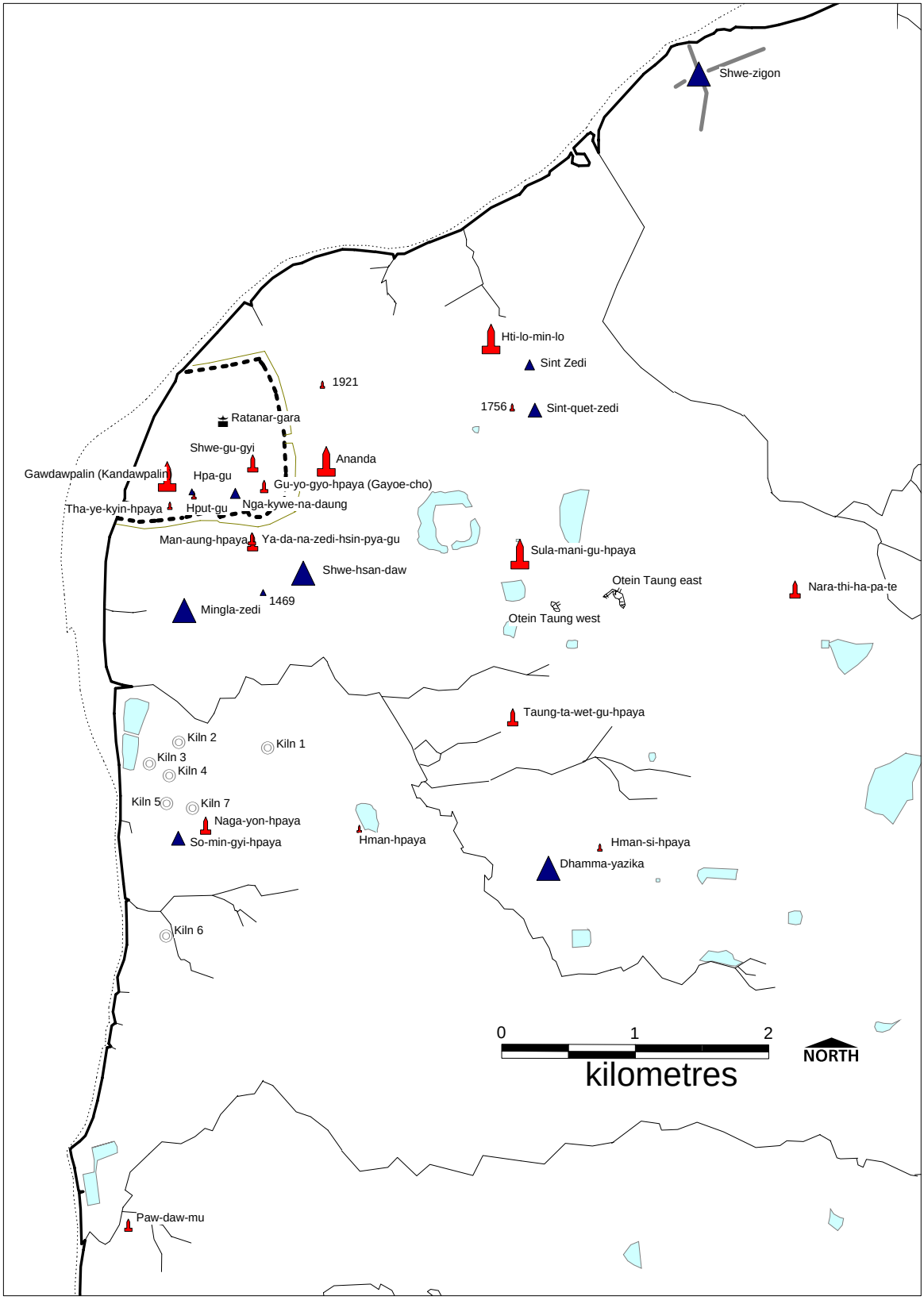

Figure 171 Bagan: buildings with glazed decoration and location of kilns.

6. The 2003 Bagan city excavation: photographic record.

Figure 172 Excavation 2003: view south along east wall.

Figure 173 Excavation 2003: underground brick building on east wall.

Figure 174 Excavation 2003: view eastward to underground buildings in southeast corner.

Figure 175 Excavation 2003: level 2 wall returning under level 1 south wall.

Figure 176 Excavation 2003: level 2B floor above level 3 floor and drain, south end of western trench.

Figure 177 Excavation 2003: level 3 drain below level 1 wall and rubble.

Figure 178 Excavation 2003: level 4 building under south wall.

Figure 179 Excavation 2003: northwest corner.

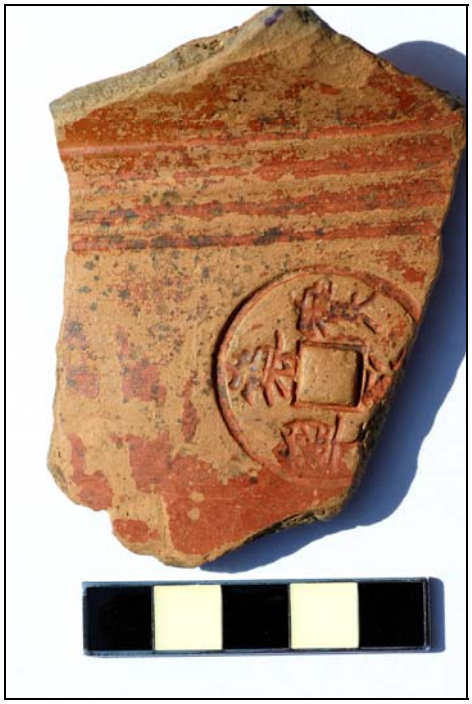

Figure 180 Excavation 2003: earthenware stamped with AD 1102-1106 Chinese coin.

Figure 181 Excavation 2003: cache of ear plugs, Vietnamese porcelain, bone awl, spindle whorl.

Figure 182 Excavation 2003: glazed bowls.

Figure 183 Excavation 2003: green painted sprinkler pot.

Figure 184 Excavation 2003: slipped earthenware painted with white lines and dots.

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