LAND OF IRON

The historical archaeology of Luwu and the Cenrana valley

Results of the Origin of Complex Society
in South Sulawesi Project (OXIS)

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Preface

This monograph is the first published joint report by the co-directors of the Origin of Complex Society in South Sulawesi Project (OXIS). It does not amount to a final report, but reflects our joint investigation at an advanced stage of progress. We feel that it is important to make public as soon as possible the basic findings and preliminary interpretations of the OXIS project and to show how these transform our understanding of South Sulawesi from the late thirteenth to the early seventeenth century. While some of the details may change, we do not anticipate any substantial amendments to our major arguments.

It is no empty boast to say that the findings and interpretations presented here are revolutionary (*sensu* Kuhn 1962). They overturn culturally important interpretations of the Bugis past, many of which have been held for hundreds of years, and which find expression in European language sources dating from 1670 to 1996. We feel that it is important to publish the data upon which these new understandings are based so that historians can examine the bedrock of our interpretations.

Local communities in South Sulawesi have their own histories, which have evolved over the centuries to satisfy their needs for an understood past. We are writing for a different audience (*sensu* Feyerabend 1975). What we offer is a history that takes into account the production and weighing of evidence, the possibility of alternative explanations, and the development of chronologies based on the evidence of ceramic sherdage and on radiocarbon dating. We hope that this monograph will contribute in a modest way to future editions of the national history of Indonesia (Kartodirdjo *et al.* 1975) as well as to English language histories of Southeast Asia (e.g. Hall 1981).

The present work is divided into three sections. Section One introduces the area of study and its importance within the overall history of South Sulawesi. Section Two describes the places at which the OXIS team worked, lists the major finds from the fieldwork, and sets out our interpretation of the archaeological record. Section Three addresses a number of important questions that have to be answered before a comprehensive, integrated history of South Sulawesi can be written. We have tried to set out the data and interpretations in straightforward, paratactic, style, keeping technical language to a minimum, and making little attempt at literary elegance. Place names are spelt using standard Indonesian spellings (e.g. Luwu, Ussu) and italicised words are Indonesian unless indicated. We would like to thank Emeritus Professor Campbell Macknight and Drs Sirtjo Koolhof for identifying numerous errors and making valuable suggestions for improvements to the text, and a number of other colleagues for reading through the final draft.

We take especial pleasure in recording that the OXIS project was a genuine collaborative exercise between Australian, Indonesian and British scholars, and that the data and interpretations offered here represent *dengan maksud yang benar* the contributions of the entire OXIS team. Responsibility for the accuracy of the data presented here, and for their interpretation, is ours alone.

The authors

Hull and Canberra
5th December 2000

Entia non sunt multiplicanda praeter necessitatum.

William of Ockham *c*. 1285-*c*. 1349

GLOSSARY of foreign words and technical terms

AD / BC	radiocarbon dates calibrated to two sigma
c.1300, 1300, etc	Common Era dates
B.	Bugis
L.	Lemolang
M.	Makasar
Mal.	Malay
Mo.	Mori
W.	Wotu

abu-abu	ash
allangngkanagnge	palace complex
attoriolong	Bugis historical text
balubu	large jar
batu besi	iron stone, ore
benteng	fortified settlement
besi	iron
bissu	transvestite ritual specialist
camat	sub-district officer
candi	Javanese temple
desa	village; an administrative unit comprising several *kampung*
duni	boat-shaped wooden coffin
empang	fish pond
gharu wood	eaglewood
granodiorite	coarse-grained acidic igneous rock differing from granite by a lower proportion of quartz
gusi	egg shaped martavan
indurated	cemented or baked into the state of a hard rock
istana	palace
kabupaten	county; an administrative unit
kacau balau	chaotic, disorganized, in total confusion
kampung	settlement
kecamatan	district; an administrative unit
kecapi	a plucked stringed instrument
keramat	sacred, possessing supernatural qualities
keramik	high fired stoneware or ceramic
kraakporselein	type of Jingdezhen porcelain
kris	dagger with a straight or wavy blade
ladang	non-irrigated field
ma'banua	to found a settlement
macang	a board game played with counters

GLOSSARY of foreign words and technical terms

Macassar	historical kingdom of the Makasars, including its capital port-city
Makasar	ethnic group living in southwest South Sulawesi; their language
Makassar	modern city of Macassar
makolle	ruler
manuport	natural object brought to a site through human agency
martavan	large jar
Ming	Chinese dynasty 1368-1644
monadnock	isolated hill that stands on a plain
nisan	stone grave marker
pamor	*damascene*-style inlay of a kris
parallelepiped	all faces parallel to their opposite face, not necessarily at right angles
parang	bush knife
pelabuhan	port, harbour
pesan-pesan	wise advice
prahu	small boat
prill	piece of iron in an unrefined state
puncak	summit
Quing	Chinese dynasty 1644-1911
sempe	sherdage
swidden	shifting, 'slash and burn' agriculture
terak besi	iron slag
tomanurung	one who descends to start a royal line
Wanli	Chinese ruler 1573-1620
Yuan	Chinese dynasty 1279-1368
zaman	age

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1. The kingdom of Luwu

From the time of the earliest European contact in the sixteenth century of the Common Era until well into the twentieth century, the Bugis of South Sulawesi were organized into kingdoms.[1] The broad outlines of the political histories of the major Bugis kingdoms in the sixteenth and seventeenth centuries are known from indigenous historical texts associated with those kingdoms and, after 1605, from Dutch and other European archival records. While accounts of the foundings of a few kingdoms, which start in most cases with the appearance of a heavenly-descended being who is invited to become ruler of a pre-existing agricultural society, can be found in a number of Bugis texts, the origins of the Bugis kingdoms – the how, when, where and why of their genesis – have yet to be explained in empirical terms. The largest, and reputedly the oldest, of the Bugis kingdoms of South Sulawesi was Luwu (Map 1).

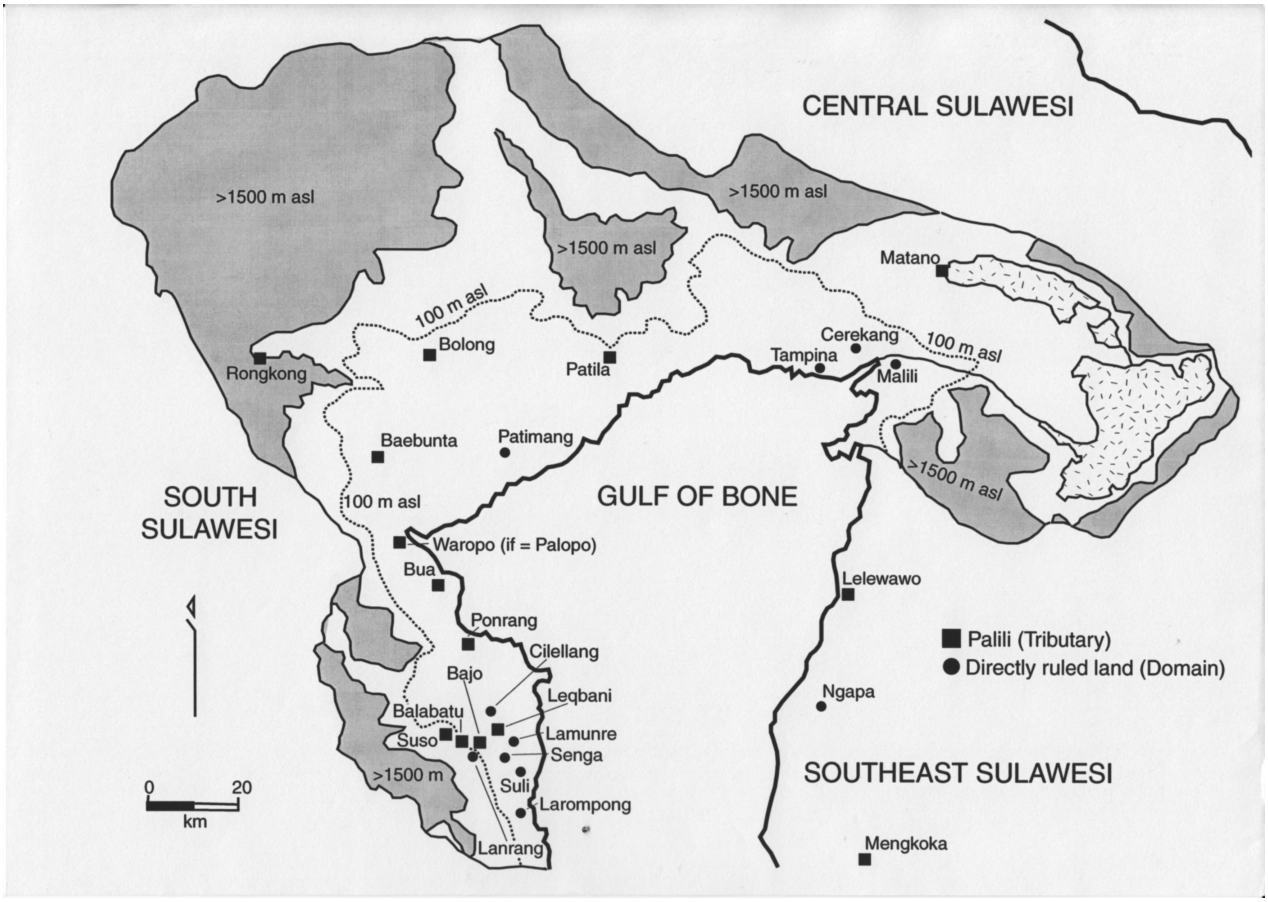
1.1 The OXIS Project

OXIS is a quasi-acronym derived from The Origin of Complex Society in South Sulawesi Project. OXIS was an international multi-disciplinary research project set up to inquire into the process of growing social complexity which led to the emergence of the kingdom of Luwu. This involved fieldwork both in the Gulf of Bone and in the western Cenrana valley, which was formerly a part of the kingdom of Luwu.

OXIS was sponsored by the Indonesian Institute of Sciences and the National Centre for Archaeological Research in Jakarta. Funding was provided by the Australian Research Council, the Wenner-Gren Institute for Anthropological Research, the British Academy, the Australian National University and the University of Hull. Participating institutions were the Australian National University, the University of Hull, Universitas Hasanuddin, the Indonesian National Centre for Archaeological Research and the Makassar (formerly Ujung Pandang) Archaeology Office.

The OXIS project arose out of the authors' previous work in South Sulawesi, beginning with their PhD theses on the development of kingdoms in South Sulawesi in the fourteenth to sixteenth centuries AD, viewed from the perspectives of Bugis historical texts (Caldwell 1988) and Makassar texts and archaeological remains (Bulbeck 1992). In particular, OXIS was inspired by the Survey of Soppeng Project, the fieldwork for which was carried out in November and December 1986 and which was funded by the Myer Foundation of Melbourne. The aim of the project was to explore the potential for combined textual and archaeological research into the early history of the Bugis. On the basis of information found in Soppeng texts, the project identified and surveyed 15

[1] A Bugis kingdom is a large political unit occupying a traditional, named territory of between several hundred and several thousand square kilometres ruled by hereditary leaders ranked around a single noble of either sex who was regarded as paramount in status. In terms of multilinear cultural evolution (Fagan 1995:28-30), the Bugis kingdoms were complex chiefdoms or proto-states. The use of the word 'kingdom' in this monograph is broadly equivalent to the term 'complex chiefdom' used in archaeological discourse.



Map 1. ***Kabupaten*** **Luwu showing tributaries and directly ruled lands**

archaeological sites over 12 days. By means of imported Chinese and Southeast Asian ceramic sherdage found at those sites, the project was able to determine the sites' elite occupation histories and to reconstruct the growth and consolidation of the Bugis kingdom of Soppeng from *c.*1300 onwards.[2] The archaeological data shed valuable light on pre-Islamic Bugis historical traditions through the provision of accurate chronologies of the founding and abandonment of the places mentioned in the texts. The results of the Survey of Soppeng Project were published in the form of a report (Kallupa *et al.* 1989).

The much larger OXIS project was set up by the present authors following the discovery of the pre-Islamic palace centre of Luwu at Malangke, on the central alluvial plain of the Gulf of Bone, and the preliminary identification of the village of Matano, on the northern shore of Lake Matano, in the mountainous eastern hinterland, as the source of the iron for which Luwu was once famous (Caldwell 1993). The importance of these sites and their potential for archaeological research were confirmed by Bulbeck (1995) and funding was sought to finance an international, multidisciplinary project to explore Luwu's pre-Islamic history.

OXIS ran for three years, from October 1997 to October 2000. The first year of the project was spent obtaining various permissions for research, securing additional funding for equipment, and carrying out preparatory surveys. Excavations in Luwu started in April 1998 and continued, with rest periods, until March 1999. A final period of fieldwork in the lower and upper Cenrana valley was carried out over a three week period in July 2000. Basic materials analysis of artifacts from both regions was carried out at the OXIS laboratory at the Makassar Archaeology Office. More detailed materials analysis of some artifacts, and pollen and phytolith analyses, are being carried out at the Australian National University; metallurgical analysis is being done at the University of Queensland.

The initial analysis of the data from Luwu and the Cenrana Valley was put out in the form of two substantial reports (Bulbeck and Bagyo Prasetyo 1999; Bulbeck 2000). The archaeological data presented in this monograph are based upon these reports and has been updated by Bulbeck. The historical analysis has been undertaken by Caldwell but owes much to the continuous communication and sifting of ideas by the authors and other OXIS colleagues.

More than forty archaeologists and other scholars participated in OXIS. Sponsorship in Indonesia was provided by Hasan Ambary and Truman Simanjuntak of the Indonesian National Centre for Archaeology. Senior archaeologists who directed field work crews were Ali Fadillah, Gunadi, Iwan Sumantri and Budianto Hakim. Ceramic identifications were assisted by Karaeng Demmanari. Other participating archaeologists were Adrian di Lello, Tanwir Tane, Ramli M., Sarjiyanto, Bernadetta, Andi Fatmawati Umar, Albertinus, Haeruddin, Nani Somba, Muhaeminah, Citra Andari, Irfan Mahmud, Akin Duli, Najemain, Joni Mappa, Rustam, Mohammad Tang, Mohammad Basir, Yusriadi and Andi Syafullah. Malcolm Lillie of the Centre for Wetland Archaeology at the University of Hull carried out the coring of the Cenrana Valley, and Muhlis Hadrawi of Universitas Hasanuddin assisted with historical research. P.T. Inco helped with transport between Makassar and Soroako and provided information on its mining and

[2] All dates are AD unless indicated. Calibrated radiocarbon dates are prefixed BC / AD.

hydroelectricity operations. Advice in the field and during analysis was received from Peter Bellwood, Geoff Hope (project geomorphologist and palynologist), and Doreen Bowdery (project phytoliths expert) (all of the Australian National University). The late Len Hogan of the University of Queensland Department of Mining, Minerals and Materials Engineering carried out metallurgical analyses. Judith Cameron, Glenn Summerhayes (both of the Australian National University), Ian Glover (Institute of Archaeology, University College London) and John Miksic (National University of Singapore) made other critical identifications. Throughout the project, Campbell Macknight provided support, encouragement and intellectual direction to OXIS.

1.2 The regions of the study

Luwu comprises the two north-eastern *kabupaten* (administrative districts) of the province of South Sulawesi, Indonesia.[3] *Kabupaten* Luwu and Luwu Utara (North Luwu) together cover 17,791 square kilometres and include sizeable areas of what are geographically and culturally parts of Central Sulawesi. Their borders are based on the territorial claims of the Bugis kingdom Luwu, or Ware' whose authority was once recognised, both in political and in spiritual terms, throughout the Gulf of Bone and far into the surrounding highlands.[4] The present *kabupaten* borders (which are somewhat reduced when compared to the original kingdom) run north-west from the River Rauang in the south-west, as far as the remote Takolekajau mountains north of the Seko Pada valley, then east along a set of ridges lying to the south-west of Lake Poso, then south-east, to encircle the great rift-valley lakes of Matano and Towuti.

The territory of Luwu can be divided into two distinct topographical zones. A large, high, mountainous hinterland encircles a smaller coastal alluvial plain stretching from Larompong in the south-west to the Bay of Ussu in the east. The hinterland mountains are steep and heavily forested, with occasional peaks of 3,000 metres, interspersed with small, flat-bottomed valleys suitable for settled agriculture. The coastal plain can be divided into three smaller plains or regions, defined by looming mountain ranges which in places approach the coast. The first region lies south of Palopo, the second extends north-east from Palopo to Wotu, and the third runs from Wotu to Malili in the east. Much of the coastal plain, which is low and flat – barely exceeding 30 metres in height along its northern edge – appears to have emerged fairly recently from the sea, perhaps in the mid- to late Holocene. The plain is prone to flooding, and human communication along the coastline east of Palopo is still largely by boat, though a well-made modern road runs along the raised, inland edge of the plain as far as Malili and then up to Lake Matano.

The Cenrana valley connects the great lakes of the Tempe or Walennae depression of the southern central region with the east coast. Through the valley runs the lower course of the Walennae river, which changes its name to Cenrana at the point where it turns sharply south-

[3] Until recently, Luwu comprised a single *kabupaten*. Indonesian nouns do not indicate number and can be read as singular or as plural.
[4] The name Ware' is also used in Bugis texts to refer to the kingdom of Luwu.

eastward at Sengkang. Deep and fast flowing, the Cenrana is the only river in South Sulawesi which is navigable by sea-going vessels along its entire course. Since at least 1300 it has provided an important trade route between the agricultural heartland of the peninsula and the coastal trading networks of the Indonesian archipelago. Like the Luwu plain, the Cenrana is prone to flooding, especially along its lower reaches. The upper part of the valley is flanked by raised lands which provide exceptionally fertile soils suitable for wet rice cultivation, with the result that population density is much higher in the western valley than in the eastern reaches.

1.3 The historical problem of Luwu

From at least the seventeenth century, outsiders have reported that Luwu was the oldest of the Bugis kingdoms. Its ruling family was (and still is) accorded a higher status than were the ruling families of the other kingdoms. Many scholars hold that the Luwu court was the origin of Bugis elite culture and traditions (e.g. Kern 1939:9; Zainal Abidin 1983:249; Darmawan *et al.* 1999:i). Luwu certainly appears to have been the first South Sulawesi kingdom to exercise power outside of its traditional borders. According to the Tributary and Domain List of Luwu (Caldwell and Druce 1998), by *c.*1600 Luwu laid claim to suzerainty over large areas of Central Sulawesi and western Southeast Sulawesi.

However, Luwu's sparse written traditions do not appear to support the claim that it is older than other Bugis kingdoms. The King List of Luwu, which starts with the kingdom's heavenly-descended founder, Simpurusia, lists just 13 rulers before *c.*1600, ten of whom are arguably historical (Caldwell 1998). A back-dated average reign length of 25 years, a figure based upon known reign lengths in the sixteenth century (Caldwell 1988:165), would place the earliest of these rulers between *c.*1350 and *c.*1375, making his reign contemporary with the well-known listing of Luwu as a tributary of Majapahit in the mid-fourteenth century Javanese poem *Desawarnana* (Negarakrtagama) (Pigeaud 1960-63 volume 3:17; Robson 1995:34). This is a century or so later than the appearance of the earliest rulers in the Walennae valley and western Cenrana valley with recognizable Bugis names, who can be backdated by the same method to the mid-thirteenth century. In short, far from demonstrating that Luwu's tradition of kingship is older than that of other Bugis kingdoms, the King List offers no real evidence of organized political life in Luwu before *c.*1400 (Caldwell 1998:40).[5]

1.4 Luwu's relationship with the Cenrana valley

Luwu is linked both in oral and written Bugis traditions with the upper, or western, Cenrana valley. The settlements of Wage, Tempe, Singkang (modern Sengkang) and Tampangeng, which lie on the southwest margins of Lake Tempe, are referred to in Bugis historical texts as the 'lands

[5] The first two non-mythical rulers, Tampabalusu (*c.*1350-*c.*1375) and Tanrabalusu (*c.*1375-*c.*1400) do not appear to be part of the main tradition.

which come down from Majapahit' (B. *tana polé ri Mancapai'*) or, alternatively, as the 'lands that are kept' (B. *tana ritaroé*) (Zainal Abidin 1985:202; Caldwell 1988:41). Both these expressions indicate that these four settlements are among the oldest of Luwu's lands, despite the fact that all lie in the former kingdom of Wajo, far to the southwest of Luwu's historical borders. This puzzle will be addressed in Section 3.7.

The upper or western Cenrana valley was home to a Bugis kingdom called Cina, which is closely linked to Luwu in Bugis epic texts and in some genealogical texts. However, unlike Luwu, Cina has left no firm evidence of its precise location, with the result that this has been a matter of dispute (Caldwell 1988:210-211; Pelras 1996:60-61). The leading evidence for the existence and location of Cina comes from the vast Bugis poetic cycle, the La Galigo, a work, or rather a series of works, of immense intricacy and length which narrate the destinies, over five generations, of hundreds of individuals of divine descent living in an undetermined period in a number of South Sulawesi kingdoms (Pelras 1996:32). In the La Galigo, the main protagonist, Sawerigading, the grandson of the heavenly-descended first ruler of Luwu, marries his cousin, We Cudai', the daughter of the ruler of Cina. The kingdom of Cina is depicted in various episodes of the epic as a sister-kingdom to Luwu, and Cina is the point of departure of many episodes (Koolhof 1999:371). In the epic, the kingdom of Cina has two political centres, Cina ri Aja and Cina ri Lau' (B. 'West and East Cina'), which lie somewhere along the Cenrana valley. The main palace complex (B. *allangkanangngé*) is located on a hill called La Tanete (B. 'hill ridge') (Kern 1989:225,231,241), which is identified by many Bugis with the low hill at the settlement of Sarepao in the western Cenrana valley.

Viewed from a geographical perspective, Cina comprises what appears to be a coalition of agricultural polities scattered along the Cenrana and Soppeng valleys. Lists of the constituent settlements of Cina vary from one text to another (the La Galigo is a collection of independent narratives structured around a complex genealogy) but the general picture is of a large, prosperous kingdom drawing on the agricultural resources of the western Cenrana and the Soppeng valleys, as far inland as the present-day *kabupaten* capital Watassoppeng.

Cina is rarely mentioned in Bugis historical texts (B. *attoriolong*), nor can a kingdom of Cina be identified in Portuguese or Dutch sources. Where the name Cina is mentioned in historical texts, in most cases it appears as a source of ascriptive status for the founders of other kingdoms, which are traditionally considered less ancient. An example of this is the prince of Cina who, while out hunting, founds the kingdom of Wajo (Noorduyn 1955:157).

Cina's near-absence from the historical texts of South Sulawesi is accounted for in Bugis historiography by the tradition that La Sangajipammana (B. 'His Majesty the Father of Pammana'), the childless, twenty-second ruler of Cina, requested that the name of the kingdom be changed to his own, and that after his death Cina was renamed Pammana (Zainal Abidin 1983:219-220). The tradition is apocryphal (Caldwell 1988:207), but suggests a change in the name of the dominant political power in the western Cenrana valley, and perhaps also a relocation of its palace centre.

With regard to the kingdom's chronology, valuable information is found in the traditional list of Cina's 20 to 22 rulers. This list can be related to a detailed genealogy of more than 100 individuals

which was written to provide an appropriate pedigree for La Tenritatta Arung Palakka, the seventeenth century ruler of Bone. Starting with a divine founder, this genealogy names 16 generations of nobles at a number of settlements in the upper or western Cenrana valley, down to La Tenritatta. The central line of this genealogy is the King List of Cina. Marriages between the ruling family of Cina and the ruling family of the kingdom of Soppeng, recorded in both kingdoms' genealogies, suggest that 13 members of the traditional king list of Cina were historical figures (Caldwell 1988:81-87). La Tenritatta's genealogy also contains two very important references to Luwu, which are examined in Section 3.7.

1.5 The La Galigo and *attoriolong* texts

In contrast to the interest shown in the early history of the islands of western Indonesia such as Sumatra, Java and Bali, very little research has been carried out into the early history of the Bugis kingdoms of South Sulawesi. The reason for this comparative neglect stems partly from the absence in South Sulawesi of Indic-influenced monumental architecture and inscriptions. Bugis kingdoms have, however, left written records that refer to individuals and events as early as *c.*1300. Most recent research on the pre-Islamic Bugis kingdoms has been carried out by locally-born scholars (e.g. Abdurrazak 1964, 1967a, 1967b, 1968; Zainal Abidin 1969, 1971, 1974, 1975, 1983, 1985, 1999), who have built on a useful base of earlier Dutch scholarship, especially the work of Matthes, Cense and Noorduyn.

Much of this research has been based upon information referring to the pre-Islamic period found in the Bugis chronicles and genealogies. These texts are written on nineteenth and twentieth century European paper in an indigenous script of Indic origin and contain information dating from around 1300. These texts were evidently copied from older manuscript texts which were based on diverse oral and written sources from earlier centuries (Pelras 1979; Caldwell 1988). The nature of Bugis historical chronicles has been examined by Noorduyn (1961, 1965) and the influences which led to their composition have been considered by Macknight (1997).

As well as genealogies and chronicles, South Sulawesi scholars have drawn also upon the Bugis epic poem La Galigo, which is believed by many scholars to refer to a period before the fourteenth century (e.g. Zainal Abidin 1974:162; Pelras 1996:36). However, the type of society depicted in the La Galigo is very different from that depicted in the historical chronicles of South Sulawesi. The rulers of the La Galigo are autocratic to an extent not met with in historical sources, and the political ordering of the South Sulawesi landscape is only partially recognizable. There is little reference to rice cultivation; instead, the political economy of the La Galigo kingdoms is based on trade with other parts of the Indonesian archipelago. Even the physical geography of the peninsula is different: in the La Galigo, a huge inland sea enables sea-going vessels to sail from east to west across the peninsula, from the mouth of the Cenrana river to the west-coast port of Suppa (Pelras 1996:62,66).[6]

[6] The differences in the physical geography of South Sulawesi are examined in Caldwell and Lillie (in press).

The task of reconciling the picture of the past found in the La Galigo materials with that derived from the chronicles, from archaeology, and from external sources, requires considerable methodological and theoretical sophistication. Most often, South Sulawesi historians have placed the characters and events of the La Galigo in a period earlier than those of the historical texts, which record the rise of agricultural kingdoms. This chronology of sources has been adopted by several western scholars, the most recent of whom is Christian Pelras (1996) in his excellent ethnographic study of the Bugis. Following this indigenous chronology of sources, Pelras divides the history of the Bugis into three periods. These are: an 'early Bugis period' (or 'Age of Galigo') lying between approximately 1100 and 1300, from which the only written sources come from the La Galigo cycle (Pelras 1996:36), a short 'period of anarchy' (or 'Age of Chaos') which ended or greatly modified the social and political institutions and practices of the 'Age of Galigo', and the historical period starting *c.*1400 for which historians can rely on Bugis chronicles supplemented by external sources (Pelras 1996:56).[7]

Pelras' historical chronology of South Sulawesi can be set out as follows:

Before 1100	Prehistoric period	Small chiefdoms based on swidden or *ladang* (settled, dry field) cultivation
1100-1300	Early Bugis period or 'Age of Galigo'	Kingdoms based on trade with other parts of the Indonesian archipelago
1300-1400	Period of anarchy or 'Age of Chaos'	Breakdown of political and social institutions as a result of rapid economic change
1400 onwards	Historical period	Rise of new kingdoms based on agriculture

The 'Age of Chaos' proposed by Pelras (1996:56) is based, in part, upon a leitmotif found at the beginning of a some historical texts. This leitmotif ranges from the simple statement that 'the rulers that went up to the age of La Galigo were no more' (Caldwell 1988:109) to an elaborate depiction of an age of political and social disorder, following the demise of the semi-divine rulers of the 'Age of Galigo' (Macknight and Mukhlis in preparation). Pelras sees very clearly that this scheme is based upon the view of the past held by the Bugis themselves. To describe it is part of his ethnographic intent:

> 'By putting together pieces of information scattered throughout texts from the *La Galigo* cycle and setting them against oral tradition one can obtain a picture of the political situation and state of civilization in South and Central Sulawesi and the surrounding world before the fourteenth century; this may or may not tally with the reality, but its coherence and plausibility are striking. Later research will perhaps permit scholars to distinguish among fact, anachronism and fiction' (Pelras 1996:61).

[7] 'Age of Galigo' and 'Age of Chaos' (equivalents of the Indonesian terms *zaman Galigo* and *zaman kacau balau*) are our terms, corresponding to Pelras' 'early Bugis period' and 'period of anarchy'.

The existence of a culturally and politically distinct 'Age of Galigo' and a short 'Age of Chaos' will be critically examined in this monograph. Apart from the brief survey of the central region of Soppeng in 1986, which served as a test bed for OXIS' methods and organization (Kallupa *et al.* 1989), almost all archaeological research relevant to this period of early Bugis history has been carried out by Indonesian archaeologists without external support. As far as the present authors are aware, little of this research has focused on the areas studied by OXIS, with the important exception of Irfan Mahmud's survey of Benteng Tompotikka (1993), which focuses on the period after 1600.

1.6 Luwu as an entrepot and comparisons with other studies

Building on earlier work, we propose that Luwu's early economy involved the movement of produce from the uplands to a coastal centre, there to be exchanged for imported goods. Bronson's (1977) simple upstream-downstream 'functional model' for coastal Southeast Asian polities provides a useful starting point. The model's theoretical reliance on river basin systems is, at first sight, inappropriate for Luwu, which has no navigable river of significant length. However, the river valleys of Central Sulawesi (the source of the iron and other trade goods upon which the economy of the Bugis kingdom of Luwu rested) have long been used as overland trade routes. These rivers flow down from the mountains and cross the alluvial plain in a north-south direction on their journey to the sea. As late as 1960, much of the central plain between Palopo and Wotu was covered with secondary forest, while the coast was lined with mangrove swamps, making east-west communication difficult. It is therefore possible to visualise the entire region of Luwu as a single catchment area, with the river valleys and sea coast providing well-defined lines of communication and trade. Following Bronson's model, coastal centres along the coastal plain should be in direct competition with each other, while tension over exchange of goods should exist between a coastal centre and its trading partner higher in the 'dendritic' hinterland network.

Competition between coastal centres should over time produce victors, which would then operate as regional entrepots, with other coastal centres reduced to collecting centres. This model differs from Bronson's model only to the extent that their connection to the central place was via the coast rather than the lower reaches of a major river. From an initial state of numerous small, competing coastal centres, one such centre should expand as the result of centralising the collection of hinterland produce transported down to each of the coastal trading centres, in order to monopolise its onward distribution. This pre-eminent centre or entrepot should be the natural residence of the rulers of Luwu. The palace-centre entrepot may later move to a logistically superior location as trading and collecting patterns change, but the continuation of Luwu as an integrated polity should be synonymous with the continued existence of a single, dominant entrepot. As noted by Caldwell (1993, 1994), the Malangke region was the site of Luwu's main entrepot from at least the sixteenth to the early seventeenth century.

Bronson proposed Sumatra and Borneo as the two places where his model should best apply. Suitable examples in Sumatra would include Srivijaya (Manguin 1992), Kota Cina (Edwards

McKinnon 1996), Borneo, Brunei (Bellwood and Matussin bin Omar 1980), Kutai (Edwards McKinnon in preparation), Sambas, Pontianak, Tanjung Pura, Kotawaringin, Sampit, Banjarmasin and Pasir (Ali Fadillah 1998). However, there is a fundamental difference between the examples discussed above and Luwu. The coasts of Sumatra, Borneo, and West Malaysia, on which these polities were located, all lie on the major maritime trade routes through early historical Southeast Asia (Pluvier 1995:3,5,16). Trading centres along these coasts were involved in the trade flowing between China in the north-east and South Asia in the west. Direct exposure to this great coastal trading network may have stimulated local exploration for tradeable products, including goods that could be substituted for more expensive products already in demand (Wolters 1967). By contrast, Luwu lay well away from the international maritime network. The nearest coastal points of this network were the southwest and southeast coasts of Sulawesi, which lay on a maritime route which ran between the northeast coast of Java and the Moluccas (Evers 1991:146).

Direct comparisons for Luwu can only be made with other coastal trading termini that lay off the major maritime thoroughfares. Maluku appears at first sight to be a possible comparison. For more than 2,000 years Maluku has been a trading terminus, exchanging cloves and nutmeg for goods brought from the islands in the west (Andaya 1993; Bellwood 1998). However, the natural sources of these spices are small islands, which became political and economic centres. Also, unlike Luwu, the islands of Ternate, Tidore and Banda had no need to concentrate hinterland produce at accessible coastal locations. The larger Maluku islands, and neighbouring Irian Jaya, had rugged interiors; Maluku's trade, however, was dominated by coastal and sub-coastal produce (e.g. tortoise-shell and spices). The accessibility of the major Maluku entrepots, all located on small islands, exposed them to early interference by the expanding European powers (Andaya 1993).

The larger Philippine islands provide a better comparison with Luwu. The economy of Mangindanao, which rose to prominence in southwest Mindanao in the seventeenth century, depended at least in part on trading rainforest produce brought downriver from the mountainous hinterland (Laarhoven 1990). Butuan, on the mouth of the Masao river at the other end of Mindanao, traded local and trans-shipped resources from the tenth century onwards, and developed into a stratified society at some stage before the sixteenth century (Ronquillo 1987; Ronquillo and Tan 1994). Tanjay, on the east coast of Negros, developed into an exemplary case of the type of coastal centre envisaged by Bronson, largely by monopolising the onward distribution of tropical rainforest produce brought down the Tanjay river. Tanjay continually increased its size between *c.*500 to *c.*1000 and again between *c.*1400 to *c.*1600, while the associated settlement hierarchy upriver grew correspondingly more complex (Junker 1994). By the early sixteenth century, Manila was in the process of developing into an indigenous state and the largest entrepot in the Philippines (Reid 1993), presumably in large part because of the exploitable fields of gold, copper, silver and lead in Luzon's hinterland (Wolf 1981; Bronson 1992). However, by the early second millennium AD the Chinese junk trade had penetrated Philippine waters (Reid 1993; Junker 1994), and the islands lay vulnerable to early Spanish colonisation because of ready access by ship.

Luwu, by contrast, lay in a remote corner of island Southeast Asia, and was free of direct colonial interference until very late in the nineteenth century. Early European visitors were aware of

the high-quality iron coming out of Luwu, but apparently made no attempt to seize control of its trade, presumably as iron could be imported reasonably cheaply from Europe as ballast. The earliest source to mention the export of iron from Luwu is Speelman (1670). Writing in the same century, the blind naturalist Rumphius declared that the iron produced at Lake Matano was practically as good as steel, and that one single Lake Matano sword was worth six swords from Bunku in Central Sulawesi (Beekman 1999:238). Until the early twentieth century, iron tools made at Lake Matano were traded to Maluku, and Lake Matano iron ore was exported as far as northern Sumatra (Bronson 1992:92).

The notion that it was a quantity of nickel in the iron mined around Lake Matano which gave it special properties runs through the modern literature on Luwu and kris (e.g. Reid 1988:110, Solyom and Solyom 1978:18). Bronson (1987, 1992:13,73) proposes that the 1-2% nickel content in the iron ores around Lake Matano gave the smelted iron a high resistance against corrosion, and that this nickeliferous iron produced the renowned *pamor* Luwu of certain Javanese kris (*Pamor* is the *damascene*-style inlay of a kris.) However, Piaskowski (1988) points out that 76% of the kris which Bronson analysed contain mere traces of nickel, or none at all. In a separate analysis of three kris by Maisey (1988), only one contained nickel; the chemical analyses reported by Maisey all include arsenic and titanium. Instead, Piaskowski proposed cobalt as the key element in high-quality *pamor*. These data would imply that iron ore from Lake Matano was generally not used in the manufacture of Javanese kris, or that the Lake Matano iron ore contains insignificant quantities of nickel. In the latter case, Lake Matano may still have been the source for *pamor* Luwu, which is commonly regarded in Java as very ancient, possibly as old as the fourteenth century (or earlier) inception of the Javanese kris tradition (Frey 1986:3-6; Maisey 1988).

High-quality iron, whether nickeliferous or not, would not be the only exportable produce available from hinterland Luwu. Caldwell (1988:185) proposed gold, slaves and forest produce from the Toraja highlands, in the context of Palopo's location at the foot of a major trade route into those highlands. Caldwell (1993) also proposed dammar as the main trade good from Rongkong and its hinterland, although the available trade statistics show Sulawesi as a major source of dammar only after the late nineteenth century (Bulbeck 1993).

Prior to the 1990s, very little archaeological work had been undertaken in *kabupaten* Luwu, and almost none of it was directed to understanding the rise of Luwu as a pre-Islamic kingdom. In 1938, the Dutch archaeologist Willems excavated ten of the 25 mounds at Karang Karangan near Bua, but recovered only metal slag, fire-hardened earth, and two thirteenth to fourteenth century celadon sherds. Willems apparently also collected ten seventeenth century sherds from the fishing village of Karang Karangan. His other collections, also identified by Orsoy de Flines, include a fifteenth century Vietnamese sherd from another mound-field in Lare-Lare, Ponrang, a fifteenth century Chinese sherd from the vicinity of Kampung Ponrang, and another fifteenth century Chinese sherd from the Bontobatu rock shelter near Pasui. Ponrang lies a short distance south of Bua, while the Bontobatu rock shelter can presumably be identified with Balabatu, a short distance south again.

When an OXIS team revisited the Karang Karangan mounds in 1997, they still stood up to two metres high, but no surface artifacts were observed on the mounds or on the intervening terrain.

Rather than being dumps from an iron-smelting workshop, as Willems' excavations might have suggested, the mounds looked like accumulations of clay-rich earth, piled around the bases of coconut trees, which had subsequently been hardened by fire. The possibility of their intentional construction for agricultural purposes could not be ruled out, but there was no visible evidence of mortuary, domestic or industrial use (Bulbeck and Prasetyo 1998). However, the ceramic sherdage recovered by Willems provides important evidence of occupation in southern Luwu from *c.*1300 to the seventeenth century.

Willems also excavated 11 enormous, empty earthenware jars which had been exposed at Sabbang by the construction of the Palopo-Malili road. He suggested the jars had been used for secondary burials, based on analogy with ethnographically observed Toraja mortuary practices, and local memories that the urn field was a cemetery from an unknown period. He also reported finding iron spearheads, stone mortars and bark-cloth beaters, earthenware sherds, and ceramic sherds in the deposits above the jars (Willems 1938). Orsoy de Flines identified the *keramik* as comprising two Chinese sherds, which he dated to the early fifteenth and the seventeenth centuries, and one Sukothai sherd (National Archaeology Museum *Keramik* Collection, Accession No. 3949). Our research will suggest that some of these artifacts, but not the ceramic sherds, represent the habitation debris of the residents who had buried the jars in the ground beneath their huts.

Bulbeck and Macknight (1985) later learned that further adjacent jar burials had been disturbed during rehabilitation of the highway, and the construction of the local *camat* (sub-district) office. Bulbeck (1992:448) proposed that the jar burials could be in the order of 1,000 to 2,000 years old based on a later report of glass beads collected from the vicinity of the urn field (Bulbeck 1995:11; 1996-97:1030). Subsequent information that metalwares and beads had been found in the jars themselves (Bulbeck and Prasetyo 1998:31) seemed to confirm this general age estimate.

1.7 Research objectives

OXIS' primary objective was to document the pre-Islamic history of the kingdom of Luwu. A second objective was to document the history of places along the northeast coast of the Gulf of Bone which are traditionally associated with Luwu's mythological origins. A third objective was to examine social and economic developments along the coastal plain of the Gulf of Bone during the pre-Islamic period with reference to Bronson's (1977) model of coastal-hinterland relationships in mountainous, resource-rich Southeast Asian locations.

As well as inquiring into the origins and development of the kingdoms of Luwu and Cina, OXIS also set out to examine three major proposals put forward over the last two decades by historians and other scholars engaged in the study of early South Sulawesi. These propositions: are a shift in the economic basis of political life from trade to agriculture around 1400, the existence of trade-based kingdoms before the fourteenth century, and a period of social disorder which is supposed to have preceded the rise of agricultural kingdoms.

In a seminal article, Campbell Macknight has proposed that around 1400 there was an important expansion of settled agriculture as the economic basis of political power in South Sulawesi:

> 'Very approximately about 1400, there was a perceptible growth in the population of areas away from the coast [...] Increasing numbers of small agricultural communities established themselves on a permanent basis. This does not, of course, represent the first agriculture in the area: that lay back some thousands of years. Rather, it is an intensification of agriculture, especially perhaps a move from swidden to more or less continuous cultivation. In particular, it is tempting to see this in terms of some concentration on rice at the expense of other crops and the extension of wet rice agriculture [...] There were, no doubt, well-developed ideas of status in the society, along the lines of other Austronesian-speaking groups, and those with high status (or acquiring high status) were able to control and encourage surplus food production [...] It is important to note the interaction of the several factors: population, geography, the technology of food-production, social status, religious function and military power.' (Macknight 1983:99.)

Macknight's argument is based on the evidence of Bugis historical texts, including the chronicle of Bone (Macknight and Mukhlis in preparation), which records the expansion of the kingdom of Bone from a cluster of settlements around 1400 to a fully-fledged kingdom occupying the coastal plain south of the Cenrana river a little more than one century later. The expansion of the kingdom is closely associated in the chronicle with the spread of wet rice agriculture, carried out under the direction of the rulers of Bone.

Macknight compared the picture of society obtained from the chronicles of the agricultural kingdoms with that of the Bugis epic poem La Galigo (Kern 1939, 1954). He noted that in contrast to the chronicles' depiction of the laying out of fields, the planting and harvesting of crops, and the warfare which formed an important part of agricultural expansion, the La Galigo portrays a landscape of small estuarine polities engaged in archipelagic trade with places such as Bima (Sumbawa), Ternate (the Moluccas), and possibly even Srivijaya (Senrijawa). There is little or no mention of agriculture. Macknight interpreted the differences in the picture of society provided by these two types of sources as evidence of a relative shift in the importance of trade and agriculture as sources of political power. This shift he dated, on the internal evidence of the chronicles, to around the year 1400.

Historical research over the last two decades has strongly confirmed Macknight's proposed agrarian revolution and its important association with the emergence of kingdoms. However, the associated research question concerning the prior existence of trade-based polities can neither be confirmed nor refuted by historians as the age of such polities would lie below the early chronological limits of Bugis texts, which post-date the beginnings of the agricultural kingdoms (Caldwell 1988:Figure 3-2). The same is true of Pelras' hypothesised 'Age of Galigo' and 'Age of Chaos'. All three hypotheses are, however, susceptible to archaeological testing, while the

hydrological changes proposed by Pelras for the Lake Tempe region and the Cenrana valley can be tested by sedimentologists.

It was with these three research questions firmly in mind, as well as the general question of the genesis of the agricultural kingdoms, that OXIS was set up in 1997. The two regions of South Sulawesi chosen for research are very different in terms of their ecology and populations. With the exception of the narrow coastal strip south of Palopo, the traditional staple of Luwu is sago, not rice. It is a thinly populated region of great ethnic diversity; speakers of Pamona, Padoe, Toala, Wotu and Lemolang languages live on the coastal lowlands and foothills, while the highland valleys are home to other groups speaking various Central and South Sulawesi languages. The Bugis are found almost solely along the coast, to which they have evidently migrated in order to trade with Luwu's indigenous peoples. Textual and oral evidence indicates that the kingdom of Luwu was a Bugis-led coalition of various ethnic groups united by trading relationships (Caldwell and Druce 1998). It is an excellent place in which to seek evidence of trade as the economic basis of centralized political life both before and after Macknight's proposed agricultural revolution of *c.*1400.

By contrast, the western Cenrana valley lies close to the great central lakes of the Bugis heartland. This region, with its fertile soils and seasonal rainfall, is one of the major rice growing areas of South Sulawesi. It lies close to the western shores of Lake Tempe where the inundation of the surrounding lands during the wet season provides ideal conditions for the planting of rice. It is an excellent place to look for the agricultural revolution, and for its impact on Bugis social organisation. The Cenrana river, which flows down the valley, is South Sulawesi's longest and deepest river and allows sea going vessels to reach as far inland as Sengkang. It might therefore be possible to detect in the archaeological record of the western Cenrana valley an earlier period in which trade was the economic basis of political life.

1.8 Hypotheses to be tested

The previously discussed research questions allow several hypotheses to be generated. Some of these are alternative hypotheses to cover different possible interpretations of the information available at the start of the OXIS project.

(1) The Bugis kingdom of Luwu established a powerful coastal centre at Malangke by the fourteenth century AD. The palace centre remained there during Luwu's heyday in the fifteenth and sixteenth centuries. Shortly after Matinroe ri Ware', the ruler of Luwu, embraced Islam in 1605 and became South Sulawesi's first sultan, the palace centre of Luwu shifted to Benteng Tompottikka, a short distance south of Palopo.

(2) Three main advantages underwrote the efflorescence of Luwu at Malangke: (i) the agricultural potential for producing enough sago to support a large population; (ii) the proximity to Baebunta, the collection point for dammar and high-grade iron ore transported down the Rongkong valley; and (iii) the production of iron weapons and agricultural tools in Malangke.

(3) The Baebunta sites, including Sabbang Loang, should all date to the middle second millennium AD, corresponding to the efflorescence of Luwu's palace centre on the adjacent coast. Alternatively, the Baebunta sites should demonstrate their own historical trajectory from at least 2,000 years ago, corresponding to the persistence of Baebunta as a linguistic enclave of prosperous individuals despite the spread of Toraja (Rongkong, Toala) and Bugis languages across the adjacent lands.

(4) A Bugis presence can be identified in the vicinity of Ussu and Cerekang earlier than the establishment of a powerful centre at Malangke. This early Bugis presence can be identified with Luwu's apocryphal origins as suggested by a conventional interpretation of the Bugis poetic cycle La Galigo. Alternatively, the coastal expansion of the Bugis as far as the head of the Gulf of Bone did not take place until a comparatively late stage in Luwu's pre-Islamic history, and perhaps even after Luwu's adoption of Islam. Communities between Tampinna and Malili were still made up of non-Bugis speakers when they came beneath Luwu's authority. The association of this region with Bajau (B. 'sea nomads') origin myths, and its proximity to the Wotu linguistic enclave, may, however, suggest very early pottery-associated occupation, indicative of Austronesian speakers.

(5) An industry collecting iron ore, smelting it, and exporting it for the production of Java's kris *pamor* Luwu was established at Lake Matano by the fourteenth century AD.

(6) Cina was a trade-based kingdom, which will be reflected by evidence of major occupation on low hills near the mouth of the River Cenrana, as initially proposed by Caldwell (1988). Alternatively, it was an agrarian kingdom, which will be reflected by evidence of early major occupation only within the rolling terrain (with its lush rice fields) immediately southeast of Lake Tempe, as suggested by the traditional identifications of its west and east palace sites (Pelras 1996).

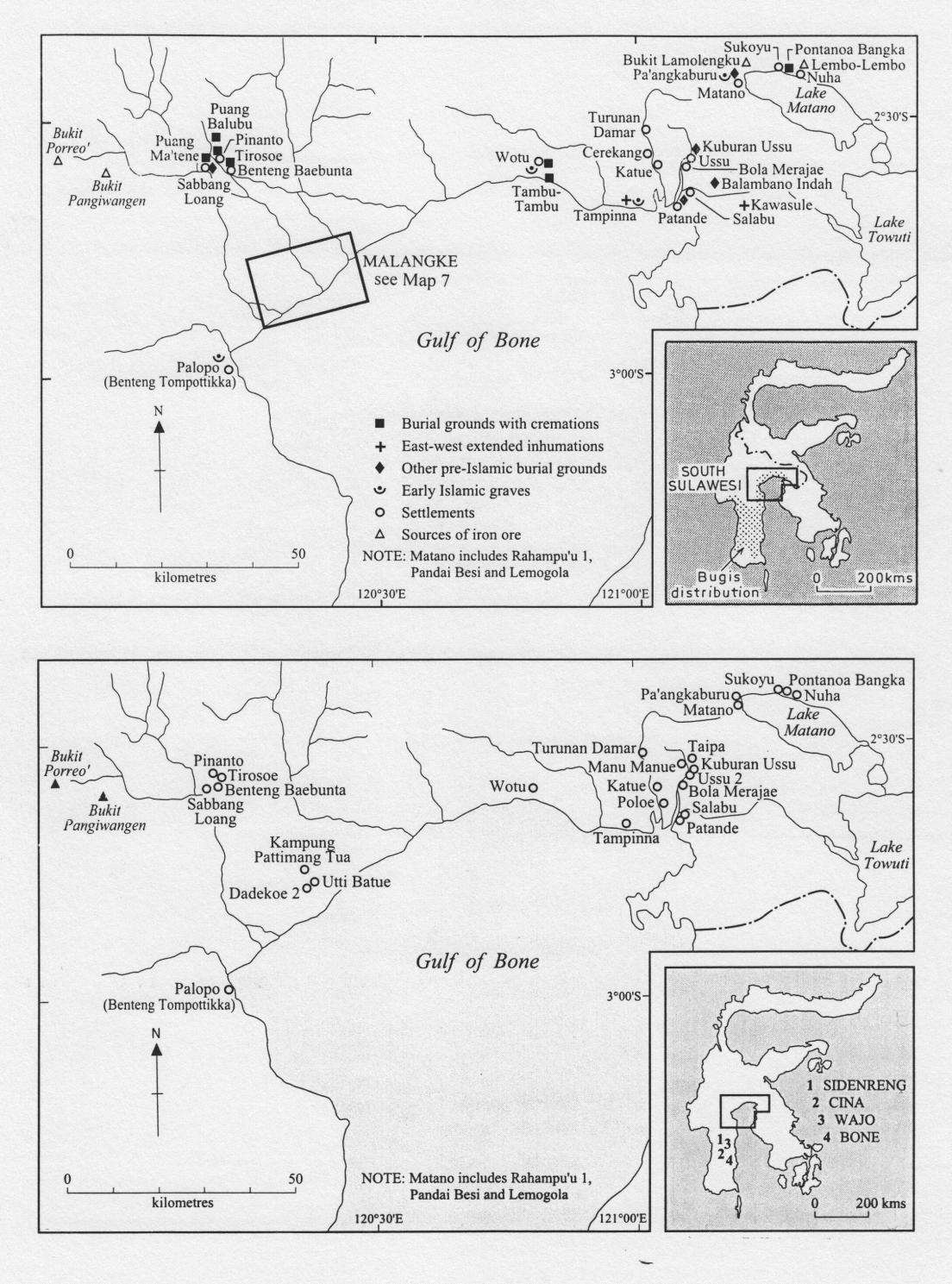
These six hypotheses will be critically examined in Section 2.

2. The programme of research

The initial impetus for the OXIS project was Ian Caldwell's trek across highland South and Central Sulawesi and his survey of certain sites in Luwu in 1992. During his journey, Caldwell recorded abandoned iron ore quarries at Bukit Porreo' near Rongkong in the Limbung valley and at Eno in the Seko Pada valley, and the remains of iron smelting on a massive scale at Kampung Matano, in the mountainous eastern interior of the Gulf of Bone. He also found incontrovertible evidence that in the sixteenth century Luwu's palace centre had been located at Malangke, on the coast of the central Luwu plain (Caldwell 1993). On a subsequent trip, Caldwell (1994) observed earthen barricades and abundant flaked chert at Matano, inquired into the existence of a complex of sacred sites at Cerekang, and collected more information on Luwu's pre-Islamic palace centre at Malangke. Bulbeck (1995) carried out preliminary site surveys with visits to Nuha, Matano, Ussu, Cerekang, Baebunta and Malangke. Following receipt of an Australian Research Council grant, a formal survey was carried out in 1997 by Bulbeck, Bagyo Prasetyo (the fieldwork co-director), Iwan Sumantri and Karaeng Demmanari (Bulbeck and Prasetyo 1997, 1998). Even after excavations started in 1998, surveys were continued in order to locate further sites that relate to Luwu's history and which might be suitable for excavation. Unfortunately, appalling weather conditions in 1998 washed away the access road to the Limbung valley, thus our only information on that region derives from the brief surveys by Caldwell and by Bulbeck and Prasetyo.

Archaeological analysis focused on economic activities, especially those related to the trade of hinterland resources for imported luxuries. Subsistence activities, and cottage industries for local exchange, form the backdrop to the long-distance trade which would have been critical for socio-political developments. The approximate size and distribution of the population also need to be correctly understood before Luwu's pre-Islamic developments are adequately illuminated. Archaeological means of detecting the various ethnic groups of Luwu, and how those groups related to each other, were also critical to the project's objectives. Equally important were the indicators of differentiation in social status and the development of Bugis high culture.

During fieldwork, 29 sites were excavated, involving a total of 107 square metres (Table 2-1) and a further 56 sites were surveyed (Table 2-2). To some degree, the large number of sites reflects the difficulties OXIS had in working at Ussu and Cerekang, two important settlements in the northeastern Gulf of Bone, owing to the large number of sacred sites in and around these settlements. Five sites were explored with test pits at Ussu, and a further five sites were inspected. At Cerekang three sites were examined by trial excavation and a further six sites were inspected, in both cases with generally indifferent results. Malangke constituted a second focus of survey, with 24 surveyed sites, in addition to the four sites excavated as a result of prior survey. At several of the excavated sites in Luwu, work did not proceed after preliminary test pits revealed shallow cultural deposits with little or no archaeological potential. Nonetheless, the excavation strategy can be described as extensive rather than intensive, and designed to sample Luwu's system of hinterland-coastal trade rather than to document particular sites in detail. The range of sites include fortifications (defensive earth walls as well as enclosed fortified centres), the pre-Islamic



Map 2. Sites excavated and surveyed by OXIS in Luwu

monumental site of Tampung Jawa in Malangke, iron quarries and smelting sites, habitation sites, burial sites, and occupation sites (which combine burials and habitation). All sites examined in detail by OXIS lie below the 100 metre contour line, except for the Lake Matano sites, which lie at a height of over 380 metres (Map 2).

The OXIS survey strategy relied heavily on local information, but, apart from this, varied according to local circumstances. At Lake Matano, survey was directed towards shedding light on the local iron industry. At Baebunta, survey focused on the sites which the local Lemolang-speaking people associate with their oral history. At Ussu and Cerekang, survey focused on the peripheries (where permitted) of the sacred sites, and on places which people remembered as being former settlements. At Malangke, Tampinna and the Malili (Larona) river, looted sites and Islamic cemeteries were the main focus of survey. At Wotu, locations with an abundance of surface sherdage were the main focus.

Excavation strategy was similarly flexible. The primary constraint was permission, and the second constraint was the availability of intact deposit, apart from a few instances where we deliberately excavated looters' refill to sample the materials that looters had missed or thrown away. Shell middens were preferred whenever available, as they provide an advantageous context for the preservation of organic remains, and directly relate to subsistence practices. Because only in a few cases was the extent of the site readily apparent, the excavating teams (three to four persons per team) were generally at liberty to choose where to place their initial test pit. Decisions on follow-up test pits were made on the basis of the excavated material, information from sub-surface bores and surface surveys, and the overall logistics of the fieldwork program. In two cases (Katue and Sabbang Loang), a succession of *ad hoc* test-pitting decisions resulted in total excavated areas of nine and 11 square metres respectively. Only at two sites (Kampung Pattimang Tua and Pinanto) was the extent of the site known prior to excavation. These were excavated probabilistically, following the procedures of stratified random sampling and systematic sampling respectively.

Test pits were always one metre square, apart from the waterlogged Utti Batue sites where larger test pits were necessary to prevent the baulks collapsing. In one test pit at Rahampu'u 1 the original square metre was extended by an additional square metre to expose the full breadth of stone footings that appeared beneath the surface. Excavation followed stratigraphic units wherever they could be recognized. However, if a stratigraphic layer (one which was not obvious refill) did not finish after five centimetres' depth, it was divided into separately excavated spits, with the horizontal orientation of the spits slanted to follow the apparent orientation of the sediments in the layer. All separately excavated lots of sediment, whether from pits, mounds, thin layers, or units within thicker layers, are referred to as 'units' in this monograph. A sediment sample was collected from every unit, usually from a 5 cm by 5 cm area in one corner of the test pit. The other sediments were weighed as they were excavated. The sediments were sieved using three and five millimetre sieves. When fine sands or clay prevented sieving, the sediments were kneaded by hand while feeling for artifacts, or were floated off in a water-borne suspension, leaving the finds in the bottom of the bucket. All artifacts and manuports (a natural object brought to a site through human agency)

Table 2-1. Sites excavated by OXIS in Luwu (asterisks denote ^{14}C dates)

Site name	*Latitude (S)*	*Longitude (E)*	*Excavated area*	*Site description*
Surutanga	3° 00' 10.6"	120° 12' 04.0"	3 m^2	17th century plus occupation
Sabbang Loang*	2° 35' 43.1"	120° 14' 46.6"	11 m^2	2000 BP plus occupation
Pinanto*	2° 35' 10.4"	120° 15' 31.6"	22 m^2	14th-17th century occupation
Tirosoe	2° 35' 22.6"	120° 15' 39.6"	2 m^2	16th-19th century ceremonial
Benteng/kampung Baebunta	2° 35' 26.4"	120° 15' 42.0"	1 m^2	14th/15th century plus occupation
Dadekoe 2	2° 47' 55.7"	120° 23' 27.2"	1 m^2	14th-16th century burials
Kuburan Pattimang Tua	2° 46' 04.8"	120° 23' 34.7"	4 m^2	Pre-Islamic burials (vacant area excavated)
Kampung Pattimang Tua	2° 46' 11.5"	120° 23' 41.5"	11 m^2	14th-17th century habitation
Utti Batue	2° 47' 49.8"	120° 24' 00.0"	13 m^2	15th-16th century habitation
Tapa Benteng	2° 35' 40.3"	120° 48' 27.3"	1 m^2	15th century plus habitation
Kande Api	2° 35' 44.5"	120° 48' 29.2"	1 m^2	16th-17th century burials
Tampinna	2° 37' 41"	120° 58' 31"	2 m^2	15th-17th century occupation
Turungang Damar*	2° 32' 42"	121° 00' 36"	2 m^2	17th century plus habitation
Katue*	2° 35' 25.1"	121° 02' 00.5"	9 m^2	1st millennium habitation
Poloe	2° 35' 39"	121° 02' 15.4"	1 m^2	17th century plus habitation
Bola Merajae*	2° 35' 40.2"	121° 05' 26.3"	2 m^2	2000 BP plus habitation
Ussu 2	2° 35' 20.2"	121° 05' 31.5"	1 m^2	16th century plus occupation
Manu Manue*	2° 35' 00.0"	121° 05' 42.5"	3 m^2	19th century plus occupation
Taipa	2° 34' 35.6"	121° 05' 45.2"	2 m^2	Late 20th century occupation
Kuburan Islam Ussu	2° 35' 17.0"	121° 05' 45.4"	2 m^2	14th century plus burials (vacant area excavated)
Patande	2° 38' 17.2"	121° 05' 32.6"	1 m^2	15th century plus habitation
Salabu*	2° 38' 13.0"	121° 05' 47.4"	1 m^2	15th century plus occupation
Pa'angkaburu	2° 26' 31.5"	121° 12' 38.8"	1 m^2	16th-18th century burials
Pandai Besi*	2° 27' 24.2"	121° 12' 57.7"	1 m^2	16th century plus smelting
Rahampu'u 1*	2° 27' 20.4"	121° 13' 00.0"	4 m^2	600 BP plus habitation
Lemogola*	2° 27' 14.5"	121° 13' 00.8"	1 m^2	17/18th century plus smelting
Sukoyu*	2° 25' 46.0"	121° 17' 55.9"	2 m^2	12th century plus smelting
Pontanoa Bangka*	2° 26' 00.7"	121° 18' 23.3"	1 m^2	13th century plus burials
Nuha*	2° 26' 46.2"	121° 20' 22.7"	1 m^2	12th century plus smelting

were collected. Charcoal samples were collected by trowel, wrapped in aluminium foil, and bagged. Stone artifacts were individually bagged to protect their edges, before being bagged with the other stone artifacts from the unit. At the end of the excavation of the unit, cardboard labels (typically themselves slipped inside small zip bags) were placed in the zip bags designated for each type of material from the unit (sediment sample, earthen sherds, shell, etc.), and an inventory made of the

unit's finds. Specimens that required individual identification and analysis, such as radiocarbon dated samples (e.g. Table 2-5), stone artifacts and tradeware sherds, were labelled individually according to the following format: site acronym.test pit.unit.number (beginning at 1 in every unit). Plans were drawn of each excavation unit to illustrate features and to show the location of major finds. Stratigraphic sections were drawn of the walls at the completion of each test pit's excavation. The photographic record included photographs corresponding to each drawn plan and section, as well as photographs of other observations made during excavation. The same methodology was followed when excavating sites along the Cenrana valley.

Precise chronological control was central to OXIS' objectives. Radiocarbon dates were obtained from 14 Luwu sites (each marked by an asterisk in Tables 2-1 and 2-2). Most are conventional dates obtained from the Australian National University's Radiocarbon Dating Laboratory (prefixed ANU), supplemented by smaller numbers of Accelerator Mass Spectrometry (AMS) dates from Lucas Heights in Sydney (prefixed OZD and OZE) and from the Waikato Laboratory in Hamilton (prefixed Wk-). Radiocarbon dating was specifically focused at sites which lacked high-fired trade stonewares and ceramics (here referred to by the Indonesian term *keramik*, a term which excludes earthenwares), which are the most important artifacts for dating historical sites in South Sulawesi (see Appendices A and B). All radiocarbon dates were calibrated using the 'area under the curve' method, provided by the CALIB 3.03 computer programme, to produce the two-sigma confidence interval, which should contain the real age of the dated sample at a level of probability of approximately 95% (see Stuiver and Reimer 1993).

Table 2-2. Sites surveyed by OXIS in Luwu

Site name	*Latitude (S)*	*Longitude (E)*	*Site description*
Passauen	2° 34' 36"	119° 54' 6"	Ethnohistorical iron smelting
Kamiri	2° 35' 12"	119° 56' 18"	Ethnohistorical iron smelting
Dandang	2° 42' 03.3"	120° 10' 48.3"	Cremated burial in a martavan under a boulder
Benteng Tompottikka	3° 00' 10.6"	120° 12' 04.0"	17th century plus palace centre
Tinoe	2° 33' 42.8"	120° 14' 14.2"	Mythological (vacant)
Puang Balubu	2° 33' 36"	120° 14' 36"	14th-16th century burials
Puang Mattene	2° 35' 17"	120° 15' 23"	13th-16th century burials
Matinroe Marampi	2° 35' 38.8"	120° 15' 18.1"	19th century plus cemetery
Kuburan Matinroe Kasoro	2° 35' 13.9"	120° 15' 44.1"	16th-17th (?) century burials
Weilawi	2° 50' 24.2"	120° 19' 23.2"	14th-15th century burials
Tompe	2° 49' 56.2"	120° 20' 05.4"	13th-14th century burials
Panasae	2° 49' 32.2"	120° 20' 38.3"	15th century burials
Jampu Pute	2° 48' 53.9"	120° 21' 14.0"	14th century burials
Kuburan Petta Pao	2° 49' 18"	120° 21' 30"	15th-16th century burials
Labellang	2° 48' 59"	120° 23' 25"	16th century burials
Tungko-Tungko	2° 48' 58.9"	120° 23' 30.5"	15th-16th century burials

Dadekoe 1, 3, 4, 5	2° 47' 46" to 2° 48' 20"	120° 23'13" to 120° 23' 38"	14th-16th century occupation
Tampung Jawa	2° 45' 39.1"	120° 23' 29.8"	13th-16th century monumental site & burials
Pattimang Tua 8	2° 47' 30.2"	120° 23' 39.3"	Undated pre-Islamic burials
Arateng 1 to 3*	2° 47' 49" to 2° 48' 03"	120° 23'36" to 120° 23' 56"	15th-16th century occupation
Mangnge	2° 48' 06.8"	120° 23' 56.8"	15th-16th century burials
Makam Dato Sulaiman	2° 47' 47"	120° 23' 58"	15th century plus burials
Lopa	2° 48' 36.0"	120° 24' 11.3"	15th-17th century burials
Wale'walae	2° 47' 59.6"	120° 24' 11.7"	15th-16th century burials
Lindrunge	2° 47' 33.3"	120° 24' 12.2"	14th-16th century burials
Pattimang Baru 1	2° 47' 40.6"	120° 24' 16.9"	Pre-Islamic occupation
Lengkong Ulaweng	2° 47' 51.4"	120° 24' 41.1"	16th century occupation
Pincang Pute	2° 48' 19.8"	120° 25' 00.7"	14th-16th century occupation
Nenek Cinong	2° 48' 51.1"	120° 25' 35.1"	16th century burials
Tanetede	2° 49' 10.6"	120° 26' 11.4"	15th-16th century burials
Malangke Beccu 1 to 3 (+ Makam Petta Malangke)	2° 47' 25" to 2° 48' 34"	120° 26'10" to 120° 26' 25"	16th-17th century burials
Benteng Masselekoe	2° 43' 00"	120° 26' 30"	Earth wall *c.*AD 1600
Tambu-Tambu	2° 36' 56.1"	120° 48' 09.4"	13th-16th century burials
Tomba (Sangyang Seri)	2° 34' 40"	121° 00' 43"	Sacred (looted)
Bukit Pensimewuni	2° 34' 36"	121° 02' 12"	Sacred (vacant?)
Beroe(Kuburan ToBerani)	2° 35' 44.8"	121° 02' 18.6"	Sacred (looted old *kampung*)
Cerekang	2° 34' 45"	121° 02'	1930s plus habitation
Mangkulili 2	2° 35' 42"	121° 02' 36"	Occupation (earthen sherdage)
Mangkulili 1	2° 35' 36"	121° 02' 54"	Occupation (earthen sherdage)
Malaulu	2° 35' 37.9"	121° 05' 11.6"	18th-20th century habitation
Ussu 1	2° 35' 22"	121° 05' 27"	16th century plus habitation
Kuburan Islam Opu Nenena Cimpak	2° 35' 12"	121° 05' 36"	19th or 20th century grave
Kuburan Islam Tamalipa	2° 35' 10"	121° 05' 37"	Sacred (looting, 18th-19th *c.* graves)
Keramat Tompottikka	2° 35' 12"	121° 05' 42"	Sacred (habitation debris)
Balambano Indah	2° 38' 36.5"	121° 07' 05.4"	17th century plus burials
Kawasule 2	2° 41' 00.1"	121° 08' 34.9"	17th century plus burials
Kawasule 1	2° 40' 53.7"	121° 08' 44.0"	15th-17th century burials
Warau	2° 40' 33"	121° 10' 3"	19th-20th century occupation
Benteng Matano	2° 27' 10"	121° 12' 42"	Earth walls *c.*AD 1900
Rahampu'u 2	2° 27' 20"	121° 12' 56"	16th century plus habitation
Kuburan Islam Matano	2° 26' 32"	121° 12' 50"	19th century plus cemetery
Bukit Lamolengku	2° 25' 39"	121° 13' 00"	Ethnohistorical iron ore quarry
Lembo-Lembo	2° 26' 42"	121° 15' 18"	Ethnohistorical iron ore quarry
Benteng Nuha	2° 26' 47"	121° 15' 28"	Earth wall *c.*AD 1900

2.1 Lake Matano

Introduction

Lake Matano is Sulawesi's deepest lake (540 metres) and its fifth largest, covering 16,408 hectares. It lies at the head of the Matano Fault which includes the Mahalona and Towuti lakes, each of which is connected to the other by streams, and, ultimately, to the sea at Malili, via the Larona river. By 2,000 years ago, farmers had colonized the lakeshores, as recorded by charcoal dates from deposits of sediment that had probably eroded after clearance of upslope forest. One of these determinations (2350±140 BP, ANU-11104) comes from a test bore at the lake's southwest margin; the second comes from the basal unit, at Sukoyu, which yielded abundant charcoal in otherwise sterile deposits (Table 2-3).

The shores of Lake Matano are surrounded by ultrabasic rocks and covered by scrubby forests which extend down to the shore.[8] On the southwestern shore, a strip of limestone runs from a point north of Soroako to the settlement of Matano. Soils here are more fertile, and the forest has been cleared from all but the steepest slopes. Shifting cultivation is practised on the slopes facing the lake, and the pockets of lakeside sediment support more permanent gardens.[9] The surrounding forests provide a wide range of collectable produce, notably dammar gum from the *Agathis* pine, *kaloju* wood (a fast-growing tree whose branches are reportedly preferred as fuel by iron workers), other timber and wild honey. Deer and wild boar are hunted in the local forest. Historically, the most important product from Lake Matano was iron ore.

From studies of the heavy metals present in Lake Matano's waters, chromium, manganese and cobalt may well be the additional elements in Matano's iron ore.[10] This is in contrast to the widely held belief that the iron exported from Lake Matano contained significant quantities of nickel (e.g. Bronson 1992:73). A publicity officer for P.T. Inco, Yusri Badullah, informed the OXIS team that the ore around Lake Matano everywhere contains less than 1% nickel, even in the rich iron deposits north of the lake.[11] Ali Fadillah and Ian Caldwell collected samples of iron ore from a traditional collection site at Bukit Lamolengku, a few kilometres north of Matano, and Gunadi and his co-workers collected ore samples from Lembo-Lembo, a short distance northwest of Nuha.[12] We expect that chemical analysis of the Lamolengku and Lembo-Lembo ore, and of the iron and slag

[8] The waters of Lake Matano offer few opportunities for subsistence. Plant growth and the dependent ecosystem rarely extend more than a few metres from shore. The high level of chromium (0.04 parts per million), and traces of other heavy metals such as cobalt, are hostile to the zooplankton. The limited endemic fauna includes eight shellfish species, five species of endemic fish, crabs, a species of freshwater snake, and 12 water birds (Whitten *et al*. 1987).

[9] Elsewhere the returns from gardening are very low, and clearances are restricted to present-day settlements such as Soroako, Matano and Nuha, and to recently abandoned sites such as Sukoyu.

[10] However, traces of heavy metals may not be ubiquitous. A sediment sample from unit 12 in Pontanoa Bangka was chemically tested with Energy Dispersive X-Ray Analysis by Judith Cameron (Australian National University) but did not produce any detectable heavy-metal peaks. The major elements in the sample were iron and silicon, followed by copper, aluminium, calcium, sulphur and zinc.

[11] P.T. Inco mines the nickel-rich deposits to the east of Lake Matano.

[12] At Bukit Lamolengku, the iron ore was simply dug from the ground. A number of abandoned pits were observed; these measured approximately one metre in diameter and two metres in depth. Similar pits have been observed near Eno in the Seko Pada valley (Caldwell 1993:7).

from Matano and Nuha will indicate the presence of chromium, and smaller amounts of manganese and cobalt. Nickel should be present rarely, if ever.

Matano and Nuha lie at alternative possible outlets for the Lake Matano iron. Matano lies at the head of the trail leading down to Ussu and Cerekang, whereas Nuha lies at the foot of a trail leading north to the Mori heartland situated between the Lemo depression and the La valley. One of the OXIS hypotheses links Matano iron to the rise of historical Luwu, with the prediction that the industry commenced no later than the fourteenth century. Three separate sites at Matano, Rahampu'u 1, Pandai Besi, and Lemogola, were excavated, each of which contained major iron-smelting deposits. Test pits were also made at Nuha and at the abandoned settlement of Sukoyu, on the northern shore of the lake. Expected finds included clay tuyères, abundant charcoal and other hearth rakeout, as well as the ore and its smelted products (cf. Pelras 1996:251). To help establish the date of the start of permanent settlement at Matano, and at Nuha and Sukoyu, test pits were also placed in the associated cemeteries of Pa'angkaburu and Pontanoa Bangka.

Nuha: findings and interpretation

Surveys of Nuha, Pontanoa Bangka and Sukoyu recovered very little *keramik* (see Appendix: Table A-1). Yet Nuha revealed mounds of ironworking debris, and Sukuyo has a hardpan of iron along its foreshore, while at Pontanoa Bangka iron bush knives (and earthen jars) were seen protruding from the eroding slope above the lakeshore. An OXIS team surveyed and excavated at these northern shore sites between February and March 1999 to investigate whether the Nuha area had been a focus of early iron smelting.

The Nuha test pit cut through approximately 92 centimetres of the kind of iron-smelting deposit that the OXIS archaeologists had previously encountered at Kampung Matano. Finds included 25.6 kilograms of iron debris (iron ore, slag, etc.), 500 grams of charcoal, 3.2 kg of lumps of baked earth identified as tuyère fragments, a possible iron tuyère-tip, two other iron fragments, 59 earthenware sherds with accreted iron bloom, and 24 flaked chert artifacts. The flaked chert would probably have been associated with a local strike-a-light industry, as recorded ethnographically among the Toraja (Van Heekeren 1950), and, according to our informant, Abdullah Andi Mattoana, still practised near Matano. A charcoal sample from the lowest excavated unit containing charcoal and abundant smelting debris was submitted for dating, and calibrates to between the eleventh and the thirteenth centuries (Table 2-3). A second charcoal sample from the top of the smelting deposit dates to the seventeenth century or later. These dates thus indicate that ore was smelted at the site throughout much of the second millennium AD, confirming the prediction by OXIS of iron smelting by at least the fourteenth century.

Table 2-3. Radiocarbon dates from Nuha, Sukoyu and Pontanoa Bangka

Site and Level	*ANU Lab. No.*	*Date (BP)*	*Two-sigma calibration*
Pre-Iron Smelting			
Sukoyu Test Pit 1, unit 8	ANU-11271	2070±50 BP	200 BC-AD 55
Early Iron Smelting			
Pontanoa Bangka Test Pit 1, unit 12	ANU-11107	1520±70 BP	AD 410-660
Pontanoa Bangka Test Pit 1, unit 7	ANU-11108	1010±60 BP	AD 900-1190
Nuha Test Pit 1, unit 15	ANU-11105	960±70 BP	AD 980-1260
Sukoyu Test Pit 1, unit 6	ANU-11272	830±70 BP	AD 1035-1290
Late Iron Smelting			
Nuha Test Pit 1, unit 3	ANU-11278	130±50 BP	AD 1670-1945

Two shallower excavations at Sukoyu (to 52 cm and 41 cm depth respectively) produced similar densities of the same materials as described for Nuha in Test Pit 1, and much lower densities in Test Pit 2. The combined yield included 385 grams of charcoal, 24.8 kg of *terak besi* (iron working slag), an iron prill, three corroded iron artifacts, four sherds with accreted iron slag, 338 grams of baked earth classified as tuyère fragments, and six flaked chert artifacts. A charcoal sample taken from the base of the smelting deposit in Test Pit 1 produced the same eleventh to thirteenth century date as observed at the base of the Nuha smelting deposit (Table 2-3). This test pit also yielded a Swatow sherd towards the top of the smelting deposit, which broadly agrees with the radiocarbon date obtained from the top of the Nuha smelting levels, and corresponds with the sixteenth to nineteenth century *keramik* sherdage from the surface of the Sukoyu site. That is to say, iron smelting appears to have commenced at two sites along Lake Matano's northern shore during the early second millennium AD, and continued at both sites until at least the seventeenth century. By this time, an iron-smelting industry had been established at Kampung Matano (see below).

Surface survey of the Pontanoa Bangka cemetery yielded abundant decorated earthenware jars in various stages of fragmentation, two iron bush knives, an eighteenth century Chinese *famille rose* saucer, and a copper cash minted during the reign of Qian Long (1736-1795). At the cemetery's knoll, some 35 metres from the lake shore, an uneroded sector was observed and a circa one metre deep test pit was excavated here.[13] The top unit immediately encountered 134 glass beads at the west of the square, and a burial pit in the northeast corner. Excavation of this pit to a depth of 40 centimetres revealed two semi-complete earthen jars and three more glass beads. Continued excavation near the pit produced another 123 identifiable glass beads. Laboratory analysis of the 260 beads shows that the great majority are Chinese wound glass beads, suggesting a date between the twelfth and fourteenth centuries, an antiquity that would also apply to the small number of blackish, Indo-Pacific beads of drawn glass found in the assemblage. Unit 9, a 13 cm deep feature

[13] The salient feature on the knoll is a 2.6 metre long, east-west oriented mound, adorned with stone blocks and a small upright *nisan* (stone grave marker) which possibly marks a late pre-Islamic, or syncretist Islamic, inhumation of a Makasar (cf. Bulbeck 1992). The name of the adjacent site of Sukoyu is Makasar for 'crab', examples of which can be seen scuttling along the site's foreshore.

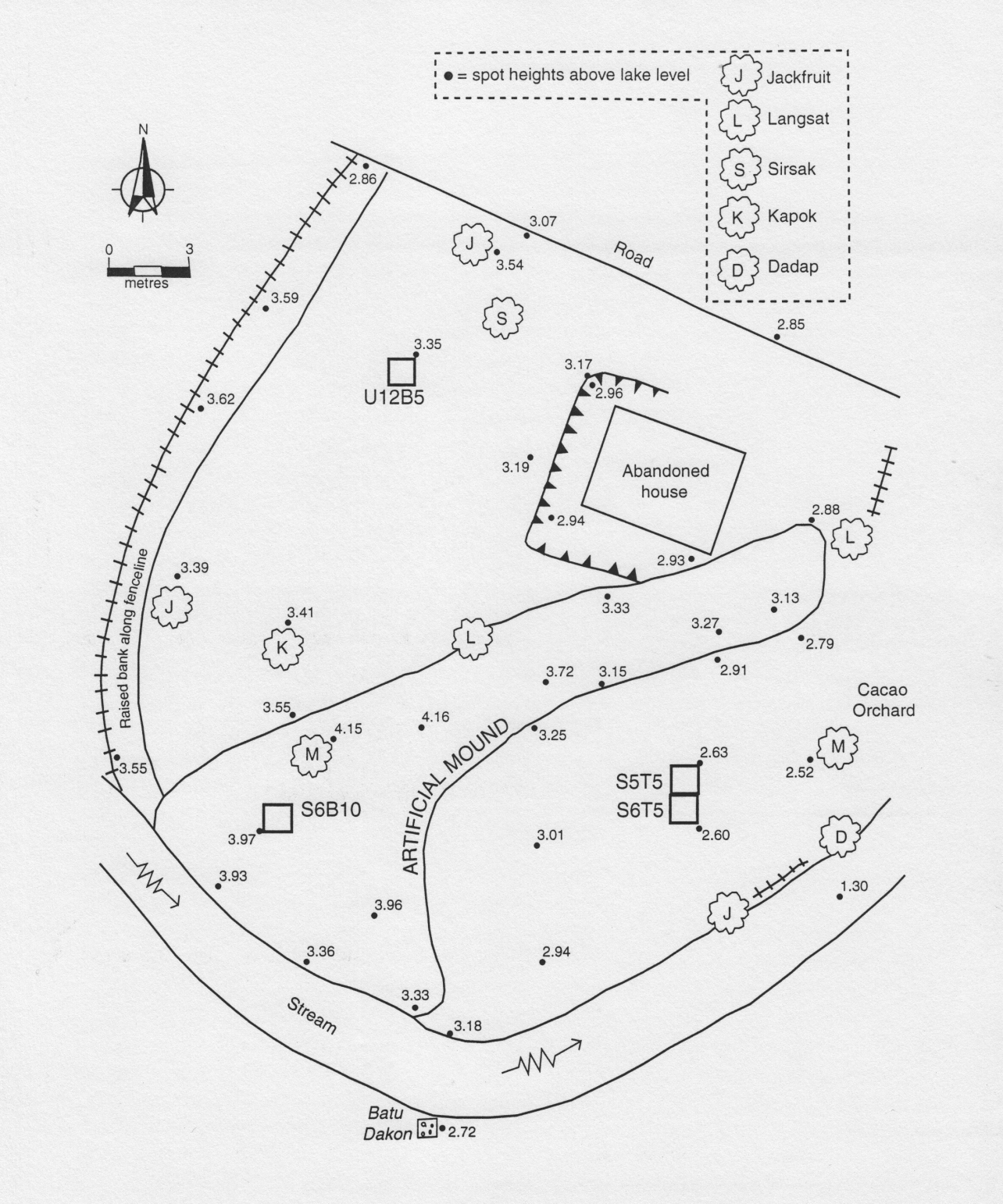
in the southwest corner of the test pit, contained a ring and bracelet of bronze. Unit 12, in the northeast corner, was a 70 cm deep pit containing two carnelian beads, one with 64 and one with 66 facets, a gripped iron knife, three bronze rings, and two bronze bracelets, one of them partly covered with patches of cotton.[14] Carnelian beads with this many facets would most likely date to the eighteenth century (Adhyatman and Arifin 1996:13), while a sample of the cotton produced an Accelerator Mass Spectrometry (AMS) dating of 50±60 BP (OZE644), which calibrates at two sigma as AD 1680-1940. Based on this evidence, the maximum period of use of the cemetery would have extended from the twelfth to the nineteenth centuries AD, an interval contemporary with the iron-smelting industry at Nuha and Sukoyu.

The usual mortuary practice at Pontanoa Bangka appears to have been the burial of cremated remains. The only observed human bone comprises two wrist bone fragments and two digit fragments, all burnt, from unit 12. The earthenware jars reconstructed from associations of sherds on the surface, or excavated towards the top of the test pit, probably originally contained cremated remains. Over a kilogram of charcoal was recovered during the excavation, occurring at all levels; conceivably, some of this could be the residue from human cremations.[15]

The radiocarbon dates from the two major concentrations of charcoal therefore came as a surprise (Table 2-3). The stratigraphically deepest sample produces a date between the fifth and seventh centuries AD, and the sample at midway depth falls between the tenth and twelfth centuries. Not only do these dates predate the evident period of use of the cemetery, but their ages are proportionate to their stratigraphic depth, whereas the excavated assemblages of burial goods appear to become younger with depth. We conclude that there were two periods of use of the site: an early non-mortuary phase associated with the accumulation of about one metre of deposit and most (or all) of the charcoal, and a subsequent mortuary phase. Small quantities of earthenware sherdage occurred at all levels of the excavation, together with 1.8 kilograms of *batu besi* (ironstone) and three flaked chert artifacts. The OXIS excavation team did not report any traces of baked earth, as would be expected if hearths had been constructed on the site, and very little *terak besi*. We suggest that the preliminary stages of the preparation of iron ore (for instance splitting the blocks with fire and some preliminary roasting to remove waste) took place at Pontanoa Bangka during the second half of the first millennium AD. Timber and iron ore (along with attached soil) brought onto site could account for the otherwise unexpected phenomenon of a metre of deposit on the top of a knoll. In short, there is sufficient evidence to suggest some association of Pontanoa Bangka with the early iron industry, but certainly not enough evidence to propose iron smelting on anything like the scale recorded at Nuha and Sukoyu.

[14] John Miksic (National University of Singapore) identified the Qian Long coin. Ian Glover (Institute of Archaeology, University College London) informed OXIS that the only carnelian beads he had seen which were similar to the Pontanoa Bangka examples were beads currently being sold in Burma. Judith Cameron (Australian National University) has submitted a report describing the very fine thread and weaving of the cotton. The cotton fragments have been sent to Ruth Barnes (Ashmolean Museum, Oxford) who suggests that they may be somewhat older than their AMS date indicates.

[15] Even if uncremated bone had been interred here, it should have been preserved, given the broadly neutral pH (6.5 to 7.5) of the sediments.



Map 3. Plan of Rahampu'u 1 in Kampung Matano showing the excavated test pits in relation to heights above the lake surface

In summary, occupation of the northern shore of Lake Matano around two thousand years ago is indicated by the date on the charcoal from the basal unit of Sukoyu. During the middle and late first millennium AD, local iron ore appears to have been processed to a preliminary stage at Pontanoa Bangka. The name Pontanoa Bangka means 'the place where *prahu* are brought to shore', and local informants state that it used to be a busy market. This information would scarcely be compatible with its use as a cemetery, and may relate to an earlier use of the site for light industry. The semi-processed ore could have been transported by *prahu* (small river and coastal craft) to Matano, then carried overland to the Cerekang river, and shipped from Katue (see below). Intensive iron smelting commenced at Nuha and Sukoyu in the early second millennium AD and continued until recent times. The community of iron smelters then evidently redeployed the ancient site of Pontanoa Bangka as their cemetery. Remarkably little in the way of foreign ceramics arrived at Lake Matano's northern shore (Appendix: Table A-1), and the few recorded sherds suggest an eighteenth to nineteenth century emphasis (Figure 2-1). The local occupation history over the last 2,000 years can presumably be related to the Mori, including those who currently inhabit the village at Nuha.

Kampung Matano: findings and interpretation

The OXIS program at Kampung Matano involved test pits at four sites: Pandai Besi (Mal. 'iron smith') on the lake's west shore, Rahampu'u 1 (Mo. 'initial settlement') 70 metres west of the lake, Lemogola, situated slightly to the north of Rahampu'u 1, and an old cemetery called Pa'angkaburu. A wide-ranging surface survey demonstrated that the Matano site complex extends from the lakeshore for a distance over 450 metres to the west, where the prevailing ground surface lies 12 to 13 metres above the surface of the lake. Here is found a series of remnant earth walls, named Benteng Matano, which once probably supported bamboo spikes or other defences. While these banks are said by residents to be associated with Matano's involvement in a late nineteenth century war between Luwu and Mori (cf. Schrauwers 1997:359), smaller bulwarks had in all likelihood been constructed at an earlier date. Earthenware sherds, flaked stone and ironstone lumps occur in a very thin surface scatter at Benteng Matano. A trial bore here by Geoff Hope recovered quantities of potsherds and some charcoal between 15 and 20 centimetres in depth.

Further east, where the steep drop to the lake begins, an exposed profile revealed about 30 cm depth of potsherds, charcoal, flaked chert, limestone clasts, and ultramafic (ironstone) clasts sealed below 20 cm of gardening outwash, lying above sterile deposits. It is the same association of artifacts which appeared in the test pits at Rahampu'u 1 and Pandai Besi, and which may be observed along the formed surface of the Jalan Pandai Besi path immediately above the lake beach. The same association literally cakes the shoreline beneath Jalan Pandai Besi in the form of a hardpan of re-precipitated iron interspersed with occasional potsherds and flaked chert pieces. Evidently, this mass of iron-smelting waste has been gradually sliding downhill, so the longer ago it was deposited, the farther it would have travelled downhill. Moreover, human occupation and industrial activities have presumably always been concentrated near the lake's edge. Hence the excavations at Rahampu'u 1, and especially Pandai Besi, should register the earliest creation of this layer, which can be observed across much of Kampung Matano.

OXIS' main excavation was carried out at Rahampu'u 1, where the surface slopes gently from west to east, and a creek at the south runs into the lake (Map 3). The site's main ironworking deposit is marked by dark Munsell colours (between 10YR2/2 and 10YR3/3) and dense smelting debris. The U12B5 test pit provides the master sequence because it alone reached the brownish yellow clay beneath the ironworking debris. Uniquely in the context of the Lake Matano sites, the U12B5 square yielded martavan sherds of Guangdong and Vietnamese manufacture: no less than five of them, and no other *keramik*. Regrettably these sherds are either undateable, or have been given fifteenth to seventeenth century datings, which may be too conservative. A wooden stake (unit 4) caused considerable disturbance to the soil when it was driven into the ground in recent times, producing a mixed association of modern materials with a martavan sherd, abundant flaked chert, earthenware sherds, ironstone and smelting debris in layer 1 (Table 2-4). Layer 2 is dense in pot sherds compared to the other Rahampu'u 1 deposits, but otherwise contains the same array of flaked chert, ironstone, iron prills, and clay tuyère fragments. Layers 1 and 2 probably combine traces of the ironworkers' habitation and industrial activities. By layer 3, flaked chert is virtually absent, but the quantities of earthenware sherdage and iron continue unabated.

Units 11 to 13 produced three sherds of martavans that had presumably been used for transport or storage, suggesting a mainly residential usage of this part of the site at this stratigraphic level (about 2.8 metres above lake level). A radiocarbon determination on charred residues scraped off potsherds from unit 13 produced a date between the tenth and twelfth centuries. This is stratigraphically consistent with the middle-first millennium AD date obtained on charcoal from unit 14 in layer 4 (Table 2-4). Units 14 and 15 together yielded 39.2 grams of baked earth, conceivably associated with hearths dug into otherwise sterile deposits. As a group, units 11 to 15 suggest desultory occupation, such the use of the site as a campsite for traders collecting iron ore to carry down to Cerekang. In summary, the U12B5 square indicates that iron smelting, represented by an association of flaked chert and iron debris, was not established at Rahampu'u 1 until the fifteenth century or later, but that some level of habitation had been maintained at the site throughout the preceding millennium.

The major surface feature at Rahampu'u 1 is an elongated mound, approximately 50 cm high (presumably higher originally), traversing the site from northeast to southwest. Local people cannot recall when the mound was made. Peter Bellwood suggested it may be piled-up rakeout from old ironworking hearths in the area of the S6T5 square (where the very high density of finds should relate to *in situ* smelting debris). In accord with Bellwood's suggestion, the S6B10 test pit in the mound produced the same materials as excavated in the other test pits, but at highly variable concentrations deposited in diffuse lenses. Furthermore, the main ironworking deposit bottomed out at 2.95 metres and 3.09 metres above the level of the lake in S6B10 and U12B5 respectively. This minor difference is consistent with the prevailing slope of the site. However, in S6T5, the same deposit extended a further metre down, to 1.97 metres above the level of the lake. The one metre difference in depth supports Bellwood's suggestion that the residents had dug out old ironworking debris here, and piled it on the mound. Under this scenario, the S6B10 test pit should contain older evidence of ironworking than the S5T5 and S6T5 test pits.

Table 2-4. Summary of the finds from the Rahampu'u 1 U12B5 test pit

Layer	*Units*	*Flaked chert (no.)*	*Potsherds (grams)*	*Iron (slag, etc.) (kg)*	*Dating Indicators*	*Dating*
1	1-4	433	1167	2.65	Nails, plastic, glass, brass, wood, Guangdong sherd	Modern, disturbed
2	5-9	329	2700	3.80	Bronze bracelet, Guangdong sherd	Historical
3	10-12	37	592	1.17	Guangdong & Vietnam martavan sherds	15^{th}-16^{th} century
3/4	13	6	138	0.06	Guangdong sherd, AD 1000-1150 radiocarbon date	10^{th}-12^{th} century
4	14-15	17	34	zero	AD 540-770 radiocarbon date	6^{th}-8^{th} century

Charcoal samples were selected from the lowest, suitable excavated units at Pandai Besi and in the S6T5 and S6B10 test pits at Rahampu'u 1. These selected units had a substantial quantity of charcoal, ensuring a reliable date, and abundant chert and ironstone (negating any chance of a spurious association between the charcoal and trampled-down debris). The resulting dates for early iron working at Kampung Matano are remarkably consistent (Table 2-5). With barely an exception, they calibrate to between the fifteenth and the seventeenth centuries at one sigma, and to a slightly expanded range at two sigma. Statistically they are indistinguishable, due to a plateau in the calibration curve between approximately 1480 and 1630 (Stuiver and Pearson 1986). This plateau means that samples relating to the period between the late fifteenth and the early seventeenth centuries, when iron smelting evidently commenced at Matano, cannot be distinguished by radiocarbon dating. However, on the available evidence, we may confidently reject an earlier onset of iron smelting at Matano, because charcoal deposited earlier than *c.*1400 should be clearly distinct from the 1480-1630 radiocarbon calibration plateau (see Section 3.3 below).

According to our interpretation of Rahampu'u 1, the mound across the site would have been constructed from original smelting rakeout. The radiocarbon dates from the S6B10 and S6T5 squares would clearly rule out any great chronological disparity between the mound and the *in situ* smelting debris. However, in view of the radiocarbon calibration plateau, the basal S6B10 materials could well date to the fifteenth to sixteenth centuries, and the lower S5T5/S6T5 debris could date to the sixteenth to seventeenth centuries. A *circa* sixteenth century construction date for the mound would be consistent with the lack of local memory of its formation, while a more recent dating for the S5T5/S6T5 smelting debris is suggested by a late seventeenth to early eighteenth century Chinese sherd incorporated within the latter deposit (unit 9). Furthermore, there is evidence of domestic occupation at Rahampu'u 1 after smelting had ceased.

Table 2-5. Radiocarbon dates from Rahampu'u 1 (RHP1), Pandai Besi (PDB) and Lemogola (LMG)[16]

OXIS Sample Label	*Lab. No.*	*Date (BP)*	*One-sigma calibration*	*Two-sigma calibration*
Pre-Iron Smelting				
RHP1.U12B5.14.7	ANU-11081	1400±110 BP	AD 540-770	AD 420-890
RHP1.U12B5.13.4	OZE646	1000±40 BP	AD 1000-1150	AD 980-1160
Early Iron Smelting				
RHP1.S6T5.13.1	ANU-11080	400±60 BP	AD 1440-1620	AD 1430-1640
RHP1.S6T5.15.1	ANU-11079	310±90 BP	AD 1450-1790	AD 1430-1810
RHP1.S6T5.17.1	ANU-11078	410±80 BP	AD 1430-1630	AD 1400-1660
RHP1.S6B10.16.1	ANU-11074	350±70 BP	AD 1480-1640	AD 1430-1670
RHP1.S6B10.18.1	ANU-11076	310±90 BP	AD 1450-1670	AD 1430-1810
RHP1.S6B10.17.1	ANU-11077	430±120 BP	AD 1410-1630	AD 1290-1680
PDB.U1T3.13.73	ANU-11083	480±130 BP	AD 1330-1620	AD 1280-1670
PDB.U1T3.14.18	ANU-11084	410±70 BP	AD 1440-1630	AD 1420-1640
Late Iron Smelting				
LMG.1.13.10	ANU-11277	120±70 BP	AD 1680-1930	AD 1670-1950

In addition to the evidence of habitation in the U12B5 square (mentioned above), units 2 to 5 in S6T5 appeared to contain domestic habitation debris. They yielded one seventeenth to eighteenth century Chinese sherd (two more were found at the equivalent level in S5T5), a steel spike, which in Len Hogan's opinion would not have been made locally, and 46% of the earthen sherds, but only 4% of the flaked stone pieces, and 8% of the ironstone. A line of boulders, completely exposed in unit 6, probably bears no relationship to iron smelting, but could have been part of a garden wall or house-yard perimeter. Two complete cooking pots were found buried along the base of the stone line; these probably once contained ritually buried afterbirth. The post-smelting 'improvements' at Rahampu'u 1 probably include the linear arrangement of boulders near the top of the S6B10 square. Hence, by the eighteenth or nineteenth century, smelting at the Rahampu'u 1 site seems to have given way to habitation.

The excavated deposit at Lemogola represents a more evolved stage of local iron smelting, after smelting had ceased at Rahampu'u 1. The Lemogola site is a mound of piled-up ironstone, iron gravels, slag and other smelting waste. Time did not permit the test pit to reach sterile deposits

[16] The table excludes two stratigraphically anomalous samples from the U12B5 square. One, in unit 13 (ANU-11082), dates to the fifth millennium BC, and presumably results from re-incorporation of ancient charcoal. The other, in unit 15 of the same square (ANU-11075), has a modern dating which reflects its tiny quantity of carbon, less than 10% of the minimum required by the ANU Laboratory to produce a reliable date (Abaz Alimanovic, pers. comm.).

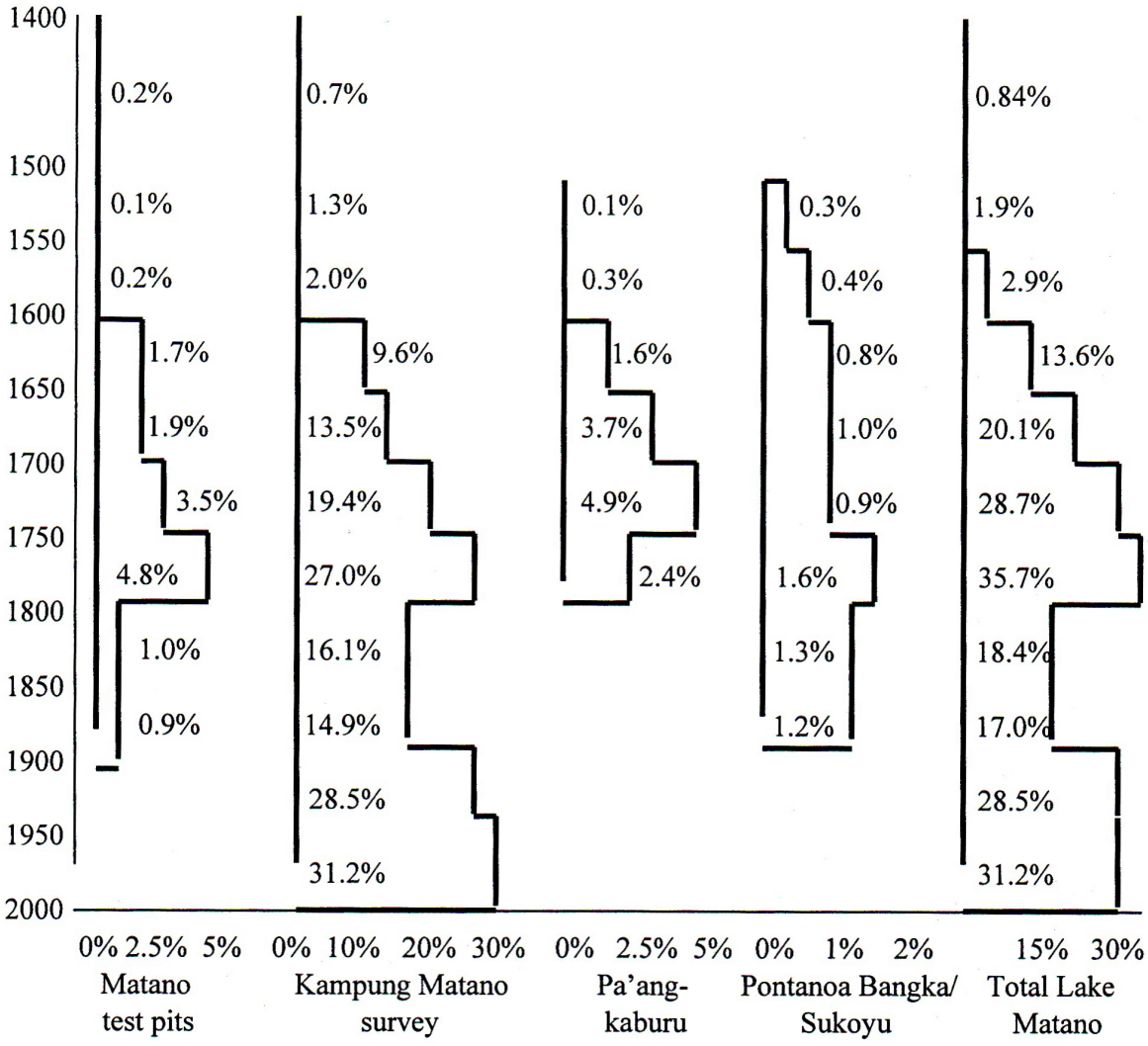


Figure 2-1. Standardized chronological histograms of the *keramik* from Lake Matano

beneath the mound, but excavation stopped where four earthen jars (probably once containing buried afterbirth) were found slotted into cavities dug into the waste. Charcoal from unit 13 (ANU-11277), which would be at least as old as the jars, because it came from the level into which they were buried, lies on a late seventeenth to early twentieth century radiocarbon calibration plateau (Table 2-5). Between units 1 and 7, six Chinese sherds were recovered, including Wanli, Transitional and Kitchen Qing sherds. They confirm the *c.*1650 to *c.*1900 dating of the deposit suggested by the radiocarbon date, and reflect the predominance of post-1600 *keramik* at the Lake Matano sites in general (Figure 2-1).

During the Lemogola excavation, 2.4 kilograms of tuyère fragments were identified, a much greater quantity than at Rahampu'u 1. However, only six flaked chert pieces were found, in contrast to the 285 flaked chert pieces from Pandai Besi, and the 7,350 pieces excavated at Rahampu'u 1. What would seem to have been a wanton wastage of chert strike-a-lights at Rahampu'u 1 may have greatly reduced the available sources of chert by the time the Lemogola deposit was formed. Alternatively, smelting practices may have altered, with iron smiths keeping the coals alive and stoking up the hearth from the coals, as suggested by the abundance of tuyère fragments. Certainly, the intensive utilization of chert strike-a-lights at Lake Matano would seem to have been primarily a phenomenon of the sixteenth to eighteenth centuries, as also indicated by the concentration of 23 of the 24 Nuha flaked chert artifacts in the seven uppermost units in the test pit excavated there. An abundance of chert near Kampung Matano, especially of the finer green chert evidently associated with the limestone hills to the immediate south, would explain why the chert strike-a-light industry figured so prominently at Pandai Besi and Rahampu'u 1.

OXIS conducted a widespread survey of Kampung Matano and collected abundant *keramik* sherds (Appendix: Table A-1), all found within 160 metres of the lakeshore. The few Sawankhalok pieces may reflect light occupation of Matano during the fifteenth century, but they could as easily date to the sixteenth century, at which period a mild increase in the Matano 'standardized chronological histogram' may be discerned (Figure 2-1). The quantities of *keramik* increase steadily from the seventeenth through to the twentieth century, apart from a distinct nineteenth century downturn, which could reflect local instability related to Matano's involvement in the nineteenth century war between Luwu and Mori. The general pattern is one of continual growth at Kampung Matano after the fifteenth century, due to the expansion of its traditional iron smelting industry, as Pelras (1996:248-49) concluded from consideration of the historical evidence.

The looted Pa'angkaburu cemetery can certainly be understood as an indication of an established population at Kampung Matano from the sixteenth century onwards.[17] The grave markers include ironstone menhirs (presumably representing males), square *nisan* with a central square hollow (presumably representing females), and human statues of limestone (perhaps to commemorate individuals of high status).[18] The collected and excavated *keramik* span the sixteenth to eighteenth

[17] The graveyard was looted by outsiders, so OXIS was unable to discover whether the graveyard had contained buried *keramik* and whether bone or ash (*abu-abu*) had been encountered.
[18] Menhirs and hollowed *nisan* are typical of early Islamic Bugis and Makasar burials (Kallupa *et al.* 1989; Bulbeck 1992).

centuries (Appendix: Table A-1) with a distinct late seventeenth and early eighteenth century focus (Figure 2-1). The eighteenth century grave goods probably represent syncretism between pre-established practices and mortuary procedures introduced with Islam, and imply less thorough Islamization of the Matano population before at least 1800. Pa'angkaburu clearly served as Kampung Matano's terminal pre-Islamic and early Islamic graveyard, until the Islamic graveyard on the lakeshore, a short distance to the north of Kampung Matano, replaced it.

To sum up, there is abundant evidence for the establishment of a well-developed iron smelting and working industry at Kampung Matano by *c.*1500. There is equally compelling evidence that this industry was not established before the fifteenth century, by which stage iron smelting had been practised on the northern shore of Lake Matano for at least several centuries. However, possibly as early as the first millennium AD, and almost certainly by the early second millennium, Kampung Matano appears to have served as a way station for traders carrying ironstone and, possibly, prills, or perhaps even pig iron, from the Lake Matano's northern shore to Ussu and Cerekang.

Preliminary results are available on the chemistry of the Rahampu'u 1, Pandai Besi and Lemogola samples analysed by the late Len Hogan. He identified chromium in eight of the ten ore and slag samples, manganese in seven samples, and nickel in just two samples. The Bukit Lamolengku ore sample contains chromium, while a suspected sand grain from Rahampu'u 1 contained traces of manganese and titanium. There are no identifications of cobalt. The dominance of chromium and manganese over nickel corresponds to the chemical assays by PT Inco of the ores around Lake Matano, as well as with the trace elements identified in the lake's waters. The low occurrence of nickel confirms the possibility that Matano iron may have been used in the production of *pamor* Luwu for the Majapahit kris*,* given that the nickel content of these kris generally varies between trace and absent (Bronson 1987). Analysis of the samples from the lake's northern shore (the main source of the iron smelted at Matano) should provide a chemical signature that could be compared with similar signatures obtained from Javanese kris. If Matano was the main source of the iron used to make these kris, their signatures should include little or no nickel, but may well contain chromium and manganese.

2.2 Malili

Introduction

Between Tampinna in the west and Ussu Bay in the east is a series of anastomising channels which wend their way through a dense and continuous forest of foreshore mangroves. This coastal forest is the largest surviving expanse of mangroves in South Sulawesi (Lucas 1998:197). A finger of higher land extends into the mangrove forest between the Lakewali and Ussu rivers, and a 300 metre high monadnock (Bulu Lagaroang) rises between the Ussu and Larona rivers. Modern settlements, and archaeological sites, are concentrated where the feet of these elevated landforms meet river channels; Cerekang and Ussu are both eight metres above sea-level and Malili is six metres above sea-level. Across much of the coastal plain, the land is simply a thin crust of soil

capping the ubiquitous water table, or failing to cap it in the numerous belts of swamp. The bright red soils, derived from the hills of ultrabasic lateritic iron, which reach down to the sea, are low in nutrients, except where the rivers have deposited sediments from richer geological formations along their banks. The 1985 population density in Malili of 23 people per square kilometre is moderate by the standards of *kabupaten* Luwu north of Palopo. There are two enclaves of Bugis speakers in this essentially Padoe-speaking area: the enigmatic Bugis-speaking inhabitants of Ussu and Cerekang, and a Bugis elite in Malili. In addition, Turung Bajo (B. 'Bajau landing place'), the closest settlement to Tampinna and the site's point of access along the Tampinna river, is populated by villagers who speak Bugis as their first language but claim Bajau descent.

Malili township is the port for the Lake Matano nickel brought down by lorry from Soroako via an excellent paved highway built by PT Inco. By the outbreak of the Second World War, Malili had developed into a large village based on the trading of forest produce and the building of wooden vessels (Anon. 1945:64). Produce from the forests of the ultrabasic hinterland today includes dammar, ebony wood, gharu wood and rattan. Until a bridge was constructed for the highway at Cerekang, sea-going vessels could reach as far up-river as the deep water pool, a short distance above the bridge. At high tide, river craft can travel a kilometre farther upriver to Turungang Damar, which lies approximately six metres above sea-level. The Ussu river is smaller and shallower, and the village can be reached by river craft only at high tide.

The archaeological investigation of Cerekang by OXIS turned out to be a very difficult exercise, owing to a local mystical group which jealously guards access to numerous sacred sites along the Cerekang river. These sites have become identified with the Bugis culture hero Sawerigading and other characters and events of the La Galigo. Pelras (1996:58-59) mentions Bukit Pensimewuni, the Wae Mami stream and Welenreng[nge]; during fieldwork, the OXIS team recorded further examples of sacred sites associated with the La Galigo at Tomba (Sangyang Seri), Ennungnge, and Beroe/Kuburan To Berani. [19] To varying degrees, these sacred places are barred to entry and their forests protected from exploitation. Archaeological excavation on these sites, and the collection of surface artifacts, were out of the question.

The OXIS survey team located a few archaeological sites in non-sacred locations along the Cerekang river, where excavation could take place. These sites are Turungang Damar, Katue and Poloe. The reason why Turungang Damar is not a sacred site may be because it has remained in continuous use as a shipment point for dammar. Katue and Poloe are remembered as local settlements before the 1930s, when the villagers moved to their present location on the Dutch-built highway.

Katue, however, also preserves ancient habitation debris buried beneath the surface. The general belief among Ussu residents is that the Cerekang people have declared particular sites to be sacred in order to protect them from unauthorized entry and looting (Darmawan *et al.* 1999:64). This opinion is supported by rumours which the OXIS archaeologists heard concerning limited looting at two such sites, Tomba and Beroe. Hence, there is good reason to expect a lengthy occupation

[19] Pelras identifies the summit of this hill with the site of Bataraguru's palace, Luwu's original palace centre in the 'Age of Galigo'.

history at sites in the vicinity of the modern settlement of Cerekang, and we may assume that the sacred sites of this area correspond to settlements locally associated with the La Galigo mythology. From these two premises, the archaeological record of the area may be used to establish the approximate date at which the identification of particular sites with those mentioned in the La Galigo material became fixed in the minds of the local mystical group. This identification should have occurred towards the end of the period for which the OXIS survey was unable to locate sites with evidence of occupation.

For instance, had Cerekang been a major political centre during the eleventh to thirteenth centuries, Turungang Damar might show evidence of trade during that early period, but the other accessible sites in the Cerekang area would conspicuously fail to provide evidence of the period from 1000 to 1300, because, according to this interpretation, it is exactly the sacred sites barred from archaeological study which were of importance in that period. Alternatively, if a La Galigo topography had been developed at Cerekang at some time during the early historical period, we would rephrase our expectations in more recent chronological terms. For instance, had Cerekang become a 'La Galigo landscape' after the shift of the palace centre from Malangke to Palopo *c.*1620, then the archaeology at Turungang Damar might be entirely fourteenth century and later, and Cerekang's archaeological 'black hole' elsewhere should date to between *c.*1300 and *c.*1600. Lastly, if the secretive mystical group at Cerekang is a recent phenomenon, and the sacred landscape is equally recent, we would expect a gap in Cerekang's archaeological record covering most or all of the seventeenth to nineteenth centuries (and possibly a longer period), depending on the period of occupation represented by the sacred sites.

Ussu can be expected to produce archaeological returns that positively relate to any prominent period of occupation in the past. Tompottikka, which is associated with the La Galigo in local traditions, is an extensive area which stretches along both sides of the Ussu river from Kuburan Islam Ussu to Manu Manue.[20] Only three sacred places along it are restricted from entry: Kuburan Islam Tamalipa, whose grave markers would appear to date between the eighteenth and nineteenth centuries (Bulbeck and Prasetyo 1998:36); Tandula, a short distance south of Tamalipa on the same side of the stream; and a site called Keramat ('sacred') Tompottikka, across the river from Tamalipa, next to Kuburan Ussu, where the rulers of Luwu were once installed in order to establish their authority in Ussu. These three places are so close together that, even had the political centre of Tompottikka been directly centred on them, the settlement would have sprawled more widely across the Tompottikka area, and should thus be archaeologically detectable.[21]

A second potential political centre at Ussu is Bola Merajae (B. 'great house' or 'noble house'). Bola Merajae is a substantial forested reserve where a large settlement could have flourished along

[20] Tompottikka is one of the kingdoms in the La Galigo which is not found in the historical period. Pelras (1996:58-59) places Tompottikka to the east of the Malili river. Neither Caldwell and Druce (1998) nor Bulbeck and Prasetyo (1998), or Darmawan *et al.* (1999) found anyone who could confirm this claim; instead, Tompottikka was always considered to lie immediately inland of Kampung Ussu.

[21] In addition, an OXIS team was allowed to make a brief survey inside the installation ground for the Datu Luwu. Earthenware sherdage, a glazed blue-and-white sherd, and some lumps of ironstone were noted. Combined with the sighting of Islamic graves at Tamalipa, this evidence would suggest that usage of this sacred part of Tompottikka would have postdated the fourteenth and fifteenth centuries.

the banks of the Malaula stream, which feeds the Ussu river. Darmawan *et al*. (1999:60-61) heard here of a palace with a hundred halls, formerly inhabited by We Tenriabeng, Sawerigading's twin sister, and her beautiful ladies-in-waiting. The palace's perimeter was reportedly protected by troops bearing kris, spears and swords made of *bessi Ussu'* (B. 'Ussu iron') decorated with a supernatural *pamor* of exceptional potency, which repelled all invaders. This localisation of the La Galigo story would place the palace centre, or at least a major palace of Luwu, at Bola Merajae. Darmawan *et al.* were also informed that the site had been looted, and had yielded large quantities of earthen sherds and Chinese antiques. These oral accounts suggest that the periphery of Bola Merajae, where the OXIS team was permitted to excavate, could well contain archaeological traces of a major polity based in Ussu. That polity should also be detectable in Tompottikka itself, or in present-day Ussu, which lies between Tompottikka and Bola Merajae.

Archaeological evidence of political centralization within the vicinity might also be detectable at Malili and Tampinna, where there are no sacred sites barred from entry. Tampinna is located in a belt of mangrove forest near the ocean, at approximately six metres above sea-level, at the confluence of three sizeable rivers, the Tampinna, Langkara and Lawakali. A polity located here would have been strategically positioned to operate as a seaport. Together with Malili and Cerekang, Tampinna appears in the Tributary and Domain List of Luwu as a domain of Luwu (Map 1) Another datum that links Tampinna with the other coastal sites in *kecamatan* Malili is the oral tradition that Tampinna produced the wooden sheaths for the iron weapons and tools manufactured in Matano (Caldwell and Druce 1998).[22] In sum, we may reasonably expect survey and excavation in *kecamatan* Malili to uncover evidence of any early trade and complex social organization in the region.

Ussu and Cerekang: findings and interpretation

Bola Merajae produced an essentially continuous occupation sequence spanning the last two millennia, with a peak between approximately the thirteenth and fifteenth centuries. Two test pits were excavated on opposite banks of the Malaula stream where it leaves the sacred forest reserve. The test pits were probably sited in a rubbish disposal sector of the Bola Merajae site, which would explain the earthen sherds and abundance of charcoal, combined with a total lack of *keramik* in a sequence which overlaps the period when high-fired ceramics were imported to Luwu.

Test pit 1 produced four stratigraphically consistent AMS dates which range between *c.*2000 years ago at the base and *c.*400 years ago near the top (Table 2-6).[23] The basal date was taken from charcoal scraped off a carbon-coated, split pebble (probably part of an earth oven or a hearth lining) in otherwise sterile deposits at 87 cm depth below ground level. The other three dates came from charcoal, which occurred consistently in all of the higher units, and weighed 157 grams in total.

[22] Caldwell and Druce doubt that there is much historical substance to this tradition. Tampinna's role as a port would provide an alternative explanation for the settlement's existence.

[23] In addition, a survey along the Malaulu stream, directly downstream from Bola Merajae, recovered two flaked chert pieces, some highly fragmented earthenware, and eighteenth or nineteenth to twentieth century Chinese *keramik*. This surveyed area is remembered in Ussu as a former *kampung*.

Earthenware sherds at low concentrations (a maximum of 20 sherds per unit) occurred equally consistently, together with river gravels (often burnt) and lumps of baked earth.

Test pit 2 produced higher concentrations of the same material: up to 166 earthen sherds per unit, and a total of 360 grams of charcoal to a depth of 65 cm below the surface. The sherdage is predominantly a low-fired, often temper-free terracotta, which we term 'soft orange'. The predominance of this pottery suggests local manufacture, possibly at Bola Merajae. Soft orange terracotta also dominates the sherdage in test pit 1 between units 6 and 9, which are younger than *c.*800 and older than *c.*1600. The radiocarbon date from the base of the cultural deposit in test pit 2 narrows the age range for the soft orange pottery to between the thirteenth and fifteenth centuries (Table 2-6).

Table 2-6. Radiocarbon dates from Bola Merajae, Katue, Turungang Damar and Manu Manue

OXIS Sample Label	*ANSTO/ANU Lab. No.*	*Date (BP)*	*Two-sigma calibration*
Bola Merajae BMJ.1.16.1	OZD843	1980±90 BP	200 BC-AD 320
Bola Merajae BMJ.1.13.1	OZE579	1870±40 BP	AD 35-315
Bola Merajae BMJ.1.10.1	OZD844	1260±60 BP	AD 655-945
Bola Merajae BMJ.1.3.1	OZE578	310±40 BP	AD 1480-1660
Bola Merajae BMJ.2.7.1	ANU-11356	660±70 BP	AD 1230-1430
Katue KTE.5.12.1	OZE581	1850±40 BP	AD 70-320
Katue KTE.5.11.1	OZD845	1100±50 BP	AD 780-1025
Katue KTE.5.9.2	OZD847	1810±40 BP	AD 90-345
Katue KTE.5.9.1	OZD846	Modern	Modern
Katue KTE.5.7.4	OZE580	370±30 BP	AD 1450-1640
Turungang Damar TDM.2.4.3	ANU-11353	350±70 BP	AD 1430-1670
Manu Manue MNMN.2.3.5	OZD848	170±70 BP	AD 1650-1955

Almost invariably, along the wall breaks, as well as on both interior and exterior faces, the soft orange sherds are covered in patches of a mixture of clay and dammar. It is hard to see why the terracotta would have been coated with dammar after it had fragmented, but if the terracotta had been impregnated with dammar while in use, the dammar would have exuded out on all faces after the vessels had been broken. These friable terracotta vessels may have been impregnated with hot dammar in order to increase their usable life, to waterproof them, and to improve their aesthetic appeal.[24] About 20 of the sherds display a range of woven and matted impressions on their dammar patches. These always occur on the interior surface, and so would reflect the vessels' contents rather than the binding on paddles beaten against the vessels to complete their shape. We may be dealing with dammar-impregnated vessels employed to carry textiles and matting, or small baskets and textile bundles holding other produce (e.g. foodstuffs, lumps of dammar, or pig iron).

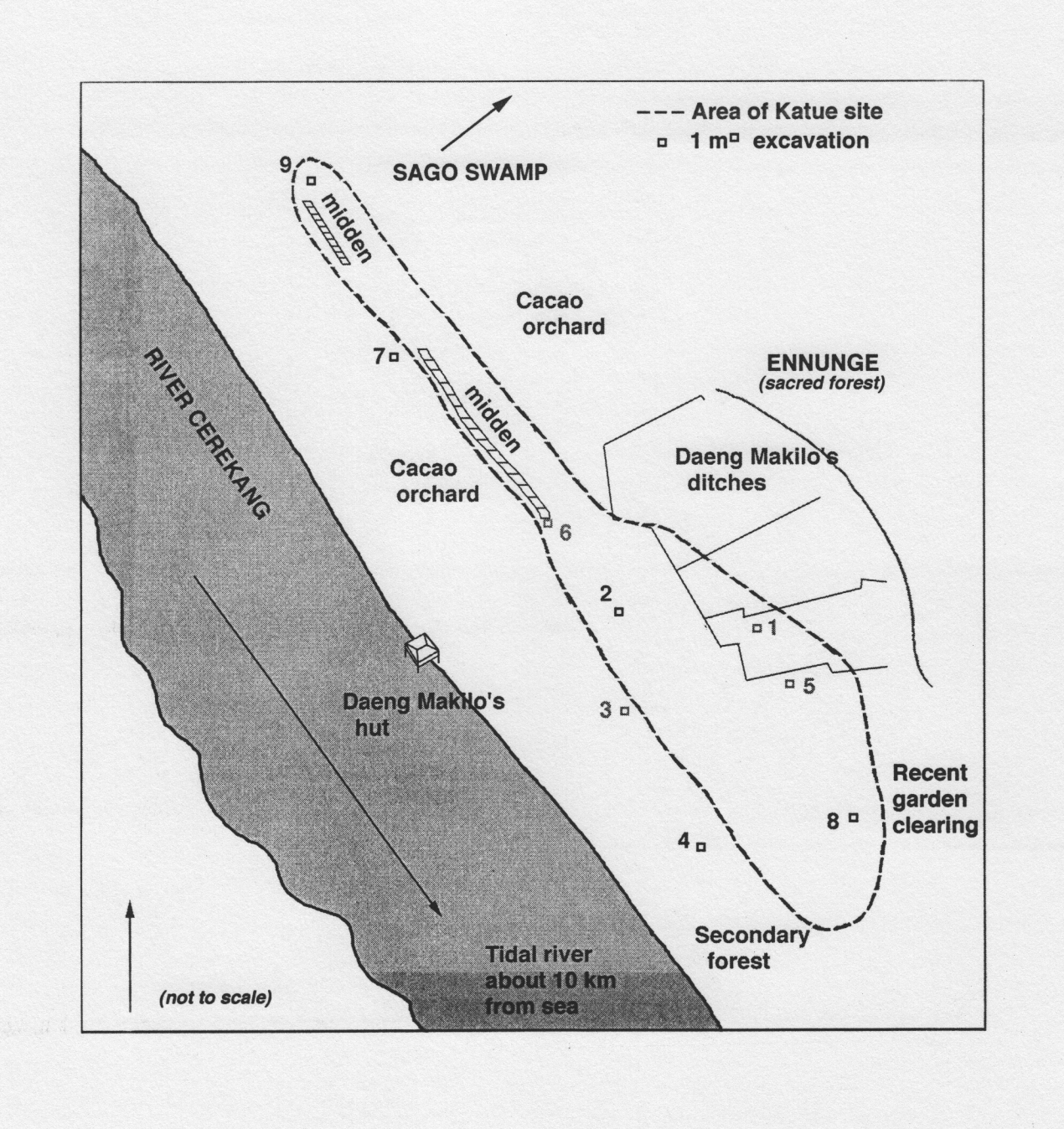
[24] Koolhof (pers. comm.) reports that he observed this process in Saparua, Maluku, in 1984.

Reportedly, in the main, the inhabitants of Ussu traded textiles to Lake Matano, in return for its smelted iron (Pelras 1996:59). This account is broadly corroborated by the evidence of abundant dammar (presumably imported from the hinterland forests), matting and woven textiles between the thirteenth and fifteenth centuries at Bola Merajae.

An important, first millennium site, Katue (Map 4), was discovered when Ali Fadillah and Budianto Hakim inspected the spoil from a set of ditches excavated by Daeng Makilo (a leader of Cerekang's exclusive mystical group) in order to drain his cacao orchard. Surface finds from the spoil included 48 glass beads, one agate bead, two lumps of iron ore, various pebbles and cobbles brought in and utilized by the former residents, and masses of earthenware sherdage. Subsequent excavation revealed a similar array of materials, but there are two absences that strongly indicate abandonment of the site by around 1000 – no imported *keramik,* and none of the 'soft orange' pottery that we found at Bola Merajae. The five radiocarbon dates from test pit 5 (Table 2-6) are not notably consistent, but the three stratigraphically deepest determinations which merit any confidence all date to the first millennium.[25] Considerable vertical movement of materials has occurred in the loose deposit of Katue, as exemplified by the dispersal of sherds from a single, distinctive, decorated vase between units 7 and 11 in test pit 5. The fifteenth to seventeenth century charcoal date in unit 7 is hard to interpret, as it lies sealed beneath six units of virtually sterile deposit; most likely the sample is a blend of old charcoal (which relates to the site's first millennium AD occupation) and recent charcoal (contamination) that has resulted in a spuriously young estimate for the age of the sample.

The limits of the Katue site were traced by boring the ground. The accuracy of the bore survey is confirmed by the returns from the test pits. Squares 3, 4 and 7, to the immediate west of the boundary defined by the bore survey, which contained only evidence of recent use of the site and just in their the upper units. However, the other six test pits within the surveyed boundary all produced traces of the same materials found in Daeng Makilo's ditches. The bore survey also detected two linear, low-density shell middens along the northwestern boundary. The Katue site was 180 metres along its longest axis and 35 metres at its widest point, and covered an area of approximately 0.6 hectares. Its linear shape, running parallel with the bank of the Cerekang river, is that of a riverside settlement, presumably consisting of wooden houses on piles. Square 6, in the centre of the site's riverside frontage, produced a layer of intentionally deposited coral gravels 90 cm thick, or 40 cm thick where the gravels are densest. These coral gravels probably represent a laid platform 40 cm or more thick. While the platform was in use, some gravels would have sunk down through though the mud, and others would have been scuffed upwards to mix with the subsequently deposited alluvial sediments. Additional coral gravels may have been added to maintain the surface. Given the platform's location, it was probably a riverside docking facility.

[25] The modern date on charcoal from unit 9 may reflect intrusion, such as the burnt root of a large tree that once grew above the square, or contamination, such as modern charcoal collected as surface scum during the wet sieving of the deposits.



Map 4. Plan of Katue showing the extent of the site as determined through subsurface survey and the excavated squares. (Illustration by Doreen Bowdery)

Two of the six test pits yielded debris corresponding to iron-working activities. Unit 6 in square 9 contained two cobbles and four pebbles of iron ore, baked earth indurated with iron, eight lumps of slag or heat-fractured iron gravels, and a fragment from an iron spike. Unit 9 in square 2 produced baked, iron-rich earth, two iron prills and two bits of iron artifacts, as well as a possible bronze fragment. Three of the remaining four test pits within the site produced isolated fragments of iron artifacts and slag: square 1 (units 6 and 9), square 6 (units 16 and 23), and square 5 (unit 8).[26] The quantity of iron-related waste falls far short of the thick, dense smelting debris observed at the Lake Matano sites, and indicates that iron working was only one of a range of economic activities at Katue. Nevertheless, the whole gamut of debris – iron ore, slag, prills, baked earth that could well represent rakeout from hearths where the iron was heated, and fragments of the finished products – indicates that the entire smelting and forging process once took place at Katue. The radiocarbon dates would place this small-scale industry in the first millennium AD, perhaps in the second half, based on the artifactual comparisons, especially the small, vivid monochrome glass beads. The maximum number of residents at the site would perhaps have been in the order of 800, in view of Fletcher's (1995) empirically derived, population density ceiling of about 1,200 persons per hectare for a settlement of Katue's size.

Earthen sherds are often abundant in the deposit, but this phenomenon may reflect longevity of occupation rather than density of occupation. Squares 1 and 5, in the vicinity of Daeng Makilo's ditches, produced the richest Palaeometallic remains. In addition to the metallic fragments and decorated vase mentioned previously, the finds include 89 glass beads, one gold star-shaped jewel,[27] seven split and utilized pebbles, and a wide range of pot sherds, which includes spouts, knobs, handles, and the foot of a pottery stove. There is sufficient variety of imported goods to suggest that more prosperous inhabitants dwelt here. Square 6 was less prolific, producing 21 glass beads, a utilized pebble and various heat-fractured gravels. Faunal remains, whose preservation was aided by the coral gravels, include crab claws, 17 types of saline shellfish, and a bone fragment which had been sliced with a metal blade. The limited repertoire excavated in square 6 is commensurate with its suspected use as a docking facility. Squares 2, 8 and 9 (which did not reach sterile soil) produced 50 glass beads, two heat-fractured gravels (in square 9), and a juvenile pig tooth with caries (suggesting that it had been fed a high carbohydrate diet, such as sago). Some evidence points to a division of the site into an industrial sector (between squares 2 and 9) and an elite residential sector (between squares 1 and 5). Ironwares presumably constituted one of Katue's main exports, in exchange for the ubiquitous glass beads, but the site would also have been ideally located for shipping forest produce, such as dammar, from the hinterland.

Intriguingly, the site abuts Laoru, a sacred expanse of secondary forest which contains Ennungnge, supposedly the world's oldest horticultural garden. Geoff Hope pointed out that the

[26] Two of the five fragments listed here appear to contain significant amounts of copper as well as iron; these we plan to test by chemical analysis. Another item from unit 8 in square 5, which is shaped like a teardrop, appears to be of bronze, and a further fragment from unit 12 of square 6 also looks like bronze. The sole diagnostic artifact fragment is the tip of an iron blade from unit 9 in square 1.

[27] The centre of this tiny jewel is of the right dimensions to hold a glass bead. Ardika (1991) mentions a gold bead in the circa 2,000 year-old site of Sembiran in Bali.

secondary forest appears less than a century old, and that it forms a buffer around a sago swamp. Surface *keramik* at Katue, and *keramik* dug up from the subsurface deposits, include the base of a Swatow plate with red and green overglaze enamelled decorations, and four nineteenth to early twentieth century European and Chinese sherds. These observations indicate a second period of occupation at Katue, between the seventeenth and early twentieth centuries, during which time the sacred Laora area appears to have been utilized.

At Poloe, a small distance farther down the Cerekang river, the OXIS test pit yielded a seventeenth to eighteenth century coarse brown martavan which had clearly been placed on the surface above an occupation layer containing four nineteenth century *keramik* sherds. A small surface collection in Cerekang produced only European sherds dating between the nineteenth and twentieth centuries, supporting local informants' statements that the settlement moved here in recent times. Accordingly, we have an archaeological record of the Cerekang community from the seventeenth century, when Katue and Poloe were under occupation, through to its twentieth century relocation to present-day Cerekang. The nineteenth century bulge in the standardized chronological histogram of these three Cerekang sites (Figure 2-2) reflects the focus by OXIS on the settlements remembered as immediately antecedent to the modern village.

The program at Turugnang Damar included surveys in 1997 and 1998, and two test pits in 1998. The surveys collected sherds from two Kangxi (early Qing) blue-and-white porcelain vessels, a European plate, and a twentieth century Chinese saucer. The oldest *keramik* appears to be TDM.0.1, an enigmatic sherd from a part of the site that has been thoroughly turned over by recent land-use developments. It is the rim of a finely potted, pale yellow stoneware (Munsell 2.5Y 8/2) which has lost its glaze. The decorative techniques of incising and carving suggest an early date; the vessel's form, a foliated plate, would place it in the second millennium. The incised pattern of interlocking infilled triangles is occasionally found on Sawankhalok celadon plates, while the carved thunderbolt motif beneath the triangles would suggest manufacture in Vietnam or China. No previous ceramic of this type from South Sulawesi is known to the authors, and at present its age could lie anywhere between the eleventh and seventeenth centuries.

The shallow, excavated deposits produced abundant charcoal, dammar and a chip of modern glass, together with potsherds, a polished white stone bead, and two chert microcores. The depth of the finds beneath the surface is consistent with a stratigraphically ordered succession, vindicating the excavators' decision to work in this part of the site. The radiocarbon date from test pit 2 (ANU-11353) dates the base of the cultural sequence to between the fifteenth and seventeenth centuries (Table 2-6). Accordingly, there is firm evidence of seventeenth or eighteenth to twentieth century use of Turungang Damar as a place from which dammar was shipped downstream to the deep water pool at Cerekang. There are faint suggestions of an early, fifteenth or sixteenth century occupation at the site, and exceedingly slim evidence in the form of the unclassifiable sherd TDM.0.1 that use of the site may go back earlier, perhaps even to the early second millennium.

Ussu residents assert that Ussu used to be a *pelabuhan* (port) on account of the quantities of *keramik* they frequently encounter. Survey within present-day Ussu revealed two locations with Ming and later *keramik* sherds. In 1997, Bulbeck and Karaeng Demmanari collected two Ming

blue-and-white sherds dug up during the preparation of a garden at one locality (Ussu 1), and also noted that many eighteenth to nineteenth century sherds lay in the same findspot. A second site with a single Ming blue-and-white sherd, Ussu 2, appeared particularly promising, as some abandoned Islamic graves lie nearby. Excavation, however, produced only modern materials and soon reached the water table.[28] Between Ussu and Tompottikka is an area of secondary forest called Bante Kikki, which is remembered as a former *kampung*. Time did not permit survey or excavation here. Overall, there is considerable circumstantial evidence that the area between Bante Kikki and present-day Ussu has been continuously inhabited since at least the sixteenth century.

The evidence from Kuburan Islam Ussu would strengthen this conclusion. One householder showed us several fourteenth to seventeenth century wares that had been discovered during the recent digging of a grave. Other grave diggings had reportedly yielded a dark blue plate, an iron sword and bronze armbands. We also heard several ambiguous reports of looting at Kuburan Islam Ussu. OXIS excavated two test pits on the slope immediately beneath the graveyard. These cut through more than a metre of loose deposits, consistent with eroded spoil from the pre-Islamic and Islamic grave cuttings above (as was the scarcity of finds). The recorded pH of 7 to 8 would suggest that any bones inhumed in the cemetery should have been preserved, but we heard no reports to this effect. Hence, the pre-Islamic interments were probably secondary burials, possibly of cremated remains, and not inhumations.[29] The Islamic graves in Kuburan Ussu are all modern, but there are several old Islamic graveyards within the Tompottikka area, namely Tamalipa, Kuburan Opu Nenena Cimpak (Bulbeck and Prasetyo 1997), Kuburan Islam Mahkoda (see below), and the old graves at Ussu 2. Accordingly, the Ussu residents appear to have been burying their deceased in the vicinity since at least the fourteenth century, and there are no compelling reasons to doubt that the inhabitants of Ussu were Bugis throughout this period.

Kuburan Mahkoda in Tompottikka, which we estimated to date to the nineteenth century, lies next to a location called Manu Manue, where three test pits were placed. Manu Manue proved to be geologically interesting for its outcrop of fossil coral reef excavated in square 1. Other finds included a small pearl in the surface collection, and from square 2, unit 3, two chert flakes and two fragments of basic volcanic glass were excavated. Charcoal from this unit produced a mean determination of AD 1780, and a range between the seventeenth and twentieth centuries (Table 2-6), entirely consistent with the apparent age of Kuburan Mahkoda. Across the River Ussu, on the border of Tompottikka, two test pits were placed at another site called Taipa (M. 'mango'), but the site proved to be that of a short-lived, twentieth century *kampung*.

The standardized chronological histogram for Ussu and its environs (Figure 2-2) shows a consistent presence from the fourteenth century onwards, with a diffuse peak, arguably of minimal significance, between 1650 and 1900. Hence the size of Ussu itself need never have exceeded the modest *kampung* which today borders the Palopo-Malili highway. Had investigations been possible

[28] In addition, on the border of Kampung Ussu is a cacao orchard where informants reported the occasional recovery of medium-sized grey jars and large blue-and-white plates (Ussu 3). The landowner, however, forbade excavation.

[29] Even the lack of reports of large burial jars would not be inconsistent with the practice of cremated burials. Looters of the pre-Islamic Bugis cremations at Malangke reportedly struck martavans only occasionally, presumably because these large vessels were too costly to accompany the majority of the deceased.

at Bante Kikki and Keramat Tompottikka, evidence of early occupation might have been discovered. But at the present state of research, we must tender our lack of any evidence that Tompottikka was a major political centre in the eleventh to thirteenth centuries, or that it was even inhabited before the eighteenth century. Attention should instead focus on Bola Merajae, with its intriguing oral traditions, and its 'soft orange' pottery dated to between the thirteenth and fifteenth centuries. Contact between Ussu and Matano during this interval is reflected in the small quantities of 'soft orange' potsherds recorded by Bulbeck at Rahampu'u 1 beneath the iron-smelting layer which dates to the fifteenth to sixteenth centuries. Excavation within the sacred precincts of the Bola Merajae forest might even recover traces of eleventh to thirteenth *keramik*, which are elusively rare in South Sulawesi even under the best of collecting conditions. However, our available positive evidence points to the role of the Ussu area as a trading post for Lake Matano iron from the thirteenth century until possibly as recently as the nineteenth century.

The archaeological evidence sits uncomfortably with our expectations as to how this evidence might relate to local perceptions of the past. Cerekang's archaeological 'black hole' spanned the eleventh to sixteenth centuries; that is to say, not only the period predicted under the 'Age of Galigo' hypothesis but also the subsequent centuries, as would be expected had the La Galigo mythology been established at Cerekang at around 1600. The evident post-1600 utilization of Ennungnge would suggest a still later origin of the localised La Galigo mythology. Similarly, sites in the Ussu region suggest continuous occupation at substantial levels, combined with evidence of contact with Lake Matano, beginning only in the thirteenth century, which would be too late for the 'Age of Galigo'. Yet Bola Merajae yielded a 2,000-year long sequence, thus occupation at this locally-celebrated site would have commenced well before the beginning of the hypothesized 'Age of Galigo'.

Overall, the data best fit an establishment of the localised La Galigo mythology among the inhabitants of Ussu at approximately 1600. There are discrepancies in the data, but these would be expected in a dynamic tradition that combines elements that may be centuries old with elements of more modern origin. Members of the Cerekang mystical group interpret dreams in order to provide new insights into their religious observances, a practice that hardly recommends treating their belief system as a type of fossilized protohistory. However, the trading relationship with Lake Matano, and the export of its iron, which we believe provided the economic basis for the origin of Cerekang and Ussu, may well go back into the first millennium. This interpretation is supported by the findings from Katue, which are much older than would have been anticipated from the 'Age of Galigo' hypothesis. However, we are not convinced that the localised La Galigo mythology of Cerekang implies an early establishment of the Bugis in this region, in part because patterns of ethnic identity and dominance can be highly dynamic, and a shift to a Bugis identity could have occurred at any time in the past.[30]

[30] The Bajau sea nomads of South Sulawesi also venerate a sacred origin site in Ussu, called Bukila, on a steep hill that directly overlooks Tompottikka (Liebner 1998; Bulbeck and Prasetyo 1998; Darmawan *et al.* 1999).

Malili and Tampinna: findings and interpretation

No remains as old as those from Katue and Bola Merajae were recovered from Malili. The OXIS team's attention was drawn to Salabu and Patande by the reported discovery of Ming-period ceramics and bronze ornaments during a local housing development. Apart from a possible tenth to twelfth century *guci* martavan in a resident's house, the recorded *keramik* commences with fifteenth century wares, and lasts until the present (Appendix: Table A-2). The mode of pre-Islamic burials could not be discerned from the available information. It could have involved primary inhumations, because the acidic pH (5 to 6) would have dissolved most bone that had not been chemically hardened through cremation. On the other hand, the three observed specimens of fifteenth to seventeenth century martavans, and an eighteenth to nineteenth century Chinese blue-and-white jar, could have been employed in the secondary burial of defleshed or cremated human bone.

The most productive result of the OXIS program at Malili was the excavation of a shell midden of approximately fifteenth to seventeenth century antiquity at Salabu, a substantial settlement on the mouth of the Malili (Larona) river. The test pit in the midden recovered essentially intact deposits, apart from where a cooking pot (which probably once contained afterbirth) had evidently been set in a fireplace that postdated the midden's accumulation. Seventeen species of saltwater shellfish have been distinguished at Salabu. The shellfish helped preserve the bone, which includes a polished bone point, abundant bovid (water buffalo and/or cattle) and Sus (pig) bones, as well as bones from fish, rodents and a snake. The partly reconstructed mandible of a pig, from its available tooth measurements clearly the domestic *Sus scrofa*, was submitted for AMS dating (Wk-7336). It was chosen because it occurs in the upper layers of the midden, and its consumption would reflect pre-Islamic dietary practices. The resulting date AD 1430-1640 calibrated, at two sigma concurs with the slim evidence from *keramik* on the chronology of the Salabu shell midden.[31]

Survey upriver from Malili produced further information of relevance to understanding the growth of this rivermouth port. Balambano Indah, three kilometres up the River Malili, is associated with reports of an old graveyard (unsighted), and minor looting of *keramik* and beads near a small, undistinguished Islamic graveyard. OXIS members were shown a miniature Wanli blue-and-white cup that had been looted there. Kawasule, which lies on the River Malili approximately nine kilometres upriver from Malili, has two early cemeteries. In one of them, reportedly looted between 1967 and 1972, east-west oriented skeletons accompanied by small *keramik* vessels occurred next to, or near to, large earthen jars that containing iron bush knives and fragments of unburnt bone. It was reported that occasionally a human skull was perched on a jar's mouth. The *keramik* apparently consisted of celadons, whitewares, blue-and-white, and Sawankhalok black-and-white, while our survey recovered only seventeenth to twentieth century sherds. At Kawasule 2, a small looted area abuts an old Islamic cemetery with grave markers oriented both north-south and east-west. Kawasule would appear to have been inhabited continuously from at least the fifteenth century to the present, with an economic focus (according to residents) on exporting dammar, rattan and possibly gharu wood. A short distance upriver lies

[31] The Patande test pit cut through heavily disturbed deposits and offers little useful chronological evidence (Bulbeck and Prasetyo 1999).

Warau, an abandoned site associated with the Bugis elite in Malili. Its observed habitation debris and Islamic graveyard date between the nineteenth and the twentieth centuries. The three Malili and Larona river sites described here accord with the pattern, as indicated by the standardized chronological histogram for Salabu and Patande (Figure 2-2), of continual growth since the fifteenth century.

Warau provides the earliest secure evidence of the presence of Bugis in the environs of Malili. The pre-Islamic burials at Kawasule, with a complete lack of evidence of cremations, suggest a non-Bugis association, presumably Padoe, but possibly Bajau. Nonetheless, there is considerable evidence of linkages into the wider trading economy from the fifteenth century onwards, and the available evidence suggests that forest produce has been Malili's major export until at least the early twentieth century (Anon. 1945:64).

Tampinna is similar to the Salabu/Patande area in its evidence of pre-Islamic burials and a range of imported materials that would appear to date to after the fourteenth century. However, in the case of Tampinna we can be confident that inhumation of corpses extended in an east-west direction, sometimes placed in boat-shaped wooden coffins (B. *duni*), was the dominant pre-Islamic mortuary practice. The lack of evidence for this tradition at Malili may reflect inferior preservation conditions compared with the anaerobic saline muds of Tampinna, or Malili's housing and other infrastructural developments may have obliterated most traces of its past. Alternatively, if Malili had been a Padoe settlement, then cultural differences may have been responsible for differences in mortuary practices between Malili and the Bajau settlement of Tampinna.[32]

Local informants reported the former existence of a *benteng* of earth walls along the northern banks of the Tampinna river, but a survey did not reveal any traces of this. Today, the most obvious archaeological site is a shell midden (Tampinna 1), approximately 250 metres long by 40 metres wide. It was discovered when a 400 metre long *empang* (fish pond) was dug on a bend of the Tampinna river. OXIS placed two test pits immediately outside the eastern bank of the *empang*. The relatively low density of finds (7.3 kilograms of classifiable shell from both pits), combined with the length of the midden, suggests casually discarded habitation debris rather than a systematically accumulated midden heap. The midden probably corresponds to a line of houses, on piles, which extended 250 metres in a north-south direction along the east and north banks of the Tampinna river, where the channel turns eastwards.

Seventeen types of saltwater shellfish have been identified among the shell. Owing to the acidic nature of the deposits (pH 4 to 5), only carbonized bone fragments have been preserved. These include bovids (water buffalo and/or cattle), pig, fish, a rodent, and possibly two civet claws. Some of the bovid fragments have been cut or scraped with a metal blade. Two fragments of iron, one with rounded edges, representing a blade, were excavated, and the iron blade of a hoe or adze was also found on the surface of the midden. A polished stone pounder, two schist manuports, classified as a whetstone and a grindstone, three baked river pebbles, and three other stone manuports were also recovered during excavation or surface survey of the midden. One of the test pits also yielded a

[32] The practice of east-west inhumations in *duni* in the vicinity of Makassar also appear to relate specifically to Bajo influences or occupation (Bulbeck 1996-97).

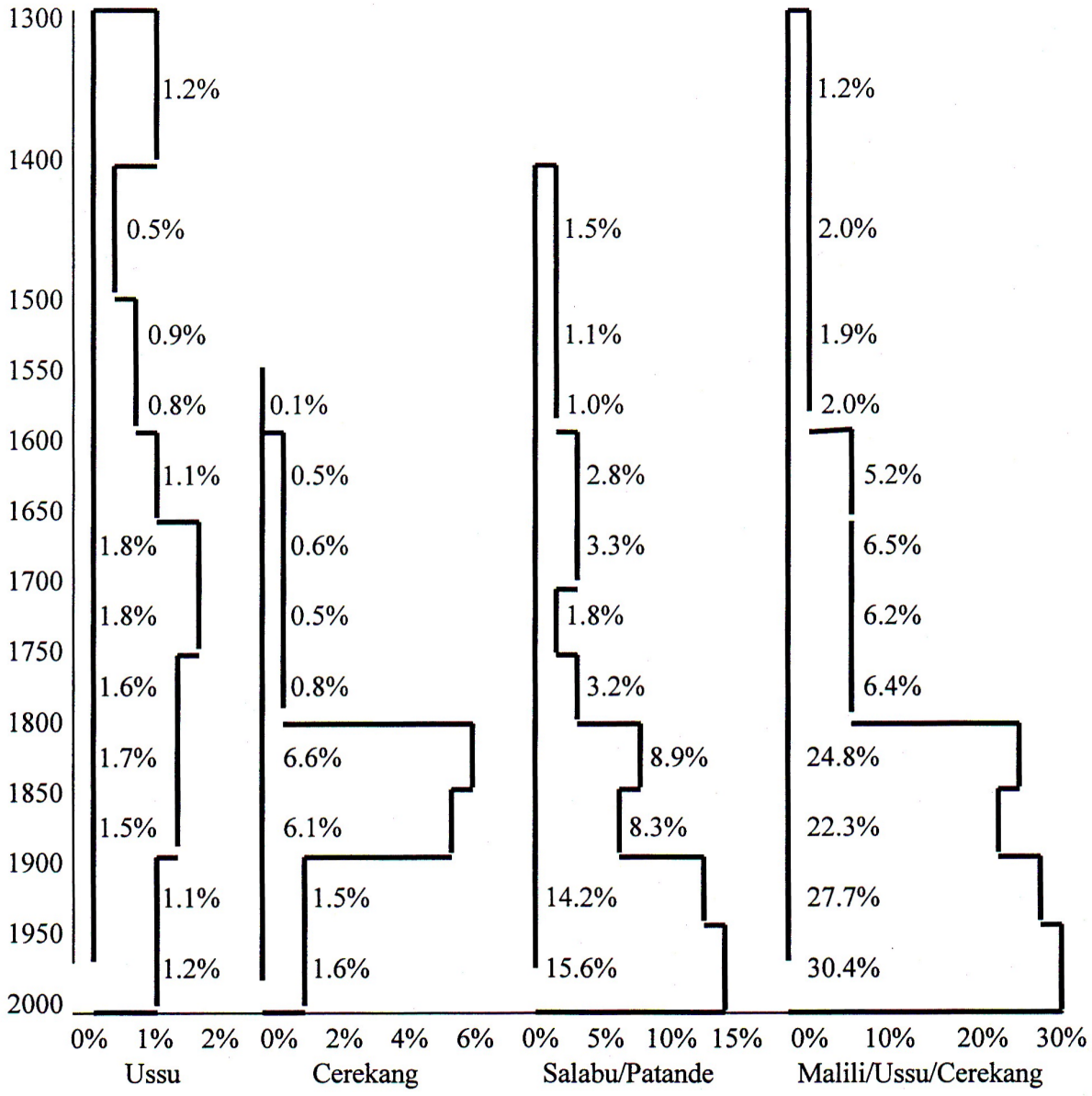


Figure 2-2. Standardized chronological histograms of the *keramik* from Kecamatan Malili (excluding Tampinna).

naturally faceted, prong-shaped bone, apparently from a small fish, which has been ground to a point, presumably to make a piercing tool.

One hundred and thirty metres north of the midden, on the north bank of the *empang* (Tampinna 5), local inhabitants reportedly exhumed a fragment of a human femur, associated with a seventeenth century Chinese bowl and three sherds from a bronze vessel. The femur fragment was preserved through slight (probably accidental) heat exposure, and burial in anaerobic mud beneath the habitation layers. Directly across the channel from Tampinna, at a locality called Ngapa, inhabitants reportedly dug up a 14 metre-long *duni* containing numerous ceramics, iron swords and knives, bronze bracelets, and beads. Preservation of the wooden *duni* and its metalwares reflect a strongly anaerobic burial environment. A total of six locales have been looted between the shell midden and Ngapa. One was reportedly associated with a *duni*, a second abuts an east-west oriented mound, and a third lies near three east-west oriented, Islamic-style grave markers and two north-south Islamic grave markers. These remains are consistent with a community making the transition from an immediately pre-Islamic practice of east-west extended inhumations, sometimes in *duni*, to the orthodox Islamic practice of north-south extended inhumations. Apart from a single sherd from a Go Sanh jar, collected from the surface of the midden, no evidence was recorded of martavans or cremated human remains, in strong contrast to the evidence from Tambu-Tambu and Wotu (see below).

Two hundred metres to the east of the shell midden, OXIS recorded an abandoned *kampung* (Tampinna 4) on the banks of the River Tampinna, at a point where it curves northeastwards. Among the small number of surface finds recovered here is an illegible Chinese copper cash, indicative of archipelagic trade. A grove of durians, mangos, coconuts and *langsat* (*Lasinum*) trees lying to the immediate west of the former *kampung* was estimated to have been abandoned about 100 years ago. However, the *keramik* recorded during survey and excavation all date between *c.*1400 and *c.*1700 (Appendix: Table A-3), with a focus (proportionately speaking) on the seventeenth century (Figure 2-3). The abrupt cessation of Tampinna's *keramik* at around 1700 matches the oral tradition (which the OXIS team heard from a number of informants) that Tampinna was abandoned after it was sacked by Wotu. Tampinna was not re-occupied, presumably because its economic attractions no longer compensated for the insecurities of dwelling in this remote, exposed location. Tampinna thus appears to have been a temporarily successful response to a fifteenth to seventeenth century window of opportunity.

We are tempted to relate this opportunity, and the sixteenth to seventeenth century growth evident at all of the sites in *kecamatan* Malili (Figures 2-2 and 2-3), to the expanding trade in Lake Matano iron, and especially to the growth of the iron smelting industry at Kampung Matano. Tampinna's maritime orientation, and its archaeological indications of considerable prosperity, would support that contention, even if Tampinna enjoyed only a minor role in the expanding economy, such as providing watercraft and mangrove timber to the coastal centres to the east. Alternatively, Tampinna could have supplied fish and shellfish, or provided maritime transport.

The eighteenth century appears to have been a period when the coastal trade of *kecamatan* Malili underwent contraction, in that Tampinna's demise was not accompanied by any signs of growth at

Ussu, Cerekang or Malili. In particular, this may have been a period when Bajau involvement in Luwu's coastal trade effectively ceased, as reflected by the permanent abandonment of the Bajau settlement at Tampinna. The subsequent nineteenth century growth of Cerekang and Malili (Figure 2-2) was probably related to the export of dammar and other forest produce, rather than to the export of iron. Writing around 1900, European observers make no mention of a trade in iron from the vicinity of Malili (Van Braam Morris 1889, Schrauwers 1997). The available evidence points to the main period of the trade in iron from Kampung Matano and its export from the Malili coast having lain between the latter half of the first millennium and the seventeenth century, without any sign of an eleventh to thirteenth century peak that would correspond to an 'Age of Galigo'.

2.3 Wotu

Introduction

Wotu is a small *kecamatan* centred on the Wotu township near the mouth of the River Wotu. Its climate may be marginally more seasonal than in the other Luwu study locations discussed in this report (Bulbeck 1992:Figure 1-2). *Kecamatan* Wotu is home to an enclave of approximately 5,000 Wotu speakers who constitute a linguistic isolate within South Sulawesi (Grimes and Grimes 1987:62-63). Sirk (1988) suggests that Wotu, and Laiyolo (a language spoken on the far south of Selayar), belong to a separate linguistic group which includes Buton in Southeast Sulawesi, but not Muna. He argues that Wotu had once been a prestigious language, on account of the advantages of Wotu as a port. Pelras (1996) points out that Wotu lies at one end of an ancient track (now a road) running north from Wotu across Central Sulawesi to reach the Bay of Tomini. Wotu's unique position within the kingdom of Luwu (Caldwell and Druce 1998) suggests that it is an old centre of trade which probably predated the rise and expansion of the Bugis kingdom of Luwu.

People we spoke to in Wotu claimed that the town is an old centre of settlement. Their claim is supported by reports of numerous, looted *guci* jars, containing charcoal, bone fragments, glass beads and other small antiques, which have been dug up in and around the Puatta Sanro and Kande Api Islamic cemeteries in Wotu. Kande Api means 'burnt with fire', and refers to a pre-Islamic mortuary practice of cremation. However, Muhammad Arsyad, our local informant, indicated to Bulbeck that Tambu-Tambu was an even older centre than Wotu. Tambu-Tambu lies at the mouth of the Wotu river, which is called Sere Bissue (B. 'dance of the *bissu'*). This name evokes the *bissu* (B. 'transvestite ritual specialist') who have been attached to the Bugis courts since pre-Islamic times. Pak Arsyad informed Caldwell and Ali Fadillah of other former settlements along the adjacent coast, including a place called Bajo at the mouth of the Pawosoi river. Slightly further up the Pawosoi river is the 176 metre high Bukit Lampenai, claimed locally to be the place where Bataraguru descended from heaven (Pelras 1996:6) and opened the first field, and also the site of Wotu's original *kampung* (Darmawan *et al.* 1999). Gold leaf is reportedly often dug up at the foot of Bukit Lampenai, but a brief inspection failed to encounter any evidence of early occupation (Ali Fadillah pers. comm.).

Findings and interpretation

A bulldozer employed to carve out an *empang* had recently revealed numerous antiques in Tambu-Tambu. This information led the OXIS team to survey Tambu-Tambu and to collect the bulldozer's spoils. Given Wotu's suspected antiquity, this collection was expected to contain *keramik* and other exotic goods at least as old as those at Malangke. Surface survey and excavation in the Wotu township, and mapping of the remnant earth walls of Benteng Wotu, were also carried out under the direction of Moh. Ali Fadillah. He suggests that the wall had formed a series of connecting loops, but it is also possible there had been just one single wall before it disintegrated to leave adjoining mounds of earth. Collections of surface sherdage were made at Kampung Kasa, Kampung Beru, Kampung Tangnga and Kande Api, and one metre square test pits were placed in Kande Api and Tappa Benteng. The test pits produced 26 *keramik* sherds with the same chronological spread as the *keramik* recorded during the surveys in Wotu township. Four complete plates from Kande Api, either shown or donated to OXIS by the town's inhabitants, are here combined with the 592 identifications from the Wotu survey (Appendix: Table A-3).

The approximately 500 square metre survey in Tambu-Tambu produced more thirteenth and fourteenth century *keramik* than were recorded by OXIS at all other Luwu sites combined (Figure 2-3). The variety and frequency of early whitewares and monochromes strongly suggest initial use of the site by *c.*1200. Indeed, the steady downward slope of Tambu-Tambu's standardized chronological histogram suggests that, relatively speaking, the site may have been an even more important location in the twelfth and possibly the eleventh centuries than in the thirteenth century. This impression cannot be evaluated by the *keramik*, which apparently did not begin to reach Luwu at archaeologically detectable frequencies until *c.*1200. The only relevant evidence here may be the wide variety of 11 glass beads, including Indo-Pacific examples, in the surface collection. Tambu-Tambu is the only coastal site we know of that seems to have been important at this early period, a datum which we interpret as a general indication of Wotu's dominance over coastal trade around the head of the Gulf of Bone immediately prior to the rise of Malangke.

Substantial frequencies of fourteenth or fifteenth to sixteenth century *keramik* follow the twelfth to thirteenth century ceramics (Appendix: Table A-3), although the proportion declines sharply relative to Luwu's total recorded frequencies (Figure 2-3; Appendix p.126). Pieces dating to *c.*1650 and later are so rare as to indicate abandonment of the site by the early seventeenth century.[33] The meaning of Tambu-Tambu (W. 'hillocks') is difficult to reconcile with elevations of just one metre above sea-level near the site, unless the hillocks were artificial 'tumuli' like those excavated by Willems at Karang Karangan, or those and surveyed by OXIS at Tampung Jawa.[34] That 63 (28.4%)

[33] The single twentieth century sherd reflects the recent re-occupation of the site.

[34] Interestingly, both the tumuli at Karang Karangan (Bulbeck and Prasetyo 1998:7) and at Tampung Jawa (see below) would appear to date to around the fourteenth century.

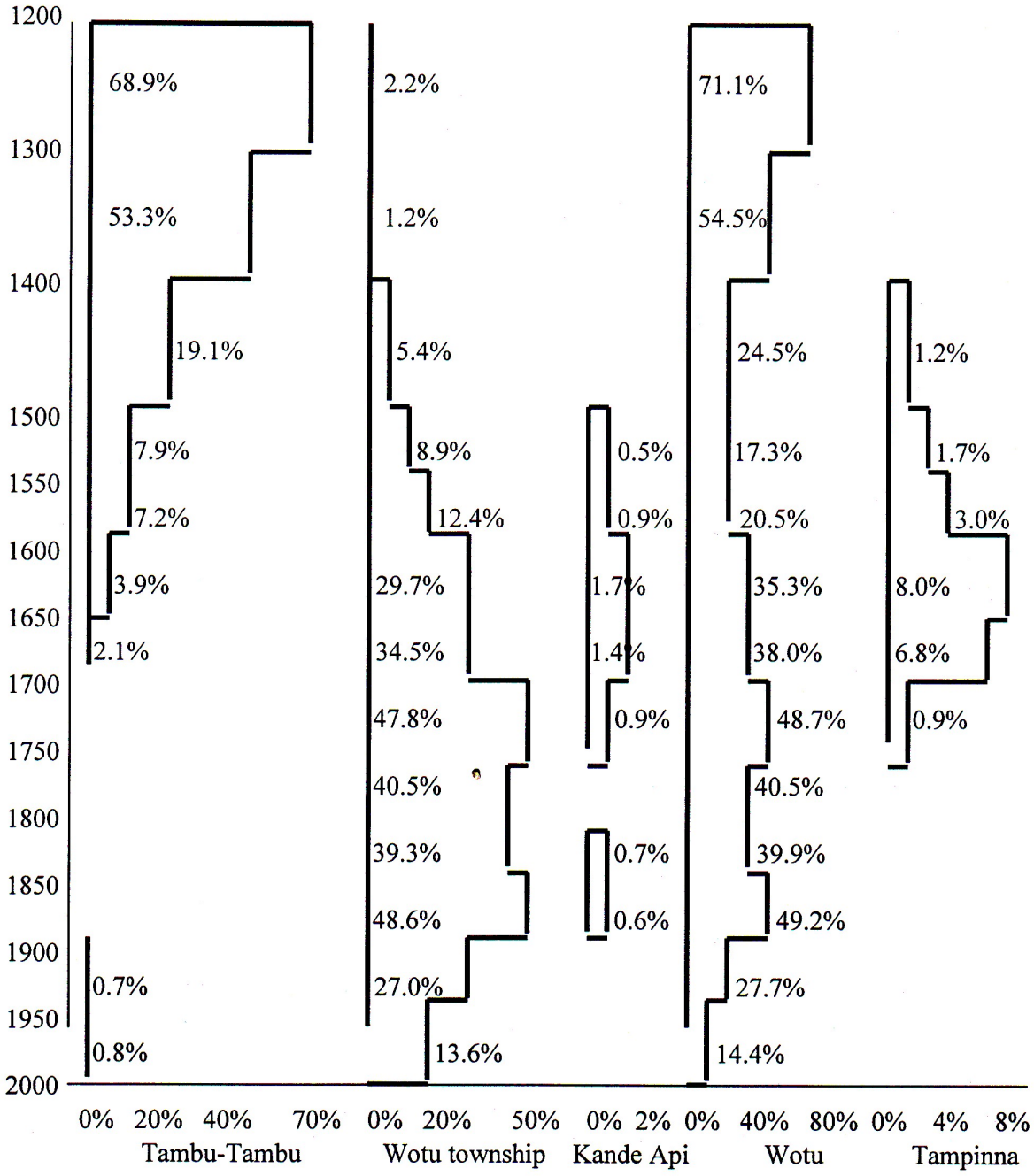


Figure 2-3. Standardized chronological histograms of *keramik* from Wotu and Tampinna

of the 222 *keramik* identifications are from martavans is even more impressive when we consider that many of those identifications include between two and five sherds assigned to the same jar. Muhammad Arsyad and Karaeng Demmanari both recall hearing that the jars exhumed during the earthworks for the *empang* usually contained *abu-abu* (ash) and beads. Quite clearly, Tambu-Tambu was a pre-Islamic cemetery where cremated remains accompanied by grave goods were interred from *c.*1200 until *c.*1600.

Tambu-Tambu would have been a Wotu cemetery (the mortuary practice resembles that at Kande Api) and our historical evidence points to a long-term persistence of the Wotu enclave. On the other hand, members of other maritime communities would appear also to have established a base near Wotu, as the toponym Bajo suggests. Ali Fadillah (pers. comm.) also recorded accounts of a second find spot, not far from Tambu-Tambu, where a complete martavan, fragments of a *duni* (which may suggest a Bajau burial), glass beads and potsherds were also unearthed during the construction of an *empang*.

The Kampung Kasa sherdage records a human presence at Wotu by the fourteenth century (Figure 2-3). According to Ian Glover and Jan Wisseman Christie (pers. comms), a bronze fragment (KPK.0.102) recovered with the sherdage possibly derives from a classical Javanese Hindu-Buddhist statue. Ali Fadillah, however, suggests that it could be from a small drum made in north Java during Islamic times. Elsewhere in Wotu, the collected sherdage is no earlier than the fifteenth and sixteenth centuries. The sixteenth century marks a substantial relocation of population from Tambu-Tambu to Wotu, as evidenced by sherdage collected from each location (Figure 2-1). The large reported expanse of pre-Islamic burials, from Kande Api and Puatta Sanro to the Wotu *camat* office, may reflect a large population rather than a long period of burials. The *benteng* wall was possibly built at around this time, as the two zones of pre-Islamic burials lie just outside the *benteng* walls. All surveyed locations inside (south of) the Benteng Wotu wall produced abundant sixteenth to twentieth century sherdage. Also within the town wall, next to the mosque, is the grave of Syekh Muhammad Al-Jafri, who reputedly hailed from Macassar and brought Islam to Wotu, presumably in the seventeenth century.

The standardized chronological histogram for Wotu suggests a late resurgence of the polity's fortunes during the eighteenth and nineteenth centuries (Figure 2-3). On the eve of Wotu's twentieth century decline, Kruyt noted Luwu's attempts to destabilize Wotu in retaliation for Wotu's refusal to assist Luwu in a nineteenth century war, and how Lake Posso (in the centre of Sulawesi) had previously served as Wotu's headquarters within Central Sulawesi (Schrauwers 1997:373-74). Van Braam Morris (1889) cited Wotu, together with Rongkong, as a source of the highest quality iron weapons available in Netherlands India. We should thus be wary of reading oral accounts of Wotu's earlier prominence as a depiction of its pre-Islamic past, because elements of these oral accounts may go back no further than the late nineteenth century. The archaeological evidence, however, clearly indicates that Wotu has played a long and important role in maritime trade in the region (Figure 2-3).

The overall pattern suggests a small population at present-day Wotu by the fourteenth century, and a major concentration of residents inside Wotu during the sixteenth century, at least some of these having come from the coastal site of Tambu-Tambu. The *benteng* wall may have been built at this time, suggesting that local people had gathered at Wotu for reasons of security. Together, Tambu-Tambu and Wotu document a prosperous enclave of Wotu speakers who, from at least *c.*1200 onwards, have traded hinterland produce from as far inland as Central Sulawesi in exchange for beads, ceramics and other manufactured goods. The Wotu colony is archaeologically demonstrated to have overlapped temporally with at least the last hundred years of the eleventh to thirteenth century period suggested by Pelras (1996) as the 'Age of Galigo'.

2.4 Baebunta

Introduction

In and around the village of Baebunta, where the alluvial coastal plain meets the foothills, lives a group of between 1,000 and 2,000 people who claim a cultural and historical heritage distinct from that of the Bugis. Their language, Lemolang (endonym Limolang), is an isolate belonging to the South Sulawesi group (Grimes and Grimes 1987:54), and their area of focal distribution lies between Sabbang Loang on the banks of the Rongkong river, and Kampung Baebunta on the banks of the Baebunta river. The adjoining flats lie between 30 and 40 metres above sea-level, whereas the abutting foothills can exceed 300 metres above sea-level. The equatorial climate is hot and humid, with abundant rainfall throughout the year. Large swathes of wet-rice land now stretch across the coastal plain, and plantations of cacao trees and oil palms cloak the foothills. Much of this agrarian activity appears recent; Willems (1938) mentioned only dry-rice fields and kapok trees on the Sabbang Loang site at the time of his excavation. The unsurfaced road to Limbung starts at Sabbang Loang and follows the south side of the Rongkong river up to Rongkong. Baebunta is an important collection point for rainforest logs and rattan from the hinterland; the looted pre-Islamic cemetery of Puang Mattene had by 1994 been turned into a log-storage yard, and by 1998 had been converted into a banana plantation, while a rattan factory now stands on the river flats immediately beneath Puang Mattene.

Local traditions are adamant that the sea once came right up to the foothills at Baebunta. Although sea-levels have never exceeded their present stand by 30 metres during the Quaternary, about 4,000 years ago they did rise 5 metres or so above their present level (Whitten *et al.* 1987:20). This would have brought the sea to within 14 kilometres of Baebunta, to extrapolate from current altitudes, and still closer if the coastal plain has built up to any significant extent through late Holocene sedimentation, or if it has been raised by tectonic uplift. Local traditions also insist that Tinoe, on the flats of the Baebunta river, is the oldest *kampung* in Luwu. However, our four auger cores at Tinoe revealed nothing apart from river sands, broken stones and occasional charcoal fragments. These poor returns do not prove the absence of early settlement, because, even had the OXIS team cored in places where habitation debris had been deposited, the habitation debris would

probably have been subsequently washed away by floods. Peter Bellwood (pers. comm.) is of the opinion that early Austronesian farming settlement was probably concentrated on river flats; Tinoe may thus be a memory of a very early, proto-Baebunta settlement.

Puang Balubu, which lies a short distance across the river from Tinoe, is portrayed in local oral traditions as the point of origin of the royal lineage (L. *makolle*) of the rulers of the former polity of Baebunta. The site is a looted pre-Islamic cemetery on a hilltop, crowned by a small, locally-revered, four-legged dolmen. A fourteenth century whiteware covered bowl from the site was donated to OXIS, and surface survey recovered sherds of a Sawankhalok plate, a Vietnamese plate, and two Ming blue-and-white vessels. The Malangke resident who had masterminded the looting of this site reported finding four martavans beneath the dolmen, plus gold objects, including gold arm protectors, similar to those worn by Majapahit Javanese, numerous iron bush knives and frequent burnt bone fragments. Another informant independently corroborated the claim of the finding of burnt bone, and added that one looted burial yielded tools which he interpreted as those belonging to an ironworker. On the available evidence, Puang Balubu appears to have been an elite pre-Islamic cemetery for cremated burials, with an origin that goes back at least as far as the fourteenth century. It may well have been associated with the lineage of Baebunta's royal foundations, and there is a hint of a high status for ironworkers in this pre-Islamic polity.

Archaeology and oral tradition are conflated at the Sabbang Loang site. Lemolang oral traditions remember it as the second oldest *kampung* after Tinoe. This claim would suggest occupation as early as 2,000 years ago, and an early Palaeometallic antiquity for the polished stone tools, iron spearheads, and massive earthen burial jars excavated by Willems. However, according to local tradition, a tabular, parallelepiped granodiorite boulder near Willems' excavation had once been part of the stairway of the palace of the Baebunta *tomanurung* (B. 'one who descended' [to commence the royal line]). The implied relationship with Puang Balubu might suggest that occupation began at Sabbang Loang during the fourteenth century, or soon after. As a third consideration, our excavations revealed that the sacred boulder, and other boulders at the site, had been placed as covers to protect a number of burial jars. Willems (1938) was informed that the urn field where he excavated was remembered as an old cemetery. Allowing for some conflation of local tradition, the commemoration of Sabbang Loang could reflect a close connection between the jar burials and the origin of the Baebunta polity. This aspect of local tradition could either stem from the incorporation of the Sabbang Loang community into a Baebunta chiefdom which traced its origins to Puang Balubu, or it might even represent a dimly remembered beginning of the chiefdom at Sabbang Loang. In either case, the sacred boulder should overlie an aristocrat's burial jar, which could date to around 1000.

According to Lemolang tradition, after leaving Sabbang Loang, the polity moved to Pinanto, a ridge top that lies on the opposite side of the Baebunta river, across from the looted site of Puang Mattene. Next, it moved to Tirosoe, which lies between Pinanto and Baebunta, then, finally, it moved to Kampung Baebunta, where in 1998 OXIS collected sherds dating to the fourteenth to fifteenth and later centuries. Accepting this local 'genealogy of places' as a useful source for Baebunta's history, we can derive a wide range of age estimates for the settlements that postdate

Sabbang Loang, depending on whether Sabbang Loang was occupied approximately two thousand, one thousand, or six hundred years ago. Under the first alternative, Pinanto would have been occupied over a thousand years ago (implying a Palaeometallic assemblage with iron and bronze, polished stone tools and abundant earthen pottery) and Tirosoe shortly after 1000. Under the second option, Pinanto would have been inhabited shortly after 1000, while Tirosoe should show evidence of occupation by the fourteenth century at the latest. Under the last alternative, in which both Sabbang Loang and Kampung Baebunta would have both been occupied *c.*1400, the sequence of Lemolang toponyms would logically refer to settlement abandonments rather than initiations. Hence we might expect the abandonment of Sabbang Loang between the fifteenth and seventeenth centuries, followed by the abandonment of Pinanto between the sixteenth and eighteenth centuries, the abandonment of Tirosoe between the seventeenth and nineteenth centuries, and the continued occupation of Kampung Baebunta until today.

The key to understanding initial occupation at Sabbang Loang lies in its massive burial jars. OXIS excavated at two places which were pointed out to us as possible locations of undisturbed burial jars. We also excavated at two further locations where burial jars had been exhumed, and we placed a test pit close to the *tomanurung* tabular stone. OXIS also carried out a surface survey which extended in between and beyond the area where jar burials had been found by villagers. This was to test the possibility of two separate occupation phases at Sabbang Loang – a prehistoric phase associated with the jar burials and a historical phase remembered in oral tradition – which might have coincided at the same site by chance. Three test pits were also excavated outside of the jar burial area.

Pinanto was the most systematically and extensively excavated of any of the OXIS sites. Twenty two test pits were set out with respect to the north-south baseline surveyed along the centre of the Pinanto ridge. Nineteen test pits were selected by starting at the southernmost point of the baseline, proceeding 15 metres northwards on successive occasions, subtending a perpendicular line east or west, and choosing the flattest spot to excavate. This systematic excavation program was aimed at revealing both the earliest and the latest occupation at Pinanto, to determine which (if any) of the three scenarios of settlement relocation based on Lemolang oral tradition was correct. Three further test pits were prompted by questions of site interpretation arising from the previous 19 pits. Another reason for the systematic excavation of Pinanto was to sample the diversity of the site in economic terms (areas for particular activities, especially those associated with the traffic of primary produce from the hinterland) as well as in social terms (elite versus commoner areas). The same issues of evidence for traded primary produce from the mountains, and signs of social differentiation, also apply to the Sabbang Loang analysis.

In 1998 we surveyed the remnant segments of the earthen wall of Benteng Baebunta, which is believed to date to the nineteenth century, and a field of Islamic cemeteries which stretches northwards as far as a plot of orchards called Tirosoe. The fort measures about 450 metres at its maximum north-south length, and 270 metres at its greatest east-west breadth. From local reports, the southern wall would have run along a former bank of the Baebunta river. The meandering course of the western wall, as far as a dip in the terrain corresponding to an old river bed, suggests

that the western wall would also have run along a river bank. Construction of the fort seems to have involved building a straight wall along the east, and adding a northeast corner to link up earthen walls built along former riverbanks. Pre-nineteenth century use of Baebunta, however, is suggested by reports that construction activities near the sacred rock inside the Bentenna primary school often turned up sherdage. *Keramik* sherds and semi-complete pieces which we were shown from this locality, date to between the fourteenth to fifteenth and early seventeenth centuries. In early 1999 Moh. Ali Fadillah (who had participated in the Benteng Baebunta survey) excavated a metre-square pit inside the school grounds to look for stratified evidence of early occupation.

The complex of Islamic graves north of Benteng Baebunta can be ascribed an early seventeenth century origin, based on the presence of the grave of Raja Pabboli. He is the Baebunta *makolle* who embraced Islam at the same time as Sultan Muhammad Wali Muzahir al-din, the first Islamic ruler of Luwu. At the far north of the graveyard, where Tirosoe begins, is an area where looters reportedly recovered numerous martavans containing a little gold and several blue-and-white plates. In June 1998, an OXIS team excavated two test pits inside a ruined stone arrangement, whose original function is now forgotten. This seemed the most promising location to recover evidence of fourteenth century or earlier occupation, as predicted by the two interpretations of the Baebunta 'genealogy of places' which treat it as a history of settlement initiations that commenced between 2,000 and 1,000 years ago.

Findings and interpretation

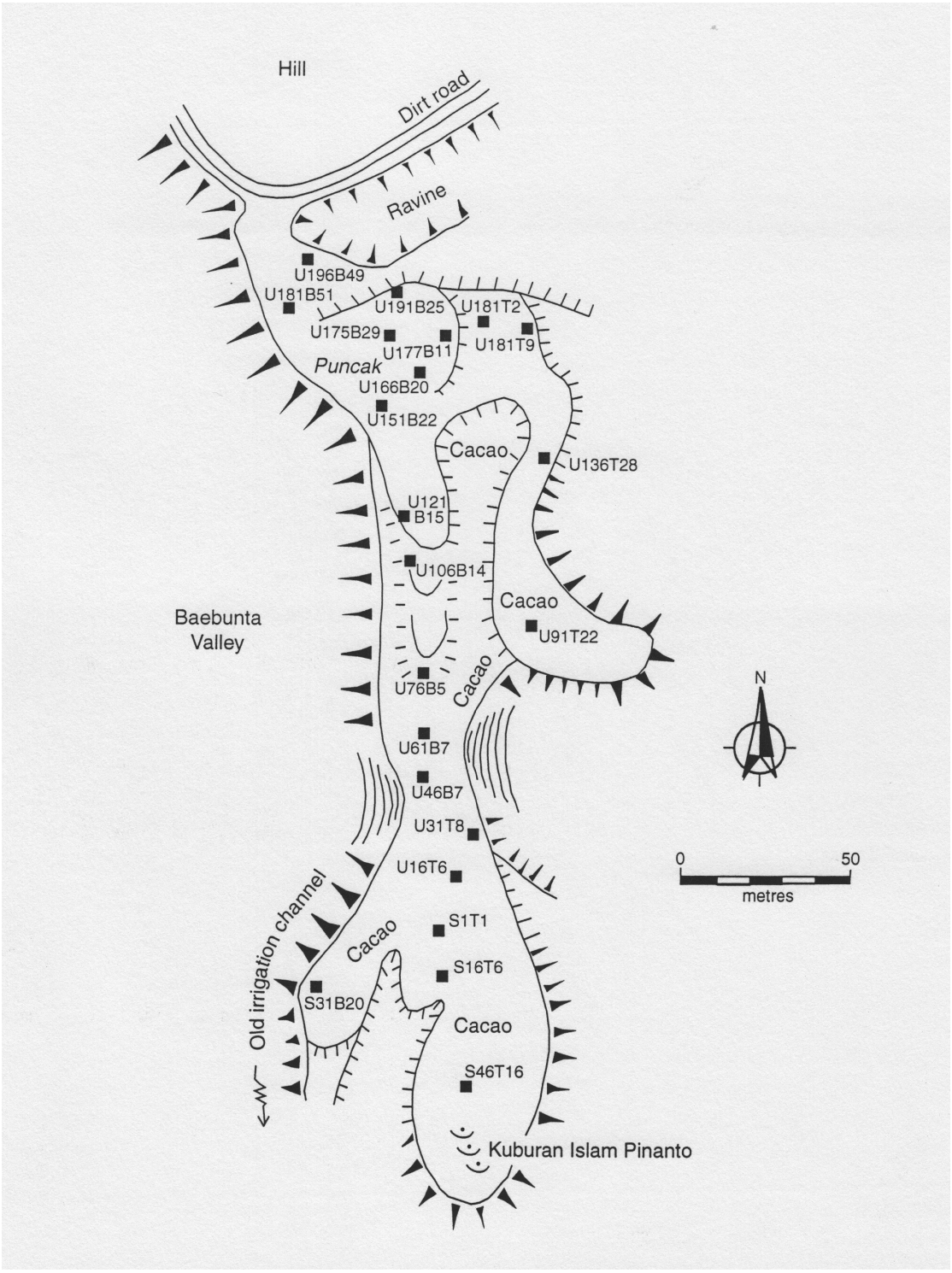
Excavations recovered no *keramik* sherds older than the seventeenth century, either at Tirosoe or at Benteng Baebunta. The main find in Tirosoe was a fragmented, eighteenth to nineteenth century Chinese blue-and-white bowl, sherds of which occurred in both test pits, from units 1 to 7. The bowl had presumably been left as a votive offering at the disused stone arrangement. Sherds from a Swatow jarlet and from nineteenth to twentieth century porcelain bowls were also excavated. The Benteng Baebunta test pit produced only eighteenth to twentieth century Chinese sherds in the black organic-rich sands of the top six units, which lay above sterile river sands. The team of excavators also collected sixteenth, eighteenth and nineteenth century sherds from the vicinity of the test pit. Altogether, these sixteenth to twentieth century sherds complement the sherds of fourteenth or fifteenth to seventeenth century antiquity previously recorded from Benteng Baebunta and indicate continuous occupation from approximately 1400 to the present. On present evidence, there is no reason to date the initial use of Tirosoe before the late sixteenth century. The evident earlier onset of occupation at Kampung Baebunta would suggest that the Tinoe-Sabbang Loang-Pinanto-Tirosoe-Baebunta sequence recorded in Lemolang oral tradition refers to the abandonment of these settlements. The standardized chronological histogram of Tirosoe and Benteng Baebunta, considered together, reveals a mild eighteenth to nineteenth century peak, and a predominantly Islamic settlement period, within a very long occupation history (Figure 2-4).[35]

[35] The twentieth century dip in the histogram is a product of the decision by OXIS to pursue evidence of early habitation at Baebunta and, accordingly, focus on the area of the primary school, rather than on the large, densely settled area of Kampung Baebunta south of the school.

Sabbang Loang and Pinanto confirm the interpretation of the Tinoe to Baebunta sequence as a succession of site abandonments. Sabbang Loang was evidently abandoned in the seventeenth century and later re-occupied, whereas Pinanto was abandoned during the eighteenth century and not reoccupied (Figure 2-4). If initiation of settlement were considered, these two sites would appear in reverse order when compared to the sequence recorded in oral tradition. A noteworthy observation from the standardized chronological histograms is that both sites have a fifteenth century peak, in particular Pinanto. Interestingly, the *keramik* profile from the two looted cemeteries, Puang Mattene and Puang Balubu, has a thirteenth to fifteenth century bulge, before reducing in the sixteenth century (Figure 2-4). This sixteenth century reduction can be partly attributed to the commencement of the use of Tirosoe as a burial area in that century, but, in particular, would appear to be a symptom of the decline of the Baebunta polity following its fifteenth century heyday. Furthermore, a couple of thirteenth to fourteenth century wares from Puang Mattene (Appendix: Table A-4) are responsible for the representation of the thirteenth century as strongly as the fifteenth century at the two looted 'Puang' sites (Figure 2-4). Accordingly, usage of the Puang Mattene cemetery would appear to have commenced by at least the earliest date that *keramik* began to be imported to Luwu in archaeologically detectable quantities.[36]

This last point relates to our evidence that Pinanto appears to have been continuously inhabited from some point prior to 1000 until the early eighteenth century, whereas Sabbang Loang has evidently been occupied on three separate occasions. Pinanto stretches 260 metres along a granodiorite ridge which overlooks the Baebunta river (Map 5). It is physically divided into two halves: a flat section running from the Pinanto Islamic cemetery at the far south to a constricted pass near the site's midpoint, and a steep section where two raised arms lead to a bamboo-choked peak (*puncak*) at the north. The flanks of the steeply elevated western arm would have risen even more steeply during the late pre-Islamic period, prior to the action of erosion over the last four centuries. This is reflected in the one metre depth of deposit in the U61B7 square at the foot of the spur, and a radiocarbon date of 390±90 BP which calibrates to AD 1400-1670 at two sigma (ANU-11355), near the base of the cultural deposit in this square. Nine test pits were excavated in the southern half of the site, ten in the northern half, and three effectively sterile test pits were excavated at the far north, beyond the site's northern boundary. Across the site, the acidic soil had dissolved all old organic remains apart from some fragments of burnt bone, and had probably corroded most of the iron at the site beyond archaeological recognition.

[36] OXIS were told that the burial jars at Puang Mattene (as at Sabbang Loang) were usually covered by a boulder, which would indicate the mortuary use of Puang Mattene prior to the thirteenth century. However, Macknight and Bulbeck (1985) did not record any boulders during their inspection of the lootings, which included numerous open pits, over an area of approximately one hectare.



Map 5. Plan of Pinanto showing the extent of the site and the excavated test pits

Evidence of prehistoric habitation was concentrated in the southern half of the site, attributable to its greater ease of physical access. This evidence includes 19 of the 21 flaked stone artifacts (of chert, and smaller numbers of chalcedony and quartz) and ten of the twelve polished stone artifacts. The latter comprise a barkcloth beater, two grindstones, a whetstone, two pounders, a pointed rod, a disc, an unidentified polished artifact, and three use-polished pebbles. In contrast, the majority of the *keramik* sherds (56%), especially those dating to the sixteenth century or earlier (69%), and vestiges of iron (74%) were excavated in the northern half of the site. Occupation during the late pre-Islamic period was evidently focused on the site's upper slopes and, as discussed below, incorporated an iron industry. Pinanto evidently enjoyed a fifteenth century peak of prosperity, and retained a substantial population until the eighteenth century (Figure 2-4), by which time the Pinanto Islamic graveyard would have come into use.

There was evidence of a small pre-Islamic burial ground on the Pinanto *puncak*, which was associated with fourteenth to sixteenth century *keramik*. The original site inspection (Bulbeck 1995:11) noted signs of scattered looting. During excavation, the U177B11 square yielded three calcined fragments, apparently of human cranial bone, two glass beads, a sherd from a glass vessel, and 24 discrete *keramik* identifications, several of which include three to four sherds assigned to the same vessel. There seems little doubt that this test pit produced the remnants of cremated human remains buried with grave goods. The other three test pits on the *puncak* also produced fair numbers of *keramik*, another glass sherd, and fragments from iron artifacts, including a shaft and a blade. The looted pre-Islamic cemetery of Puang Mattene is clearly visible from the *puncak*, as is the area of Pinanto used for habitation. The burial ground's location suggests it was reserved for elite individuals, in particular those who dwelt on the steep slopes of Pinanto's northern section, who were literally accustomed to looking down upon their inferiors, in death as well as in life. These individuals probably included iron smiths, as inferred from our archaeological evidence of iron having been worked on the slopes of Pinanto. The apparent burial of at least one iron smith at the elite Puang Balubu cemetery, and indications of the ancient prominence of iron smiths in the pre-Islamic Bugis kingdom of Bone, lend credence to this inference.[37]

Five test pits, two of them effectively sterile, were excavated in the two arms of land which descend steeply from the *puncak*. The recovered *keramik* sherdage dates entirely to the fifteenth and sixteenth centuries, confirming that the relations of these two arms of land to the burial ground are chronological as well as spatial. The western arm contains the U121B15 square, which is the critical test pit for deciphering the function of this part of Pinanto. This square yielded two iron prills, eight fragments of iron slag and four iron artifact fragments. The fact that 71% of Pinanto's excavated iron prills and slag were recovered from this test pit suggests that it lies within a focal area for working iron in the site. Len Hogan's analysis of a prill and an iron slag fragment found that both contained metallic iron, consistent with the reduction of iron, but not with its smelting, thus suggestive of local reworking of previously smelted iron. In terms of chemical composition, both samples contain significant quantities of iron, aluminium, silicon and calcium, but no

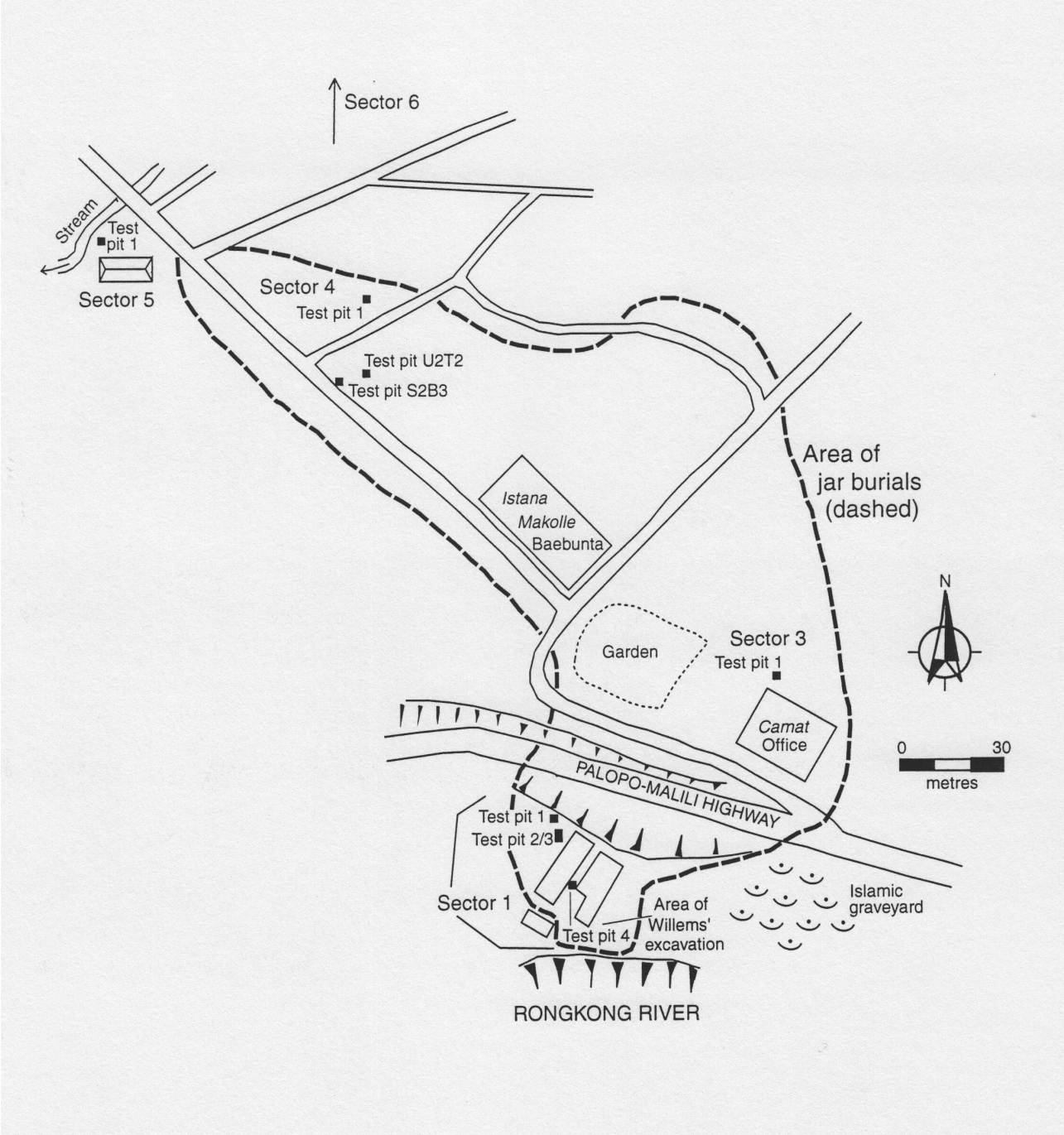
[37] The title of the second, partly mythical ruler of Bone is 'The iron smith' (Macknight and Mukhlis in preparation). An anvil said to be his is still kept among the kingdom's regalia (Pelras 1996:249).

detectable quantities of chromium or nickel, characteristics that hold also for the ironstone gravel from Sabbang Loang (see below). The iron at Pinanto would seem not to have come from Lake Matano, where few of the tested samples of iron contain substantial amounts of all four of the elements prominent in the Baebunta samples, but where chromium and manganese can usually be discerned. The likely source for Baebunta's iron would be the mines in the Limbung valley, near the headwaters of the Rongkong river.

Southern Pinanto, which includes the gently southwards sloping terrain from the U61B7 square, yielded fifteenth to eighteenth century *keramik* sherdage, but, as discussed above, had been occupied earlier, probably more or less continuously from the late Palaeometallic. All our test pits in southern Pinanto encountered substantial habitation debris, and old occupation debris also litters the surface of the ground in Kuburan Islam Pinanto. Isolated lumps of iron slag were recovered from the U61B7 and S46T16 squares at the opposite ends of southern Pinanto, indicating that working of iron occurred in this part of the site, even if it was primarily a residential area rather than an area of smelting workshops. This section, Pinanto's main settlement area, extended across at least 0.6 hectares and originally probably more, as erosion has clearly diminished the surface area of this low-lying spur. An area of 0.6 hectares would correspond to a maximum population of about 750 people (cf. Fletcher 1995:Figure 4-3), a number large enough to support a range of artisans and a society with one or more additional social strata. Future analysis of Pinanto's abundant earthenware sherdage should provide a window on economic specialization within the site.

Today, Sabbang Loang is a thriving, prosperous, modern town that has grown rapidly in recent years on both sides of the bridge across the Rongkong river where it meets the coastal plain. The town, which functions as a transport node, sits at the easiest crossing point over the Rongkong and marks the starting point of the road up to Limbung and Seko. The standardized chronological histogram shows a major twentieth century peak of *keramik* at the site; most of the European, Japanese and modern Chinese wares represented at the site postdate Willems' excavation in the 1930s. These sherds were either collected during a wide-ranging survey of the hilltop area of Sabbang Loang, or excavated in the topsoil across the site, or retrieved from test pits on the hilltop that coincided with holes dug by the villagers for their garbage. Willems' photographs and description of Sabbang Loang suggest only a small number of inhabitants when he carried out a salvage excavation of part of an urn field which lay in the way of the Palopo to Malili road then being constructed by the Netherlands Indies government.

A minor fifteenth to seventeenth century community at Sabbang Loang is represented by a variety of Vietnamese, Thai and Ming Chinese sherds (Appendix: Table A-4). These were either recovered during Willems' original fieldwork (National Archaeology Museum *Keramik* Collection, No. 3949) or collected by OXIS from the surface of the site's hilltop. Reported, sporadic looting of *keramik* on the Sabbang Loang hillside corroborates other indications of a late pre-Islamic to early Islamic settlement in the site's upper reaches, but, from our evidence, this settlement did not extend downhill to the area where Willems carried out his excavation. In addition, the upper part of Sabbang Loang yielded evidence of prehistoric occupation which presumably dates to the same period as the urn field excavated by Willems in the lower part of the site. The prehistoric vestiges



Map 6. Plan of Sabbang Loang illustrating the area where jar burials have reportedly been found, five of the six sectors recognised at the site, and the test pits within these five sectors

on the hilltop include four flaked stone artifacts, a stone barkcloth beater donated to Budianto Hakim by villagers, and scattered instances of isolated earthenware jars chanced upon by villagers (confirmed in several instances by visual inspection of sherds) when they dug rubbish and latrine pits. These earthen jars had been buried across a total area of two hectares, but were markedly concentrated in the southern, downhill sector, in the vicinity of Willems' excavation. Two hectares would represent a large settlement by Palaeometallic standards. However, occupation was probably light and dispersed across most of this area, specifically in the uphill sector where the burial jars are spaced well apart from each other.

The densest archaeological remains have been recovered at the far south of the site, west of the present-day Sabbang Loang Islamic cemetery, immediately overlooking the northern bank of the Rongkong river. Here Willems excavated a cluster of 11 massive burial jars. In the soil covering the jars he recovered iron spearheads, barkcloth beaters, mortars, and earthenware sherds. OXIS' excavations in the vicinity recovered fragments of several burial jars, 191 flaked stone artifacts, an iron spearhead, various other iron fragments, two polished stone artifacts resembling a pick and a prong, a phallus-shaped river boulder, and a large Indo-Pacific glass bead. A consistent series of radiocarbon dates places the main phase of this occupation in the early centuries AD (Table 2-7).[38]

Table 2-7. Radiocarbon Dates from Sabbang Loang

OXIS Sample Label	*Lab. No.*	*Date (BP)*	*Two-sigma calibration*
SBL.1-2.5.1 (square 2, unit 5)	OZD852	1750±50 BP	AD 160-AD 420
SBL.1-3.4.1 (square 3, unit 4)	OZD851	1780±50 BP	AD 130-AD 390
SBL.3-1.9.4 (square 1, unit 9)	OZD850	1910±70 BP	50 BC-AD 320
SBL.1-4.10.3 (square 4, unit 10)	ANU-11273	1990±200 BP	410 BC-AD 435
SBL.1-4.DB.1 (square 4, west wall)	ANU-11106	2020±140 BP	380 BC-AD 320
SBL.1-4.19.1 (square 4, unit 19)	OZE129	Modern	Modern

Squares 2 and 3 in sector 1 encountered at a shallow depth in the sediment a thin habitation stratum, marked by potsherds indistinguishable from those observed on the surface of the site. Remarkably, the dates from this layer (OZD851 and OZD852) fall with 95% confidence between the second and fourth centuries AD. These determinations were obtained from charcoal scraped off the sherds, which would have accreted during cooking, or some other use involving fire, and which thus relates to habitation activities. The underlying sterile clay was extensively probed, but yielded no evidence of a burial jar or other large object. Test pit 1 in the same sector produced a jumbled

[38] The single exception, a modern radiocarbon determination from the deepest excavated level, presumably represents contamination, namely modern charcoal that had dropped into the test pit.

assemblage of the same thin, earthenware sherds found in test pits 2 and 3, as well as thicker sherds from burial jars disturbed during the construction of the highway.

Across the highway, next to the *kecamatan* office (sector 3), our test pit cut through more than one metre of heavily disturbed habitation debris and jar-burial sherds. The test pit partly underlies a granodiorite boulder, which evidently protected the underlying sediment from contamination by modern materials. Despite the excavators' hopes, it was not an *in situ* cap over an intact or reconstructible burial jar. Habitation debris extended down to at least unit 9, from which were recovered a chert flake, fragments of schist brought onto the site, and sherds with charcoal accretions dating to between the first and third centuries AD (OZD850). The iron spearhead and spear shaft fragments from units 8 and 12 respectively can presumably be related to this early Palaeometallic occupation, as can a second chert flake from unit 14 at the base of the excavation. However, the Indo-Pacific glass bead from unit 14 may be a burial good, to judge from local reports of occasional glass beads and metalwares found in burial jars accidentally dislodged by the villagers during daily activities. Although thick sherds from burial jars were abundant in the remains excavated from the test pit, the disturbance associated with the burial of the jars (and subsequent disturbance during the construction of the *kecamatan* office) rules out much hope of separating habitation and burial materials. It should also be noted that to date all the professionally excavated burial jars have failed to yield traces of grave goods.

The last excavation placed a test pit between the *tomanurung* tablet at Sabbang Loang and the several large boulders lying around it (sector 1, test pit 4). From units 12 to 18, the basal portion of an earthenware burial jar, which rested on a granodiorite slab, was excavated in the northwestern corner. It seems probable that this burial jar had originally extended upwards as far as the base of the overlying boulders. The sediment in the jar, which was removed by the excavators as a single block, proved on close inspection to be sterile. The lack of human bone can be attributed to the strongly acidic sediments at the site, while the absence of any grave goods would suggest that a person of ordinary status had been buried within the jar, or that grave goods were commonly not interred with the corpse. Excavation revealed an eight gram sample of charcoal in the west wall at the equivalent level of unit 17 (ANU-11106). This charcoal had evidently originated from inside the jar and would thus relate to the burial event: it could be human remains cremated beyond the point of recognition, debris from ritual feasting, or an accidental inclusion. Its calibrated date, 380 BC to AD 320 (Table 2-7), is essentially identical to the calibrated date of 410 BC to AD 435 (ANU-11273) obtained from charcoal in unit 10 from a context commensurate with grave fill. Notwithstanding the agreement, the large error on both dates allows considerable latitude in their interpretation. Thus the date obtained from the grave fill could relate to contemporary with the burial of the jar, or it could be up to six centuries older. Nor is it clear whether the jar had been buried earlier than, or at the same time as, the habitation activities represented by the char that was scraped off potsherds to produce the OZD850-852 dates.

Beneath unit 2 in square 4, earthenware sherds were recovered only in merely small numbers; these could all be interpreted as spalls from the jar. One hundred and eighty five flaked-stone artifacts were also excavated, mainly between units 3 and 10 and from units 17 to 20. The simplest

interpretation of the flaked stone would be pre-ceramic debris disturbed by the burial of the jar and re-interred with the grave fill. However, two slightly corroded iron fragments in unit 4, an ironstone gravel (chemically analyzed by Len Hogan) in unit 19, and an iron-coated gravel in the same unit, indicate that the grave fill is of Palaeometallic antiquity. The radiocarbon date from the charcoal in unit 10 also points to the same conclusion. In addition to charcoal flecks in approximately half of the units, the evidence of hearth debris in the grave fill includes a piece of heat-shattered chert, several granodiorite gravels with traces of exposure to heat, and some lumps of baked earth. The assemblage resembles a diluted, dispersed representation of the materials found at the iron-smelting sites of Kampung Matano, with the stone having been flaked to produce sparks. However, other interpretations could be entertained, for instance, the preparation of ochre pigments from ironstone. Most of the flaked stone is locally available quartz (163 pieces) and granodiorite (2 pieces), but four apparently imported types of stone are included: chert (12 pieces), quartzite (4 pieces), chalcedony (3 pieces) and a flake of obsidian. Investigation of the potential source of the obsidian is currently underway.

Sectors 1 and 3 at Sabbang Loang were the site of a Palaeometallic occupation with probable traces of cooking food and smelting iron, and massive earthenware jars buried beneath much, but not all, of the habitation layer. Willems (1938) employed a Torajan ethnographic analogy to suggest that previously defleshed human remains had been interred secondarily in the jars, but, from the available evidence, other mortuary rites could have been practised, including the primary burial of corpses, the jars sliced open at their midriff to admit the body. Data on the chemical composition of the site's iron artifacts are not yet available. These could have been imported from distant sources, or even from overseas, even if the ironstone found at Sabbang Loang had been imported from the Limbung valley or from other sources of iron ore located along the River Rongkong. Nonetheless, the simplest interpretation of the evidence would posit transport of Rongkong iron ore to the site for smelting and forging. Exogenous materials at Sabbang Loang include obsidian and glass, the origins of which could lie hundreds or thousands of kilometres distant, and more locally available imports such as quartzite and chert. The extensive, two hectare area of the Palaeometallic settlement suggests the strategic exploitation of significant local economic advantages. The most obvious advantage is the site's position where the Rongkong meets the coastal plain, at a time when the coastline may have been closer than it is today.

When the three occupation phases at Sabbang Loang are considered in the light of Pinanto's long period of occupation, and habitation at Baebunta until the present, a strong case emerges for at least two millennia of continuous occupation in the Baebunta area at sites recorded in Lemolang oral traditions. The isolated status of the Lemolang language is compatible with a scenario in which early colonists secured this economically strategic location, subsequently maintaining social and cultural reproduction over at least two thousand years, in the face of pressure from language groups arriving later As previously noted, the archaeological data are consistent with the interpretation of the Lemolang 'genealogy of places' as a memory of a history of site abandonments.[39] However,

[39] The earlier suggestion that the sacred boulder at Sabbang Loang may have covered the *c*1000 year old burial of an early Baebunta aristocrat can thus be ruled out.

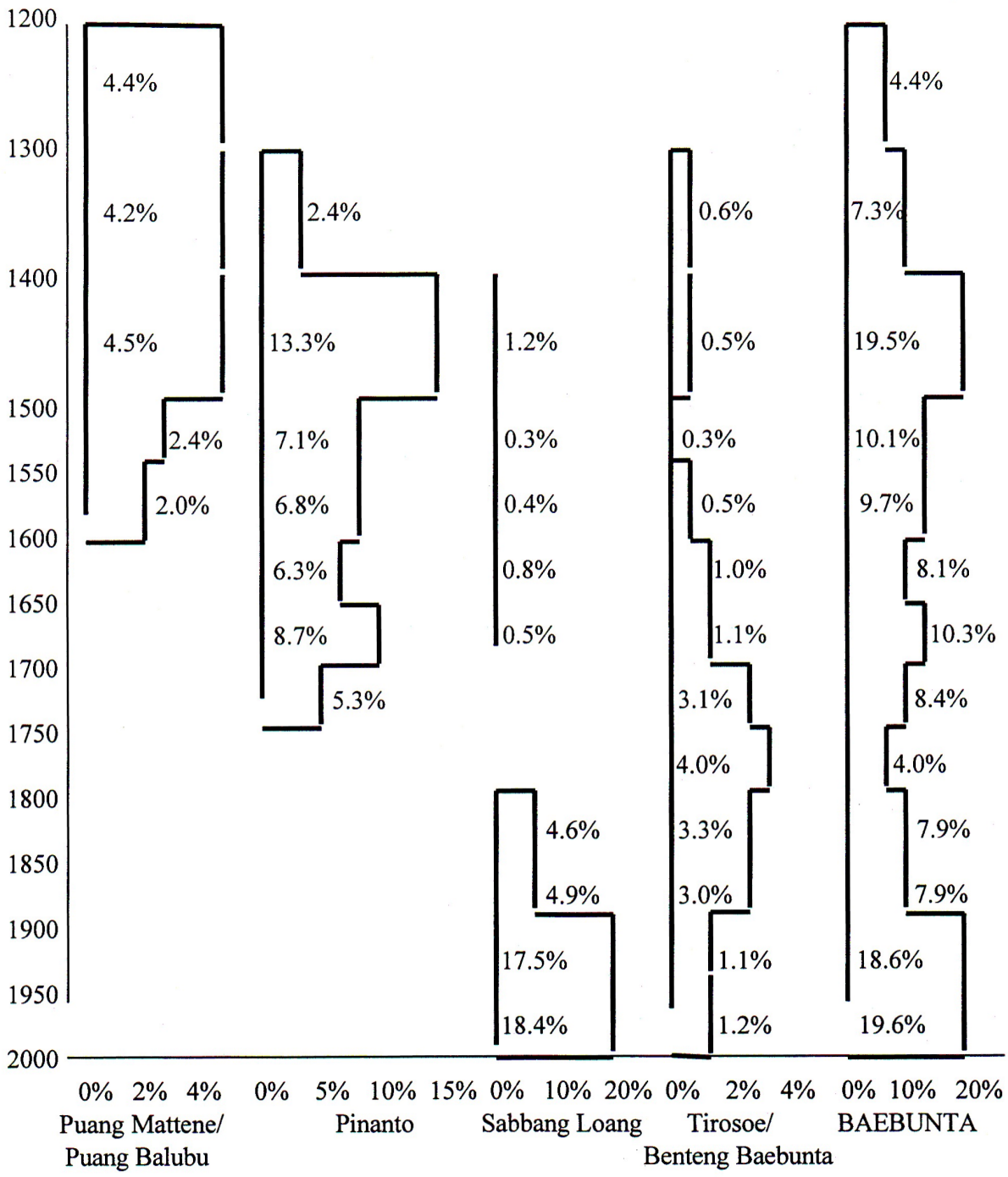


Figure 2-4. Standardized chronological histograms of the *keramik* from the Baebunta sites

Sabbang Loang and Pinanto appear to mark a sequence of settlement initiations in the early and late Palaeometallic respectively, while Tinoe could well represent a Neolithic occupation that preceded Sabbang Loang. Conflation of an old tradition of ancient settlements with a later tradition of settlement abandonment would not be surprising given that Sabbang Loang has evidently been occupied on three separate occasions, and that oral tradition is an unreliable repository for a potentially complex site history.[40] Accordingly, the locally remembered Tinoe, Sabbang Loang, Pinanto, Tirosoe and Baebunta sequence would appear to correspond to more than two millennia of continuous occupation by Lemolang speakers of the vicinity of Baebunta.

In summary, a local community of Lemolang speakers trading exotic luxuries in exchange for iron and other produce from the mountainous hinterland would appear to have been established at Baebunta well before the inception of the historical polity, the origins of which would appear to have been contemporary with the origins of the Bugis kingdom of Luwu in Malangke about 1300 (see below). The working of iron brought down the Rongkong river from sources near Limbung, possibly in the form of prills, appears to have been a craft specialization within pre-Islamic Baebunta. Other hinterland produce was probably collected by the Baebunta traders for onward distribution, as reflected in the settlement pattern on raised ground where the Rongkong and Baebunta rivers meet the coastal plain. This economic activity has continued through to the present. The standardized chronological histogram of the site complex (Figure 2-4) suggests a fifteenth century peak and continued prominence until *c.*1700, prior to a twentieth century resurgence that relates to the construction of the Palopo to Malili highway that runs through the major sites.

During late pre-Islamic times, Baebunta had at least three graveyards in use. The burial ground on the Pinanto *puncak* may have been reserved for iron smiths, the Puang Mattene cemetery was evidently used by the general population at Pinanto, while the Puang Balubu cemetery seems to have been associated with an aristocratic lineage descended from the founding ruler of Baebunta. Demonstration of significant, concurrent habitation at three sites (Sabbang Loang, Benteng Baebunta and Pinanto) is also relevant to the issue of the size of the pre-Islamic Baebunta polity. A moderate estimate of 2,000 burials of adults at Puang Mattene would correspond to a maximum population estimate of about 500 inhabitants, by analogy with the argument developed below for the Malangke burial grounds. Hence the estimated maximum population size of 750 persons at Pinanto should be scaled down to a community of at most 500 residents during the fifteenth and sixteenth centuries, including a number of specialist ironworkers. Unless the Baebunta settlement pattern was strongly nucleated, over half of the population would have dwelt outside Pinanto, for instance at Sabbang Loang and Benteng Baebunta, as well as at settlements too small to be remembered in local oral traditions. Overall, the results of OXIS suggest that the Baebunta polity contained a population of approximately 1,000 inhabitants during the fifteenth and sixteenth centuries.

[40] The abandonment of Sabbang Loang on two occasions could reflect its vulnerability to attack (the site's advantages as a traffic node would present problems of defence) or temporary interruptions to trade along the Rongkong valley, such as periods of hostility between Rongkong and Baebunta.

2.5 Malangke

Introduction

Kecamatan Malangke has a high annual rainfall of 2,500 to 3,000 mm, evenly distributed with at least seven to nine wet months (Bulbeck 1992:Figure 1-2). A complex system of debouching rivers and a low-lying topography (with spot heights always five metres or less above median sea-level) further contribute to swampy conditions across the area researched by OXIS. All the studied sites lie within or near a 12,000 hectare zone of mangrove forest which, in the late 1980s, was the largest in Sulawesi (Whitten *et al*. 1987:125, 190).[41]

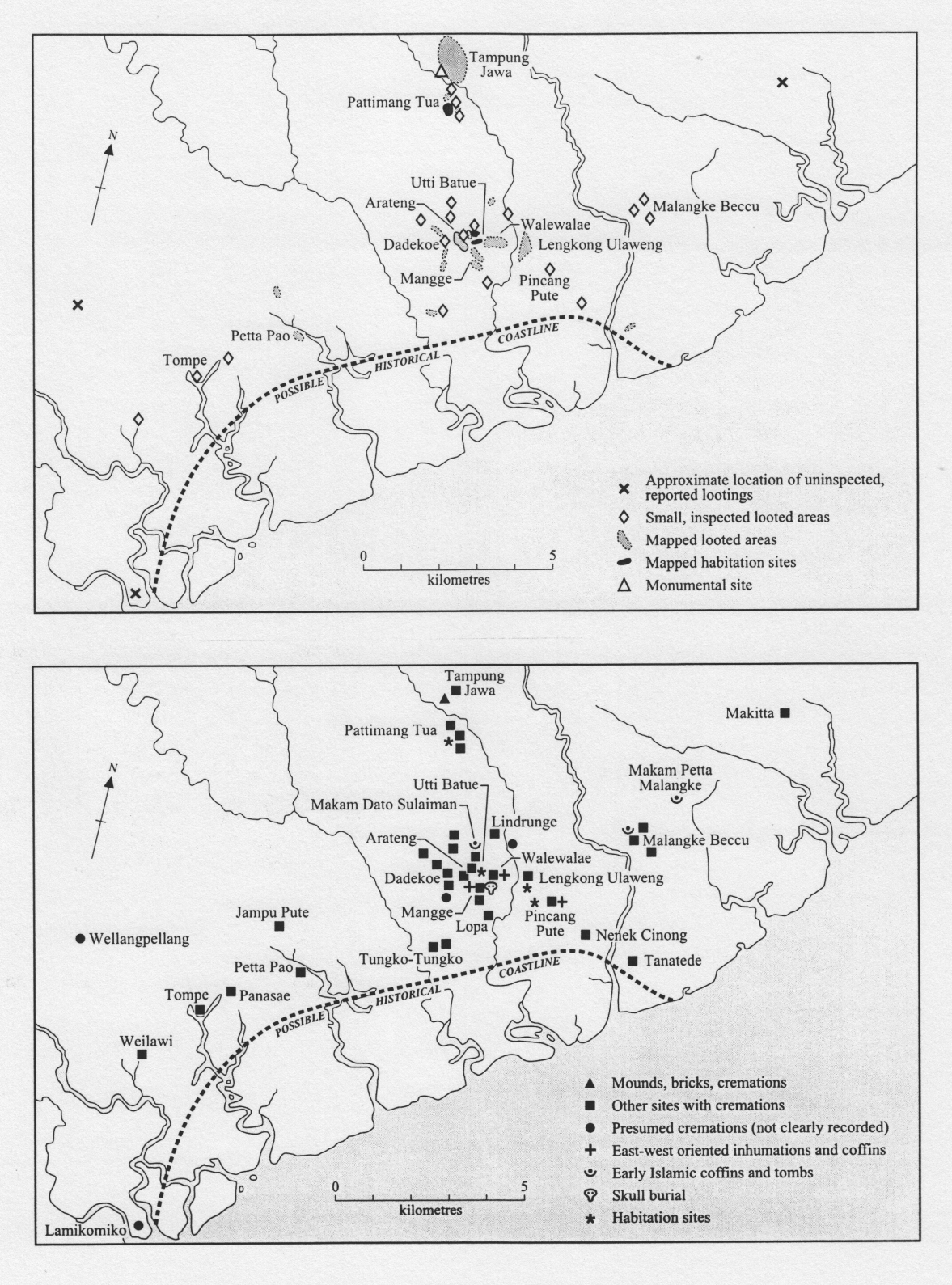
The Malangke coastal swamps are one of the primary sources of sago in South Sulawesi. One stand between Wailawi and Tompe exported around 760 tons of wet sago (approximately 70% of Malangke's sago exports) to Palopo in 1984 (Osazawa 1986). To the immediate northeast, smaller sago stands are common, but much of the land shown as mangrove forest on even the most recent maps has now been converted to mandarin orchards. Currently, cacao increasingly rivals mandarins as the favoured cash crop. These dramatic changes are the result of a virtual epidemic of spontaneous transmigrant Bugis converting scrub and forest to orchards for cash cropping. These transmigrants represent a very recent overlay on the traditional population, which appears to be Bugis to the core.

From the above observations, we would expect the landscape of Malangke during the late pre-Islamic period to have been a landscape of dense mangrove swamps penetrated only by meandering estuarine waterways. Sago should have been the main subsistence crop, supplemented by fruits and nuts from other trees able to tolerate the humidity and brackish groundwater. The phytoliths (silica skeletons of the plant cells) from sediment samples should be dominated by mangrove species and sago identifications, with a lower representation of other tropical tree crops. Fish should represent a substantial portion of the diet. In conditions offering good preservation of organic remains, mangrove timber, nut husks and fish bones may be expected. Dammar, imported from the Rongkong highlands, might also be expected.

Further expectations follow from our hypotheses regarding Luwu's early history (Section 1.8). The earliest *keramik* identifications of any significant number should date to around 1300. There should be many fourteenth century examples, a peak corresponding to the fifteenth century, and a continually strong representation of sixteenth century wares, followed by a marked decline in seventeenth century and later wares. Much of the *keramik* should be of high quality. Other material cultural remains should also reflect the existence of a prosperous, sophisticated elite. Archaeological site surveys should identify a settlement pattern with a large central place, corresponding to the palace centre, surrounded by smaller settlements. The entire population in Luwu's core could equal or exceed ten thousand inhabitants.

The palace centre should be large and internally diverse in terms of economic specialization. A random sampling procedure for its excavation should find evidence for working and, possibly, smelting iron in at least one of the site's sectors. Other sectors of the site should recover evidence of

[41] In the 1940s the mangrove forest extended nearly as far inland as Baebunta (Anon. 1945).



Map 7. Sites excavated by OXIS in Malangke

other specialist crafts, for example, the production of earthenware pots. Fragments of iron tools and weapons should be relatively common in excavated deposits where conditions allow the preservation of iron. Evidence of imported foods (e.g. rice) should be restricted to an elite sector, which should be similarly favoured in terms of the quality of its material culture.

Findings and interpretation

Figure 2-5 shows the results of the OXIS survey of *kecamatan* Malangke. Thirty nine discrete looted places, corresponding to pre-Islamic burial grounds, were plotted, and three further looted sites were reported but not inspected.[42] Not only is this a major concentration of ancient burial grounds, but also the larger sites reportedly had up to a thousand men employed to loot them at the time of peak exploitation. The extent of two large habitation sites, at Utti Batue and Pattimang Tua, were revealed through sub-surface survey; smaller habitation sites were often identified by looters' reports that these places yielded only *sempe* or sherdage rather than complete vessels.

In the pre-Islamic period, the local coastline may have been a small bay, based on the lack of reports of sites southeast of the dotted line on Map 7 and the deposition of 70 cm or more of sediments on Utti Batue since its abandonment. If so, the settlement pattern would have consisted of one coastally oriented, major cluster of sites around Utti Batue, and a second cluster of major sites a few kilometres inland at Pattimang Tua/Tampung Jawa. The Utti Batue cluster would have sat in the approximate centre of a continuous swathe of coastal sites which are generally smaller with distance from Utti Batue, whereas Pattimang Tua/Tampung Jawa apparently lacks a surrounding constellation of smaller sites. The coastal sites, at least, exhibit a pattern of increasing density and areal extent towards the centre (as would be expected from Central Place Theory) indicating the predominantly coastal orientation of the Malangke pre-Islamic settlement system.

OXIS' records of the *keramik* from the various sites consist of complete and semi-complete pieces stored in the villagers' possession, sherds collected from the surface of the sites, and sherds excavated at the sites. Table A-5 in Appendix A amalgamates the available identifications from a series of surveys and excavations in 1995, 1997, 1998 and 1999. The 120 recorded pieces in villagers' possession, 74 pieces identified from excavations, 434 pieces recorded from a single dumping event or refuse pit at Utti Batue, and 162 pieces identified from dispersed surface collections, add up to a large, reliable sample. The only potential bias is the large representation of Utti Batue pieces, which account for about 60% of the entire Malangke sample. Therefore, the Malangke total will be considered under the categories 'Utti Batue' and 'other Malangke'.

Only one sherd, a martavan base collected from Tampung Jawa, has been dated to the twelfth to thirteenth centuries, and even this identification is questionable.[43] Small numbers of wares dating to

[42] Site names and numbers correspond to present-day land divisions and may bear little relationship with the pre-Islamic naming system. For instance, just one or a few names may have referred to the concentration of sites now represented under eight names (Pattimang Tua 8, Lindrunge, Pattimang Baru 1, Utti Batue, Arateng, Dadekoe, Wale'walae and Mangnge).

[43] The apparent contradiction with reports of numerous Song celadons and monochromes from Malangke (Caldwell 1993:8) is explained by the fact that in the local classification system all celadons are automatically assigned to the Song Dynasty.

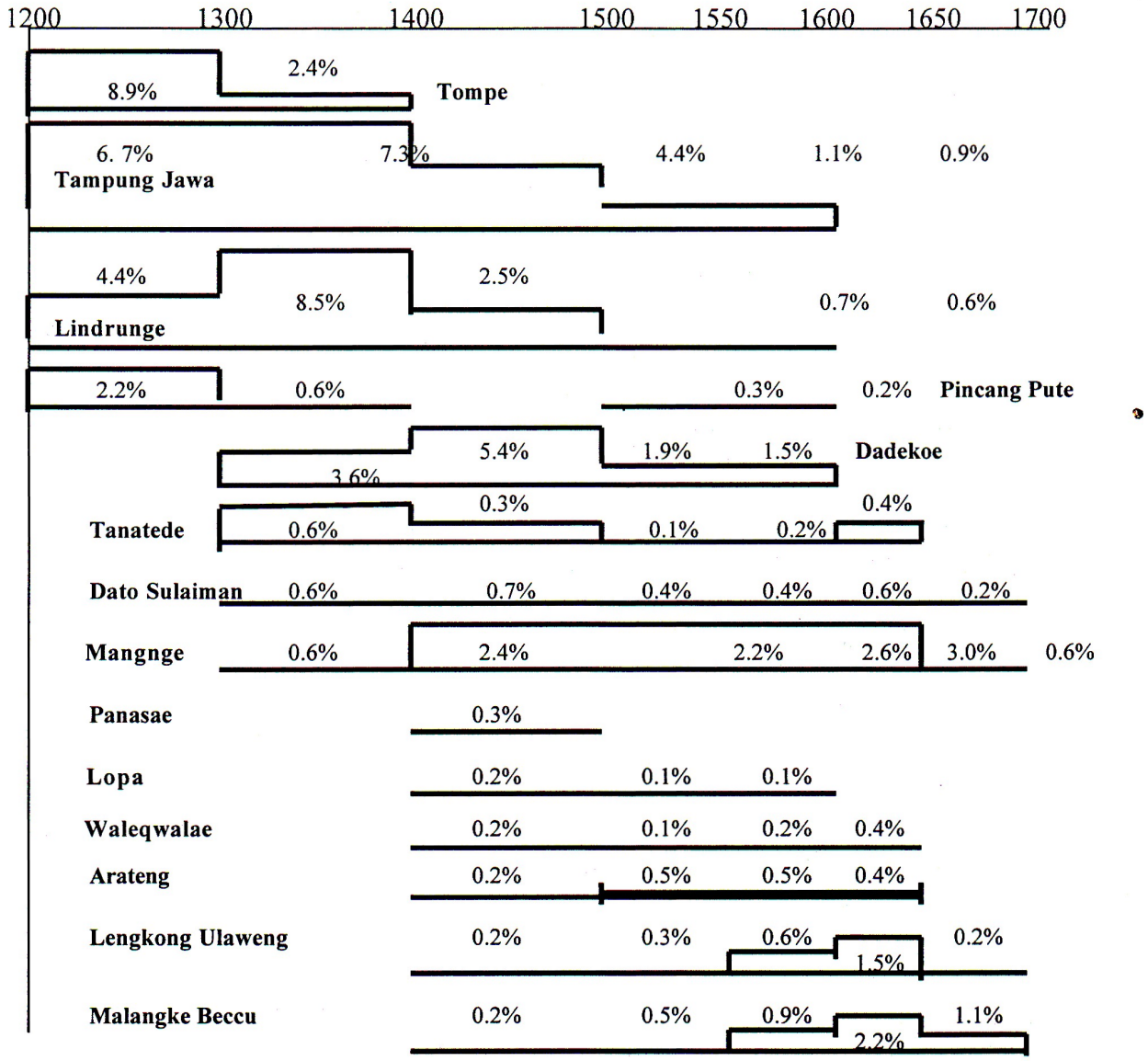


Figure 2-5. Standardized chronological histograms of the *keramik* from looted Malangke sites

the thirteenth to fourteenth centuries were recorded both in villagers' possession and from surface sherdage. This pattern would extend to excavated pieces as well, if Jizhou jars should be dated to these centuries, rather than to the fourteenth to fifteenth century, as we have done here (following Bulbeck 1996-97:1059). Hence the available evidence strongly confirms the expectation that the earliest *keramik* were imported to Malangke *c.*1300. The tiny burial ground of Tompe is particularly interesting, as it evidently fell into decline during the fourteenth century (Figure 2-5). Its location is marginal with respect to the Malangke site complex; it perhaps represents an independent, coastal trading centre which withered with the centralisation of local commerce in Malangke.

Keramik imports would appear to have grown apace from 1300: there are numerous fourteenth to fifteenth and fifteenth century identifications, including rare classes such as Vietnamese black-and-white and early Vietnamese blue-and-white. A fifteenth century emphasis is suggested by the high frequencies of Ming celadons and whitewares, and Vietnamese and Sawankhalok pieces. The ratio of 130 Vietnamese blue-and-white to 282 Ming blue-and-white identifications in Malangke (Appendix: Table A-5) contrasts markedly with the ratio of 88 Vietnamese blue-and-white to 860 Ming blue-and-white in Macassar (Bulbeck 1992:608), the power and wealth of which underwent a meteoric rise in the sixteenth century. When Malangke's standardized chronological histogram is considered (Figure 2-6), we see that at sites other than Utti Batue the fourteenth and fifteenth centuries are equally strongly represented, proportionally speaking, and a sixteenth century dip is clearly evident. The addition of Utti Batue, which is essentially a fifteenth to sixteenth century site (Figure 2-6), produces a fifteenth century increase in Malangke's *keramik* profile compared to the fourteenth century, and expansion continues into the sixteenth century.

Keramik identifications at Malangke remain strong into the early seventeenth century, as represented by classes such as Wanli, Swatow, and Transitional blue-and-white (Appendix: Table A-5). However, there is no more than a single Qing Dynasty identification, which, being nineteenth century, refers to the recent phase of light, dispersed occupation. Clearly, at the start of the seventeenth century there was still a large population in the Malangke survey area, and by the end of the century the place was virtually deserted. The demise of Malangke as a palace centre can be dated to between *c.*1610 and *c.*1630 from the evidence discussed in Caldwell and Druce (1998). Malangke Beccu evidently harboured an elite occupation until the middle or even the late seventeenth century, as reflected in the site's standardized chronological histogram (Figure 2-5), the finding of a fine Islamic coffin preserved in its waterlogged sediments, and the mysterious earthen wall at Massalekoe to the immediate north of Malangke Beccu (see below). The abandonment of Malangke was thus a process that occurred over approximately half a century, suggesting it was more an adjustment to changing socio-economic conditions than a sudden response to a disaster or emergency.

Many of the identified pieces are high-quality wares, for instance the seven Jizhou iron-painted martavans,[44] the Vietnamese and Ming blue-and-white *balubu* (large jar) and the Kraakporselein from Malangke Beccu (classified in Table A-5 in the Appendix as Wanli). A single hole at Pincang

[44] Only seven examples are known from the entire Macassar and Soppeng surveys (Bulbeck 1992:594).

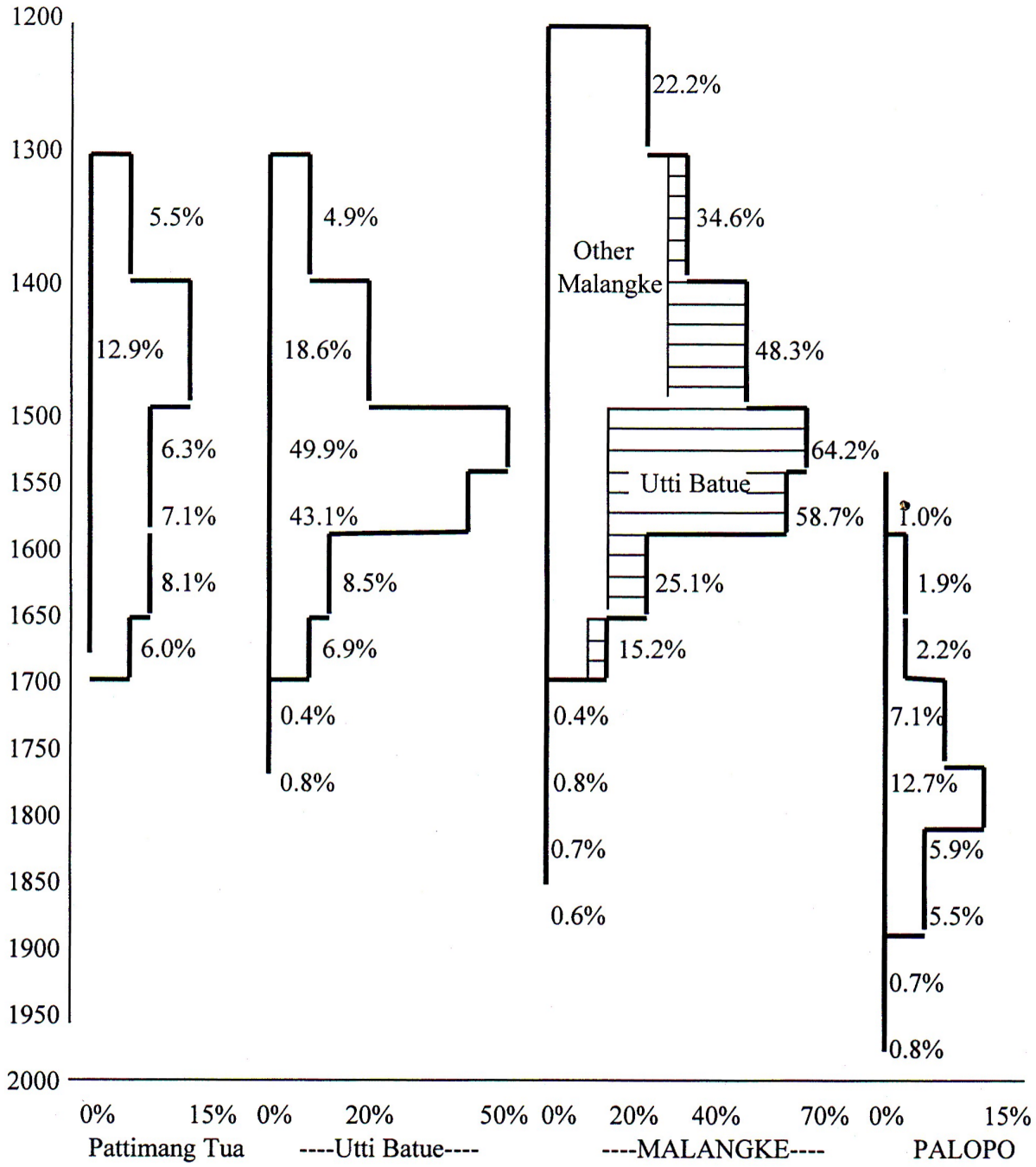


Figure 2-6. Standardized chronological histograms of the *keramik* from Malangke habitation sites, Malangke as a whole, and Palopo

Pute reportedly yielded 40 pieces, presumably accompanying the burial of a wealthy aristocrat. Gold was reportedly often looted, sometimes in great quantities, and all since melted down for sale. The few bronze bracelets, glass vases and glass beads shown to the survey team represent the tip of the iceberg of the extraordinary wealth of the pre-Islamic Malangke inhabitants, or at least that of its elite. Looters reportedly came upon a *kacapi* (mandolin) at Mangnge, evidence of the presence of musicians at Luwu's royal court. Another reported find, from the southerly habitation area in Utti Batue, was a boulder engraved as a board for playing *macang*, a traditional Bugis game played with counters. A north-south oriented Islamic coffin from Malangke Beccu, finely carved in the Banten decorative style, and the Javanese-style tomb of Luwu's second sultan (Van Lijf 1953) demonstrate the continued presence in Malangke of a prosperous, sophisticated elite, until the shift of the palace centre to Benteng Tompottikka near Palopo.

One local informant reported that the looted ceramics almost invariably contained or accompanied burnt fragments of bone, which almost certainly represent the remains of human cremation. The report of these burnt fragments from Tompe suggests that as early as the thirteenth century the Luwu Bugis cremated their dead and interred the remains. However, three east-west oriented *duni* (boat-shaped coffins) were reportedly found stacked on top of each other at Mangnge; a fourth was reportedly found at Wale'walae, and a fifth at Arateng. In the Arateng *duni*, long bones in a poor state of preservation were observed aligned with the coffin border. A sample of wood from the Arateng coffin dates to 450±60 BP (ANU-11109), which calibrates to AD 1420-1490 at one sigma, and AD 1330-1630 at two sigma. That is to say that the chances that the coffin dates to the fifteenth century are better than 50%. Inhumed east-west burial, occasionally in *duni*, was the common mortuary tradition in immediately pre-Islamic times among the Makasars and the Bajau sea-nomads (Bulbeck 1996-97:1032-4). The report of 92 ceramic vessels in the Mangnge *duni* points to the elite social position of its occupant. Moreover, a human skull was reportedly found in association with the Arateng *kacapi*. Whether or not these variant burial practices reflect the presence of Makasars or Bajau, or members of other non-Bugis ethnic groups, they contribute to the picture of a wealthy cosmopolitan society at ancient Malangke, offering attractive opportunities for immigrants from many ethnic groups. [45]

These immigrants almost certainly included Javanese, who may have been responsible for much of the prosperity and cultural efflorescence at early Malangke. Evidence of the important role Javanese immigrants played in the economy and the cultural life of the pre-Islamic kingdom is found at Tampung Jawa (B. 'foreigners'/Javanese graveyard') and, in particular, the unique monumental complex to its west, where lie two earthen mounds approximately 30 metres in diameter and six metres high, their bases about 30 metres distant from each other. The mounds have

[45] Some preliminary observations are available on the organic remains excavated from the anaerobic, waterlogged sediments at Utti Batue. Traces of dammar were noted during the original survey (Bulbeck and Prasetyo 1997) and *Canarium* (*kemiri*) nut husks were frequently noted during the site's excavation. More recently Malcolm Lillie (pers. comm.) has identified certain cigar-shaped objects as the burnt remains of an unknown fruit. The abundant wood in the excavated sediments has been identified as mangrove timber, much of it of high quality. Fish bones and turtle scutes have also been extracted from the faunal remains which otherwise predominantly reflect domesticated taxa, notably bovids (cattle or water buffalo). Analysis of the phytoliths from the site is incomplete, so predictions regarding the consumption of sago and rice are untested.

been systematically looted and large numbers of Majapahit-Javanese-style gold upper-arm protectors, rings, bracelets, earrings, and petal-shaped foil (probably eyelid covers) were reportedly recovered. No death masks were recovered. Other reported finds included iron kris and *parang* (bush knives), pieces of bronze, and an extraordinary variety of *keramik*. The frequent discovery of cremated bone and charcoal leaves small reason to doubt these mounds were reserved for the burial of Majapahit Javanese.[46]

Even more remarkably, the looters reported finding bricks across a rectangular area measuring approximately 70 metres by 30 metres, immediately southeast of the mounds.[47] The OXIS team bored twice into this area and hit brick fragments on one occasion, suggesting several small brick platforms rather than one large platform. This would agree with Drs Gunadi's information that a 70 by 30 metre area could be too large for a single Majapahit structure. Gunadi suggested that the buildings may have been *vihara*, places for the instruction and practice of Hindu-Buddhism, rather than *candi*. The available information suggests up to several layers of bricks, lying at a depth of between *c.*40 cm and *c.*1.2 metres beneath the ground, with antiques sometimes found lying on the bricked surface, and sometimes as deep as 50 cm beneath the bricks. Excavation of this major site would need careful, systematic planning and was not feasible within the few days available for fieldwork at the time of the site's inspection. However, we can confidently say that this is the only known example in South Sulawesi of a 'classical' Javanese ceremonial site, and that on current evidence its use can be dated to approximately the fourteenth century (Figure 2-5).

The OXIS hypotheses for Malangke also included expectations of iron remains. *Parang* (bush knives) and kris were reportedly often found during the looting of burial sites. The 1997 survey of Utti Batue produced a gripped knife, a *parang* blade, and a curved tang which could have conceivably once have been part of a kris. Iron fragments were not recovered from the Utti Batue or Dadekoe 2 excavations, but were recovered from well over half of the Pattimang Tua test pits. These include a gripped object which could conceivably have been an early, simple Sulawesi-style kris, and three adjoining fragments from a *parang* blade. Three of the eleven excavated squares yielded iron slag and other ironworking debris, and a fourth test pit produced a possible tuyère iron tube. The *circa* 30% encounter rate of ironworking evidence in the randomly sampled Pattimang Tua test pits suggests this activity was a major craft specialization at the site, with as much as 1.6 hectares dedicated to ironworking. Overall, we have undeniable indications that the pre-Islamic Malangke inhabitants had ready access to iron tools and weapons, and that Pattimang Tua was an important centre for forging iron.

A pattern of spectacular growth and even more rapid decline in Malangke's population can be estimated from the extent of the looted burial grounds. From this observation, an area of 0.1 of a hectare (33 by 33 metres) would admit 11 x 11 =121 burials; 0.2 of a hectare (45 by 45 metres)

[46] The Tampung Jawa mounds evoke comparison with the Karang Karangan and Tambu-Tambu mounds, mentioned previously, but contrast greatly in terms of size and reported artifactual contents.

[47] Measurable brick fragments varied between 15 and 17 cm in breadth and 3.5 to 4 cm in thickness, similar in size to Macassar's seventeenth century fortress bricks, especially those from Tallo and Sanrabone (Bulbeck 1992:738-9). However, the predominance of thirteenth to fourteenth century sherdage collected from the same area as the bricks (Figure 2-5) suggests that the Tampung Jawa bricks are much earlier.

would admit 15 x 15 = 225 burials; one hectare (100 by 100 metres) would admit 1,090 burials, etc. If we assume that each hole corresponds to a single adult burial, each hole would correspond to two individuals in the population when the buried person was an adult, under the conservative assumption of a living population with equal numbers of adults and children (cf. Siven 1991:115). If the average life span after reaching adulthood was 40 to 45 years (cf. Lallo *et al.* 1980:Table 4), or 25 years as an adult, four burials would represent one adult living for a century, or two persons (including the corresponding child) over the same period. By limiting the length of use of any burial ground to the smallest number of centuries necessary to account for its looted contents, we can estimate the population it represents. For example, Tompe (0.15 hectares) may be entirely fourteenth century, so the estimated 167 burials in it would correspond to a fourteenth century population of 167/4 x 2, or approximately 83 people. When a cemetery's use spanned two (or more) centuries, its area can be divided into two (or more) equally sized cemetery areas that relate to each of the represented centuries; that is, the total number of represented individuals is divided by the number of centuries (Table 2-8).

The results of these calculations are summarized in Tables 2-8 and 2-9. They show that the population in the survey area stood at approximately 2,700 in the fourteenth century before increasing sharply to nearly 10,000 in the fifteenth century, and climbing to nearly 15,000 during the sixteenth century. The 900 people estimated for the seventeenth century represent a large population at the beginning of the century, and a tiny dispersed population after the shift of the palace centre to Palopo between *c.*1610 and *c.*1630. Although the present data suggest that the population of Malangke grew by about 50% in absolute terms between the fifteenth and sixteenth centuries, in relative terms Malangke's population growth may have lagged behind the growth of other population centres on the southern peninsula. For example, the population of Macassar and its hinterland may have nearly doubled in the sixteenth centuries, from an estimated 85,000 to an estimated 155,000 individuals (Bulbeck 1992:462).

From the surface survey, we know that Kampung Pattimang Tua covered about 5.3 hectares, while from an auger survey we can calculate the inhabited extent of Utti Batue to have been about 4 hectares (see Figure 2-6). The 4 hectares in Utti Batue would correspond to a maximum population of 1,400 people, while the 5.3 hectares in Pattimang Tua would produce a maximum estimate of 1,850 inhabitants (Table 2-8). The latter figure very closely matches the figure of 2,000 inhabitants estimated on the basis of the Pattimang Tua and adjacent Tampung Jawa burial grounds (Table 2-9). It is also clear from the profusion of pre-Islamic burial grounds clustered around Utti Batue that further, smaller settlements within the immediate vicinity used the same burial grounds. Hence the population size calculated from the Utti Batue habitation zone is probably an underestimate of the population within the immediate vicinity, which could have stood at 5,000. Overall, the estimates from settlement areas confirm the broad reliability of the population figures given in Table 2-9.

Table 2-8. Estimates of population size as represented by Malangke looted burial grounds

Pre-Islamic cemetery	*Area (hectares)*	*Estimated number of burials*	*Minimum use period*	*Burials per century*	*Population each century*
Tompe	0.15	167	14th c.	167 (14th c.)	83 (14th c.)
Jampu Pute	0.5	529	14th c.	529 (14th c.)	265 (14th c.)
Weilawi	0.15	167	14th–15th c.	83 (14th c.)	42 (14th c.)
″ ″	″	″	″	83 (15th c.)	42 (15th c.)
Tampung Jawa	9.6	10,609	14th–16th c.	3,536 (14th c.)	1,768 (14th c.)
″ ″	″	″	″	3,536 (15th c.)	1,768 (15th c.)
″ ″	″	″	″	3,536 (16th c.)	1,768 (16th c.)
Lindrunge	1.5	1,600	14th–16th c.	533 (14th c.)	267 (14th c.)
″ ″	″	″	″	533 (15th c.)	267 (15th c.)
″ ″	″	″	″	533 (16th c.)	267 (16th c.)
Pincang Pute	0.15	167	14th, 16th c.	83 (14th c.)	42 (14th c.)
″ ″	″	″	″	83 (16th c.)	42 (16th c.)
Pattimang Tua 1-7	1.6	1,764	14th–17th c.	441 (14th c.)	220 (14th c.)
″ ″	″	″	″	441 (15th c.)	220 (15th c.)
″ ″	″	″	″	441 (16th c.)	220 (16th c.)
″ ″	″	″	″	441 (17th c.)	220 (17th c.)
Panasae	0.25	256	15th c.	256 (15th c.)	128 (15th c.)
Petta Pao	4.0	4,356	15th–16th c.	2,178 (15th c.)	1,089 (15th c.)
″ ″	″	″	″	2,178 (16th c.)	1,089 (16th c.)
Dadekoe 1-5	2.0	2,209	15th–16th c.	1,104 (15th c.)	552 (15th c.)
″ ″	″	″	″	1,104 (16th c.)	552 (16th c.)
Tungko-Tungko/	1.4	1,521	15th–16th c.	760 (15th c.)	380 (15th c.)
Labellang	″	″	″	760 (16th c.)	380 (16th c.)
Tanetede	0.5	529	15th–16th c.	264 (15th c.)	132 (15th c.)
″ ″	″	″	″	264 (16th c.)	132 (16th c.)
Mangnge 1 + 2	5.0	5,476	15th–16th c.	2,738 (15th c.)	1,369 (15th c.)
″ ″	″	″	″	2,738 (16th c.)	1,369 (16th c.)
Arateng/	2.7	2,916	15th–16th c.	1,458 (15th c.)	729 (15th c.)
Pattimang Tua 8	″	″	″	1,458 (16th c.)	729 (16th c.)
Wale'walae	9.4	10,404	15th–16th c.	5,202 (15th c.)	2,601 (15th c.)
″ ″	″	″	″	5,202 (16th c.)	2,601 (16th c.)
Makam Dato	0.3	324	15th–16th c.	162 (15th c.)	81 (15th c.)
Sulaiman	″	″	″	162 (16th c.)	81 (16th c.)
Lopa	0.4	441	15th, 17th c.	220 (15th c.)	110 (15th c.)
″ ″	″	″	″	220 (17th c.)	110 (17th c.)
Nenek Cinong	0.1	121	16th c.	121 (16th c.)	60 (16th c.)
Lengkong Ulaweng	8.5	9,409	16th c	9,409 (16th c.)	4,705 (16th c.)
Malangke Beccu	2.0	2,209	16th–17th c.	1,104 (16th c.)	552 (16th c.)
1-3	″	″	″	1,104 (17th c.)	552 (17th c.)

Table 2-9 also indicates a relocation of the population over time. The highly centralized nucleus of inhabitants in Tampung Jawa (Pattimang Tua) seems to have remained relatively constant from the fourteenth to the sixteenth centuries, before being survived by a remnant settlement in the seventeenth century. The Utti Batue cluster (which includes Lindrunge, Arateng, Mangnge, Wale'walae, and Makam Dato Sulaiman) seems to have become prominent during the fifteenth century, when over 50% of Malangke's population may have been concentrated there. Utti Batue seems to have remained the largest centre of population during the sixteenth century, but population growth to the east, especially at Lengkong Ulaweng and Malangke Beccu, may have begun to erode Utti Batue's earlier pre-eminence. In addition, the apparent abandonment of the entirely fourteenth to fifteenth century settlements at Weilawi, Tompe, Panasae and Jampung Pute, at the far west of the survey area, was probably linked to the rise to prominence of Petta Pao, in the western part of the survey area, in the fifteenth and sixteenth centuries. This would suggest a transition from small coastal communities to a centralized local authority at Petta Pao during the fifteenth century, coinciding temporally with the even greater centralization of authority at Utti Batue.

Table 2-9. Estimated population (rounded off) in Malangke's site divisions

Site group	*14th century*	*15th century*	*16th century*	*17th century*
Tampung Jawa/Pattimang Tua	2,000	2,000	2,000	220
Utti Batue cluster	270	5,050	5,050	0
Peripheral sites	430	2,430	7,500	660
TOTAL (to nearest hundred)	**2,700**	**9,500**	**14,500**	**900**

The results can be checked against estimates of population size based on the surveyed area of Malangke's two main settlements. By way of background, the population densities in Southeast Asia's seventeenth century cities (calculated from Reid 1993:Tables 7 and 8) are high by the standards of the world's cities, and often lie close to Fletcher's (1995:Figure 4-3) band showing the maximum sustainable population density in an urban settlement of a given population size. Hence, Fletcher's band may be used to derive realistic estimates of the maximum sustainable population which the Malangke settlements would have contained (Bulbeck in press). From the surface survey, we know that Kampung Pattimang Tua covered about 5.3 hectares, while from an auger survey we can calculate the inhabited extent of Utti Batue to have been about 4 hectares (see Figure 2-6). The 4 hectares in Utti Batue would correspond to a maximum population of 1,400 people, while the 5.3 hectares in Pattimang Tua would produce a maximum estimate of 1,850 inhabitants (Bulbeck in press). The latter figure very closely matches the figure of 2,000 inhabitants estimated on the basis of the Pattimang Tua and adjacent Tampung Jawa burial grounds (Table 2-9). It is also clear from the profusion of pre-Islamic burial grounds clustered around Utti Batue that further, small settlements within the immediate vicinity used the same burial grounds. Hence the population size calculated from the Utti Batue habitation zone is probably an underestimate of the population

within the immediate vicinity, which could have stood at 5,000. Overall, the estimates from settlement areas confirm the broad reliability of the figures given in Table 2-9.

In summary, Bugis settlement at Pattimang and Malangke began in the late thirteenth century.[48] In the fourteenth century there appears to have been a number of small settlements along the coastal fringe from Weilawi in the west to Tanatede in the east, with an early 'urban' centre developing at Pattimang Tua, and, slightly later, another such centre at Utti Batue. The evident existence of a settlement of Majapahit Javanese adjacent to Pattimang Tua may explain why an apparently small polity, with possibly no more than 3,000 residents in its heartland, earned a mention in the *Desawarnana* (Nagarakrtagama), written in 1365. It strongly confirms Bulbeck's (1992:480-1) suggestion that Luwu gained much of its early ascendancy through its special relationship with the trading ports along Majapahit Java's north coast. Evidence of ironworking and a possible kris at Pattimang Tua confirm the expectation that high-quality iron was central to Luwu's economy from the outset.

The astonishing wealth and prosperity of the Malangke region in the fifteenth and sixteenth centuries, reflected by the quantity, variety and quality of the recovered sherdage, must account for a large part of Luwu's reputation as the oldest and most prestigious of the Bugis kingdoms, a claim which can be traced back in European sources to the mid-eighteenth century (Blok 1759:3). Instead of a 'golden age' lasting from the tenth to fourteenth centuries as claimed by Van Braam Morris, Luwu's period of power and prosperity would appear from archaeological (as well as textual) sources to belong to the fifteenth and sixteenth centuries. The population of Malangke increased dramatically between the fourteenth and the sixteenth centuries, at least in part as a result of the opportunities it offered to immigrants of non-Bugis as well as Bugis backgrounds. By the fifteenth century, a second major population focus, with a more coastal orientation, grew up at Utti Batue. This cosmopolitan centre rapidly outgrew the older centre at Pattimang Tua. Luwu's loss of control of the Cenrana river in the sixteenth century (see below) would probably have resulted in a relocation of people from Luwu's fortified settlement near the mouth of the Cenrana to Malangke. This resettlement could explain why the population at Malangke, Luwu's palace centre, evidently increased significantly during the sixteenth century, and wealth became concentrated at Utti Batue on an unprecedented scale, even though by then Luwu was no longer able to dominate its Bugis neighbours to the south.

Crowding, associated with continued population growth, seems to have encouraged the development of further large settlements to the east of Utti Batue during the late sixteenth century. The eastward shift of authority was complete by the beginning of the seventeenth century, when the Utti Batue heartland appears to have been deserted. Malangke Beccu emerged briefly as a final centre at Malangke: this was presumably the location of the palace of the second Islamic ruler of Luwu, Sultan Nurussalam Petta Malangke, who reportedly built the S-shaped bank of earth to the immediate north called Benteng Massalekoe (Bulbeck and Prasetyo 1998:35-36). Despite the exquisitely carved early Islamic coffin recorded at Malangke Beccu, and the once beautifully decorated tomb of Sultan Nurussalam, his court at Malangke Beccu would appear to have been but a pale reflection of the earlier efflorescence of high culture at Utti Batue and its surroundings.

[48] Only one sherd from OXIS' large, multi-sourced collection of 1,580 pieces of sherdage or whole ceramics from Malangke was provisionally assigned to the twelfth to thirteenth centuries (Appendix:Table A-5).

2.6 Benteng Tompottikka (Palopo)

Introduction

Benteng Tompottikka is located in *kecamatan* Wara in the southern suburbs of Palopo, Luwu's capital city. This busy port had over 200,000 inhabitants in 1984 and is now the third largest city in South Sulawesi. Despite its rapid development, remnants of mangrove forest still survive along the foreshore south of the city. The towering mountain ranges immediately landward of Palopo are breached by a modern paved highway leading up to Tana Toraja. The climate differs little from that of Malangke. The stone mosque opposite the Palopo post office, which is widely regarded as the oldest in South Sulawesi (Reid 1990), has a nineteenth century dedicatory inscription behind one of its doors (Muhaeminah pers. comm.) and thus may not be particularly old. Most of the urban development in Palopo's present-day centre dates from the period after 1920; during the nineteenth century most of the population would presumably have resided to the southeast, where the earthen walls of Benteng Tompottikka were constructed to deter the Dutch colonial threat (Irfan Mahmud 1993:96-99).

Irfan Mahmud surveyed the extant segments of wall and recorded a huge enclosed area approximately two and a half kilometres east-west by one kilometre north-south. His task was made difficult by the high density housing along the western and southern walls of the fort. The northern wall apparently took the form of a peculiar succession of linking zigzags. As it lies near the current coastline, it may be that the northern wall followed the lines of an old beach. The line of wall coincides with the graveyard Makam Jera Surutanga, which includes a finely masoned Islamic *nisan* inside a walled masonry enclosure and a large expanse of apparently old Islamic graves. Ninety sherds of Ming, Qing, Japanese and European *keramik* were collected from the surface here, indicating a lengthy period of occupation. Smaller numbers of similar sherds were also collected from surface exposures within the *benteng*, to the south. This southern area also included the ritual site where the rulers of Luwu used to be formally enthroned (Irfan Mahmud 1993). Although Irfan Mahmud recorded 20 Ming sherds during his Benteng Tompottikka survey, the Ming dynasty extended to the reign of Wanli, so the sherds need not date earlier than the late sixteenth or even the early seventeenth century. Finally, an area with possible ironworking debris was also recorded during the Benteng Tompottikka survey (Irfan Mahmud, pers. comm.).

In February 1999, OXIS team members briefly inspected Makam Jera Surutanga. We learned that *keramik* is occasionally encountered beneath the ground when a new grave is dug, and a resident, Andi Nasir Luwu, informed us that looting had once been prolific here. He also asserted that Surutanga had been the original centre of Palopo. The anecdotal evidence would suggest that a substantial pre-Islamic community had buried its dead at Surutanga immediately prior to the development of the early Islamic community associated with the extensive old graveyard. However, given the likelihood of a period of syncretism, when early Muslim converts would have continued traditional practices such as interring grave goods with the dead alongside the new Islamic rites, at least some of the looted *keramik* was probably associated with early Islamic burials (cf. Bulbeck 1992 for Macassar). Accordingly, the expectation from archaeological work at Surutanga would be that the earliest *keramik* would date to the late sixteenth century, and that most would be of seventeenth century and later antiquity. This expectation derives from the evidence that Luwu

shifted its palace centre to Tompottikka between *c.*1610 and *c.*1630, and that Surutanga lay within the sphere of this relocated palace centre.

Findings and interpretation

The OXIS excavation team (which included Irfan Mahmud) had time available for only three test pits in Surutanga after mapping the site's Islamic graves and modern land-use features. The first test pit lay in the vicinity of its old Islamic cemetery, the second in a shell midden near the house of Andi Nasir Luwu, and the third a little way north of Jalan Malajai. All three test pits lie a short distance north of a remnant stretch of Benteng Tompottikka's northern wall; that is, between the fortress and the beach lying immediately to its north.

The test pit near the old Islamic cemetery encountered barely any cultural materials, only three earthenware sherds and a suspected lump of dammar. The dammar may be significant in terms of the historical record of trade in forest produce (and in slaves) from the Toraja highlands to Palopo (Van Braam Morris 1889). The test pit north of Jalan Malajai recovered only three *keramik* sherds, all dating to the eighteenth to nineteenth century, and all from the top three units. Ground-up shellfish in the lower units, and a paucity of distinctive associated cultural materials, might suggest that the land here was beach until approximately the nineteenth century. The proximity of the sea would explain the existence of the shell midden lying outside of Andi Nasir Luwu's house.

The test pit in the shell midden was the one which produced the richest array of cultural materials, including 475 earthenware sherds, 24 *keramik* pieces, bone and shell food remains, suspected dammar, and metal and glass fragments. There is a general progression from more recent *keramik* at the top to older sherds in the lower units, but there has clearly been some movement of sherds up and down the profile, as would be expected from human trampling and other site-formation processes. For instance, one Qing mottled brownware is represented by separate sherds in units 5 and 10. Overall, it is wise to treat the excavated contents as a single assemblage. Of the *keramik* identifications (Appendix: Table A-7), Wanli pieces are the oldest in the assemblage, clearly confirming the expectation of sherdage no earlier than the late sixteenth century or early seventeenth century. The resulting standardized chronological histogram (Figure 2-6) clearly has a complementary relationship with that of Malangke – as Malangke's *keramik* profile plummets, Suratanga's profile rises to prominence. The sharp drop in Suratanga's profile in the twentieth century probably corresponds to the development of Palopo as the major focus of population.

Further excavation would, of course, be needed before one could claim to understand fully the archaeology of the Palopo area. Nonetheless, the present evidence clearly confirms the early seventeenth century shift in Luwu's palace centre from Malangke to Palopo, as indicated by local oral traditions. The northern wall of Benteng Tompottikka would appear to have been constructed along a former beach front, and traces of dammar in the test pits may reflect historical trade patterns between Palopo and the highlands of Tana Toraja.

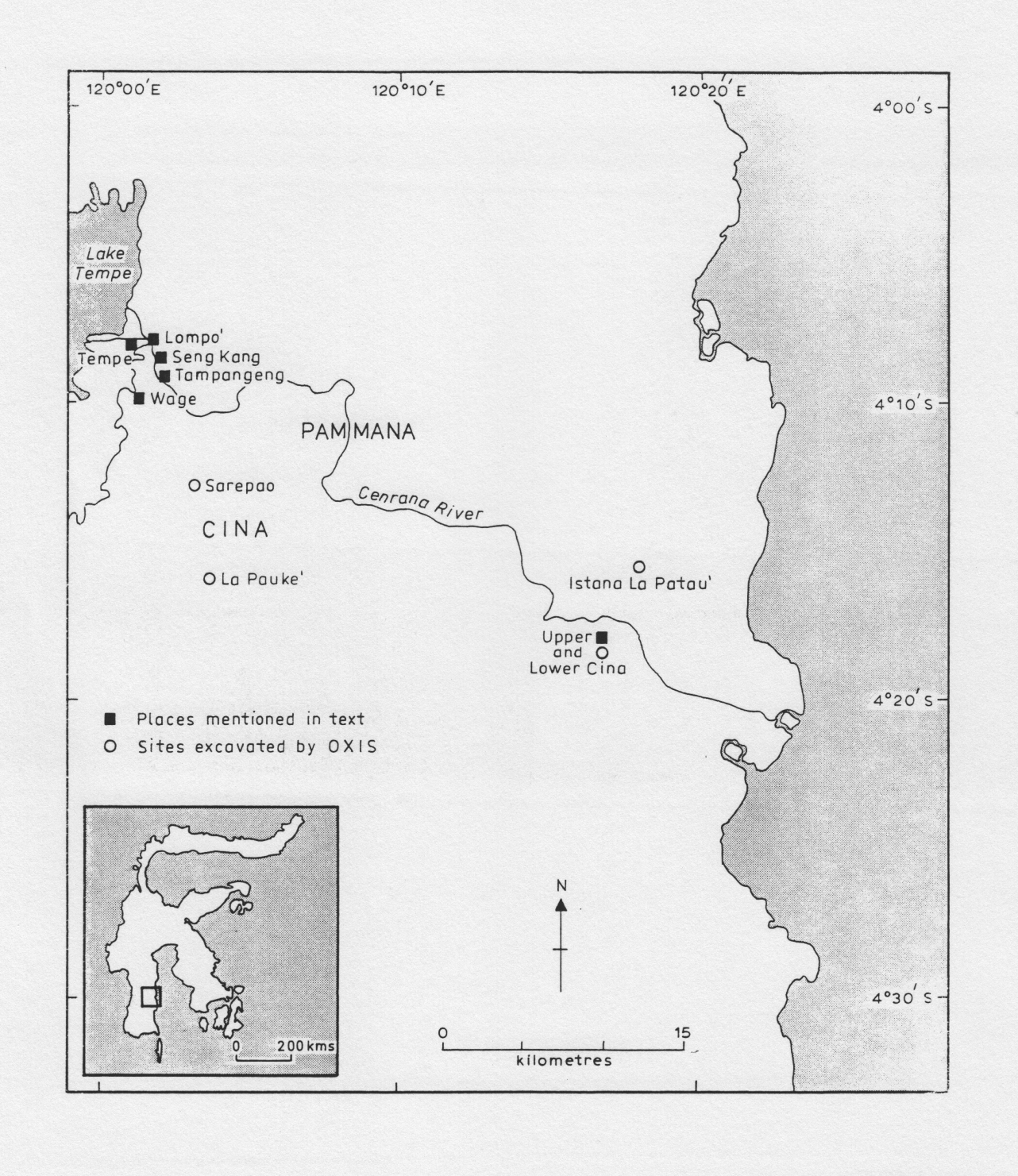
2.7 Istana La Patau' (Cenrana)

Introduction

Istana La Patau' (La Patau''s palace) is a large area of raised land which lies near the settlement of Cenrana, approximately ten kilometres northwest of the mouth of the Cenrana river, in *kabupaten* Bone. The site contains the former palace complex of La Patau' Sultan Alimuddin Idris, the nephew and adopted son of La Tenritatta Arung Palakka, who liberated Bone from Gowa's domination by forming an alliance with the Dutch East India Company, which culminated in Dutch and Bone forces occupying Macassar in 1667. La Patau', who succeeded Arung Palakka to the throne of Bone in 1696, is buried at Cenrana along with his wives and several Soppeng and Wajo aristocrats of the same era. He is known locally as Matinroe ri Nagauleng (B. 'He who lies at the Golden Serpent'). Istana La Patau' also includes the remains of a huge fortified palace complex covering several hectares, of which parts of the defence walls and a gateway are still standing (Sarjiyanto 2000). It is the site on which Arung Palakka built for himself a fortified palace-complex, which was secretly mapped by Dutch spies (Andaya 1981: Map 8). From this information, we would expect the archaeological materials from the site to be predominantly late seventeenth to early eighteenth century in age.

However, the chronicles of Wajo record that Dewaraja, the ruler of Luwu between *c.*1490 and *c.*1520, founded a settlement (B. *ma'banua*) at Cenrana. In the chronicles, this information appears prior to the account of how Wajo seized Luwu's traditional domains on the southeastern shores of Lake Tempe around 1500 (Zainal Abidin 1983:202-207,211; Pelras 1996:112). The textual chronology gives the distinct impression that Dewaraja based himself at the mouth of the Cenrana *before* he became Datu Luwu. After the loss of Wage, Tempe, Sengkang and Tampangeng *c.*1500, Luwu evidently maintained its control over the lower Cenrana river from this site until the 1560s, when Luwu was compelled to surrender its fortified settlement at Cenrana to the kingdom of Bone, and thus lost control over trade flowing down the Cenrana river (Pelras 1996:132). From the middle sixteenth century onward, Luwu was effectively relegated from any direct involvement in political developments within the South Sulawesi peninsula, and its ambitions were restricted to the highlands and coastal plain that ring the northern shores of the Gulf of Bone.

The first question OXIS wished to answer was whether Dewaraja's settlement was built on the same site as Arung Palakka's fortified palace-complex. The Istana La Patau' site lies on a natural rocky outcrop which is one of the few permanently dry, raised locations near the mouth of the Cenrana river and is the logical place for Dewaraja to have established his settlement. It seems likely that Luwu's loss of its ancestral lands would have led to a strengthening of Luwu's fortified settlement at Cenrana, near the mouth of the river. Luwu's occupation of this site between *c.*1480 and *c.*1550 would be indicated by a substantial presence of sixteenth century tradewares, and a much smaller number of late fifteenth century tradewares.



Map 8. Sites excavated by OXIS in the Cenrana valley

Findings and interpretation

Excavations at Istana La Patau' took place between 21 and 24 July 1999. Three one-metre squares were opened at selected locations within the lines of the walls of the fortified palace centre. Square one was chosen for analysis on the grounds that it was the only square excavated at the site which combined evidence of a reasonable depth of deposits with remains of archaeological interest, including 324 earthen sherds. The excavators recorded three layers: an upper layer of loose sediments (units 1-2), a middle layer of more compact sediments (units 3-7 and 10), and a lower layer of loose sediments (units 8-9). Bedrock was not reached during the four days available for excavation, and the undiminished presence of earthenware sherdage in the lower excavation units suggests that deeper, and older, habitation deposits underlie the bottom of the test pit. Recorded pH was generally between 6.5 and 7, reflecting a neutral to mildly acidic environment with favourable prospects for the preservation of bone and shell.

The sediment in the upper layer would appear to have been redeposited. This is suggested by the recovery of a modern iron nail, a *c.*300 year old Chinese sherd, and a *c.*400 to *c.*500 year old Vietnamese sherd, all mingled together in the top two units. The middle layer would seem to date squarely to the seventeenth century. This layer contained a coin with Arabic script, possibly minted in silver in Aceh (Ali Fadillah pers. comm.) and two Transitional Chinese porcelain sherds in unit 10 at the base of the layer. Unit 10 probably represents a rubbish pit, as its base cuts into the bottom layer and contained more charcoal than did the rest of the sediments, as well as a bone fragment, possibly from a bovid. The bottom layer could represent habitation during the sixteenth century or earlier: the sixteenth to early eighteenth century *keramik* recovered from this square and from the surface near the square (Appendix: Figure B-1) are commensurate with occupation first by a Luwu, and later by a Bone, elite.

However, the number of sherds recovered from the square is small, and a statistically more valid sample may be expected from the extended survey of the site. The sherdage from this survey, combined with the identifications from the Square 1, produced the following chronological characterization of the Cenrana site. Qing blue-and-white identifications, presumably all late seventeenth to early eighteenth century (Appendix B-2), account for 73.2% of the recorded tradewares. The isolated datum of a single European sherd confirms OXIS' hypothesis that the site had been effectively abandoned by the eighteenth century. [49] On the other hand, Swatow and Ming Transitional sherdage is scarce, and no Wanli identifications were made. These data suggest light occupation between the end of the sixteenth and the late seventeenth century, and contrasts with the healthy representation of fifteenth to sixteenth century sherds (approximately 20% of the total). As summarized by the standardized chronological histogram (Figure 2-7), the available tradeware identifications are consistent with a scenario of two main phases of occupation, consisting of an earlier phase between the early to middle sixteenth century, and a more prominent phase between the late seventeenth and early eighteenth centuries.

[49] The sherd is presumably nineteenth century and may be the basis for Sarjiyanto's (2000:74) claim for a small amount of Japanese *keramik* at the site. Sarjiyanto's study, which focuses on the royal Bone occupation of the site, is fully compatible with the interpretation developed here.

Sufficient *keramik* probably dates to the fifteenth century to be taken as confirmation of Luwu's presence at the mouth of the Cenrana prior to the sixteenth century.[50] However, the available data confirm the historical indications that Luwu built or further strengthened a fortified settlement at Istana La Patau' at about 1500, following its loss of its ancient lands at the head of the river, and that Luwu remained there until the 1560s, when Bone's military successes led to its gaining possession of the site. After the installation of La Tenritatta Arung Palakka as the ruler of Bone in the late seventeenth century, the site served as Bone's heavily fortified palace centre, which controlled access to the Cenrana river and Lake Tempe. This situation continued during the reign of Arung Palakka's successor, La Patau'.

2.8 Allangkanangnge ri La Tanete (Cina ri Aja)

Introduction

Allangkanangnge ri La Tanete in *kampung* Sarepao, *desa* We Cudai', *kecamatan* Pammana, *kabupaten* Wajo is one of the most famous historical sites in South Sulawesi. The name translates as 'The palace complex on the hill ridge' and the summit of the large, low hill is reputed to have been the site of the western palace centre of the legendary kingdom of Cina, which figures prominently in the Bugis epic La Galigo, but which in historical texts is referred to mainly as a source of status for the founders of the ruling families of traditionally later kingdoms.

The hill top site overlooks an expanse of excellent rice growing land, and there is no geomorphological evidence to suggest that this was not also the case as early as two thousand years ago (Caldwell and Lillie in press). Hence the onset of significant occupation at the site may be interpreted as reflecting the beginning of centrally-directed wet-rice agriculture within the kingdom of Cina.

On the summit of the hill lies the walled graveyard of the rulers of Pammana.[51] Tradition states that when La Sangajipammana, the childless, twenty-second Datu Cina, lay dying, he requested that the name of the kingdom be changed to his own. Also on the summit is a *keramat* (sacred) grave associated with We Cudai', the princess of Cina who marries Sawerigading in the La Galigo, and the hill is also known as Istana We Cudai', or We Cudai''s palace. The colonial Dutch ceramics expert Orsoy de Flines inspected a collection of 58 tradeware sherds from the site, and dated them all between the fifteenth and seventeenth centuries (Bulbeck 1996-97:1042). Previous surveys carried out by Macknight and Bulbeck (1985) and Kaharuddin (1994) recorded Ming and pre-Ming tradewares, and Kaharuddin produced a sketch map of the site. The fieldwork by Caldwell and his colleagues between 1 and 3 August 1999 constitutes the first systematic survey of the site's surface contents in relation to mapped zones, and the first professional excavation of this site, which is of great importance to the early history of South Sulawesi.

[50] A single fourteenth to fifteenth century Chinese Longquan celadon sherd most likely relates to late fifteenth century habitation.

[51] The installation stone of the rulers of Pammana lies 500 metres to the west of the hill.

Findings and interpretation

The palace centre would have been located at the northern end of the hill, to judge by the dense scatter of *keramik* and earthenware sherdage found there (Kaharuddin 1994). Six units were excavated in a single square which yielded abundant materials throughout the sequence. One thousand nine hundred and sixty eight earthen sherds, one bead, 247 bone fragments, two rodent teeth and a bovid molar point to a dense habitation context for the 26 *keramik* sherds recovered from the test pit. Time available for excavation ran out before the OXIS team reached sterile soil, but it is questionable whether evidence of historical occupation would have continued much deeper than unit 6, where the oldest tradeware sherd known from the site, an eleventh to twelfth century martavan sherd, was recovered.[52] However, the basal unit also yielded 30 grams of *Telescopium telescopium* marine shellfish fragments which could conceivably relate to the period before 2,600 years ago, when saline influences had evidently reached along the entire Cenrana river (Caldwell and Lillie in press). Depending on the radiocarbon date which this shellfish sample produces, it could either reflect light occupation on the hill in prehistoric times, or communications between Cina ri Aja and the coast in early historical times.

The excavated square can be schematically divided into two levels: an upper level from the surface to unit 3, whose tradewares may all be of sixteenth or sixteenth to seventeenth century antiquity, and a lower level (units 4 to 6), whose tradewares may all belong to the thirteenth to the fifteenth century. Hence the recovered surface assemblage contains a high proportion of later sherdage compared to the tradewares buried in the sediments (Appendix: Table B-1). However, one element in common is the very high proportion of martavan sherdage in both the excavated square (54% of all tradewares) and the surface survey assemblage (26% of all tradewares). The excavated square yielded no evidence of the Bugis pre-Islamic mortuary practice of burying cremated human remains in jars, so the abundance of martavans at Allangkanangnge ri La Tanete indicates both substantial storage capacity at the site, and considerable prosperity, as reflected in the number of expensive imported vessels used for this task. Of particular relevance in this context are the five Jizhou sherds in the surface collection. Jizhou iron-painted martavans are a status marker *par excellence*, and have been recorded only at the early palace centres at Pattimang Tua and Utti Batue in Malangke (Appendix A), Tinco Tua in Soppeng (Kallupa *et al*. 1989), and Kale Gowa and Benteng Tallo in the environs of Makasar (Bulbeck 1992).

A second remarkable aspect of the Allangkanangnge ri La Tanete tradeware assemblage is the high proportion of celadons and other greenwares, which represent approximately 23% of the total. These include numerous late Ming (sixteenth to seventeenth century) celadons, and a predominance of fifteenth to sixteenth century celadons imported from Thailand and Vietnam, as well as from China (Appendix: Table B-1). The inhabitants of Allangkanangnge ri La Tanete would seem to have preferred celadons to the blue-and-white wares which typically (and overwhelmingly) dominate the Ming-period tradewares at most South Sulawesi sites. This preference may reflect a

[52] Identified on the basis of its rim shape, it could have been deposited in the thirteenth century or later, as stoneware jars are durable.

conservative streak among the local nobility as a result of their long prior acquaintance with celadons or, perhaps, nostalgia for earlier days when Cina ri Aja enjoyed a particularly high status and political authority. While occupation at the site clearly continued without a break until the late seventeenth century, by the fifteenth century the site's importance was on the wane, and by the sixteenth century La Pauke' may have been the more important centre (Figure 2-7).

During the pre-Islamic period, Cina ri Aja evidently experienced economic stasis in absolute terms, which, in relative terms, translates into a profile of decline. This stasis would account for the sheer variety of the sherdage recovered from Allangkanangnge ri La Tanete, which is a veritable smorgasbord of colours and shapes. Even after some rationalization of the identified tradeware classes at Allangkanangnge ri La Tanete, there are 53 separate classes (Appendix: Table B-1) including brownwares of various shades, whitewares, celadons, lead-glazed greenwares, other miscellaneous monochromes, iron-painted wares, and wares with enamelled decorations on the glaze, as well as the 'common or garden' blue-and-white wares, despite the moderate size (277 pieces) of the assemblage. Such a variety can be realized only after centuries of acquisition and, in particular, relatively constant rates of acquisition over time, notwithstanding the growing availability of tradewares as the second millennium proceeded (Appendix: Figure B-1).

In summary, there is strong evidence that by the thirteenth century a substantial population ruled by a prosperous elite had established itself at Allangkanangnge ri La Tanete. This population can be identified with the ancient kingdom of Cina. Occupation continued at a fairly steady rate until the late seventeenth century. Although population and general prosperity continued to grow in South Sulawesi during this period, comparable growth did not occur at Allangkanangnge ri La Tanete, which appears to have been totally abandoned in the eighteenth century.[53]

2.9 La Pauke' (Cina ri Lau')

Introduction

The eastern palace centre of the legendary kingdom of Cina is said to have been located in *kampung* La Pauke' (formerly Sumpang Ale') in *kabupaten* Wajo. The site, which lies on a low rise of land, contains a number of menhirs and other megaliths. The most impressive of these is a large and finely carved boat-shaped megalith named Palungeng Patue, which has a row of five rectangular bas-relief panels, each containing a large ground-out hole. At first sight these megaliths would appear to suggest a very early role for West Cina as a ceremonial centre.

Approximately 100 metres north of the Palungeng Patue megalith is an east-west oriented oval graveyard of about 100 metres in length and 50 metres in width. The graveyard, which was looted in 1959 under the direction of an Indonesian army officer, reportedly yielded ten fine celadon

[53] Some sporadic re-occupation or other light use of Allangkanangnge ri La Tanete during the nineteenth and twentieth centuries is indicated by the tiny assemblage of European and coeval sherdage (Table B-1).

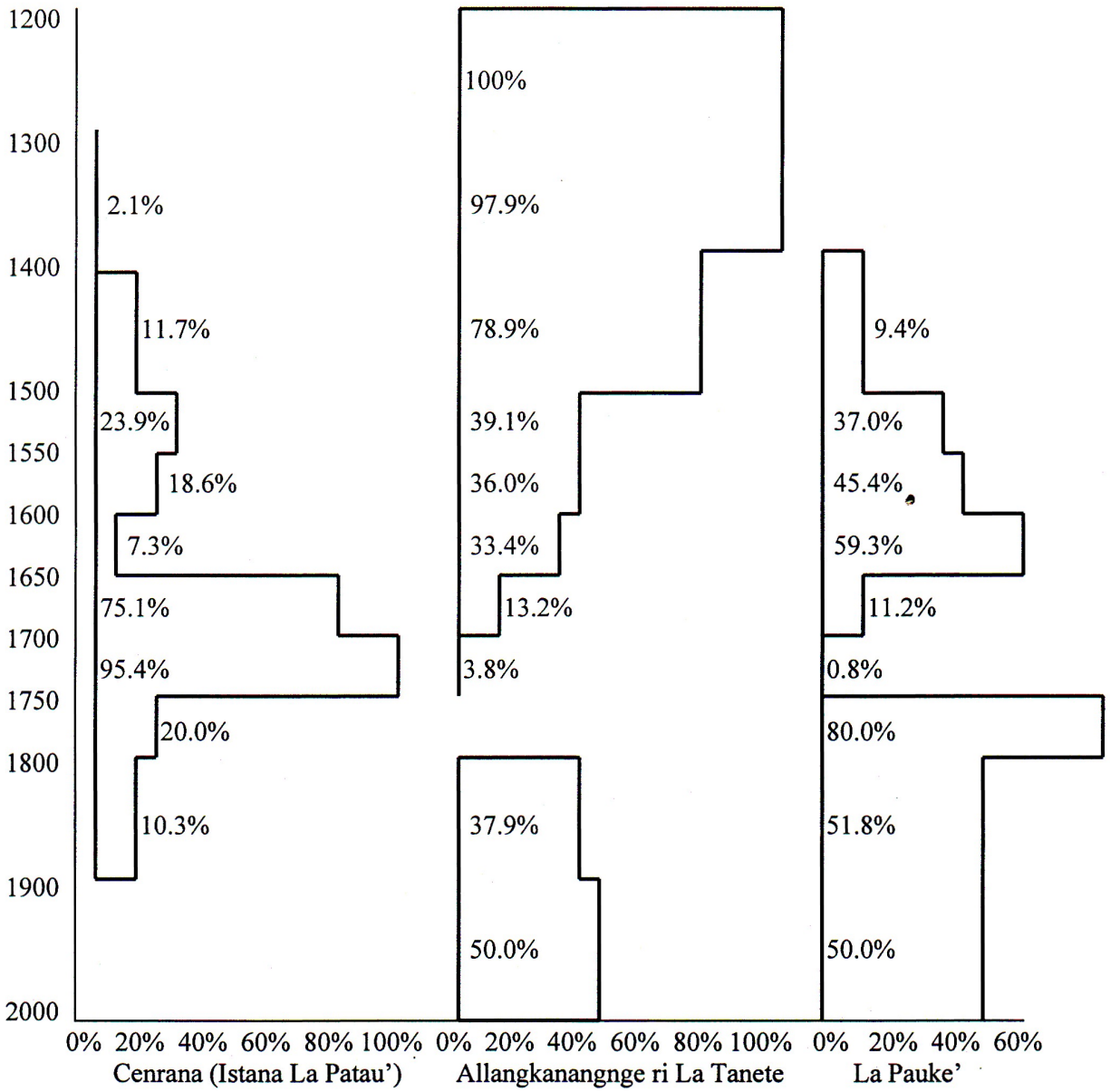


Figure 2-7. Standardized chronological histograms of the *keramik* from the Cenrana valley

martavans with raised dragon designs containing speckled ash, drops of melted gold and fragments of incense (some of which, it was reported, were still fragrant). A number of rings and small leaves of gold, and a few small ceramic jarlets were also reported. The site was marked by a hundred or more plain stone menhirs with an average height of one metre, but with one reportedly two and a half metres in height. These menhirs were broken up in 1971 to provide building materials for the construction of a road and only a few pieces now remain on the site.

Findings and interpretation

The OXIS team worked at La Pauke' from 25 to 31 July 1999. The team established a datum point near the Palungeng Patue megalith and excavated five test pits, all of which yielded sparse archaeological materials. Even the square with the richest assemblage (probably the result of refuse buried in a pit near the megalith) falls far short of the density of materials recovered from the Allangkanangnge ri La Tanete test pit.[54] Despite the scarcity of tradeware sherdage excavated at La Pauke' (a single Swatow sherd), the imported ceramics recovered from an extensive surface survey are very clear in showing that the main period of use of the site lasted from the sixteenth to the early seventeenth century (Appendix: Table B-1; Figure 2-7). Use of the site had clearly commenced by the fifteenth century, as indicated by a small number of Vietnamese sherds. The absence of any Qing Kangxi sherdage indicates effective abandonment of the site during the late seventeenth century. The *keramik* profile at La Pauke' closely complements that at Allangkanangnge ri La Tanete and could arguably reflect the transfer in the sixteenth century of Cina's palace centre from Cina ri Aja to Cina ri Lau'.

The reported evidence of the jars dug up at the graveyard 100 metres north of the Palungeng Patue megalith points to cremated pre-Islamic burials (cf. Hadimuljono and Macknight 1983; Bulbeck 1996-97). Given the small reported number of ten martavans looted from the graveyard, it would appear that these jar burials represent only a small minority of the cremated burials. A surface collection from the former graveyard (now an orchard) produced a wide array of Ming sherdage and a wide range of fifteenth century tradewares, including a three-coloured 'Sancai' lead-glazed sherd (Appendix: Table B-1). The small quantities of seventeenth century sherdage from the graveyard survey suggest that cremations continued at Cina ri Lau' until some time after Wajo's official adoption of Islam in 1610 (Pelras 1996:137).

Five other adjacent survey localities contained surface sherdage, the datings of which are closely comparable with the chronology indicated for the graveyard, apart from producing a greater emphasis on Swatow and other seventeenth century sherdage (Appendix: Table B-2). We interpret from this that the major phase of habitation at Cina ri Lau' continued until shortly after Islam had been fully adopted, and the practice of cremations had been discontinued. Sixteenth to seventeenth

[54] Square S14B3 (South 14 West 3), next to the Palungeng Patue megalith, contained the richest finds, although no tradeware sherdage was recovered. The finds include 87 earthen sherds, 23 grams of charcoal, and five burnt bone fragments towards the base of the excavation. The test pit apparently coincided with a pit whose stone-lined base had been hollowed into sterile sediments. With a pH of 6.5, the very mildly acidic sediments are favourable for the preservation of burnt bone.

century tradeware identifications were recorded in all of the twelve survey zones, with one exception, and indeed were often the dominant identifications.

In summary, La Pauke' may be interpreted as the latter palace centre of the Cina kingdom. It combined a small, late pre-Islamic cemetery with an associated habitation area of limited extent, of which the low level of finds in the test pits points to a brief period of habitation and a low population density.[55] Evidently, by the sixteenth century, Cina had declined to the status of a secondary polity.

Allangkanangnge ri La Tanete and La Pauke' may be compared with another hilltop site, Lakukang on the southern banks of the Cenrana, in *kabupaten* Bone. Lakukang closely resembles La Pauke' in its clusters of megaliths and evidence of cremated Bugis burials (Salam 2000). This comparison suggests that by the sixteenth century, not only had Cina declined to the status of a secondary polity, but that it was just one among several similarly organized, and similarly modest, political centres distributed along the Cenrana valley.

[55] Zones 7, 8 and 12 also produced small quantities of eighteenth to twentieth century tradeware sherds which are absent from the rest of the site. These localities are representative of the continued occupation of Cina ri Lau' as a small *kampung* subsequent to its abandonment as a socio-political centre.

3. The historical interpretation

Bugis texts contain information dating back to *c.*1300 and provide detailed data on the origins and development of several of the major kingdoms of South Sulawesi. Sources for Luwu, however, are comparatively poor, and the traditional King List of Luwu is particularly problematic. In his study of this list, Caldwell (1998:40) concludes that: 'In the cold light of day, far from demonstrating that Luwu's tradition of kingship is older than that of other Bugis kingdoms, the King List offers no real evidence of organized political life before 1400.' He adds that no Bugis textual evidence can be found to date the Bugis kingdom of Luwu any earlier than the Desawarnana (Nagarakrtagama)'s well-known reference of 1365 (Pigeaud 1960-63 volume 3:17; Robson 1995).

Extrapolating from the evidence from other Bugis kingdoms, Luwu's inception should date to *c.*1300 (Caldwell 1995). However, the evidence from other kingdoms is closely related to the spread and intensification of wet rice agriculture, whereas the staple in much of Luwu is sago and the soils are generally unsuited to the growing of rice. Portuguese sources, which cover for the most part a small portion of the west coast between the years 1542 and 1547, do not mention Luwu. The first important Dutch source on Luwu is Speelman's *'Notitie dienende voor eenen korten tijd en tot nader last van de Hoge Regering op Batavia voor den ondercoopman Jan van Oppijnen'* (Speelman 1670), which, importantly, records the export of iron from Luwu. The first systematic history of South Sulawesi is Blok's *History of the island of Celebe*s, which was written in 1759 and published in English in 1817. Blok, a Dutch governor of Macassar, based his account on unnamed indigenous written and oral sources, as well as on Speelman's *Notitie.* Despite its having been published almost two centuries ago, Blok's history provides a useful point of entry into the historical sources for pre- and early post-Islamic South Sulawesi. The first systematic study of the textual sources for the pre-Islamic period was by Caldwell (1988) who later published an account of the general features of pre-Islamic state and society depicted in these sources (Caldwell 1995). The present historical analysis does not aim to present a comprehensive account of the political and cultural history of Luwu, but is intended to address a number of key questions which must be answered in preparation for the writing of that history.

3.1 The interpretation of the La Galigo epic

In a report on a recent workshop on the early history of South Sulawesi, Macknight writes that:

> 'Some genres of writing, such as genealogies, king lists, vassal lists or chronicles, while posing various philological problems for editors, allow relatively straightforward interpretation. Others, and especially the vast collection of texts deriving from the I La Galigo cycle of stories, pose major problems of interpretation.' (Macknight in press.)

Previously we have touched upon the problem of reconciling the picture of the past found in the La Galigo materials with that derived from the chronicles, from modern archaeology, and from external sources (Section 1.5). Any interpretation of the La Galigo materials must start from Koolhof's brilliant demonstration of the nature of the La Galigo as 'oral composition' (Koolhof 1992).[56] The skills required for this task thus belong not to the discipline of history but to the specialised study of orally-composed epic literature (e.g. Lord 1960).

To address the problem of cultural and political discontinuity, South Sulawesi historians have placed the characters and events of the La Galigo in a period earlier than those of the historical texts, which record the rise of agricultural kingdoms. This interpretation of the material can be traced at least as far back as the chronicle of Bone, which was probably composed in the late seventeenth century. It is also widespread among those Bugis people today for whom the stories retain the force of reality. As we have noted above, it is also the basis on which Pelras has developed his view of the early history of South Sulawesi.

Caldwell has written that:

> 'To [use the La Galigo texts as historical sources] will require a methodology different from that used for genealogical or toponymic records, and, to judge by the study of the Greek epics, the prospects do not look promising. Finlay (1964) sets out the formidable problems in attempting to use the Iliad's account of the Trojan War to account for the destruction of Troy VIIa.' (Caldwell 1995:418, footnote 47.)

There are indeed good arguments for ignoring the La Galigo as a source of accessible historical information. These arguments are drawn from the study of comparable European epic poems, such as the Nibelungenlied (Thomas 1995), the Chanson de Roland (Brault 1978) and the Iliad (Mueller 1984), which have been carefully evaluated against detailed archaeological and historical records, as well as having been subject to very detailed internal scrutiny. Study of these and similar non-European epic traditions has revealed that the composition of such texts results in an 'atomization' of the informational content. While the overall plot of each episode may remain consistent – generally there is a remarkable consistency in structure and personal relationships – the composer draws on a wide range of formulas and other linguistic devices in order to tell the tale. Thus an individual, object or practice from one period can be juxtaposed with an object or practice from a completely different period, in a causal as well as a temporal relationship. The result is that unless we know, from historical or from archaeological sources, which object or practice belongs to which particular historical period, we are likely to be led astray by the text's seeming coherence. The fact that we can only assess the truth of an oral epic from other sources leads to what Macknight (1993:

[56] His dissertation, which is in Dutch, is summarised in Macknight (1993). Koolhof (1999) examines the role of the La Galigo as a cultural encyclopaedia and discusses the historical development of the work.

footnote 107) has called the Vermeule paradox, namely that one only knows what is true if one already knows it from some other source.[57]

On the grounds of method, we agree with Macknight (1993:35) that 'the concept of an "Age of Galigo" must be strenuously resisted.' However, even he agrees that the La Galigo material has its uses. In particular, we are impressed by the way it draws attention to the close link between Luwu and the western Cenrana valley, and to the importance of the eastern area of the Gulf of Luwu. These two important themes directed and shaped much of the field research carried out by OXIS. The results, set out in Section 2 above, and discussed below, confirm, we believe, the essential correctness of this approach to the La Galigo cycle.

3.2 The chronology of the Bugis kingdom of Luwu

It is a fundamental axiom of Bugis historiography that Luwu is the oldest and most prestigious of kingdoms of South Sulawesi. In Section 1.3 it was stated that this tradition can be dated back in European sources to the seventeenth century. The obvious source of this idea is the La Galigo cycle, which can reasonably be assumed to have been current in South Sulawesi since at least the same century.[58]

Viewed from an archaeological perspective, there are three important questions to be answered. The first is whether or not Luwu can be considered the homeland of the Bugis people themselves, as numerous oral traditions from all over South Sulawesi would suggest. The second is whether there existed a Bugis kingdom in Luwu for 400 years (Van Braam Morris 1889) or for 300 years (Pelras 1996) before the rise of the historical kingdoms in the southern peninsula, the emergence of which can be dated by textual and by archaeological evidence to *c.*1300. The third question is whether Pelras (1996) is correct in ascribing a period of anarchy, conventionally lasting seven *pariama* (B., a period of time ranging from 8 to 25 years), to the mid-fourteenth century.

Was Luwu the homeland of the Bugis?

Despite the consistent view of Bugis tradition, an anthropologically informed view of Luwu suggests that it is an area into which the Bugis have migrated at an uncertain time in the past. Unlike other Bugis kingdoms, where Bugis is the dominant language and is spoken across the entire landscape, in Luwu the Bugis language is spoken only along the seaboard and scarcely at all inland, apart from along the narrow coastal strip south of Palopo. Inland of the coast, on the lowlands and

[57] This does not mean of course, that one cannot be prodded into certain lines of inquiry by an epic poem. The most famous example of this is Schliemann's search for the ancient city of Troy, which was inspired in part by his life-long passion for the Iliad, the story of which he believed to be essentially true. The identification of Hissarlik as the site of Ilion and the acropolis of New Ilium was, however, made by Charles Maclaren, and the site was probably pointed out to Schliemann by a young American, Frank Calvert (Wood 1985:43-44).

[58] In its present written form on European paper, the La Galigo cannot date from much earlier than the seventeenth century, and the oldest surviving datable texts are from the late eighteenth century (Koolhof 1999:footnote 12). The palm-leaf 'spools' that comprised the physical means of recording Bugis texts before the introduction of European paper (Tol 1996:218) may have contained brief, mnemonic 'outlines' of the La Galigo.

foothills, live speakers of the Toala, Lemolang, Wotu, Padoe and Tolaki languages. Speakers of the Rongkong, Seko, Rampi and Mori languages are found in the highland valleys (Grimes and Grimes 1987:20). This linguistic situation parallels the organisation of the polities in the Tributary and Domain List of Luwu (Caldwell and Druce 1998), which suggests that the Bugis were the dominant group at the domains located along the coast, which included Tampinna, Ngapa, Malili, Patimang, Cilellang, Lamunre, Suli, Larompong, Lanrang, Senga and Cerekang. Inland were found the internally autonomous 'tributary' chiefdoms of Baebunta, Matano, Mengkoka, Patila, Bolong, Rongkong, Suso, Waropo, Loda, Bajo, Balabatu, Lebbani and Lelewawo, many corresponding to a distinct non-Bugis group. The simplest explanation of this pattern is that the Bugis have settled at strategic places along the coastline in order to trade with these inland polities.

When did the Bugis settle along the coast of the Gulf of Bone?

The ceramic evidence from the OXIS excavations and surface surveys along the coast of the Gulf of Bone strongly suggest that Bugis settlement had commenced by around 1300, initially at Malangke (but possibly also at Bua and Ponrang). At Malangke there is sufficient sherdage from the thirteenth to fourteenth centuries to suggest a date of settlement in the latter half of the thirteenth century. This closely matches textual evidence for a mid-thirteenth century date for the origins of agricultural polities in the Soppeng and Cenrana valleys (Caldwell 1988). Only a single martavan sherd from nearly 1,600 classified sherds from Malangke can be provisionally ascribed to the twelfth to thirteenth centuries. The thirteenth to fourteenth century category is represented by just nine pieces; there are six pieces for the fourteenth century, 40 for the fourteenth to fifteenth centuries, 24 for the fifteenth century, 221 for the fifteenth to sixteenth centuries, 391 for the sixteenth century, and 76 for the sixteenth to seventeenth centuries (Appendix: Table A-5). The chronological histograms for Malangke (Figures 2-5 and 2-6) show occupation of Tompe, Lindrunge, Pincang Pute and Tampung Jawa by the thirteenth century, and map the growth of two major habitation centres starting in the fourteenth century, at Pattimang Tua (close to the Javanese settlement of Tampung Jawa) and Utti Batue. The histograms indicate that Malangke grew rapidly after *c.*1400, reached a peak of development about 1500 and maintained that level of development during the sixteenth century. The sharp drop in the number of ceramics in the seventeenth century corresponds to the oral tradition that Malangke was largely abandoned after *c.*1620.

Was there a period of political and social disorder in the late fourteenth century?

The chronological distribution of sherdage from Malangke and Wotu shows no sign of a falling-off in trade, or shifting patterns of trade, which Pelras (1996:52-56) posits as the cause of the hypothesized period of political and social disorder in the mid-fourteenth century. Instead, the sherdage recorded in Malangke grows demonstrably from *c.*1300 to *c.*1600, with no gap or reduction in the ceramic record (Appendix A: Table A-5). The ceramic sherdage from Wotu, some of which dates back an additional 100 years to *c.*1200, shows a similar growth over the same period of time (Appendix A: Table A-3), as does the Baebunta sherdage (Appendix A:Table A-4). A pattern of exponential growth in the ceramics imported to Luwu between the thirteenth and the

sixteenth centuries is abundantly clear from the histogram in Figure A-1 (Appendix A). Of course, it might be argued that Luwu is not representative of the southern Bugis kingdoms, the economies of which were largely agricultural. However, the combined sherdage from the Cina sites and Cenrana shows a similar exponential increase in volume from the thirteenth to the fifteenth century (Appendix B: Figure B-1). Nowhere in Luwu or at Cina is there any sign of a decline in the quantity or quality of sherdage, symptomatic of deteriorating trading conditions.

The estimates of population size at Malangke based on the number of looted burials at the surveyed sites (Tables 2-8 and 2-9) also reflect Malangke's rude economic health in the fourteenth century. Although these are whole century estimates, the much larger fifteenth century population figures can clearly be read as evidence of population growth in the fourteenth century. The population of Europe was everywhere lower in the fifteenth century than in the fourteenth century, as a result of the outbreaks of Black Death after 1347, which killed about one third of Europe's population. Malangke offers a sensitive barometer of economic change in South Sulawesi, as its decline and later abandonment following Luwu's loss of control over the Cenrana around 1560 illustrates. A period of social and political disorder in the Bugis agricultural heartlands would have had a profound impact on life at a remote outpost such as Malangke, which (we argue below) maintained close economic and political relations with the western Cenrana valley. A period of anarchy lasting several years, let alone several dozen years, would almost certainly have led to Malangke's abandonment.

Pelras' proposed period of political and social disorder (Section 1.5) is based in part upon the leitmotif of a short period of anarchy in a number of historical texts and in part upon ceramic evidence from Soppeng, published in Kallupa *et al.* (1989). Macknight (1986:220) has drawn attention to the similarity of the description in the chronicle of Bone of the lawless period before the acceptance of the first rulers with appropriate status and the Sanskrit concept of matsyanyaya or 'way of the fishes'. He sees this description of lawlessness as an Indic literary trope which the author of the chronicle has somehow picked up and put to use, rather than a memory of actual conditions. The decline in the number of ceramic sherds in the fourteenth century, which Pelras reports for Soppeng (after Kallupa et al. 1989) is based on the difference of 59.5 fourteenth century sherds compared with 61.5 thirteenth century sherds. This small difference is the result of slightly more sherds being assigned to the late Sung (the twelfth to thirteenth century category) (15) than to the late Yuan-early Ming transition (the fourteenth to fifteenth century category) (ten). However, some of the Soppeng sherds which were dated to the thirteenth to fourteenth century category (108 in all) may have arrived at the sites during the fourteenth century, although Kallupa *et al.* (1989) had no evidence for this. In short, nowhere in South Sulawesi do we find any evidence of an economic decline in the thirteenth to fourteenth century indicative of a period of social and political disorder. Instead, growing evidence points to a significant increase in trade with other parts of the archipelago, and the rise of large political groupings, or kingdoms.

***What preceded Malangke**?*

Our answer to this question must be qualified by the fact that at Cerekang, and to a lesser extent at Ussu, local residents forbade the OXIS team to excavate, or even to survey, the sites with the most likely prospects for yielding remains from the pre-Islamic period. Nevertheless, there is no evidence from elsewhere in Luwu of an 'Age of Galigo' preceding Bugis settlement in this region around 1300, unless one chooses to see it as an allusion to the earlier settlement of Wotu.

The general argument is implicit above but will bear repeating. Van Braam Morris (1889) placed Luwu's main period between the tenth and fourteenth centuries, while Pelras (1996) proposed a date between the eleventh and thirteenth centuries. These dates would place the origin and rise of Luwu some 300 to 400 years earlier than the other kingdoms of South Sulawesi, which are widely accepted to have arisen in the fourteenth century.

Unlike the western Cenrana valley, Luwu is not a Bugis-speaking region. An anthropologically informed view of Luwu would suggest that the Bugis have moved into the region from the south, in order to trade with Luwu's indigenous ethnic groups. A date of Bugis settlement in the centuries preceding *c.*1300, coupled with evidence of cultural florescence, would lend support to Pelras' hypothesis that an older civilization based in Luwu and in the Cenrana valley (equivalent to the 'Age of Galigo') preceded the changing economic conditions which led, in the late fourteenth century, to the rise of new agricultural societies in the southern peninsula.

However, no Bugis site in Luwu excavated or surveyed by OXIS produced evidence of settlement earlier than the late thirteenth century. Two sites, Katue and Bola Merajae, yielded evidence of initial occupation by 1,500-2,000 years ago, but the case for a Bugis association with this initial occupation is highly dubious. Nor was there any evidence, at any site, of an economic decline following initial settlement, which would have shown up as a falling off, or a gap, in the ceramic record. Where the archaeological record stretched back to the thirteenth century, which it did at a number of sites in Malangke, it did so with no visible chronological gap in the sherdage. Instead, ceramic imports appear to have grown apace from 1300 onwards (Appendix: Figure A-1). From this evidence it would appear that the kingdom of Luwu is no older than some other Bugis kingdoms, and that the rise of the Bugis kingdoms, whether their economies rested on agriculture or trade, or on a combination of the two, was due to a general change in economic conditions in the second half of the thirteenth century AD.

The single coastal sites in Luwu that produced abundant ceramics significantly earlier than the fourteenth century is Tambu-Tambu in Wotu. Tambu-Tambu is the only place that OXIS excavated or surveyed in Luwu which provided significant evidence of long distance trade starting by the early thirteenth century. Tambu-Tambu lies close to the small town of Wotu, which sits at the foot of a trade route leading north from the Gulf of Bone across the central highlands to the Pamona-speaking regions of Central Sulawesi and further north to Poso. Tambu-Tambu yielded larger amounts of thirteenth to fourteenth century sherdage than did any other site in Luwu (Figure 2-3), and the variety of broadly Yuan wares strongly suggests substantial settlement by *c.*1200. As predicted in OXIS' working hypotheses, Wotu was evidently an established trading polity before the arrival of the first Bugis at Malangke. Only later, perhaps in the fourteenth or fifteenth century,

was Wotu loosely incorporated into the kingdom of Luwu, not as a tributary but as a partner kingdom (Caldwell and Druce 1998:57). Linguistic research is necessary to establish whether Tambu-Tambu should be interpreted as representing a settlement of traders from Selayar (or possibly from Buton) who settled at Wotu in order to trade with the Pamona of Central Sulawesi. Nevertheless, the evidence from Tambu-Tambu demonstrates the existence from at least *c.*1200 until the present day of a prosperous settlement of ancestral Wotu speakers trading hinterland produce from as far inland as Lake Posso in Central Sulawesi, in exchange for beads, ceramics and other manufactured goods.

Wotu has a mythologized topography which is remarkably similar to the mythologized topography of Cerekang-Ussu. In Wotu's mythologized topography, the nearby hill of Lampenai (which provides a useful landmark for sailors approaching the coast) is the structural equivalent of the hill Pensimewuni in the origin myth of the Bugis-speaking settlement of Cerekang. According to informants at Wotu, Bataraguru, the son of the ruler of the upper heavens, is supposed to have descended on the summit of Lampenai, accompanied by a retinue of slaves and followers, and there opened the world's first cultivated field. Several other Wotu sites are also identified with the characters and events of the La Galigo. Logic suggests that this mythologized topography represents a borrowing or imitation of Bugis traditions, or that the Bugis of Cerekang (and elsewhere) have borrowed and adapted a Wotu mythology, or that both the Bugis and the people of Wotu have adopted a mythology common to the eastern coast of the Gulf of Bone. For various reasons, including the fact that the creation sections of the La Galigo are set in an essentially non-Bugis-speaking area of Luwu, we are inclined to the view that the Luwu Bugis, who appear to have moved into the Gulf of Bone after *c.*1300, have adopted their creation mythology from an older, local mythology.

Katue was the other Luwu site which produced evidence of considerable trade significantly earlier than the fourteenth century. The people of Katue were engaged in trade, including, it would seem, the export of iron ore from the Nuha region. Radiocarbon dates from Katue are problematic, but the glass beads recovered from the site indicate an occupation date prior to *c.*1000. However, we should be cautious in identifying the trade at Katue with an 'Age of Galigo'. Katue was probably a Bajau settlement (there is evidence of a historical Bajau presence all along the eastern coast of Luwu), or a Padoe settlement with a sizable Bajau population. The site produced no evidence of cremated burials, which are the classic markers of Bugis settlement, nor did the Bugis of Cerekang, who jealously guard what we believe to be their historical sites, have any knowledge of Katue, other than as the place where they lived before the Netherlands Indies government moved the settlement of Katue to its present roadside location at Cerekang. Significantly, the quantities of trade goods recovered at Katue suggest a very much smaller volume of trade than do post-*c.*1300 trading sites elsewhere in Luwu. We therefore believe that Katue is best interpreted as providing evidence of Bajau involvement in long-distance trade along the coasts of South and Southeast Sulawesi in the first millennium AD, before the arrival on this coast of the Bugis.

3.3 Iron smelting in Luwu

One of OXIS' key aims was to establish the date of the start of the large-scale export of iron from Matano. The bulk of the iron smelted at Matano was presumably exported to Java, which is generally poor in iron deposits. In Java, the name Luwu is associated with iron and kris. Garrett and Bronwen Solyom (1978:5,18) discuss *pamor* Bugis or *pamor* Luwu, which Javanese informants describe as being 'rough and sharp to the touch, but of a more uniform grey and thus less "alive"' than Javanese *pamor*. These scholars favour a mid-fourteenth century development of the kris, and its expansion to the outer islands in the fifteenth century.

OXIS' working hypotheses named iron as an important element in the expansion of the Bugis into the Gulf of Bone. When one considers the scarcity of iron in Java, and the early contacts between the Bugis and Majapahit Java (discussed below), it seems reasonable to assume that a trade in iron, which is plentiful in the mountainous highlands of the Gulf of Bone, played an important role in the economy of early Luwu. The local Bugis term for Luwu iron, *bessi Ussu',* or Ussu iron, points to Matano as the likely source of Luwu's iron, and Cerekang as the coastal settlement from which it was traded.

The idea that the Bugis settled first in the Cerekang-Ussu region in order to establish trading relationships with the iron smelters of Matano (as suggested by the reputed precedence of Cerekang over later palace sites) was, however, not supported by the radiocarbon dates from Matano. The dates obtained from charcoal associated with iron smelting at Kampung Matano showed that smelting started no earlier than the late fifteenth century. These dates all fall within a wide plateau in the calibration curve which lies between approximately 1480 and 1630 (Stuiver and Pearson 1986:Figure 1A). If the true age of any of the charcoal samples were older than *c.*1480, this should be reflected by determinations which cross into an earlier plateau in the calibration curve between 1280 and 1380, or which include the curve's sharp step between 1280 and 1380 (Stuiver and Pearson 1986: Figure 1B). In no instance is this the case, which suggests that all the radiocarbon determinations from Matano do in fact belong to the 1480-1630 plateau. Iron smelting could thus have started at Matano anywhere between *c.*1480 and *c.*1630, but a date at the earlier end of this range is indicated by the 120 ceramic pieces collected in a systematic surface survey of the village, which included a few pieces of sherdage attributable to the fifteenth to sixteenth centuries. However, the bulk of the iron smelting clearly took place after 1600, as indicated by the fact that approximately 90% of the collected and excavated *keramik* postdate the seventeenth century (Appendix: Table A-1). We conclude from these data that iron smelting started at Matano around 1500, or perhaps a little earlier.

Kampung Matano does not, however, mark the origin of iron smelting in Luwu. Charcoal from the lowest unit of square 1 at Pontanoa Bangka returned a radiocarbon date of AD 410-660. This suggests that iron was lightly processed on the north-west coast of Lake Matano as early as the mid-first millennium, roughly one thousand years before smelting began at Matano. Although no smelted iron was found in this square, the charcoal was associated with plentiful ironstone (*batu*

besi). The largest deposit of charcoal (461 grams) was from the middle levels of the test pit, in unit 7. This produced a radiocarbon date falling within a plateau between the tenth and twelfth centuries, suggesting that processing of iron ore continued into the early second millennium AD. In addition, the coastal settlement of Katue, at the foot of the trade route down from Matano, produced evidence of the entire process of the smelting of iron ore, which was presumably brought down from the shores of the lake. Katue yielded three carbon dates between *c.*100 and *c.*1000, consistent with occupation during much of the first millennium. The iron smelting at Katue perhaps belongs to the second half of the first millennium, although this cannot be demonstrated. However, it certainly does not belong to the second millennium, during which period Katue yielded only a small number of ceramics, all dating from the seventeenth to twentieth centuries and indicative of reoccupation or reuse of the site after its abandonment around the end of the first millennium.

Nuha and Sukoyu, two sites on the northern shore of Lake Matano, bridge the evidence of the desultory processing of iron ore at Pontanoa Bangka during the first millennium, and the full-scale smelting industry at Kampung Matano in the second half of the second millennium. Both Nuha and Sukoyu produced evidence of sustained iron smelting throughout much of the second millennium. Nuha's location at the foot of a trail leading north to the Mori heartlands points to its inclusion in a trade network centred on an area lying between the Lemo valley and the River La in Central Sulawesi (David Henley pers. comm.). In the early twentieth century, iron smelted at Nuha was traded northwards to the Lemo valley, and exported from the Bungku coast, mainly to eastern Indonesia (Sarasin and Sarasin 1905:305; Grubauer 1913:59; Reid 1981:12). On the other hand, Matano's location at the western end of the lake is the logical place for a smelting centre exporting southwards via the Gulf of Bone. Matano lies at the head of a well-used trail, which leads, via Bonepute, Laroeha and Turungang Damar, down to the deep water pool at Cerekang, a Bugis outpost strategically located in the complex of deep water bays in the Malili region. This trail, or set of trails, leads down through rolling hills and farmland, and may well date back to the initial settlement of the area around 2,000 years ago. Matano's later economic importance within the kingdom of Luwu is reflected by its position in the Tributary and Domain List of Luwu, immediately following Luwu's core polities (B. *ana' tellu*) of Bua, Ponrang and Baebunta (Caldwell 1988:77), as well as in a number of oral traditions recorded in Bugis manuscripts.

In summary, the archaeological evidence from the Matano region suggests a knowledge of iron processing among the traditional inhabitants, the Mori, and their direct ancestors, as early as the mid-first millennium. First-millennium iron smelting and the export of iron, whether in the form of tools or weapons or as iron ingots, is evident also at Katue, on the coast of the Gulf of Bone. By contrast, commercial, export-oriented iron smelting at Kampung Matano started only at about 1500, and the main period of the iron smelting and working industry there dates to the seventeenth and later centuries. Matano iron may have been characterised by traces of chromium rather than nickel, as commentators have tended to assume. The secret of Matano's economic success appears to have been the high quality of its iron, perhaps enhanced by a small quantity of chromium contained in the ore. Writing in the seventeenth century, Rumphius declared that the iron produced at Lake Matano was worth six swords from Bungku, 'because they damascene repeatedly, they know how

to work the iron in such a way that it becomes almost steel' (Beekman 1999:238). In the following century, Blok (1759:75) wrote of Luwu: 'The country is very fertile in Paddy and Sago; and produces very good iron.' As late as the early twentieth century, iron tools made at Lake Matano were traded as far as to Maluku, and lake Matano iron ore was exported as far as northern Sumatra (Bronson 1992:92).

3.4 The 'La Galigo model' of the origin of Luwu

Cerekang and Ussu are Bugis-speaking settlements in the remote, Mori-speaking, eastern corner of the Gulf of Bone. The settlements, which lie about ten kilometres distant, can be viewed as a single ethnic and cultural complex: Cerekang is located on a small, deep water harbour and Ussu sits on a valuable patch of fertile land in an otherwise agriculturally unproductive region. The modern settlement of Cerekang sits at the junction of the Palopo-Malili road and the Cerekang (or Lakanai) river, at the foot of a sacred hill, Pensimewuni. According to tradition, on the summit of Pensimewuni is a clearing which never needs sweeping, and on which there are various stone 'tools' (*alat*). This is the hill on which Bataraguru, the founder of the Luwu dynasty in the La Galigo, descended to earth, and where his palace once stood. To the northwest of Pensimewuni runs a sacred stream, the Wae Mami, which originates from a spring some distance to the north. Water from this hill is used in rituals, and was recently taken to Palopo to consecrate the new palace. The hill, the river and a dozen or more sites in the surrounding forest, are associated with characters and events of the La Galigo and are guarded by an exclusive and impenetrable mystic group of perhaps 20 or so Cerekang families, centred around a male and female *Pua'* (B. 'father/mother', an appointed ritual office). Near Cerekang, the first field, Ennungnge, was supposedly opened, and the giant Welenreng tree was felled to make Sawerigading's ships.

The forests surrounding Cerekang produce wood, dammar and rattan. Sago was until recent times the staple food and sago palms still grow wild in the swamps. From Cerekang it is possible to sail to Malili via a system of waterways which run through the mangrove swamps. Before the construction of the Palopo-Malili road during the Dutch period, these waterways would have been the chief means of communication with Malili. At high tide the water in the large pool by the hill at Cerekang is five *depa* (three fathoms) deep and would have made an excellent harbour for small sea-going vessels, which even today come up the river as far as the bridge that now blocks entry to the pool. According to local informants, in the pre-Dutch period, weapons and other iron goods manufactured in Matano were brought down to a site called Turungang Damar, a kilometre or so upstream of Cerekang, at the point where the river shallows.

The widespread belief in Luwu that the origins of the Bugis kingdom lie at Cerekang is based on the early sections of the epic poem La Galigo. While the topography of the La Galigo is extremely vague, it is widely held by the Bugis of Luwu (and elsewhere) that the early events of the La Galigo, from Bataraguru's descent into the world through to Sawerigading's departure to Cina, took place at Cerekang and at neighbouring Ussu. Today, Cerekang is considered to be the 'hidden centre' (B. *posi' malinrung*) of the former Bugis kingdom of Luwu. The *Pua'* of Cerekang, who rarely leave their houses, are considered to be the structural equivalents of the Datu Luwu, who resides at the visible centre (B. *posi' talle'*) of the kingdom. There is a saying, both in Cerekang and

in Palopo, that: 'When the Datu Luwu enters Cerekang he is no longer Datu'; that is, when he enters Cerekang he enters the realm of a ruler of similar status.

Because the OXIS team was barred to excavate on any of the sacred sites, it was hard to get any substantial archaeological data from Cerekang. The evidence that the OXIS team was able to get indicates a Bugis settlement dating from the seventeenth century. The important Early Metal Phase site at Katue (B. 'the old settlement') was unknown to informants at Cerekang, who knew it only by its much later (seventeenth to twentieth century) reuse as an occupation site. Furthermore, the world's first field, Ennungnge, which was supposedly opened by Bataraguru's *oro'* (B. 'aboriginal') slaves, and which lies directly east of Katue, shows clear evidence of having been abandoned (probably about the same time as Katue) within the last hundred years (Geoff Hope pers. comm.). Another site, Kuburan Ussu, which is today a graveyard, was, we were told, formerly a sacred site, and when excavated yielded quantities of pre-Islamic ceramic burial goods. Sacred sites can thus be created and forgotten, in a pattern common to people whose cultural traditions are preserved and transmitted orally.

To sum up the findings from Turungang Damar, Katue and Poloe (the three sites we were allowed to excavate on the Cerekang river), the OXIS team found evidence of non-Bugis occupation during the first millennium at Katue, and evidence of Bugis occupation from the seventeenth to early twentieth century at Katue and Poloe. The much-disturbed site at Turungang Damar also showed evidence of its use as a trans-shipment point from about the sixteenth to twentieth centuries. There is, therefore, a gap in the archaeological record along the Cerekang river from *c.*1000 to *c.*1500 which overlaps both the hypothesized 'Age of Galigo' (1100-1300) and the early historical period (1300-1600). The archaeological record is at present silent on the possibility of occupation during these two periods.

Evidence from surrounding settlements, however, suggests a fourteenth century coastal occupation by the Bugis, three to four hundred years after the abandonment of Katue by its Bajau or Padoe occupants. Evidence for this comes from Ussu and Malili (Salabu and Patande). Just one piece of fourteenth century ceramic was identified at Ussu, and a single piece of fifteenth century ceramic from the latter settlement. At both settlements combined (Appendix: Tables A-2) the OXIS team found a total of ten pieces of fifteenth to sixteenth century ceramics, eight pieces of sixteenth century ceramics and seven pieces of sixteenth to seventeenth century ceramics, including Swatow. The pattern from Lake Matano, Cerekang-Ussu's main trading region, suggests a gradual increase over the same period, namely five pieces of fifteenth century ware, four pieces of fifteenth to sixteenth century wares, 11 pieces of sixteenth century wares and 20 pieces of sixteenth to seventeenth century wares (Appendix: Table A-1). Dividing the sherds from the whole century categories equally between the dual century categories, we get the following result:

$14^{th}/15^{th}$ cent.	$15^{th}/16^{th}$ cent.	$16^{th}/17^{th}$ century
2	24.5	36.5

The similarity of the age span and distribution of ceramic sherdage from Lake Matano, Ussu and Malili suggest that a similar pattern would have been found at Cerekang had the OXIS team been allowed to excavate at old occupation sites. The major occupation at Bola Merajae, near Ussu, fell within the same period as the onset of occupation is dated by the radiocarbon method to between

the thirteenth and the fifteenth centuries. Ussu and Cerekang form a single, symbiotic, ethnic and cultural complex, and it is unlikely that Bugis settlement was older at one than at the other. Cerekang's economic function within the kingdom of Luwu (and the reason for its settlement by the Bugis) was presumably as a trade terminus for the export of iron from Matano. The founding population could have come from Malangke; there is textual evidence that Cerekang was ruled by a member of Luwu's ruling family (Caldwell and Druce 1998:31). The sacred sites of Cerekang and Ussu (as evidence from the former sacred site of Kuburan Ussu indicates) are likely to be old occupation and activity sites belonging to the period when Luwu's palace complex was at Malangke, before its rulers converted to Islam and the palace centre moved to Palopo.

3.5 The autonomous history of Baebunta

Local traditions maintain that the kingdom of Baebunta was originally an independent Lemolang polity, which once rivaled Luwu, of which it later became part (Caldwell 1991:117). OXIS' archaeological evidence shows that Baebunta (a polity represented by a complex of sites) is considerably older than Luwu, and strongly suggests that its rise to prosperity after *c.*1400 (the Pinanto site) was due to its relationship with the Bugis at Malangke.

The occupation history of the older Sabbang Loang site goes back to the early Bronze-Iron Age, approximately 2,000 years ago, as evidenced by the set of radiocarbon dates associated with one of the large earthenware jar burials. The economy of this early Palaeometallic settlement would presumably have been based on shifting agriculture, but an obsidian flake and a single glass bead (and reports of beads found in association with some large burial jars) provides evidence of trade with other parts of the archipelago. The establishment of Lemolang-speaking communities on raised ground where the Rongkong and Baebunta rivers meet the coastal plain suggests that hinterland produce was collected by the Baebunta traders for onward distribution.

The main craft specialization of pre-Islamic Baebunta was the working of iron, which was probably brought down the Rongkong valley from sources in the Limbung valley. The appearance in the fourteenth century at Pinanto of a Lemolang-speaking polity with economically important trading links to other parts of the archipelago is contemporary with the inception of the Bugis settlement at Malangke around 1300. Likewise, the evident early seventeenth century shift of the Pinanto palace centre to Tirosoe, and thence to Benteng Baebunta, is contemporary with (and may have been a response to) the early seventeenth century shift of the Bugis palace centre from Malangke to Benteng Tompottikka, now the southern suburbs of Palopo.

The population of Baebunta would have been much smaller than the population of Malangke. Consideration of the area under occupation, and the likely number of burials, suggests a community of about a thousand people at Baebunta during the fifteenth to sixteenth centuries, including a number of specialist ironworkers in Pinanto.

3.6 The expansion of agriculture in the western Cenrana valley

OXIS' research confirmed both the existence of the kingdom of Cina and the location of its palace sites at Sarepao and La Pauke'. Owing to a lack of time, the single square excavated at Allangkanangnge ri La Tanete (Cina ri Aja) stopped at an eleventh to twelfth century layer, which showed no reduction of earthenware sherdage or faunal refuse. However, only younger ceramic sherds were obtained by surface collection. It is possible that this occupation site dates back well into the Bronze-Iron Age, prior to the importation of *keramik* to South Sulawesi in archaeologically visible quantities. This would not be surprising, as Cina lies in the Bugis heartlands around Lake Tempe.

As discussed below, it seems clear that Cina was not a trade-based kingdom, but that its political economy was based upon wet rice agriculture. The La Galigo's depiction of Cina as a trade- based kingdom lying within reach of sea-going vessels is wrong, at least to the extent that it refers to the thirteenth century and later. The La Galigo (and modern tradition) is, however, correct in identifying Allangkanangnge La Tanete (B. 'The palace complex on the hill ridge') as the main palace site of Cina. Apart from the impressive evidence of the *keramik* and earthenware sherdage found there, the detailed and persistent oral traditions of the immediate area, including the remembered location of the pre-Islamic cremation site at Sarepao, at the eastern foot of the hill, provide solid evidence of the identification.

The archaeological evidence from the Cina palace sites shows that by the thirteenth century a substantial population with an elite element had established itself at Allangkanangnge ri La Tanete. The settlement continued to maintain its importance until the sixteenth century, at which time a second settlement, Cina ri Lau' was established at La Pauke', about six kilometres to the southeast, and the population at Allangkanangnge ri La Tanete stabilized. The sheer variety and wealth of sherdage from Allangkanangnge ri La Tanete can only be accounted for by assuming continuous occupation by a sizeable and wealthy elite. However, the political crises of the seventeenth century led to the abandonment of both the La Pauke' site and Allangkanangnge ri La Tanete in the second half of the same century.

The co-directors of OXIS had previously proposed that the ancient kingdom of Cina was either centred on a pair of hills, locally called 'upper Cina' and 'lower Cina', near the mouth of the Cenrana river (Caldwell 1988:Figure 5-2), or that the western and eastern palace centres of Cina lay at either end of the Cenrana valley (Bulbeck 1996-97). The fieldwork described here refutes both these proposals. Excavations of the supposed 'palace site' on the summit of the larger hill near the mouth of the Cenrana river revealed shallow sterile soils down to a loose limestone bedrock at 0.5 metres (Bulbeck 2000), while the 'flattened' summits of both hills can be best explained as a product of geologically recent times when the hills lay under a shallow sea (Malcolm Lillie, pers. comm.). Excavations at Istana La Patau', on the northern bank of the river, likewise indicated late pre-Islamic (*c.*1500) settlement by a Bugis elite. The archaeological evidence thus agrees with tradition in finding that Cina has always been based in the Pammana region, on the low hills near the junction of the western Cenrana valley and the Tempe depression. This will not come as any

surprise to scholars who have endorsed the traditional view that Cina's dual palace centre lay here at Sarepao and La Pauke' (e.g. Zainal Abidin 1983; Pelras 1996:60-61).

What is surprising is the unequivocal evidence that the existence of east and west palace sites would seem to be mainly, or even entirely, a sixteenth to early seventeenth century phenomenon. Scanty evidence allows the possibility of incipient fifteenth century use of the Cina ri Lau' site at La Pauke', but there is no mistaking the dominance of sixteenth to middle seventeenth century tradewares (Figure 2-7). Furthermore, any suggestion of a wholesale shift of Cina's palace centre from Sarepao to La Pauke' would be refuted by the tradeware data. Allangkanangnge ri La Tanete remained under continuous occupation until the late seventeenth century, by which time the settlement at La Pauke' had also been effectively abandoned. The sixteenth to seventeenth century assemblages at both sites are quite modest compared to those at nearby, contemporary palace centres such as Watassoppeng (Kallupa *et al.* 1989:18-22) and Tosora (Kallupa 1984-85; Darmawan *et al.* 1993). Although Cina retained some nominal independence as an autonomous kingdom that ruled over Pammana (Zainal Abidin 1983:220), it was by then a mere pawn in the regional struggle for power being played out between Bone, Wajo and Soppeng, the three most powerful Bugis kingdoms of the terminal pre-Islamic and early Islamic period.

The occupation history at Istana La Patau' intersects with Cina's later history. At approximately 1500, three (presumably related) events occurred: La Pauke' was established as a major settlement, Luwu lost its Lake Tempe settlements to the rising kingdom of Wajo, and Luwu established or further developed a fortified settlement at Cenrana, near the mouth of the Cenrana river. It is interesting to note that Luwu's subsequent expulsion from Cenrana by Bone in the 1560s had no archaeologically observable repercussions on Cina's demographic history, presumably because the kingdom adjusted itself successfully to the changing political environment. However, Bone's occupation of Cenrana (following a series of campaigns) does appear to have spelled the demise of Cina (Figure 2-7). During the reign of Arung Palakka in the last decades of the seventeenth century, Bone was especially harsh on its traditional adversary, Wajo (Andaya 1981). Bone's campaign against Wajo evidently created conditions intolerable for the continued occupation of Cina's two socio-political centres. The final demise of Cina can be dated archaeologically to the late seventeenth century, although the kingdom had been of minor regional significance for at least two centuries before the abandonment of La Pauke' and Allangkanangnge ri La Tanete.

When was Cina established? The evidence of imported Chinese and Southeast Asian ceramic sherdage at Allangkanangnge ri La Tanete points to the thirteenth century AD. Unfortunately, the single test pit was excavated only as far as a level yet to show any diminution in the earthenware sherdage or quantity of faunal refuse. That level may well be representative of the earliest habitation at the site associated with imported ceramics, but there could have been earlier, late prehistoric occupation corresponding to a time before imported ceramic tradewares figured significantly among the exotic goods traded to South Sulawesi. Specifically, the excavation stopped above the eleventh to thirteenth century levels when, according to Pelras (1996), Cina would have had a close relationship with protohistorical Luwu, as reflected in the La Galigo. Research in progress by Caldwell indicates that Luwu had a major presence in the western Cenrana valley

during the fourteenth and fifteenth centuries. If so, this should be sufficient to account for the Luwu-Cina nexus depicted by the La Galigo epic. However, an earlier establishment of an agricultural polity at Allangkanangnge ri La Tanete and, indeed, an earlier relationship with the trading coast of Luwu does not lie beyond the realms of possibility. This possibility could only be investigated through more extensive excavation at Allangkanangnge ri La Tanete, and systematic investigation of Luwu's ancient possessions near Sengkang in the Tempe depression.

3.7 The origins of Luwu in the Cenrana valley

In this penultimate section, we will attempt to combine the findings and interpretations offered above with evidence from Bugis texts to produce a single, new, and radically different account of the origin and early development of Luwu, which begins not in the east at Cerekang and Ussu, but in the west, on the margins of Lake Tempe.

When speaking of the 'origin' of Luwu, a distinction should be made between particular events which may have given rise to the polity known under that name since at least the sixteenth century, and the system of political relationships found across South Sulawesi and, indeed, in some form throughout most of the societies speaking Austronesian languages. Just as the Austronesian languages can be seen, very broadly, as a series of linguistic transformations, so other cultural features can be seen as cognates of each other. At the most basic level, this system of political relationships involves competition for precedence and requires the concept of social inequality or asymmetry. As Bellwood has pointed out, this view of political relationships (often associated with a stress on origins and various metaphorical expressions of this) is well suited to setting up new settlements. A further consequence is the easy movement of power from one place to another, since power rests in the quality of particular individuals, rather than any localized expression of legitimacy (Bellwood 1996).

Our new account of the origin and early development of Luwu is as follows. By the mid-thirteenth century, small Bugis trading settlements had grown up on the southwest margins of Lake Tempe, close to the Cenrana river at the point where it turns sharply southward before turning southeast down the Cenrana valley. Chief among these settlements were Wage, Tempe, Sengkang and Tampangeng. These settlements had established commercial relations with Javanese traders, who were calling in increasing numbers at the south coast Makasar kingdoms of Binamu and Bangkala and Bantaeng *en route* to the Moluccas (Bougas 1998; Bougas and Caldwell in preparation). The Javanese traders offered Indian cottons and Chinese and Southeast Asian ceramics in exchange for rice, forest products and iron. Rice could be supplied from the rising agricultural polity of Cina, a dozen kilometres south of Sengkang. To obtain iron, which was needed also for clearing the forests and expanding and intensifying agriculture in the western Cenrana valley, the Lake Tempe Bugis had developed trading relations with indigenous polities on the western and northern coastline of the Gulf of Bone.

By the late thirteenth century, a number of Lake Tempe Bugis had settled semi-permanently at Malangke, while other Bugis settlements had possibly sprung up at Bua and Ponrang, south of Palopo, at the foot of important trade routes out of the Makale and Rantepao valleys. The Bugis settlements in and around the Gulf of Bone were founded on, and maintained by, mutually advantageous trading relationships between the Bugis and upland societies (cf. George 1996).

This interpretation has the virtue of fitting all the archaeological data and explaining a number of curious historical facts. The first is that the rulers of Cina traced their lineage back to the same *tomanurung* (B. 'heavenly descended progenitor') as did the rulers of Luwu. No other Bugis kingdoms shared a *tomanurung* progenitor: on the contrary, a kingdom's claim to political autonomy was symbolised by the possession of its own, unique *tomanurung*. Support for our identification of Simpurusia, Luwu's founding *tomanurung*, as a Lake Tempe figure is provided by a manuscript in the Makassar National Archives, which describes how Simpurusia was invited to become the first ruler of Cina by its people (microfilm roll 12, item no.8). That the three-generation genealogy of the descendents of Simpurusia, which heads the Cina and Luwu king lists, was known in the western Cenrana valley is suggested by a chronicle of Wajo in which Simpurusia's granddaughter, We Matengngaempong, marries the son of the ruler of Pammana, Cina's political successor in the western Cenrana valley (Noorduyn 1955:159).

The genealogy of the rulers of Cina (Caldwell 1988:88) starts with the following passage:

> Tania upomabusung \ llakke'lakke' wija toma[ng]kau' \ manurungngé \ riaseng Si[m]purusia \ yi[a]na tti[m]pangngi Lo[m]po' \ nano'na \ tti[m]pangngi Talettu' \ nato[m]po'tonasa \ Da La Akko \ nayi[a] ri Luwu' naissengngi wawinéna \ to[m]po'é ri Luwu' \ llao mano'ni \ Si[m]purusia ri Luwu' \ napoléini wawinéna \ ripa'datu ri Luwu'é
>
> May I not swell for setting out in order the descendants of the lord who descended, called Simpurusia. He opened Lompo' and then he went down and opened Talettu'. Then Da La Akko arose in Luwu. When he knew that his wife had arisen in Luwu, Simpurusia went down to Luwu to meet his wife, and was made ruler of Luwu.

This passage tells us a number of significant things: firstly, Simpurusia, who heads the King List of Luwu and also a three generation myth of Luwu's founding family (Caldwell 1988:26-47), was the *tomanurung* progenitor of the rulers of Cina. Secondly, the passage states that Simpurusia 'went down to Luwu' to meet his wife, Da La Akko – that is, he journeyed to Luwu to meet her. Thirdly, it tells us that only after they were married did he (or possibly 'they') become ruler of Luwu.

Importantly, the passage also tells us that Simpurusia had earlier founded the settlements of Lompo' and Talettu'. These two settlements were almost certainly close to Sengkang, on the western edge of Lake Tempe. *Lompo'* is a Bugis word meaning 'field, plain'. It is not, however, a common place name. A search of the catalogue of the 4,000-odd manuscripts in the National Archives in Makassar reveals only one entry bearing this name, a text containing the wise advice (*pesan-pesan*) of an Arung Lompo. This text is associated in its codex with texts on Wajo,

Pammana and Timurung, which suggests that Lompo' lies in the western Cenrana valley. A search of Dutch maps of the 1930s reveals a settlement named Lompo just north of Sengkang (it has since been absorbed by the expanding town), and the largest hill in Sengkang is also called Bulu Lompo. On Dutch maps this hill is called Patiro Sompe' (B. 'looking at sailing away'); it is the hill on which, in the La Galigo, I Monno stood, crying and stamping her feet, as she watched her husband sail away with her son (Koolhof 1999:383). Until the 1970s, the summit was a sacred site (Lineton 1975) but in recent years two large radio communication towers have been built upon it. Although the OXIS team was unable to identify Talettu', the southern suburb of Sengkang, which lies on the northern bank of the Cenrana river, has the same unusual name, Amasengngeng, as does the current harbour at Malangke.

Importantly, our new understanding of the origins of Luwu also accounts for the tradition that Wage, Tempe Sengkang and Tampangeng, all of which lie well to the southwest of Luwu's historical borders, were its most ancient constituent tributaries, the 'lands *which are kept'* (our italics) or 'the lands that came down from Majapahit' (Zainal Abidin 1985:202; Caldwell 1988:41). Wajo's seizure of these lands from Luwu around 1500, when Luwu was still a power to be reckoned with, was in part a consequence of the remoteness of these settlements from the main body of Luwu, as well as a reflection of Wajo's growing power and confidence. The settlements of Wage, Tempe Sengkang and Tampangeng lie approximately ten kilometres or less from Cina's western palace centre, Allangkanangnge ri La Tanete.

Other Bugis historical texts tell us of the close relationship between the western Cenrana valley settlements and the coastal Bugis settlements of Luwu. The Royal Genealogy of Cina (Caldwell 1988:81-99) records at least two marriages between the ruling families of Cina and Luwu. The first is associated with La Pabaturi, who, by backdating using standard 25 year average reign lengths, can be estimated to have ruled *c.*1365-*c.*1390. The text reads:

> Ana'daranna \ La Pabaturi \ riasengngé \ Wé Teppedirona[59] \ mallakkai \ ri Balubu \ siala \ La Palibureng \ ana'ni \ To Pajung La Usa \ aseng ri ana'na \ yi[a]na [n]réwe' ri Luwu' \ ma'bawiné
>
> La Pabaturi's sister, who was called We Teppodinro, married at Balubu with La Palibureng. Their child was La Usa; To Pajung ['Father of the Ruler of Luwu'] was his teknonym. He returned to Luwu to marry [i.e. the list of his descendents may be found in Luwu].

The second recorded marriage is with the son of the subsequent ruler of Cina, La Panyorongi, who ruled *c.*1390-*c.*1415.

> La Térénga \ ana'na \ La Panyorongi \ ma'bawiné \ ri Luwu' \ siala \ Wé Apunana[60] \ ana'ni \ Te[n]riadudu \ ana'ni \ La Sappé

[59] An alternative reading of We Teppodinro is followed in the translation.
[60] An alternative reading of We Aputtana is followed in the translation.

La Terenga, the child of La Panyorongi, married at Luwu with We Aputtana, and their children were [We] Tenriadudu and La Sappe.

The point to emphasize here is that no other royal genealogy from any South Sulawesi kingdom records marriages with the royal family of Luwu. The fact that We Teppodinro's grandson (as indicated in the first marriage, above) became the Datu Luwu indicates that the ruling family of Luwu recognised the ruling family of Cina as its equal in status. This is because the status of a Bugis individual was largely determined by his mother's status (cf. Chabot 1950:91,96). Had We Teppodinro been of lower status than La Paliburung (who was evidently a high status member of Luwu's ruling family) it would have been unlikely that her grandson would have ascended the throne of Luwu, as the example of the second ruler of Bone clearly shows (Caldwell 1995:405).

3.8 A new chronology for South Sulawesi

We conclude by setting out a new chronology to replace that based on Pelras (1996) (Section 1.5). In the right-hand column we have entered the key economic, social and political developments in South Sulawesi for each period, in a broadly chronological sequence (cf. Gruin 1975). This new chronology will be explored in detail in future publications.

*c.*300 BC	Bronze-Iron Age (Van Heekeren 1958) *or* Palaeometallic Age (Sutayasa 1979) *or* Early Metal Phase (Bellwood 1997)	Luwu sparsely populated by ancestors of today's indigenous peoples. Settlement of Mori around Lake Matano; smelting of iron at Baebunta c.AD 0. Processing of iron at Pontanoa Bangka; smelting and export of iron at Katue c.500. Bugis established on southern peninsula, c.1200 organised into a large number of small, independent chiefdoms based on swidden (shifting) and ladang (settled, dry-field) agriculture.
AD 1200	Proto-Historical Period	Intensification of trading relationships between Selayar and the east coast of Java. Settlement of ancestral Wotu speakers in Gulf of Bone. Start of import of Chinese and Southeast Asian ceramics. Bugis living on the western shore of Lake Tempe develop trading relationships with Java via the south coast Makasar kingdoms. Increasing demand for rice as a trade good stimulates the expansion and intensification of agriculture and forest clearance. South Sulawesi is incorporated in an international trading

		network focused on India and China via the northeast coast of Java and the southern Philippines. Bugis settlement at Malangke.
1300 1400 1450 1500 1550	Early Historical Period	Bugis begin to unite the Luwu region through trading alliances. Intensification of agriculture in the Cenrana and Soppeng valleys leads to political centralization. Rise of the first kingdoms; important cultural influence of Singosari-Majapahit Java; rulers of Luwu adopt Javanese-Sanskrit titles. Development of writing. An international 'trade boom' (Reid 1988) stimulates rapid expansion of Luwu's authority along the coasts of South and Southeast Sulawesi. Rise of new agricultural kingdoms of Ajatappareng, Bone, Goa and Tallo. Luwu reaches its peak of prosperity and power as a maritime trade-based kingdom claiming a monopoly on trade throughout much of South Sulawesi. Luwu's monopoly increasingly challenged by Wajo, Bone, and Goa and Tallo, now established as paramount powers in their respective regions. Luwu's ruler Dewaraja builds a fortified settlement at Cenrana; Wajo seizes Luwu's settlements at Lake Tempe. Dewaraja attacks Bone, is defeated and allowed to escape with just 20 men. Luwu attacks the emerging agricultural kingdom of Sidenreng with the aid of Wajo. Intensification of struggle for trading hegemony between Bugis kingdoms and the Makasar kingdom of Goa. Malay settlers arrive in Macassar. Guns are introduced. Luwu concedes control of the Cenrana valley to Bone. Fortified settlements are built in Macassar with walls able to resist cannon fire. Portuguese traders establish relations with Bugis kingdoms on the west coast. The rising power of Goa-Tallo leads to a defensive union of Soppeng, Wajo and Bone.
1600	Start of Early Modern Period	Arrival of Dutch; First Chinese junk calls at Macassar. South Sulawesi is incorporated in the global economy. Conversion of Bugis and Makasar elite to a world religion (Islam).

Appendix A. *Keramik* recorded in Luwu

Unless otherwise stated, the *keramik* or imported, high-fired ceramic specimens from Luwu were identified jointly by Bulbeck and Karaeng Demmanari at the Makassar Archaeology Office, using standard references, notably Guy (1986) and Harrisson (1990, 1995). Most of the 1,910 identifications reported here are taken directly from Bulbeck and Bagyo Praseyo's (1999) report to the Indonesian Institute of Sciences. Two sites near Malili, Kawasule and Warau, are reported here for the first time (Table A-2). Minor additions are made to the recorded finds at Rahampu'u 1 and Pinanto, following Bulbeck's inspection of the excavated materials. John Miksic (National University of Singapore) provided the identification of the *Ding* body fragment from the latter site. He also identified the two Pegu monochrome vessels represented in the Utti Batue *keramik* cache.

The analysis of the Utti Batue *keramik* cache was carried out by Bulbeck and Demmanari in February 2000 and is reported here for the first time. This very large cache is a mound of broken tradewares assembled by a local looter after he came upon them in the southern sector of the Utti Batue site. The OXIS survey archaeologists were permitted to carry away what they could carry of the cache; we estimate this to have been roughly one half. Hence the 29 grams of glass vessel and 31.4 kilograms of tradewares collected would correspond to an original mass of about 60 grams of glass and about 60 kilograms of *keramik*. The looter informed the OXIS archaeologists that the sherdage had all been recovered from a single locality. Several test bores in abutting localities at the site supported the looter's statement that these localities produced no sherdage except earthenwares. The concentration of *keramik* encountered by the looter could correspond to a designated secondary refuse location; an alternative explanation would be a single dumping event in the wake of a catastrophe, or at a time when the inhabitants laid plans to abandon the site. In either case, many of the vessels would be represented by multiple sherds. Bulbeck and Karaeng Demmanari thus decided to assign all the sherds to potentially distinct vessels, allowing estimation of the minimum number of represented vessels. This decision ensured that the vessel frequencies in the Utti Batue cache would not overwhelm the frequencies calculated for Malangke, and indeed for Luwu generally, due to the very large size of the sample. The estimated minimum numbers of vessels in the Utti Batue cache are listed in Table A-5.

In the interests of streamlining the data, the remaining *keramik* observed by OXIS members in Malangke are aggregated into (looted) vessels in the possession of villagers, pieces collected during the surface survey of (looted cemetery) sites, and sherds excavated from Pattimang Tua, Utti Batue and Dadekoe 2. The single twelfth to thirteenth century sherd was recovered during the surface survey of Tampung Jawa, where a thirteenth to fourteenth century *Dehua* whiteware sherd was also retrieved. Other particularly early tradewares include the three thirteenth to fourteenth century whitewares and the one similarly dated celadon from the small cemetery at Tompe, and the three sherds of thirteenth to fourteenth century *Dehua* whitewares collected during surface survey at Lindrunge and Pincang Pute. All other finds provenanced to a particular site date to the fourteenth century or later.

Tables A-6 and A-7 summarize the total identifications from the 1998 and 1999 field seasons in Luwu, plus a few sherds that had been collected by Willems at Sabbang Loang in 1938 and identified by Orsoy de Flines. The total counts are aggregated by 100-year interval between the thirteenth and fifteenth centuries, and by half-century intervals between the sixteenth and twentieth centuries. This is achieved by splitting every sherd evenly between each interval to which the sherd is dated, e.g., a fifteenth to sixteenth century Vietnamese blue-and-white sherd would be considered to represent half of a fifteenth century sherd, a quarter of a sherd dated to 1500-1550, and a quarter of a sherd dated to 1550-1600.

The aggregate counts conform to a pattern of exponential increase throughout the pre-Islamic period, and a sharp drop during the Islamic period. Figure A-1, which groups the counts by century interval, illustrates the pattern graphically. The exponential increase in *keramik* identifications between the thirteenth and sixteenth centuries evidently results from two factors. One is the growing availability of imported ceramics in Indonesia during the period (Guy 1986). The second is the growth in the economy of Luwu, as discussed in the text. The sharp reduction in *keramik* counts after the shift of the capital to Palopo should not, however, be interpreted as evidence of a collapse in the economy of Luwu, or a diminution of the authority of its palace centre. Rather, it reflects the success of the OXIS program in identifying and investigating pre-Islamic sites. One thousand one hundred and thirty six of the grand total of 1,910 identified *keramik* pieces (i.e. 59.5%) occurred in three sites and site complexes that were effectively abandoned at around 1600 or shortly afterwards, namely Malangke, Tambu-Tambu and Pinanto. A focus on predominantly Islamic-period sites, such as Benteng Tompottikka in Palopo, would have yielded a very different pattern of sherdage.

The aggregate counts per interval should not be treated as representing the pattern of long-term importation of high-fired ceramics into Luwu, even with respect to the pre-Islamic period (which constituted the focus of our research activities). However, they can be treated as the background against which to compare the sherdage frequencies from each site and site complex. For instance, the identifications from Lake Matano sites (Table A-1) suggest remarkably little pre-Islamic *keramik*, and an increasingly healthy representation of pieces between the seventeenth and twentieth centuries. The point is clearly illustrated by comparing the Lake Matano counts per interval (either a 100 or a 50 year period) with those recorded from the Luwu sites in general (Main text: Figure 2-1). These standardized chronological histograms demonstrate that very little of the *keramik* that arrived in Luwu in pre-Islamic times reached as far as Lake Matano. The Lake Matano histograms suggest an eighteenth century boom, but otherwise indicate that the communities based on the lake may have never been more populous, or enjoyed greater prosperity, than do the communities which live there today.

Table A-1. *Keramik* Recorded at Lake Matano

Keramik Category	Matano test pits	Matano survey	Pa'ang-kaburu	Pontanao Bangka/Sukoyu	Total
Guangdong martavan undateable	3	0	0	0	3
Coarse Red martavan 15th-16th centuries	1	0	0	0	1
Sawankhalok martavan 15th-16th centuries	0	1	0	0	1
Sawankhalok black-and-white 15th-16th c.	0	3	0	0	3
Ming blue-and-white 16th century	0	4	0	0	4
Ming Swatow blue-and-white 16th century	0	3	1	1	5
Ming Swatow red-green overglaze 16th c.	0	1	0	0	1
Ming Swatow plainware 16th century	0	0	0	1	1
Wanli red-green overglaze	1	0	0	0	1
Vietnam Brittleware *tempayan* 16th-17th c.	1	0	0	0	1
Swatow blue-and-white	0	9	0	2	11
Swatow red-green overglaze	0	2	2	0	4
Swatow monochrome	0	2	0	1	3
Transitional blue-and-white 17th century	1	8	1	0	10
Transitional whiteware 17th century	0	2	0	0	2
Transitional red-green overglaze 17th century	0	1	0	0	1
Thai Coarse Brownware 17th century	0	1	0	0	1
Qing plain 17th-18th centuries	1	0	0	0	1
Qing blue-and-white 17th-18th centuries	2	5	2	0	9
Vietnam red-green overglaze 17th-18th c.	0	0	1	0	1
Qing Kangxi blue-and-white	1	5	4	0	10
Qing blue-and-white 18th century	1	8	0	0	9
Qing *famille rose* 18th century	0	2	0	1	3
Qing blue-and-white 18th-19th centuries	0	4	0	0	4
Qing plainware 18th-19th centuries	1	4	0	0	5
Qing celadon 18th-19th centuries	0	1	0	0	1
Kitchen Qing blue-and-white 19th century	1	2	0	0	3
Qing plainware 19th century	0	4	0	0	4
European transferware 19th century	0	1	0	0	1
European cream-coloured ware 19th century	0	12	0	2	14
Chinese whiteware/plainware 19th-20th c.	0	2	0	0	2
Chinese whiteware 20th century	0	23	0	0	23
Chinese *famille rose* 20th century	0	2	0	0	2
Chinese decalware 20th century	0	2	0	0	2
European transferware 20th century	0	3	0	0	3
European stamped blue-and-white 20th c.	0	1	0	0	1

European decalware 20th century	0	3	0	0	3
European whiteware 20th century	0	1	0	0	1
Indonesian *keramik* 20th century	0	3	0	0	3
Total	**14**	**125**	**11**	**8**	**158**

Table A-2. *Keramik* Recorded at Ussu, Cerekang and Malili

Keramik Category	Ussu/ Taipa/ Malaulu	Cerekang Katue/ Poloe	Turunan Damar	Balambano/ Salabu/ Patande	Kawasule/ Warau	Total
Chinese/Vietnam *gusi* 10th-12th c. (?)	0	0	0	1	0	1
Chinese/Vietnam plate 11th-17th c. (?)	0	0	1	0	0	1
Dehua whiteware 14th century	1	0	0	0	0	1
Ming blue-and-white 15th century	0	0	0	1	0	1
Ming blue-and-white 15th-16th centuries	1	0	0	0	0	1
Vietnam red-green overglaze 15th-16th c.	2	0	0	0	0	2
Vietnam blue-and-white 15th-16th c.	0	0	0	2	0	2
Sawankhalok celadon 15th-16th centuries	0	0	0	1	0	1
Sawankhalok black-and-white 15th-16th c.	0	0	0	3	0	3
Sawankhalok martavan 15th-16th centuries	0	0	0	1	0	1
Ming blue-and-white 16th century	1	0	0	0	0	1
Ming red-green overglaze 16th century	1	0	0	0	0	1
Ming Swatow blue-and-white 16th century	1	0	0	2	0	3
Ming Swatow plainware 16th century	1	0	0	2	0	3
Vietnam underglaze green 16th-17th c.	1	0	0	0	0	1
Vietnam oliveware 16th-17th centuries	1	0	0	1	0	2
Swatow blue-and-white	1	0	0	1	0	2
Swatow red-green overglaze	0	1	0	0	0	1
Swatow whiteware	0	0	0	1	0	1
Wanli blue-and-white	0	0	0	0	1	1
Transitional blue-and-white 17th century	1	0	0	3	0	4
Transitional red-green overglaze 17th c.	0	0	0	0	1	1
Guangdong brownware martavan 17th c.	0	0	0	1	0	1
Coarse Brown martavan 17th-18th c.	0	1	0	0	0	1
Qing greyware 17th-18th centuries	0	0	0	2	0	2
Qing Kangxi blue-and-white	1	0	2	0	0	3
Qing blue-and-white 18th century	1	0	0	0	0	1
Qing blue-and-white 18th-19th centuries	1	0	0	2	0	3
European transferware 19th century	2	4	0	1	2	9
European decal/painted ware 19th century	0	1	1	0	0	2
European cream-coloured ware 19th c.	0	1	0	5	4	10
Qing red-green overglaze 19th century	0	1	0	1	0	2
Kitchen Qing blue-and-white 19th century	0	1	0	1	0	2
Qing celadon 19th century	0	1	0	2	0	3
Guangdong brownware martavan 19th c.	0	1	0	0	0	1

Qing whiteware 19th century	0	0	0	0	3	3
Qing *famille rose* 19th-20th centuries	1	0	0	1	0	2
Japanese stamped blue-&-white 19th-20th c.	1	0	0	1	0	2
Qing whiteware 19th-20th centuries	0	0	0	3	1	4
European decal/transferware 20th century	0	1	0	1	1	3
European painted polychrome 20th c.	0	1	0	0	0	1
European whiteware 20th century	0	0	0	5	1	6
Chinese red-green overglaze 20th c.	0	0	1	0	0	1
Chinese whiteware 20th century	7	0	0	11	5	23
Total	**26**	**14**	**5**	**56**	**19**	**120**

Table A-3. *Keramik* Recorded at Wotu and Tampinna

Keramik Category	Tambu-Tambu	Wotu township	Kande Api	Tampinna	Total
Guangdong unglazed 12th-14th centuries	1	0	0	0	1
Vietnam brownware 13th-14th centuries	1	0	0	0	1
Qingbai whiteware 13th-14th centuries	2	0	0	0	2
Dehua whiteware 13th-14th centuries	17	0	0	0	17
Yuan celadon 13th-14th centuries	10	1	0	0	11
Qingbai whiteware14th century	2	0	0	0	2
Yuan celadon 14th century	3	0	0	0	3
Dehua/Ming whiteware 14th-15th c.	19	0	0	0	19
Ming celadon/oliveware 14th-15th c.	3	1	0	0	4
Vietnam monochrome 14th-15th centuries	12	0	0	0	12
Vietnam unglazed 14th-15th centuries	6	0	0	0	6
Go Sanh Red martavan 14th-15th centuries	6	0	0	0	6
Vietnam Coarse red martavan 14th-15th c.	1	0	0	0	1
Vietnamese blue-and-white 15th century	0	0	0	1	1
Sawankhalok black-and-white 15th century	1	0	0	0	1
Ming whiteware 15th century	0	0	0	1	1
Ming whiteware 15th-16th centuries	4	0	0	1	5
Sawankhalok black-and-white 15th-16th c.	3	1	0	1	5
Sawankhalok celadon 15th-16th centuries	15	6	0	0	21
Sawankhalok martavan 15th-16th centuries	10	11	0	0	21
Thai Coarse Brownware 15th-16th centuries	2	1	0	0	3
Vietnam monochrome 15th-16th centuries	4	1	0	0	5
Go Sanh Red martavan 15th-16th centuries	1	0	0	0	1
Vietnam Coarse red martavan 15th-16th c.	8	1	0	0	9
Vietnam blue-and-white 15th-16th centuries	5	3	0	0	8
Ming celadon/oliveware 15th-16th centuries	9	6	0	0	15
Ming blue-and-white 15th-16th centuries	4	1	0	1	6
Vietnam blue-and-white 16th centuries	0	2	0	0	2
Ming blue-and-white 16th century	14	31	3	1	49
Ming red-green overglaze 16th century	0	0	1	0	1
Ming Swatow blue-and-white 16th century	6	9	0	7	22
Ming Swatow red-green overglaze 16th c.	1	0	0	0	1
Ming Swatow plain 16th century	2	1	0	3	6
Ming whiteware 16th century	1	6	0	0	7
Ming celadon/oliveware 16th century	1	0	0	0	1
Wanli whiteware	3	0	0	2	5

Wanli blue-and-white	2	28	2	4	36
Ming plain 16th-17th centuries	3	0	0	0	3
Ming celadon 16th-17th centuries	0	1	0	0	1
Vietnam unglazed/monochrome 16th-17th c.	1	2	0	1	4
Thai Coarse Brownware 16th-17th centuries	0	1	0	0	1
Swatow red-green overglaze	1	5	0	1	7
Swatow plainware	1	6	0	0	7
Swatow blue-and-white	0	17	3	12	32
Transitional whiteware 17th century	1	1	0	0	2
Transitional blue-and-white 17th century	0	19	0	4	23
17th century	0	1	0	0	1
Qing Kangxi blue-and-white	0	26	1	1	28
Qing Kangxi red-green overglaze	0	2	0	0	2
Qing plain 17th-18th century	0	2	0	0	2
Qing celadon 17th-18th century	0	2	0	0	2
Qing blueware 18th century	0	1	0	0	1
Qing blue-and-white 18th century	0	12	0	0	12
Qing red-green overglaze 18th century	0	1	0	0	1
Qing celadon 18th century	0	3	0	0	3
Qing red-green overglaze 18th-19th centuries	0	1	0	0	1
Qing blue-and-white 18th-19th centuries	0	4	0	0	4
Qing whiteware 18th-19th centuries	0	6	0	0	6
Qing celadon 18th-19th centuries	0	1	0	0	1
Qing *famille rose* 18th-19th centuries	0	1	0	0	1
Kitchen Qing blue-and-white 19th century	0	7	1	0	8
Qing celadon 19th century	0	5	0	0	5
Qing whiteware 19th century	0	1	0	0	1
European cream-coloured ware 19th century	0	29	0	0	29
European transferware 19th century	0	6	0	0	6
European greyware/greenware 19th century	0	5	0	0	5
European painted late 19th/early 20th c.	0	1	0	0	1
European transferware late 19th/early 20th c.	0	9	0	0	9
Kitchen Qing late 19th/early 20th century	0	1	0	0	1
Qing celadon 19th-20th centuries	0	1	0	0	1
Japanese stamped blue-and-white 19th-20th c.	0	8	0	0	8
Chinese blue-and-white 20th century	0	1	0	0	1
European plainware 20th century	0	4	0	0	4
European decalware 20th century	0	1	0	0	1
Chinese decalware 20th century	0	2	0	0	2
Chinese whiteware 20th century	1	9	0	0	10

Guangdong martavan undateable	33	5	0	0	38
Britteware martavan undateable	2	6	0	0	8
Total	**222**	**326**	**11**	**41**	**600**

Table A-4. *Keramik* Recorded at the Baebunta sites

Keramik Category	Puang Mattene	Puang Balubu	Pinanto	Tirosoe/ Sabbang Loang	Benteng Baebunta	Total
Dehua whiteware 13th-14th centuries	1	0	0	0	0	1
Yuan celadon 13th-14th centuries	1	0	0	0	0	1
Dehua whiteware 14th century	0	1	0	0	0	1
Ding body fragment 14th century	0	0	1	0	0	1
Vietnam oliveware 14th-15th century	3	0	2	0	1	6
Vietnam oliveware 15th century	1	0	0	0	0	1
Vietnam blue-and-white 15th century	2	0	3	0	0	5
Ming Sancai 15th century	0	0	1	0	0	1
Ming whiteware 15th century	0	0	2	0	0	2
Sawankhalok black-and-white 15th c.	1	0	0	0	0	1
Ming blue-and-white 15th century	0	0	11	1	0	12
Ming blue-and-white 15th-16th centuries	0	1	6	0	1	8
Ming whiteware 15th-16th centuries	0	0	3	0	0	3
Ming celadon 15th-16th centuries	0	0	2	0	0	2
Vietnam monochrome 15th-16th centuries	3	1	8	0	0	12
Vietnam blue-and-white 15th-16th centuries	2	0	6	2	0	10
Go-Sanh Red martavan 15th-16th centuries	0	0	1	0	0	1
Sawankhalok whiteware 15th-16th centuries	1	0	0	0	0	1
Sawankhalok celadon 15th-16th c.	1	1	6	1	1	10
Sawankhalok black-and-white 15th-16th c.	6	0	6	0	0	12
Sawankhalok martavan 15th-16th centuries	0	0	4	1	0	5
Sukothai black-and-white 15th-16th c.	0	0	0	1	0	1
Thai Coarse Brown martavan 15th-16th c.	0	0	1	0	0	1
Vietname blue-and-white 16th century	1	0	0	0	1	2
Vietnam red-green overglaze 16th century	0	0	1	0	0	1
Ming Swatow plain 16th century	0	0	5	0	0	5
Ming Swatow blue-and-white 16th century	0	0	12	0	0	12
Ming blue-and-white 16th century	5	1	13	0	0	19
Ming whiteware 16th century	3	0	0	0	0	3
Wanli blue-and-white	0	0	2	1	1	4
Wanli whiteware	0	0	1	0	0	1
Swatow blue-and-white	0	0	3	0	1	4
Swatow red-green overglaze	0	0	4	0	0	4
Swatow plain/monochrome	0	0	3	0	1	4
Ming *Dehua* whiteware 16th-17th centuries	0	0	1	0	0	1
Transitional whiteware 17th century	0	0	2	0	0	2

Transitional blue-and-white 17th c.	0	0	3	1	0	4
Qing Kangxi blue-and-white	0	0	6	0	1	7
Qing celadon 18th century	0	0	0	0	2	2
Qing blue-and-white 18th-19th centuries	0	0	0	0	1	1
Kitchen Qing blue-and-white 19th century	0	0	0	0	1	1
Qing *famille rose* 19th century	0	0	0	2	0	2
European creamware 19th century	0	0	0	4	3	7
European whiteware 19th-20th centuries	0	0	0	1	0	1
Qing whiteware 19th-20th centuries	0	0	0	1	1	2
European transferware late 19th/early 20th c.	0	0	0	1	0	1
European decalware 20th century	0	0	0	1	0	1
European whiteware 20th century	0	0	0	1	0	1
Japanese blue-and-white 20th century	0	0	0	1	0	1
Chinese decalware 20th century	0	0	0	2	0	2
Chinese enamelled overglaze 20th century	0	0	0	2	0	2
Chinese whiteware 20th century	0	0	0	15	1	16
Guangdong martavan undated	0	0	5	0	0	5
Total	**31**	**5**	**124**	**39**	**17**	**215**

Table A-5. *Keramik* Recorded at Malangke

Keramik Category	Utti Batue cache	Villagers' possession	Surface survey	Test pits	Total
Guangdong unglazed 12th-13th centuries	0	0	1	0	1
Qingbai whiteware 13th-14th centuries	0	3	0	0	3
Dehua whiteware 13th-14th centuries	0	1	4	0	5
Yuan celadon 13th-14th centuries	0	1	0	0	1
Dehua whiteware 14th century	1	0	2	0	3
Yuan celadon 14th century	0	0	3	0	3
Jizhou iron-painted 14th-15th centuries	3	1	1	2	7
Vietnam monochrome 14th-15th centuries	0	3	9	0	12
Vietnam unglazed 14th-15th centuries	0	0	2	0	2
Vietnam black-and-white 14th-15th centuries	0	0	4	1	5
Vietnam blue-and-white 14th-15th centuries	0	1	2	0	3
Go Sanh Red martavan 14th-15th centuries	0	0	3	0	3
Guangdong brownware 14th-15th centuries	0	0	1	0	1
Ming celadon 14th-15th centuries	0	0	1	1	2
Ming whiteware 14th-15th centuries	1	0	0	0	1
Ming blue-and-white 14th-15th centuries	2	0	2	0	4
Ming blue-and-white 15th century	0	0	3	4	7
Vietnam blue-and-white 15th century	0	1	3	0	4
Ming whiteware 15th century	0	0	1	0	1
Ming greyware/celadon 15th century	1	0	2	0	3
Ming Sancai 15th century	2	1	0	0	3
Sawankhalok black-and-white 15th century	0	1	3	0	4
Sawankhalok celadon 15th century	0	0	2	0	2
Sawankhalok whiteware 15th-16th centuries	1	0	0	0	1
Sawankhalok celadon 15th-16th centuries	3	2	7	11	23
Sawankhalok black-and-white 15th-16th c.	6	8	6	0	20
Sawankhalok martavan 15th-16th centuries	2	6	5	1	14
Sukothai 15th-16th centuries	2	1	0	0	3
Thai Coarse Brown martavan 15th-16th c.	0	0	0	3	3
Coarse Red martavan 15th-16th centuries	1	0	3	1	5
Vietnam monochrome 15th-16th centuries	4	8	3	3	18
Vietnam blue-and-white 15th-16th centuries	38	22	14	10	84
Ming blue-and-white 15th-16th centuries	2	2	3	4	11
Ming celadon 15th-16th centuries	7	3	4	3	17
Ming whiteware 15th-16th centuries	9	2	4	3	18
Ming monochrome 15th-16th centuries	4	0	0	0	4

Pegu (Burma) monochrome 15th-18th c.	2	0	0	0	2
Ming monochrome 16th century	2	0	3	0	5
Ming Swatow plainware 16th century	8	0	0	0	8
Ming celadon 16th century	0	0	0	2	2
Ming whiteware 16th century	17	1	0	0	18
Ming blueware 16th century	1	0	0	0	1
Ming blue-and-white 16th century	222	17	17	4	260
Ming red-green overglaze 16th century	14	2	3	0	19
Ming Swatow blue-and-white 16th century	10	8	2	7	27
Ming Swatow red-green overglaze 16th c.	2	0	1	2	5
Vietnam blue-and-white 16th century	37	1	0	1	39
Vietnam red-green overglaze 16th century	2	1	0	0	3
Vietnam monochrome 16th century	1	2	0	0	3
Guangdong brownware 16th century	1	0	0	0	1
Vietnam Brittleware martavan 16th-17th c.	0	0	1	0	1
Thai celadon 16th-17th centuries	0	1	0	0	1
Late Ming blue-and-white 16th-17th centuries	0	0	1	0	1
Wanli blue-and-white	6	12	11	0	29
Wanli whiteware	0	0	2	0	2
Swatow blue-and-white	1	4	9	5	19
Swatow red-green overglaze	3	1	0	0	4
Swatow whiteware/monochrome	16	0	3	0	19
Transitional blue-and-white 17th century	0	3	0	0	3
Kitchen Qing blue-and-white 19th c.	0	0	1	0	1
Guangdong martavan undateable	0	0	10	4	14
Brittleware martavan undateable	0	0	0	2	2
Total	**434**	**120**	**162**	**74**	**790**

Table A-6. Total Luwu Mainly Pre-Islamic *Keramik*

Keramik Category	No.	*Keramik* Category	No.	Period Counts	
Chinese/Vietnam *gusi* 10th-12th c. (?)	1	Chinese/Vietnam plate 11th-17th c. (?)	1		
Guangdong unglazed 12th-13th c.	1	Guangdong unglazed 12th-14th c.	1		
Vietnam brownware 13th-14th c.	1	*Qingbai* whiteware 13th-14th c.	5		
Dehua whiteware 13th-14th centuries	23	Yuan celadon 13th-14th centuries	13	**13th c.**	**22.5**
Dehua whiteware 14th century	5	Yuan celadon 14th century	6		
Qingbai whiteware14th century	2	*Ding* body fragment 14th century	1		
Dehua/Ming whiteware 14th-15th c.	20	Jizhou iron-painted 14th-15th c.	7		
Ming celadon/oliveware 14th-15th c.	6	Vietnam black-&-white 14th-15th c.	5		
Vietnam monochrome 14th-15th c.	30	Vietnam blue-&-white 14th-15th c.	3		
Vietnam unglazed 14th-15th c.	8	Ming blue-and-white 14th-15th c.	4		
Go Sanh Red martavan 14th-15th c.	9	Guangdong brownware 14th-15th c.	1	**14th c.**	**82.5**
Vietnam Coarse Red 14th-15th c.	1	Ming Sancai 15th century	4		
Vietnam oliveware 15th century	1	Ming whiteware 15th century	4		
Vietnam blue-and-white 15th c.	10	Ming blue-and-white 15th century	20		
Sawankhalok black-&-white 15th c.	6	Ming greyware/celadon 15th c.	3		
Sawankhalok celadon 15th century	2	Sawankhalok whiteware 15th-16th c.	2		
Sawankhalok celadon 15th-16th c.	55	Sawankhalok martavan 15th-16th c.	42		
Sawank. black-&-white 15th-16th c.	43	Sukothai 15th-16th centuries	4		
Thai Coarse Brown 15th-16th c.	7	Coarse Red martavan 15th-16th c.	15		
Go Sanh Red martavan 15th-16th c.	2	Vietnam monochrome 15th-16th c.	35		
Vietnam blue-&-white 15th-16th c.	104	Vietnam overglaze 15th-16th c.	2		
Ming blue-and-white 15th-16th c.	26	Ming whiteware 15th-16th centuries	26		
Ming celadon 15th-16th centuries	34	Ming monochrome 15th-16th c.	4	**15th c.**	**298**
Pegu monochromes 15th-18th c.	2	Ming monochrome 16th century	5		
Ming whiteware 16th century	28	Ming celadon 16th century	3		
Ming blueware 16th century	1	Ming blue-and-white 16th century	333		
Ming red-green overglaze 16th c.	21	Ming Swatow blue-&-white 16th c.	69		
Ming Swatow overglaze 16th c.	7	Ming Swatow plainware 16th c.	23		
Vietnam red-green overglaze 16th c.	4	Vietnam monochrome 16th century	3		
Vietnam blue-and-white 16th c.	43	Guangdong brownware 16th century	1		
Viet. underglaze green 16th-17th c.	1	Vietnam Brittleware 16th-17th c.	2		
Vietnam monochrome 16th-17th	6	Thai Coarse Brown 16th-17th c.	1		
Thai celadon 16th-17th centuries	1	Ming monochrome 16th-17th c.	4		
Late Ming blue-&-white 16th-17th c.	1	Ming *Dehua* whiteware 16th-17th c.	1		
				1500-50	**375.25**

Plus sherdage chronological counts carried forward to the Table A-7 totals:
1550-1600 – 375.5; 1600-1650 – 4.75; 1650-1700 – 4.75; 1700-1750 – 0.25; 1750-1800 – 0.25.

Note: 12th century (and earlier) ignored owing to small number of identifications, hence also the 12th-13th century Guangdong sherd treated as 13th century, and the 12th-14th century Guangdong sherd treated as 13th-14th centuries.

Table A-7. Total Luwu Mainly Islamic Period *Keramik*

Keramik Category	North Luwu	Palopo	Total	Period	Count
Wanli blue-and-white 1550-1650	70	4	74		
Wanli red-green overglaze 1550-1650	1	0	1		
Wanli whiteware 1550-1650	8	0	8		
Swatow blue-and-white 1550-1700	68	1	69		
Swatow red-green overglaze 1550-1700	20	0	20		
Swatow plainware 1550-1700	34	0	34	**1550-1600**	**457.75**
Transitional blue-and-white 17th century	44	1	45		
Transitional blueware 17th century	1	0	1		
Transitional whiteware 17th century	6	0	6		
Transitional red-green overglaze 17th c.	2	0	2		
Guangdong brownware martavan 17th c.	1	0	1		
Thai Coarse brownware martavan 17th c.	1	0	1		
Thai Coarse brownware martavan 17th-18th c.	1	0	1		
Vietnam red-green overglaze 17th-18th c.	1	0	1		
Qing blue-and-white 17th-18th centuries	9	3	12		
Qing red-green overglaze 17th-18th centuries	0	1	1		
Qing celadon 17th-18th centuries	2	0	2		
Qing plainware 17th-18th centuries	5	2	7	**1600-1650**	**121**
Qing Kangxi blue-and-white 1650-1750	48	0	48		
Qing Kangxi red-green overglaze 1650-1750	2	0	2	**1650-1700**	**104.5**
Qing blue-and-white 18th century	22	1	23		
Qing blueware 18th century	1	0	1		
Qing red-green overglaze 18th century	1	0	1		
Qing *famille rose* 18th century	3	0	3		
Qing celadon 18th century	5	0	5		
Qing blue-and-white 18th-19th centuries	12	2	14		
Qing red-green overglaze 18th-19th centuries	1	0	1		
Qing *famille rose* 18th-19th centuries	1	3	4		
Qing whiteware 18th-19th centuries	11	3	14	**1700-1750**	**56.5**
Qing celadon 18th-19th centuries	2	0	2	**1750-1800**	**31.5**
Kitchen Qing blue-and-white 19th century	15	1	16		
Qing red-green overglaze 19th century	2	0	2		
Qing *famille rose* 19th century	2	0	2		
Qing whiteware 19th century	8	0	8		
Qing celadon/monochrome 19th century	8	1	9		
Guangdong brownware martavan 19th c.	1	0	1		

European cream-coloured ware 19th century	60	2	62		
European transferware 19th century	14	0	14		
European greyware/greenware 19th century	5	0	5		
European painted/decalware 19th c.	4	0	4		
European whiteware/transferware 19th-20th c.	1	2	3		
Qing whiteware 19th-20th centuries	8	0	8		
Qing *famille rose* 19th-20th century	2	0	2		
Qing celadon 19th-20th centuries	1	0	1		
Japanese stamped blue-and-white 19th-20th c.	10	0	10	**1800-1850**	**76.25**
Kitchen Qing blue-and-white 1850-1950	1	0	1		
European transferware 1850-1950	10	0	10		
European painted ware 1850-1950	1	0	1	**1850-1900**	**82.25**
European plainware 20th century	12	0	12		
European decalware/transferware 20th c.	11	0	11		
European painted/stamped 20th century	2	0	2		
Japanese blue-and-white 20th century	1	0	1		
Chinese decalware 20th century	6	0	6		
Chinese enamelled overglaze 20th century	5	0	5		
Chinese blue-and-white 20th century	1	0	1		
Chinese whiteware 20th century	72	0	72	**1900-1950**	**68.5**
Indonesian *keramik* 20th century	3	0	3	**1950-2000**	**62.5**

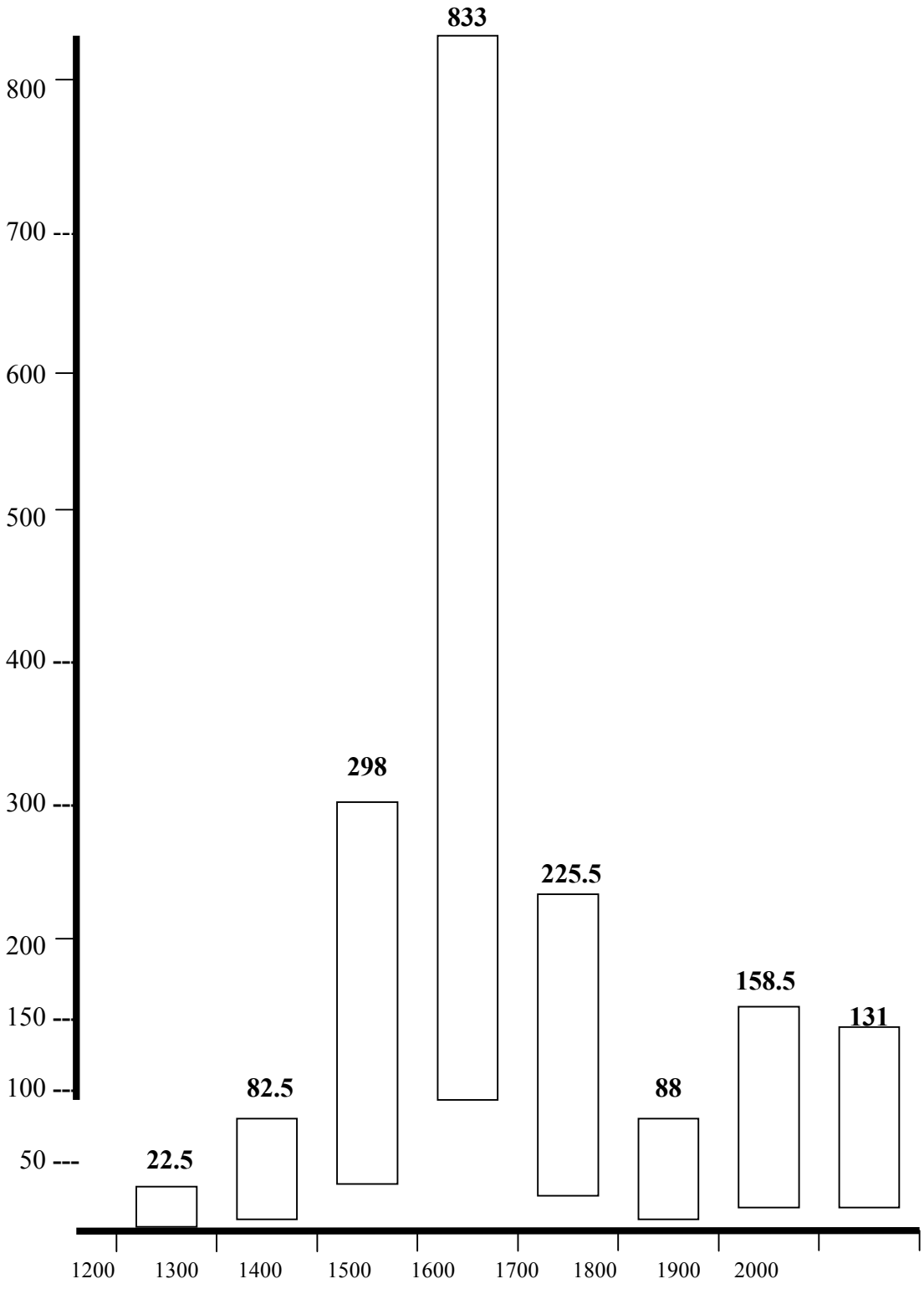


Figure A-1. Histogram distribution of the recorded Luwu *keramik* by century intervals

Appendix B. *Keramik* recorded along the Cenrana valley

All the high-fired ceramics collected from Istana La Patau' (Cenrana), Alangkanangnge ri La Tanete and La Pauke' sites were identified jointly by Bulbeck and Karaeng Demmanari. Unfortunately, most of the *keramik* sherds recorded during the survey of Istana La Patau' were simply identified in the field and then discarded. Only 17 examples were collected for confirmation under laboratory conditions, and none of these are Qing blue-and-white sherds, which makes it difficult to determine whether or not the site had been effectively abandoned in the early eighteenth century following the death of La Patau'. However, the fact that all of the Qing sherds from Square 1 and its vicinity are of Kangxi antiquity (late seventeenth to early eighteenth centuries) suggests that the same may have been true of the other Qing sherdage from the site – at least, there are no grounds to assume the contrary. The coarse stoneware sherds support this inference, as five of the six identified instances include the seventeenth century within their dating range. Moreover, only one definite instance of a sherd postdating 1700, a European sherd (referred to by Sarjiyanto [2000] as Japanese), has been recorded at the Cenrana site. Accordingly all of the site's Qing blue-and-white sherds are consigned to the reign of Kangxi (Table B-1).[1]

The grand total of 835 recorded *keramik* from sites along the Cenrana valley falls far short of the 1,910 recorded in Luwu. Hence the tiny complement of twelfth century Chinese sherds, from Allangkanangnge ri La Tanete (Table B-1), may be suggestive of the earlier regular importation of high-fired ceramics to Cina than to Luwu. However, the inclusion of the twelfth century in the long-term profile of recorded *keramik* imports to the Cenrana valley would still be pointless as a formal exercise. As a consequence, the three 'Yueh' sherds may be modelled as being of thirteenth to fourteenth century antiquity (Table B-2). Table B-2 shows how the centuries up to and including the fifteenth century (and the nineteenth century, as well as the half-century intervals during the intervening period) are represented by the *keramik* identifications in total. The methodology employed in producing these counts, and the histogram depicted in Figure B-1, follows that described above for Luwu.

Table B-1 shows the same exponential growth in *keramik* counts between the thirteenth and sixteenth centuries as noted for Luwu; indeed, the exponential increase in the case of the Cenrana valley sites is even sharper than in Luwu. The predominant difference compared to Luwu is the much slower decline during the seventeenth and eighteenth centuries, reflecting much less of a focus on pre-Islamic sites along the Cenrana valley. While the two Cina palace centres, Alangkanangnge ri La Tanete and La Pauke', are predominantly pre-Islamic to transitional Islamic sites, La Patau' (the Cenrana site) is particularly associated with the rulers of Bone in the late seventeenth and early eighteenth centuries (see main text). The remarkably low tallies after *c.*1750 (Table B-2) suggest that the specific economic conditions that led a Bugis elite to occupy the recorded sites have not been of such importance with relation to those sites in

[1] The other way of managing the sherds imprecisely identified as Qing blue-and-white would be to exclude them from consideration. This is far less satisfactory, as it would leave a remainder of *keramik* of predominantly Ming antiquity to represent the Cenrana site. Few other characterizations could be further from the truth.

the last 250 years. The critical factor here is probably the rise of Sengkang as the capital of an increasingly powerful kingdom of Wajo which, after approximately 1750, no longer suffered under Bone's domination. Excavation or survey in the vicinity of Sengkang would likely reveal a dramatic increase in *keramik* counts in the eighteenth to twentieth centuries, complementing the steep drop after 1700 illustrated in Figure B-1.

Table B-1. *Keramik* Recorded at Cina and Cenrana

Keramik Category	Allangkanangnge		Cenrana		La Pauke'	
	Test pit	survey	Squ. 1	survey	cemetery	other zones
Vietnam/Guangdong brownware 11th-12th c.	1	0	0	0	0	0
"Yueh" olive-greenware 12th-14th centuries	2	1	0	0	0	0
Guangdong brownware 13th-14th centuries	0	1	0	0	0	0
Qingbai whiteware 13th-14th centuries	0	1	0	0	0	0
Dehua whiteware 13th-14th centuries	0	3	0	0	0	0
Yuan celadon 13th-14th centuries	1	6	0	0	0	0
Qingbai whiteware 14th century	0	2	0	0	0	0
Dehua whiteware 14th century	0	2	0	0	0	0
Yuan overglaze enamelled 14th century	0	1	0	0	0	0
Yuan green lead-glazed 14th century	0	2	0	0	0	0
Jizhou iron-painted 14th-15th centuries	0	5	0	0	0	0
Dehua whiteware 14th-15th centuries	1	3	0	0	0	0
Vietnam monochrome 14th-15th centuries	0	2	0	0	0	0
Vietnam blue-and-white 14th-15th centuries	0	1	0	0	0	0
Vietnam Coarse Red martavan 14th-15th c.	0	1	0	0	0	0
Ming celadon 14th-15th centuries	1	3	0	1	0	0
Sawankhalok brownware 15th century	0	1	0	0	0	0
Ming Sancai 15th century	0	0	0	0	1	0
Sawankhalok celadon 15th-16th centuries	0	15	0	11	1	0
Sawankhalok black-and-white 15th-16th c.	1	1	0	4	2	0
Sawankhalok martavan 15th-16th centuries	1	16	0	0	0	0
Sukothai brownware 15th-16th centuries	0	1	0	0	0	0
Thai Coarse Brown martavan 15th-16th c.	1	1	0	1	0	0
Brittleware brownware martavan 15th-16th c.	0	3	0	0	0	0
Guangdong brownware martavan 15th-16th c.	3	10	0	0	0	0
Vietnam brownware martavan 15th-16th c.	0	6	0	0	0	0
Go Sanh martavan 15th-16th centuries	2	10	0	0	0	0
Vietnam monochrome 15th-16th centuries	0	11	0	0	0	0
Vietnam red-green overglaze 15th-16th c.	0	1	0	0	0	0
Vietnam blue-and-white 15th-16th centuries	0	3	0	3	7	4
Ming celadon 15th-16th centuries	3	13	0	0	0	0
Ming whiteware 15th-16th centuries	0	5	0	0	0	0
Guangdong brownware martavan 15th-17th c.	6	6	0	0	0	0
Vietnam blue-and-white 16th century	0	0	1	1	2	1
Ming blueware 16th century	0	0	0	0	1	0

Ming red-green overglaze 16th century	0	5	0	0	1	0
Ming blue-and-white 16th century	0	18	5	(33)	11	14
Ming Swatow blue-and-white 16th century	2	13	0	14	12	42.
Ming plainware/whiteware 16th century	0	0	0	0	0	3
Ming Swatow plainware 16th century	0	4	0	0	0	5
Ming celadon 16th century	0	2	0	0	0	0
Vietnam brownware martavan 16th-17th c.	0	2	0	0	0	0
Guangdong brownware martavan 16th-17th c.	0	3	0	2	1	0
Ming celadon 16th-17th centuries	0	3	0	0	0	0
Ming plainware 16th-17th centuries	0	0	0	0	0	1
Wanli whiteware	0	0	0	0	0	1
Wanli blue-and-white	1	4	0	0	9	27
Swatow blue-and-white	0	22	1	4	3	32
Swatow red-green enamelled overglaze	0	7	0	0	0	1
Swatow whiteware/monochrome	0	2	0	0	2	5
Transitional blue-and-white 17th century	0	8	2	0	2	3
Transitional blueware 17th century	0	0	0	0	2	0
Transitional whiteware 17th century	0	1	1	0	0	0
Guangdong/Vietnam martavan 17th century 2		0	0	0	2	0
Vietnam lead-glazed stoneware 17th-18th c.	0	0	0	1	0	0
Qing Kangxi blue-&-white/red-green overglaze	0	10	5	(246)	0	0
Qing blue-and-white 18th century	0	0	0	0	0	1
Qing blue-and-white 18th-19th centuries	0	0	0	0	0	2
Kitchen Qing blue-and-white 19th c.	0	0	0	0	0	1
Qing grey monochrome 19th century	0	0	0	0	0	1
European 19th century	0	2	0	1	0	2
European 19th-20th centuries	0	3	0	0	0	4
Qing celadon 19th-20th centuries	0	1	0	0	0	1
Qing blue-and-white/overglaze 19th-20th c.	0	3	0	0	0	0
European painted ware 20th century	0	0	0	0	0	1
Chinese whiteware 20th century	0	1	0	0	0	1
Stoneware martavan unidentified/undated	0	0	0	4	0	3
Total	**26**	**251**	**15**	**328**	**57**	**158**

Table B-2. Total Cina and Cenrana Dated *Keramik*

Keramik Category	Total	Period	Count
"Yueh" olive-greenware 12th-14th centuries	3		
Guangdong brownware 13th-14th centuries	1		
Qingbai/*Dehua* whiteware 13th-14th centuries	4		
Yuan celadon 13th-14th centuries	7	**13th century**	**7.5**
Qingbai/*Dehua* whiteware 14th century	4		
Yuan overglaze enamelled 14th century	1		
Yuan green lead-glazed 14th century	2		
Jizhou iron-painted martavans 14th-15th centuries	5		
Dehua whiteware 14th-15th centuries	4		
Vietnam monochrome 14th-15th centuries	2		
Vietnam blue-and-white 14th-15th centuries	1		
Vietnam Coarse Red martavan 14th-15th centuries	1		
Ming celadon 14th-15th centuries	5	**14th century**	**23.0**
Sawankhalok brownware 15th century	1		
Ming Sancai 15th century	1		
Sukothai brownware 15th-16th centuries	1		
Sawankhalok celadon 15th-16th centuries	27		
Sawankhalok black-and-white 15th-16th centuries	8		
Sawankhalok martavan 15th-16th centuries	17		
Thai Coarse Brown martavan 15th-16th c.	3		
Chinese brownware martavan 15th-16th centuries	16		
Vietnam brownware martavan 15th-16th centuries	6		
Go Sanh martavan 15th-16th centuries	12		
Vietnam monochrome 15th-16th centuries	11		
Vietnam blue-&-white/ red-green overglaze 15th-16th c.	18		
Ming celadon 15th-16th centuries	16		
Ming whiteware 15th-16th centuries	5		
Guangdong brownware martavan 15th-17th century	12	**15th century**	**85.5**
Ming celadon 16th century	2		
Ming plainware/whiteware 16th century	3		
Ming Swatow plainware 16th century	9		
Ming blueware 16th century	1		
Ming blue-&-white/red-green overglaze 16th century	87		
Ming Swatow blue-and-white 16th century	83		
Vietnam blue-and-white 16th century	5		
Vietnam brownware martavan 16th-17th centuries	2		

Guangdong brownware martavan 16th-17th centuries	6		
Ming celadon/plainware 16th-17th centuries	4	**1500-1550**	**135.0**
Wanli blue-and-white 1550-1650	41		
Wanli whiteware 1550-1650	1		
Swatow blue-and-white 1550-1700	62		
Swatow red-green enamelled overglaze 1550-1700	8		
Swatow whiteware/monochrome 1550-1700	9	**1550-1600**	**182.333**
Transitional blue-and-white 17th century	15		
Transitional blueware 17th century	2		
Transitional whiteware 17th century	2		
Guangdong/Vietnam martavan 17th century		4	
Vietnam lead-glazed stoneware 17th-18th centuries	1	**1600-1650**	**63.833**
Kangxi blue-&-white/red-green overglaze1650-1750	261	**1650-1700**	**173.333**
Qing blue-and-white 18th century	1	**1700-1750**	**131.75**
Qing blue-and-white 18th-19th centuries	2	**1750-1800**	**1.25**
Qing blue-and-white/grey monochrome 19th century	2		
European 19th century	5		
European 19th-20th centuries	7		
Qing celadon/blue-and-white/overglaze 19th-20th c.	5	**19th century**	**14.5**
European painted ware 20th century	1		
Chinese whiteware 20th century	2	**20th century**	**9.0**

Figure B-1. Histogram distribution of the recorded Cenrana valley *keramik* by century intervals

Appendix C. Radiocarbon dates from Luwu

Table C-1 lists the 42 radiocarbon dates obtained so far from the excavations and survey undertaken between 1998 and 1999 in Luwu. A further date on the cotton fragment from Pontanoa Bangka is being organised by Ruth Barnes of the Ashmoleum Museum, Oxford. For an explanation of the three determinations of modern charcoal, see the main text.

Conventional dates are prefixed ANU (Australian National University Radiocarbon Dating Laboratory). Accelerator Mass Spectrometry dates are prefixed OZD for dates processed in 1999 at the Australian Institute of Nuclear Science and Engineering facility (AINSE) in Sydney, OZE for dates processed in 2000 at the same facility, and Wk for the date processed by the University of Waikato Radiocarbon Dating Laboratory at Hamilton, New Zealand.

Seventeen of the dates were paid for by the Australia Research Council large grant A59701253 awarded to the authors, and the research support grant attached to Bulbeck's Australian Postdoctoral Research Fellowship (F59700294). The Centre for Archaeological Research at the Australian National University funded 14 of the remaining dates (from the Australian National University Radiocarbon Dating Laboratory). The The Faculties Research Fund at the Australian National University funded seven of the Accelerator Mass Spectrometry determinations from AINSE, and an AINSE grant (Project 00/020) covered four of the remaining determinations.

Table C-1. Radiocarbon dates from the 1998-9 fieldwork in Luwu

Site, square, excavation unit	Lab. No.	Material	Date (BP)	2-sigma calibration
Rahampu'u 1, U12B5, unit 13	ANU-11082	Charcoal	5680±130 BP	4250-4900 BC
Rahampu'u 1, U12B5, unit 13	OZE646	Soot on sherds	1000±40 BP	AD 980-1160
Rahampu'u 1, U12B5, unit 14	ANU-11081	Charcoal	1400±110 BP	AD 420-890
Rahampu'u 1, U12B5, unit 15	ANU-11075	Charcoal	Modern	Modern
Rahampu'u 1, S6B10, unit 16	ANU-11074	Charcoal	350±70 BP	AD 1430-1670*
Rahampu'u 1, S6B10, unit 17	ANU-11077	Charcoal	430±120 BP	AD 1290-1805*
Rahampu'u 1, S6B10, unit 18	ANU-11076	Charcoal	310±90 BP	AD 1430-1955
Rahampu'u 1, S6T5, unit 13	ANU-11080	Charcoal	400±60 BP	AD 1430-1640
Rahampu'u 1, S6T5, unit 15	ANU-11079	Charcoal	310±90 BP	AD 1430-1955
Rahampu'u 1, S6T5, unit 17	ANU-11078	Charcoal	410±80 BP	AD 1400-1660
Pandai Besi, U1T3, unit 13	ANU-11083	Charcoal	480±130 BP	AD 1280-1670*
Pandai Besi, U1T3, unit 14	ANU-11084	Charcoal	410±70 BP	AD 1420-1640
Lemogola, square 1, unit 13	ANU-11277	Charcoal	120±70 BP	AD 1670-1950
Lake Matano bore, 176 cm depth	ANU-11104	Charcoal	2350±140 BP	2740-2060 BC
Pontanoa Bangka, square 1, unit 7	ANU-11108	Charcoal	1010±60 BP	AD 900-1190*
Pontanoa Bangka, square 1, unit 12	ANU-11107	Charcoal	1520±70 BP	AD 410-660
Pontanoa Bangka, square 1, unit 12	OZE644	Cotton	50±60 BP	AD 1680-1940
Sukoyu, square 1, unit 6	ANU-11272	Charcoal	830±70 BP	AD 1035-1290
Sukoyu, square 1, unit 8	ANU-11271	Charcoal	2070±50 BP	200 BC-AD 55
Nuha, square 1, unit 3	ANU-11278	Charcoal	130±50 BP	AD 1670-1945
Nuha, square 1, unit 15	ANU-11105	Charcoal	960±70 BP	AD 980-1260*
Bola Merajae, square 1, unit 3	OZE578	Charcoal	310±40 BP	AD 1480-1670
Bola Merajae, square 1, unit 10	OZD844	Charcoal	1260±60 BP	AD 655-980
Bola Merajae, square 1, unit 13	OZE579	Charcoal	1870±40 BP	AD 35-320
Bola Merajae, square 1, unit 16	OZD843	Firestone soot	1980±90 BP	200 BC-AD 320
Bola Merajae, square 2, unit 7	ANU-11356	Charcoal	660±70 BP	AD 1230-1430
Katue, square 5, unit 7	OZE580	Charcoal	370±35 BP	AD 1450-1640
Katue, square 5, unit 9	OZD847	Charcoal lump	1810±40 BP	AD 90-345
Katue, square 5, unit 9	OZD846	Charcoal	Modern	Modern
Katue, square 5, unit 11	OZD845	Carbonised shell	1100±50 BP	AD 780-1025
Katue, square 7, unit 12	OZE581	Charcoal	1850±40 BP	AD 70-320
Turungang Damar, square 2, unit 4	ANU-11353	Charcoal	350±70 BP	AD 1430-1670*
Manu Manue, square 2, unit 3	OZD848	Charcoal	170±70 BP	AD 1650-1955
Salabu, S4T1, unit 3	Wk-7336	Pig dentine	400±60 BP	AD 1430-1640
Sabbang Loang, 3-1, unit 9	OZD850	Soot on sherds	1910±70 BP	50 BC-AD 320
Sabbang Loang, 1-2, unit 5	OZD852	Soot on sherds	1750±50 BP	AD 160-420*
Sabbang Loang, 1-3, unit 4	OZD851	Soot on sherds	1780±50 BP	AD 130-390*
Sabbang Loang, 1-4, unit 10	ANU-11273	Charcoal	1990±200 BP	410 BC-AD 435*
Sabbang Loang, 1-4, west wall, 125 cm depth (unit 17)	ANU-11106	Charcoal	2020±140 BP	380 BC-AD 320
Sabbang Loang, 1-4, unit 19	OZE129	Charcoal	Modern	Modern
Pinanto, U61B7, unit 12	ANU-11355	Charcoal	390±90 BP	AD 1400-1670*
Arateng 1 coffin (looted)	ANU-11109	Wood	450±60 BP	AD 1400-1635*

* Between 98% and 99.9% of the area under the 2-sigma probability curve

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