

**ARCHAEOLOGICAL RESEARCH IN NORTHEASTERN BALI
INDONESIA**

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ABSTRACT

Archaeological discoveries indicate that the coastal areas around the villages of Julah, Pacung and Sembiran in northeastern Bali have been involved in long distance trade since at least 2000 years ago. The discovery of Indian sherds, including Rouletted Ware, a rim sherd of Arikamedu type 10, a sherd inscribed with Kharoshthi characters and hundreds of glass beads suggest that contacts between India and Bali were already occurring at this time. The Indian traders might have stopped at Sembiran while trading for spices and aromatic woods from the eastern part of the Indonesian archipelago. Sembiran probably functioned as an ancient port located on a major spice trade route.

Sembiran might also have functioned as a manufacturing site, as suggested by the finding of a fragment of a mould for impressing decoration into wax during the production of Pejeng-type bronze drum.

Inscriptional data from the 10th to 12th centuries AD indicate that Julah (including Sembiran ?) had developed as "a gateway community" into northeastern Bali by this time. There was a market in Julah, and also a guild or community of foreign traders. Regulations are mentioned in the inscriptions for those who lived in this settlement, which was plundered at least once and the villagers captured, killed or dispersed. It is not clear why Julah was eventually abandoned as a port, but rapid alluvial sedimentation and poor security could have been major reasons for its abandonment.

This thesis describes the excavated archaeological data from sites in the vicinity of Julah, most of which date to the first two centuries AD, later deposits are present in some trenches. Appendices at the end of this thesis describe the result of pottery and soil analysis, glazed trade ceramics, and the contents of the inscriptions of the 10th to 12th centuries.

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Chapter 1

INTRODUCTION

1.1 Background

In my study (Ardika 1987) on bronze artifacts from Bali, I concluded that the island had been involved in inter-island importation of copper and tin since the second half of the first millennium BC or the beginning of our era. The occurrence in the village of Manuaba in central Bali of fragments of a mould for impressing decoration into wax during the production of a Pejeng-type bronze drum already indicated that bronze drums and other distinctive metal objects were manufactured locally in Bali at that time.

It is known (Bemmelen 1949) that copper and tin are not available naturally in Bali. Therefore, these raw materials were perhaps obtained from other islands to the west, possibly Sumatra, Bangka and Java. It is also possible that ingots of copper and tin might have been derived from the mainland of Southeast Asia. Recent archaeological research at Non Pa Wai in the Khao Prachan Valley in central Thailand has unearthed a number of small ceramic cups and conical moulds which are presumed to have been for the casting of small ingots of copper (Pigott and Natapintu 1988: 160; Pigott 1989). Bronson (1985 [as cited by Stech and Maddin:1988: 170]) has pointed out three subregions of copper deposits in Southeast Asia; the northern and central Philippines, the northern mainland, and Sumatra and Java. Only the Philippines and the northern mainland can be described as moderately copper rich. The rest of Southeast Asia is more or less deficient in copper deposits, including the Mekong delta and Cambodia and a broad belt of territory that extends from the Malay Peninsula eastwards to the Moluccas.

The largest tin deposits, according to Bronson (1985), exist in the northern mainland of Southeast Asia and south China. All the rest of the tin is concentrated into a single belt that runs from the eastern side of central Burma down through the Kra isthmus and the Malay Peninsula to the islands of Singkep, Bangka and Balitung. Adjacent parts of Sumatra have a few small deposits but the whole of the Philippines have none.

Early bronze metallurgy in Bali might have also been inspired and influenced by the Dongson tradition of Vietnam, especially in terms of the use of the lost wax technique, the drum tradition, socketed axes, and several types of ornaments such as arm protectors and spiraled wire necklace units (Ardika 1987). It seems that a flow of raw materials and technology could have occurred from the mainland into the islands of Southeast Asia during the Early Metal Period. The existence of long distance trade at that time is also supported by the appearance of imported glass and stone beads in Balinese sarcophagus burials and in the necropolis site of Gilimanuk. Many of the beads are believed to be of Indian origin.

In such circumstances of overseas trade the role of coastal sites is very important, yet to date Gilimanuk in northwestern Bali is the only coastal site on this island to have been excavated intensively. Other coastal sites which might have been important during the period of early metallurgy and early Indian contact in Bali include Blanjong in southern Bali, and Sembiran, Julah, Bondalem, Tejakula, and Les, all in northern Bali.

My research in northeastern Bali was initially inspired by a number of copper plate inscriptions dated between AD 922 and 1181. These are now kept in the villages of Sembiran and Julah, and their contents are described in chapter 8. For their transliterations see appendix E. The inscriptions of Sembiran AI and AII, dated to AD 922 and AD 975 respectively, both refer to a *kuta* (fortified settlement) in the village of Julah and to a *ser pasar* (market officer). Sembiran AI also mentions the regulations of Julah for dealing with stranded ships within its territory. Sembiran B (AD 955) and AII (AD 975) contain the term *banigrama* (Sanskrit *vanigrama*), which refers to a merchant guild (Goris 1954; Wheatley 1975: 268). Sembiran AIV (AD 1065) and C (AD 1181) state that seafaring merchants (*banyaga*) arrived at Julah in their *jong* (ships) and *bahitra* (boats).

In relation to metal working, Sembiran AIII (AD 1016) mentions a *tuha gusali* and Sembiran AIV (AD 1065) a *juru gusali*, both of which literally mean a leader of a smithy or an official in charge of metal working. Sembiran AIV (AD 1065) also mentions that the villagers of Julah were allowed to manufacture crowbars and *kris*es.

The inscription of Sembiran AII mentions shrines, a bathing place, graves and a main road, all of which had to be maintained by the villagers of Julah. In their total content these inscriptions indicate that Julah and its environs were quite heavily involved in maritime trading activity and metallurgy about one thousand years ago.

Another stimulus for my research was the finding of a damaged bronze drum of Pejeng-type, together with an earthenware jar and bowl, by villagers digging a well in 1978 in the coastal plain of Pacung (Widia 1981). The jar and bowl are now preserved in the Bali Museum in Denpasar but the drum was sold and now forms part of the Eilenberg collection in London. This drum has recently been described in considerable detail (McConnell 1986; McConnell and Glover 1990).

Based on these findings, it seemed to me that the area around the villages of Julah, Sembiran and Pacung could have been a potentially important coastal centre for trading activities about one thousand years ago, if not before. In Hirth's (1978) terminology the region developed at this time as "a gateway community", or a coastal centre in Bronson's (1977) dendritic model of long-distance trade. Bronson (1977) also argued that coastal centres could control rare resources and act as centres for manufacturing. The evidence reported in this thesis pushes back these functions for the region to almost two thousand years ago.

1.2 Outline of the Present Study

Prior to 1987, no systematic archaeological survey and excavation had been undertaken in the coastal plain of northeastern Bali. Because of the existence of the inscriptions, I decided to focus my attention on the adjacent village territories of Julah, Sembiran and Pacung.

During my survey in 1987, archaeological deposits were first noted in the low beach cliffs in the village territories of Pacung and Sembiran. These findings led to the excavation of the trenches of Bangkah I, Sembiran I, and Sembiran II/III. These trenches were placed just inland from the cliffs where the densities of exposed potsherds were very high.

Additional observations around and in the sides of wells also produced significant information on the stratigraphy and archaeological deposits of the area. For example, potsherds were found about 2.8 m below the ground surface in the sides of a well 2 metres away from the important trench of Sembiran (SBN) IV. SBN IV was then excavated in 1987 and produced Indian Rouletted sherds. The trenches of SBN VI and VII, only one metre away from SBN IV, were later excavated in 1989 and also produced

Indian imports.

Overall, eleven trenches and 78.5 cubic metres of soil were excavated during the excavation programme in 1987 and 1989. Archaeological discoveries, dating from possibly 2800 BP to the present, include Indian sherds, imported ceramics, earthenware sherds, beads of glass, stone and gold, a fragment of a mould for impressing decoration into wax during the production of Pejeng-type bronze drum, fragments of metal objects, animal bones and human burials. Besides archaeological evidence, the research also produced some relevant geomorphological data concerning site formation.

The data presented in this thesis can be divided into five parts. Part 1 (chapter 2) describes the geographical setting and present environment of this region of northeastern Bali. Part 2 (chapter 3) deals with the field survey and archaeological excavations of 1987 and 1989. Part 3 (chapters 4, 5, 6 and 7) describes the archaeological discoveries. Part 4 (chapter 8) describes the contents of six bronze plate inscriptions dated between AD 922 and 1181 which are now kept in the villages of Sembiran and Julah. Finally, there follows a synthesis of the archaeological and epigraphic data relevant for the late prehistory and early history of the region.

1.3 Summary of thesis contents

Chapter 2 describes the present environment of northeastern Bali. This area is in the driest part of the island and has a dry season of about 7-8 months in length, with rain usually occurring from December to April. There are no large rivers in the area, and most water courses run dry during the dry season. The sea off this coastline is very deep and the shore line forms a slight bay which might have been sheltered and convenient for anchoring in the past. However, no maritime activity apart from fishing occurs now in this area, except for the ports at Sangsit and Singaraja which lie about 15 and 30 km west of Sembiran respectively.

All eleven trenches excavated in 1987 and 1989 were placed between 2 and 80 m from the present shore line on the coastal plain. The plain in this region ranges between 25 and 600 m in width from the beach to the foot of the inland hills. Today the plain is cultivated with crops of cassava, corn, and beans. Tree crops include coconut, banana, rambutan, breadfruit and clove.

Phytolith analysis of sediment samples from layers 3 to 7 in the trench of Pacung I indicate that rice was being grown at the site during the period of layers 6 and 7 (sample 477 and 478), between 2.4 and 3.8 m below the surface, dated to c. 2000 years ago. It seems that the rapid build up of colluvial and alluvial deposits caused a cessation of rice growing in this region. Today, no rice is grown at all on the coastal plains of Pacung, Sembiran or Julah.

Chapter 3 reports the archaeological survey and excavations carried out in 1987 and 1989. The survey involved walking about 25 km along the beach to observe archaeological evidence in the low cliffs (usually under 2 metres high) which occur in places. This survey extended from the village of Tembok in Kecamatan Tejakula to the village of Sangsit in Kecamatan Sangsit (see map 2 in chapter 2). The survey was very successful and yielded the visible strata with potsherds on which the excavations of the trenches of Bangkah I and Sembiran I - III were based. Eleven trenches were excavated in total to depths between 2.2 and 4.0 m. Stratigraphic observation revealed that processes of erosion and sedimentation in this area have been very rapid, with about 3 metres of deposit being laid down within the last 2000 years.

Chapter 4 addresses the finding of Indian sherds in the Sembiran and Pacung trenches and the comparison of these with specimens from India and Sri Lanka. The Indian sherds include 8 rims of Rouletted ware, 11 rouletted body sherds, a rim sherd of Wheeler's Arikamedu type 10, and an inscribed sherd with Kharoshthi characters, as well as lots of plain body sherds. The results of x-ray diffraction and neutron activation analyses suggest that the Rouletted sherds from Sembiran and Pacung are identical in composition to the samples from Arikamedu and Karaikadu in Tamil Nadu, and Anuradhapura in Sri Lanka. These results imply that all the Rouletted sherds examined come from a single locality using a single clay source. The location of this source remains unknown, but possibly it was in South India.

A single rim sherd with black slip and impressed decoration of a bird motif (peacock ?) was also found in Sembiran. This type of pottery was found at Arikamedu and is termed type 10 in the report on this site (Wheeler, Ghosh and Deva 1946). The same type of pottery has also been discovered in other sites in West Bengal and Tamil Nadu, but so far, no pottery of Arikamedu type 10 has been found in other sites in Southeast Asia, except for Sembiran.

Another important Indian sherd discovered in Sembiran bears three characters in Kharoshthi script, identified by Prof. B.N. Mukherjee of Calcutta University. Mukherjee

(1989a,b, 1990a,b) believes that a group of people who used the Kharoshthi script migrated from Northwest India to settle in West Bengal, in the region around Chandraketugarh and perhaps in the area of Tamluk in Midnapur district. They functioned as traders between the first and fifth centuries AD and maintained maritime contacts with Southeast Asia. They are reported to have also been involved in the trade of central Asian horses.

In terms of x-ray diffraction analysis, this inscribed sherd is very similar to the Rouletted Ware and contains dominantly quartz. However, neutron activation analysis indicates that it is rather different from the Rouletted Ware group. Thus the sherd could be derived from West Bengal, although this can not be proven.

Chapter 5 describes the local earthenware sherds from the excavations and compares them with other assemblages from Indonesia and Island Southeast Asia. About 85,308 earthenware sherds were discovered during the excavations, 94% (80,134) of which are plain, and 6% (5174) decorated. Decorated sherds were mostly derived from the lower levels (c. 2000 BP) of SBN IV, VI, and VII.

In terms of vessel form and decoration, the assemblages of local pottery from northeastern Bali are very similar to assemblages from other sites in Indonesia and Island Southeast Asia, including Gilimanuk, Plawangan, Buni, Leang Buidane, the Madai and Tabon Caves, Kalanay and Sa-Huynh. The results of XRD analysis suggest that some of the earthenware sherds from Gilimanuk are similar to those from Sembiran in that they contain dominantly plagioclase feldspar, magnetite and minor haematite.

It seems that the wide similarities in vessel forms and decoration between Sembiran and other contemporary (c. 1500 - 2500 BP) assemblages in Island Southeast Asia reflect contacts and possibly inter-regional trade. The Indian potsherds in Sembiran and Pacung support this assumption. Elsewhere, X-ray fluorescence tests on sherds from several sites in Southeast Asia dated between the 9th and 14th centuries AD suggest that pottery manufactured in South Thailand and East Java was traded to the Kota China site near Medan in North Sumatra (Miksic and Yap 1990a,b). Similar trade might have begun much earlier, prior to 2000 BP.

Chapter 6 deals with the excavated small finds, including beads, metal objects, and a fragment of a stone stamp or printing mould, probably used for impressing decoration into wax during the production of a Balinese Pejeng-type drum. About 500 glass beads, together with two of carnelian and one of gold, were also found in the

trenches of SBN IV, VI and VII, in association with the Indian sherds. Chemical analysis of 5 of the glass beads from Sembiran suggests that they are very similar in composition to south Indian samples in terms of raw materials (Basa 1991; Basa *et al* 1991). Basa (1991) believes that the Sembiran glass beads might have been brought from Arikamedu in Tamil Nadu, where glass beads are known to have been manufactured.

The fragment of the drum mould contains a decorative zone of triangles, very similar to those on the larger mould fragments with a face design from Manuaba in central Bali, and also to the triangles on the large drum from Pejeng. The occurrences of these mould fragments in Sembiran and Manuaba indicate that drums of Pejeng type and possibly other distinctive metal artifacts were being manufactured in Bali 2000 years ago.

Chapter 7 deals with the excavated animal bones. Those bones were concentrated in habitation layer 7 in SBN IV, VI and VII, and were undoubtedly food bone of the Early Phase of occupation at Sembiran. Food bone of the Late Phase was found in much smaller amounts in BKHI and JLHI.

The identified species from northeastern Bali include pig, dog, goat/deer, bovid, fish and bird. The range of domesticated mammals is quite similar to that excavated by Glover (1972) from the later levels (post 5000 BP) in caves of East Timor. Of the identified species from northeastern Bali the pig was the most popular throughout and clearly served as the main food animal.

Chapter 8 describes the contents of the six inscriptions which are still preserved in the villages of Julah and Sembiran. As already noted, these inscriptions suggest that Julah was very actively involved in maritime trade at least as long ago as the 10th century AD. It seems that the trade activities were carried out in a *kuta* or fortified settlement within Julah territory and that a foreign merchant community (*banigrama* or *banyaga*) also lived there. These inscriptions also state that Julah was very often attacked by pirates or plunderers. The purposes of the inscriptions were to describe the rights and responsibilities of the villagers with respect to the ruler and state officials.

The archaeological discoveries and the inscripational data from northeastern Bali complement each other. It seems that Sembiran and Pacung, which are located only 1 km west of Julah, were part of the ancient port zone about 1000 years prior to the inscriptions. Sembiran was probably a port located on the major trade route between western and eastern Indonesia, and may have been involved in the trans-shipment of

(8)
Spies.

Chapter 2

THE PRESENT ENVIRONMENT OF BALI

The island of Bali is located between 114.26° and 115.43° east longitude, and between 8.03° and 8.51° south latitude. It is flanked by Java and the Bali Strait to the west, by the Strait of Lombok (a part of the Wallace line between Sundaland and Wallacea) to the east, and by the Bali Sea to the north and the Indian Ocean to the south. An east-west volcanic mountain range divides the island into separate northern and southern divisions. This volcanic range represents an eastward continuation of the Quaternary volcanic complex of the Solo Zone of Java. The major colluvial and alluvial plains of southern Bali extend from the southern side of these volcanoes, and are formed of volcanic sediments (Bemmelen, 1949:30,52).

There are three of these plains in southern Bali, separated by areas where the high lands almost reach the sea. The Plain of Jembrana in the west extends from the River Daya to the River Embang and is about 24 km long and up to 7 km wide. The main plain in the centre of south Bali includes the districts of Tabanan, Badung, Gianyar and Klungkung. This is a very densely populated area. On this plain the settlements and irrigated ricefields extend inland to an altitude of 600 m. Beyond this most densely populated area there are still many settlements and extensive areas of lowland dry cultivation up to 1500 m. To the east this plain is interrupted by the Sidemen Mountains, rising to 826 m, which almost isolate the third small plain of Karangasem. On the northern coast the coastal plain is always narrow, reaching a maximum width of 7 km in a central strip between Kubutambahan and Gondol.

There are four volcanic crater lakes in the mountains of Bali, namely Lake Batur at about 1030 m above sea level, Lake Bratan at 1246 m, Lake Buyan at 1214 m and Lake Tamblingan, about 900 m southwest of Lake Buyan, also at 1214 m.

The climate of Bali is monsoonal. The Southeast Monsoon blows from a direction between east and southeast from April to October. It is strongest during June, July and August, and brings dry weather to the island. The northern coast is very dry during this season, although some rainfall still occurs in southern Bali. The Northwest Monsoon occurs from December to March. This brings the wet season to Bali, with January and February the wettest months along the north coast and December along the south coast.

The statistics for rainfall in various localities on the island are shown in Table 2.1

Table 2.1 Distribution of rainfall in Bali from 1928 to 1930.
Taken from Mohr (1944: 197. table 57)

Locality	Elevation above sea level in m	Average No. Rainy days per year	Average Rainfall per year in mm.	Humid (wet) months	Arid (dry) months
Singaraja	40	81	1182	4	6
Munduk	700	136	2295	7	4
Pupuan	800	136	2538	8	3
Negara	8	104	1678	7	1
Tabanan	130	122	2535	11	0
Denpasar	40	89	1717	6	3
Gianyar	120	99	1892	11	0
Klungkung	85	88	1831	11	0
Karangasem	105	77	1254	4	3

The northeastern coast of Bali has a very long dry season of about 7-8 months. It belongs to an intermediate tropical climatic zone which runs from the western part of the Philippines, through parts of Sulawesi and Maluku, to Java, Bali and the Nusa Tenggara Islands. In Java this zone narrows to a wedge along the north coast of the island, and also extends eastwards to encompass the southernmost part of New Guinea (Whitmore, 1981:38.fig.5.2). This belt of intermediate tropical climate separates the equatorial rain forests of Sundaland and Papuasias.

The majority of the rivers in Bali rise from the central mountain range and flow to the south or north coasts. The larger rivers occur in southern Bali and these carry water throughout the year, but only those between Tanjung Bungkulan and Celukanbawang on the north coast do likewise (Allied Geographical Section 1945:83). During the dry Southeast Monsoon the other rivers on the north coast, west of Celukanbawang and east of Tanjung Bungkulan, carry water only in their upper and middle courses.

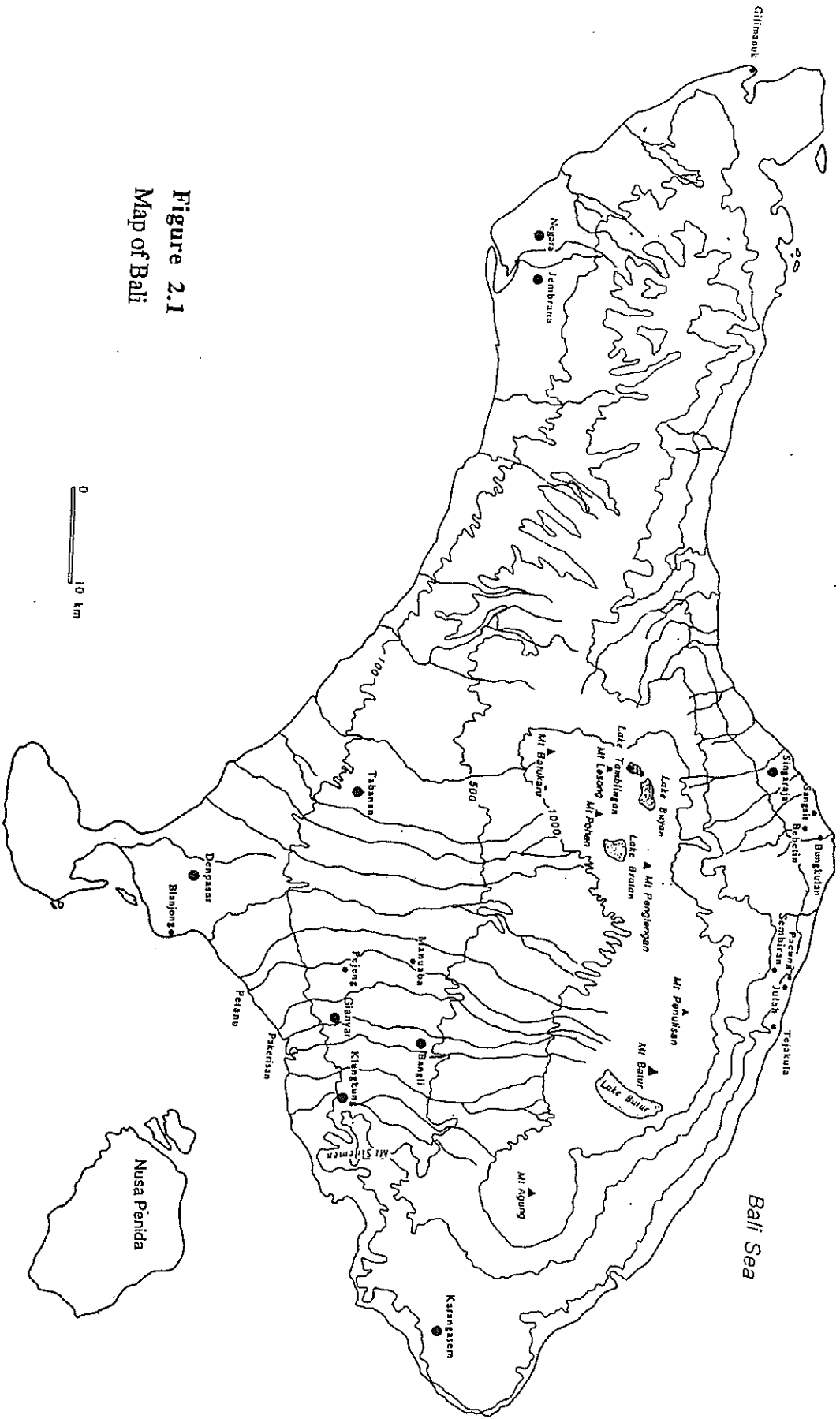


Figure 2.1
Map of Bali

The AIDAB funded excavation program in northeastern Bali involved research in the village lands of Pacung, Sembiran and Julah. These villages territories are spread out for a distance of about 3 km along the northeastern coast, between 8.6° and 8.7° south latitude and 115.17° and 115.18° east longitude. This area is a narrow strip of lowland along the coast, merging into the mountain slopes inland. At Tanjung Batu, about 300 m west of Pacung, a spur of the mountains comes down to the coast. West of Tanjung Batu the plain is wider and becomes about 7 km wide in the vicinity of Singaraja.

The archaeological excavations in northeastern Bali have revealed some important geomorphological information about the history of the narrow coastal plain in this region. For instance, some of the trenches have produced Indian Rouletted Ware of the first two centuries AD at depths between 2.4 and 3.6 m below the surface. This depth of burial by colluvial and alluvial deposition (see chapter 3) suggests that the processes which formed this plain occurred quite rapidly (see fig. 2.2). As sediments accumulated, the river banks and adjacent terrain would have become raised further above the river beds and overbank flooding would have become less frequent. This means that less surface water is available now than in the past. Today, the water table under the plain along the coast lies around 2.5 or 3.0 m below the surface, so people must dig wells in order to obtain fresh water during the dry season.

Human activities were probably the main causes of these erosional and depositional processes. Agricultural activities, such as forest clearance and burning for dry rice fields and gardens on the steep inland slopes, must have released vast quantities of soft volcanic sediment.

Landscape changes involving coastal plain formation as a result of human activities have been studied intensively in some Pacific Islands, such as Aneityum in Vanuatu (Spriggs 1981, 1986), Tikopia in the eastern Solomons (Kirch and Yen 1982) and some Micronesian islands (Athens *et al.* 1989). Spriggs (1986: 16) argues that agricultural intensification in Aneityum, with a corresponding development of social complexity, occurred due to the great expansion of fertile lowland as a result of these processes. However, Athens *et al.* (1989) argue differently for Micronesia, where population growth and competition over scarce land for cultivation are considered to be the main factors which ultimately led to social complexity.

As far as agriculture is concerned, phytolith analysis of sediment samples from layers 3 to 7 in the trench of Pacung I, undertaken by Doreen Bowdery of the Prehistory and Anthropology Department, at ANU, indicate that rice was being grown at the site during the period of layers 6 and 7 between 2.4 and 3.8 m below the surface, dated to c. 2000 years ago. Between 60 and 80% of the bulliform cells found in layer 7 are identified as *Oryza*, as are between 27.2 and 40.8% of those in layer 6 (see Appendix C). No definite *Oryza* cells were found in the sediment samples above layer 6, except for one possible example in a sample from layer 4, 2 m below the surface. It seems that the rapid build up of colluvial and alluvial deposits caused a cessation of rice growing in this region. Today, no rice is grown at all in the coastal plains of Pacung, Sembiran or Julah.

Phytolith analysis also indicates the presence of cytoplasmic carbon in the phytolith cells in sediment samples between layers 6 and 5 at 2.4 m in depth (c. 1500 BP?). The presence of this cytoplasmic carbon indicates that carbon was present in the atmosphere during the plant's growth periods. This is perhaps evidence for a volcano erupting nearby and emitting carbon, which caused a dramatic reduction and change in the local vegetation. The sediment sample from layer 5 also reveals sparse vegetation and grasses of a different species to those growing on the site before the presumed eruption. After the eruption the highest number of phytoliths was found in the sediment sample from layer 4, at 2 m in depth. The lowest number of cells containing cytoplasmic carbon also occurred in this horizon, indicating the cleanest atmosphere for the profile. However, in the sediment sample for layer 3, at 156 - 190 cm in depth, the occurrence of cytoplasmic carbon increased again and the vegetation again seems to have become less dense. This suggests the occurrence of at least two volcanic eruptions within the last 1500 years.

The environment of the northern coastal plain might also have changed in lesser ways over time. According to the inscription Sembiran C, dated to AD 1181, the western boundary of the village of Julah was formed by the village of Bakah (Bangkah?) and an area of swamp (*renek*). It thus seems that the northeastern coastal plain in this area still contained swampy areas during the 12th century AD, but they do not occur today, perhaps because alluvial sedimentation has filled them in.

The sea off the northeastern coast of Bali, particularly off the village of Julah, is very deep (931-1022 m). The edge of the Sunda shelf has here been scoured deeply by currents, and probably also by Pleistocene river activity on the Sundaland surface when it was exposed during glacials. This situation supports a theory that Julah was an ancient

port where ships or boats could easily get access to the beach. The sea surface along this coast is very calm and rarely affected by surf, so large vessels could probably anchor safely very close to the shore in calm weather. The coastline of Sembiran and Julah has probably maintained a similar position to that of today for at least the past 2000 years. Where sedimentation has been heavy wave-cut cliffs have formed, thus reducing any tendency of the coastline to aggrade seawards. For instances, the present coastline in the vicinity of the trenches of Sembiran IV-VII has probably only moved about 100 m seawards since 2000 BP. It is in the cliffs that the first observations occurred of the archaeological potential of this coastline.

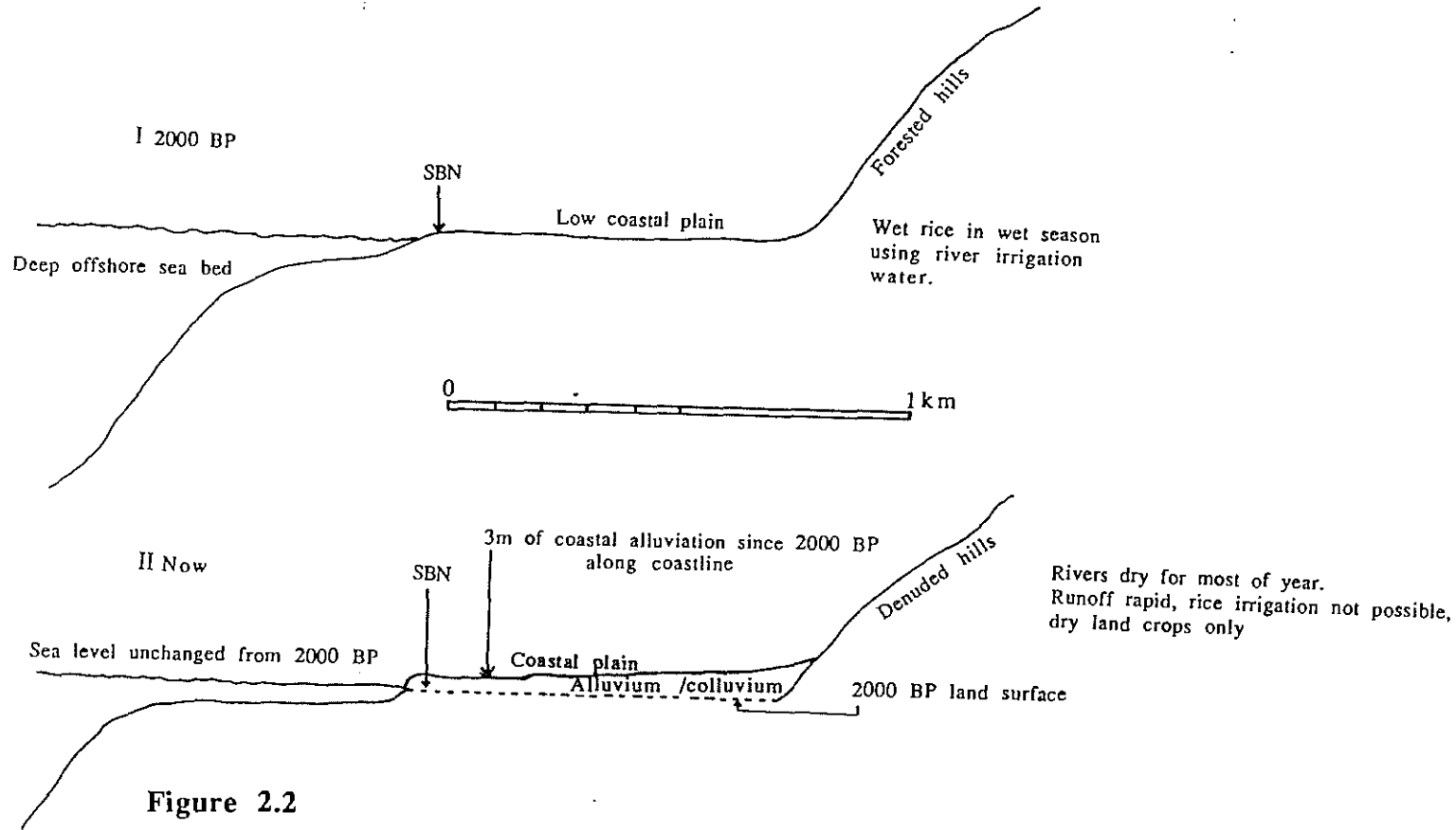


Figure 2.2

Diagram suggesting the processes of erosion and deposition of alluvial/colluvial sediment at Sembiran

CHAPTER 3

SURVEY AND EXCAVATION

3.1 Survey

The survey for archaeological sites was initially conducted in the vicinities of ten of the villages in Kecamatan Tejakula. These villages were Pacung, Sembiran, Julah, Madenan, Bondalem, Tejakula, Les, Panuktukan, Sambirenteng and Tembok (see fig. 3.1). Brief surveys were also carried out in the adjacent Kecamatans of Kubutambahan and Sangsit. The surveys were not undertaken systematically by using a system of grid squares, since it soon became apparent that surface indications of archaeological sites, apart from occasional potsherds, were almost absent on the coastal plain owing to the continuous nature of alluvial deposition. Instead, the survey involved walking along the beach and the adjacent coastal plain to look for archaeological exposures in the beach cliffs and wells. Villagers were also interviewed.

The aim of the survey was to assess the potential of the area for archaeological research. Some potsherds were discovered during the survey, particularly in exposed sections of the low cliffs just behind the beach in the village territories of Pacung and Sembiran. In the *dusun* of Bangkah (within the village territory of Pacung) potsherds were found in these low beach cliffs for a length of about 300 metres east of Sungai Kambing (see fig. 3.2). The trench of Bangkah I was placed just inland from the cliff, where the density of exposed potsherds was very high.

Potsherds also appeared in the low cliffs for about 200 m to east and west of the mouth of the Bayad river channel in Sembiran. The trench of Sembiran I was located almost 200 m to the west of the Bayad river channel. Sembiran II/III was located a similar distance to its east where potsherds were found on the surface in the fields.

Careful observations in the sides of wells also produced information on areal stratigraphy and on the occurrences of archaeological deposits. Some potsherds were found in the side of the well which lies about 2 m away from the excavation of Sembiran IV, hence the decision to open this very productive square. The sherds were observed in the well down to almost 2.8 m below the ground surface. Potsherds were also discovered on the ground surface close to two other wells which lie 75 m to the

southwest and northeast respectively of Sembiran IV.

In addition, a damaged bronze *moko* together with an earthenware jar and bowl were discovered in the territory of Pacung in 1978 (Widia 1981). These artifacts were found in Bapak Seleg's field when a well was dug, about 100 m to the northeast of Sembiran V (see map). The jar and the bowl are preserved in the Bali Museum in Denpasar, but the *moko* was sold and now forms part of the Eilenberg collection in London. (O'Connell 1986, O'Connell and Glover 1990).

The archaeological layers discovered all occur within the coastal alluvial plain, on the seaward side of the present villages. These villages lie along the modern road which runs close to the major ecotone separating the coastal plain and the lower mountain slopes.

Archaeological excavations in the trenches of Pacung (PCN) I, and Sembiran (SBN) IV, VI and VII have revealed Indian Rouletted Ware and beads dated to c 2000 BP. This Rouletted Ware occurs mainly between 2.9 and 3.6 m below the surface. A radio carbon sample from layer 2 of SBN I, which lies 1 m below the present surface, has been dated to 770 ± 180 BP (ANU 6543). Another sample from 2.5 m below the surface in SBN VI has been dated to 1010 ± 110 BP (ANU 7218). These findings indicate that the rate of coastal plain alluviation has been fairly rapid during the past 2000 years, varying around one metre per 400-800 years just inland from the beach (doubtless faster as one moves further inland closer to the sources of the sediments). Because of this relatively rapid build up, and the fact that the water table is generally only about 3 metres below the present ground surface, it is unlikely that we will find neolithic or older sites in this area without massive earth-moving operations. Most archaeological deposits over 2000 years old would now be buried beyond reach, and probably occur increasingly further inland as well as deeper as one moves back in time.

3.2 The 1987-1989 Excavations

Archaeological excavations were conducted on the coastal plain between November 1987 and March 1988, and from mid-October to early December 1989. They took place in the coastal territories of the four villages of Bangkah, Pacung, Sembiran and Julah, all in Kecamatan Tejakula. Two trenches were excavated in Bangkah ([BKH] I and II), seven in Sembiran (Sembiran [SBN] I-VII), one in Pacung (Pacung [PCN] I) and one in Julah (Julah [JLH] I).

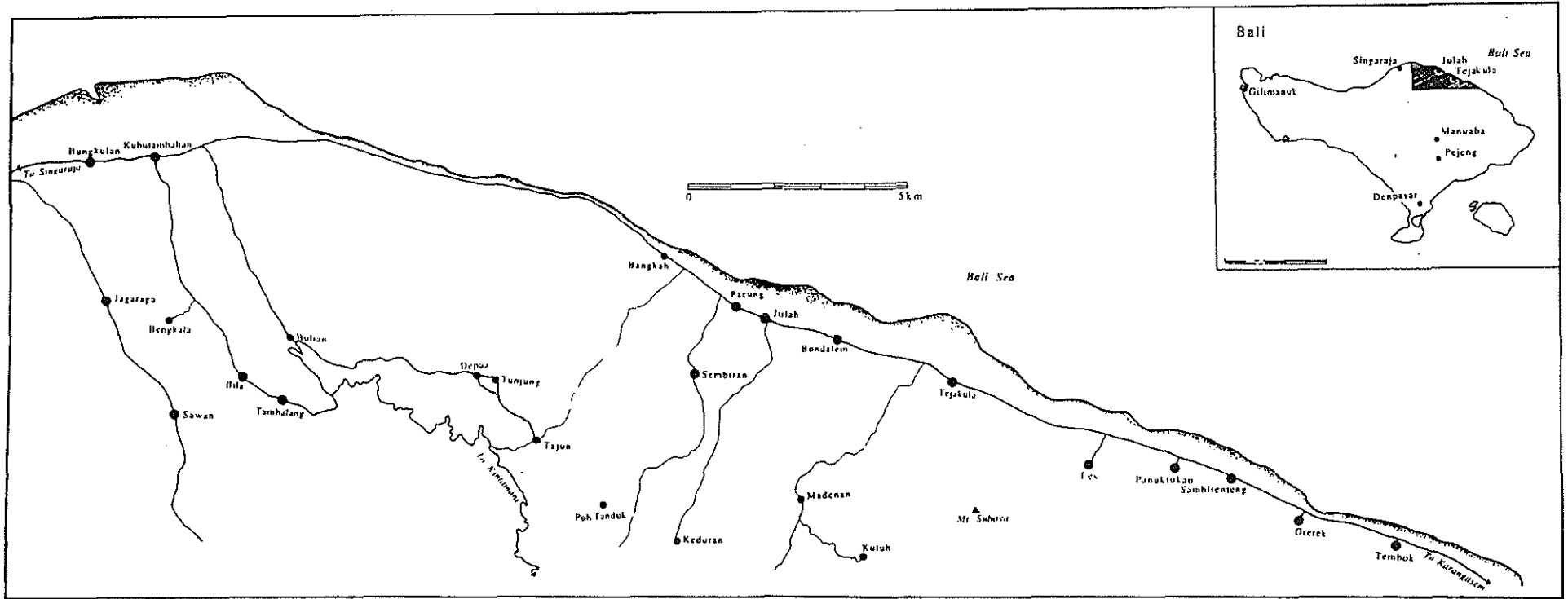
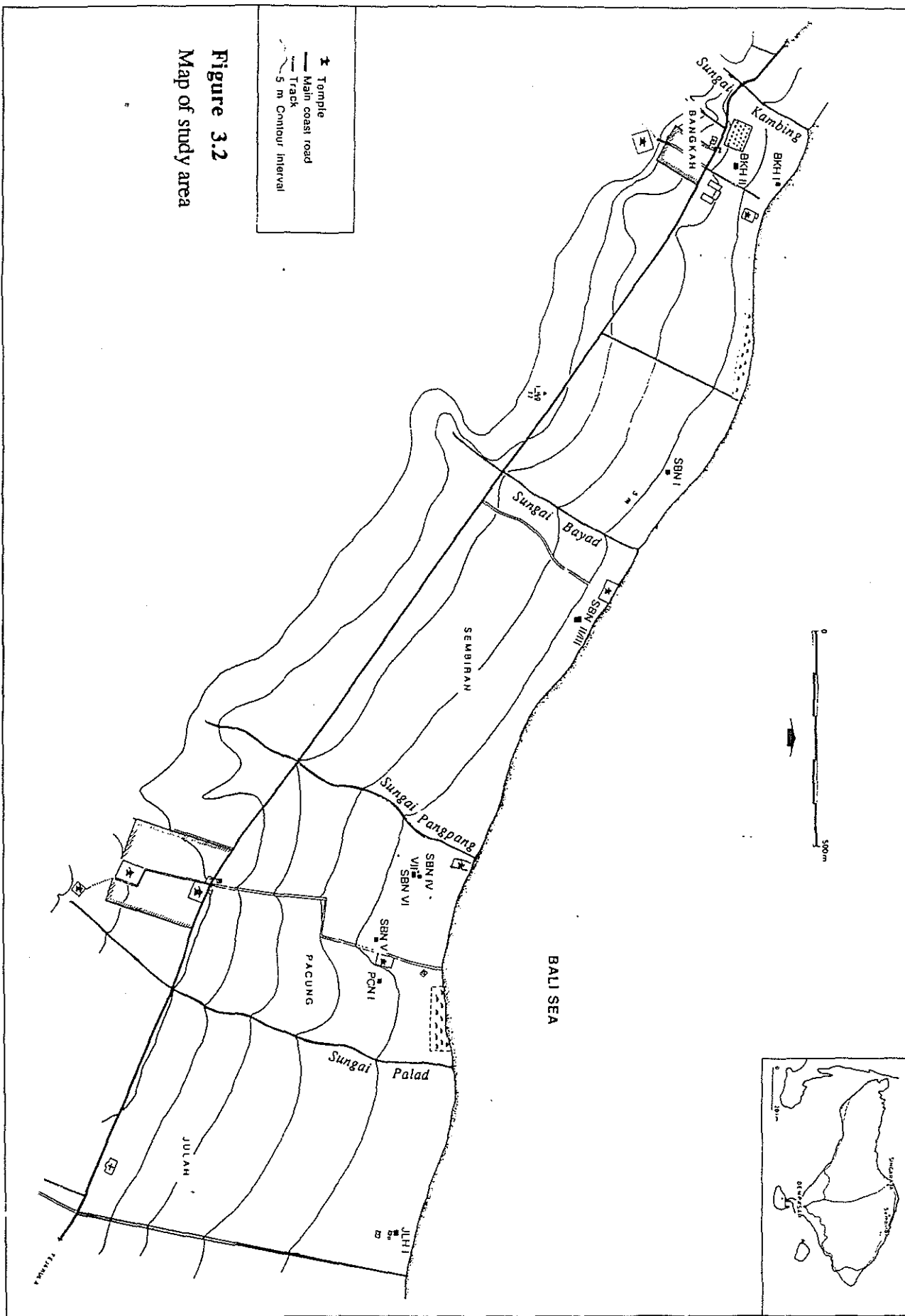


Figure 3.1
Map of the villages in Kecamatan Tejakula and Kubutambahan



The Old Balinese inscriptions of Sembiran AI-IV and Sembiran C (see chapter 8 and appendix E where these are translated and discussed in more detail), dating between AD 922 and 1181, indicate that there was a port in the village territory of Julah or nearby at this time. This reference was one of the major pre-fieldwork reasons for investigating this area, and the inscriptions kept in Sembiran and Julah as a whole provide much information about this region of Bali in the late first millennium AD. The limitations of funding and time made it impossible to extend the research beyond the villages listed, but the eleven trenches produced important archaeological and geomorphological information from c 2000 BP to the present time.

Soil samples from all layers in squares SBN IV and PCN I, and from layers 4 and 5 of BKH I and JLH I were brought back to ANU for further analyses. Grain sizes analysis of these samples was undertaken in the Waikato Rapid Sediment Analyser in the Department of Geography at ANU under the supervision of Dr G. Hope and Mr Roger Booth. In addition, loss on ignition analyses of soil samples from SBN IV were also carried out in the Department of Geography at ANU with the help of Simon Haberle. The X-Ray Diffraction analyses of soil samples from SBN IV were conducted by Mr Chris Foudoulis of the Department of Geology, ANU. The excavation trenches, stratigraphy and the results of the soil sample analyses are now described.

3.2.1 Bangkah I (BKH I)

The trench of BKH I was chosen to reveal the stratigraphic distribution and density of the many potsherds which are visible in the low cliff which runs along the head of the beach at this point. The trench was placed immediately inland from the cliff where the ground surface lies about 4 m above mean sea level.

Since the stratigraphic layers turned out to be quite thick during excavation, the trench, which was 1.5 m square, was excavated using a system of arbitrary 10 cm spits. The trench was excavated completely to spit 22, and the southwest quadrant was excavated further to spit 31 (3.1 metres depth).

13,798 body sherds and 163 rims were recovered from BKH I. In addition, a bronze fish hook and an unidentified bronze object were also found. These archaeological remains occurred from layer 1 down to layer 4, below which lies virgin soil (see table 3.1).

The distribution of artifacts in BKH I suggests that the site has been continuously occupied since the alluvial plain commenced deposition from the base of layer 4 to the present time. Layer 5 underneath layer 4 is a modified black beach sand incorporating the same sand as the adjacent modern beach.

During a post-excavation visit to the site with other participants of the Yogyakarta IPPA conference in September 1990, we found two stone arrangements which were possibly the faces of earthen house platforms (see figs. 3.4-3.5). These stone structures had been recently exposed by the sea which in this area is continuously eroding back the cliff. One of these arrangements is about 4 m to the west of BKH I and 1.9 m below the ground surface. It is 1.38 m long in an east-west direction and 0.75 m wide from north to south. The second lies about 6 m to the west of BKH I and 2.2 m below the ground surface. It is 2.25 m long. These stone platforms belong to the upper level of layer 4 in BKH I and date to the beginning of occupation of the site. Similar but younger stone platforms were also excavated at SBN II/III (see below).

The five stratigraphic layers recognized in BKH I are numbered 1 to 5 from the surface downwards (fig. 3.3). Layer 1 is almost 70 cm thick and yellowish brown in colour (10YR 5/8). It is a loose and alkaline soil (PH 7-7.5). Many large stones occur in this layer, perhaps dispersed from the facings of old house platforms.

Layer 2 is much looser than layer 1 and contains more sand. It is brown (7.5YR 5/4), about 80 cm thick, and contains coconut roots. Small fragments of brick also occur in this layer.

Layer 3 is about 30 cm thick and reddish-yellow in colour (5YR 6/6). This layer is very alkaline (PH 8-8.5) and loose. Fragments of brick continue to occur.

Layer 4 is more compact than layer 3. It is about 90 cm thick and reddish-yellow in colour (5YR 6/6). A sample of layer 4 was analysed in the Waikato Rapid Sediment Analyser in the Department of Geography at ANU. The results indicate 0.4% gravel, 53.4% sand, and 46.2% silt+clay. Because sherds were very few in this layer only the southwest quadrant was excavated to the basal beach sand of layer 5. A sample of layer 5 was also analysed in the Waikato Rapid Sediment Analyser which indicated 57.6% sand and 42.4% silt+clay. The house platforms mentioned above belonged to the upper part of this layer.

The beach sand of layer 5 is entirely sterile of human occupation. Its silt and clay content have presumably leached down from layer 4 above.

It is clear that the coastal plain around BKH I has been built up as a result of the erosion and transportation of alluvial and colluvial materials (perhaps mainly alluvial this close to the present strandline) from the inland volcanic mountain slopes. Human activities presumably caused this process to intensify. Unfortunately, no radiocarbon samples were recovered from this trench so it is not possible to give a precise date to the beginning of the process. However, the absence of Indian pottery and the nature of the local sherds found (to be discussed later) suggest a date much less than 2000 years ago.

Figure 3.3

The stratigraphy of BKH I

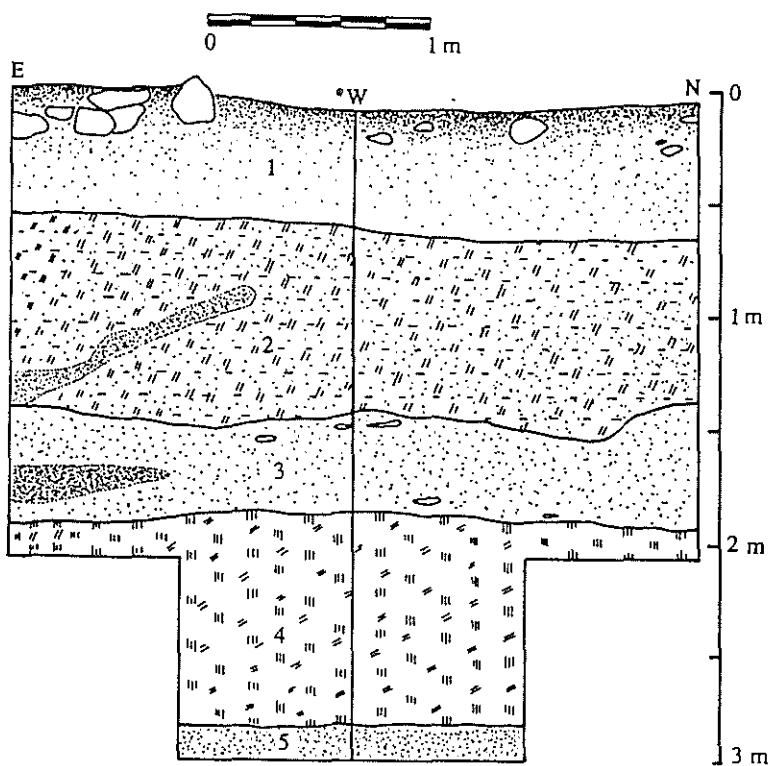


Table 3.1: Distribution of artifacts and animal bones by layer and spit in BKH I

Layer	Spit (10 cm)	Sherd No Total	Sherd weight (gram)	Metal Object	Bone weight (gram)
1	1	-	-	-	-
	2	52	100	-	-
	3	188	400	-	-
	4	660	1110	-	-
	5	604	1250	-	-
	6	551	1160	-	-
2	7	397	844	-	-
	8	400	850	-	-
	9	1033	2710	-	-
	10	683	1555	2	-
	11	783	1889	-	-
	12	925	2225	-	-
	13	781	1830	-	-
	14	682	1595	-	20
3	15	804	2080	-	-
	16	624	1730	-	-
	17	758	2420	-	-
	18	1858	2870	-	-
4	19	761	2270	-	-
	20	682	2990	-	-
	21	656	2780	-	-
	22	47	100	-	-
	23	-	-	-	-
	24	-	-	-	-
	25	-	-	-	-
	26	-	-	-	-
5	27	-	-	-	-
	28	-	-	-	-
	29	-	-	-	-
	30	-	-	-	-
	31	-	-	-	-
TOTAL		13961	34758	2	20

Figure 3.4

Stone platform exposed by marine erosion near Bangkah I

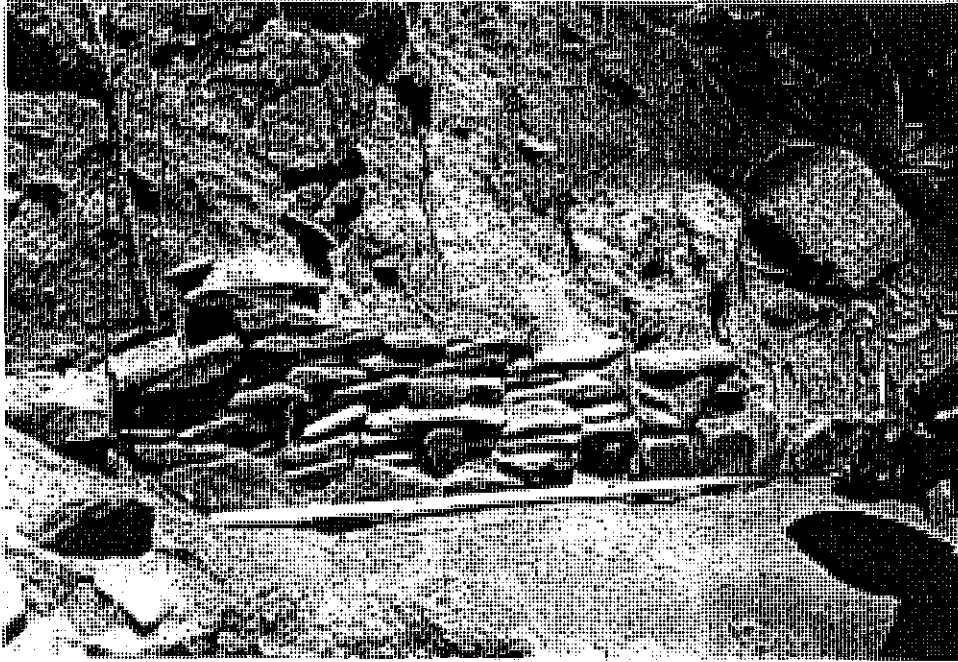
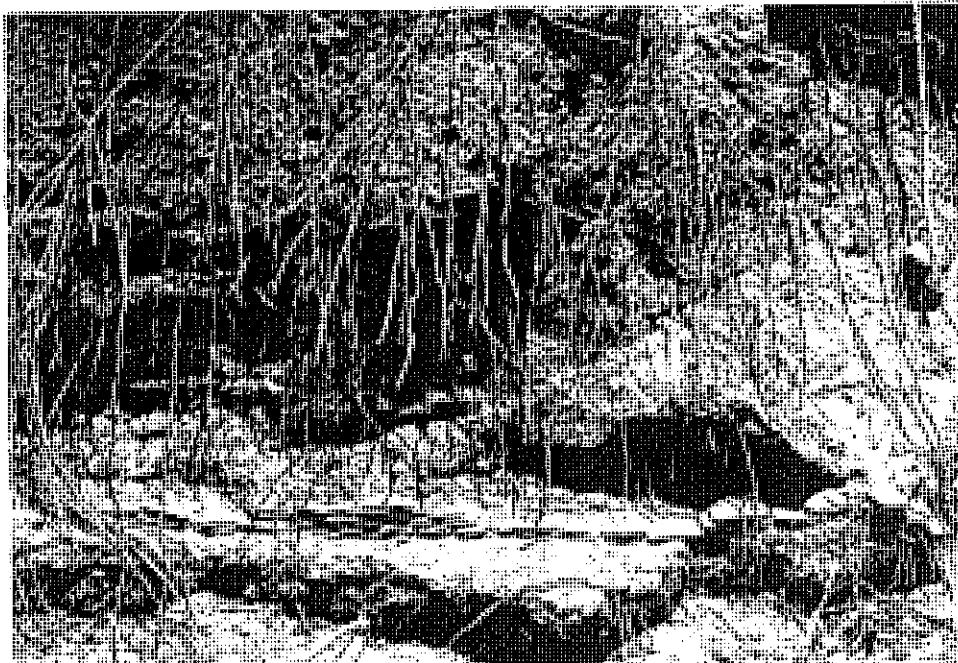


Figure 3.5

Stone platform near Bangkah I



3.2.2 Bangkah II (BKH II)

The trench of BKH II was located 105 m inland (south) of BKH I, and about 100 m seaward of the base of the inland hill slope. The ground surface here has risen evenly from the strandline to about 10 m above mean sea level. The trench was 1.5 m square and 2.2 m deep, and each excavated spit was 10 cm thick. The aim of the excavation here was see if the potsherds and stratigraphic levels represented in BKH I extended inland. However, the excavation at BKH II produced only 359 potsherds in total compared to the 13,961 sherds from BKH I. The excavation was stopped at spit 22 because of the presence of large rocks and the very small number of sherds found at this level. The distribution of sherds in the layers of BKH II is shown in table 3.2

Four layers were excavated in this trench, numbered 1 to 4 from the surface downwards. They are different from those of BKH I in colour and texture. Layer 1 is a thin humic layer of alluvium about 10 cm deep and reddish-brown in colour (2.5YR 5/4). Layer 2 is more compact than layer 1 but has the same colour and is about 140 cm deep. Layer 3 consists of sand, gravel, pumice and large rocks and the matrix is yellowish-brown in colour (10YR 5/8). It is between 20 and 50 cm thick, and becomes thicker in the northern part of the trench (see Fig.). This layer may owe its existence to a phase of coarse sedimentation from the nearby and inland hill slope, possibly due to forest clearance. It is not clear how the material was deposited, but an outwash fan deposited by a stream seems likely. Layer 4 beneath, a fine alluvial sand with no large rocks, is yellowish-brown in colour. It was excavated for about 20 cm in depth. Being sterile of artifacts it probably represents a fairly stable alluvial landscape without any major human activity involving deforestation nearby. However, the true pre-human virgin soil (or beach sand) presumably lies many metres beneath the depth reached in the excavation. Resources were not available to deepen the square indefinitely.

Figure 3.6
Stratigraphy of BKH II

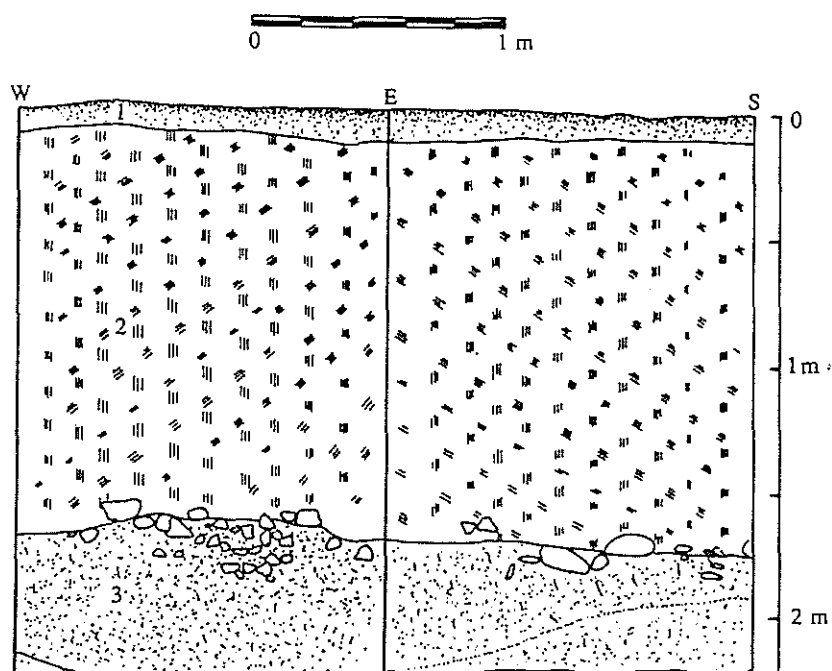


Table 3.2 Distributions of artifacts by layer and spit in BKH II

Layer	Spit (10 cm)	Sherd No Total	Sherd weight (gram)	Ceramics No
1	1	27	350	1
2	2	25	60	1
	3	11	30	-
	4	8	40	-
	5	12	70	-
	6	4	25	-
	7	6	25	-
	8	26	90	-
	9	27	60	-
	10	14	35	-
	11	14	60	-
	12	8	15	-
	13	9	30	-
	14	18	115	-
	15	42	130	-
3	16	33	100	-
	17	25	105	-
	18	15	55	-
	19	10	45	-
4	20	8	45	-
	21	7	25	-
	22	10	25	-
TOTAL		359	1515	2

3.2.3 Sembiran I (SBN I)

The square of SBN I was located about 1 km to the east of BKH I (see map), 40.5 m inland from the present shore line, and 200 m to the west of the Bayad river channel. The ground surface here is about 5 m above mean sea level. Several potsherds were discovered during the survey on the surface of the site and some are still intact in the nearby beach cliff. This trench was excavated in order to examine the distribution of these sherds and any associated habitation evidence.

The trench was 1.5 m square and dug to a depth of 2.2 m. Three layers were excavated, of which layer 1 is top soil between 8 and 20 cm thick and reddish-brown (5YR 4/6) in colour. Layer 2 beneath is about 90 cm thick. A lens of very dark brown or black (7.5YR /2 or N 2) sand between 10 and 25 cm thick was found in layer 2, particularly in the northeastern part of the trench. Layer 2 itself is reddish-brown in colour (5YR 5/4). Most potsherds were discovered in this layer and a scattered charcoal sample from spit 10 has been dated to 770 ± 180 BP (ANU 6543).

Some boulders appeared in layer 3, which was archaeologically sterile. This layer is reddish-brown in colour (5YR 5/4). The occurrence of these boulders made the excavation difficult, so only the southwest quadrant of the trench was excavated until spit 22, when excavation was stopped. These boulders may have a similar explanation as a very coarse colluvial fan deposit to those in layer 3 in trench BKH II, although SBN I is located further away from the inland hillslopes. Excavation ceased in the lower boulders at 2.20 m.

Figure 3.7

The stratigraphy of SBN I

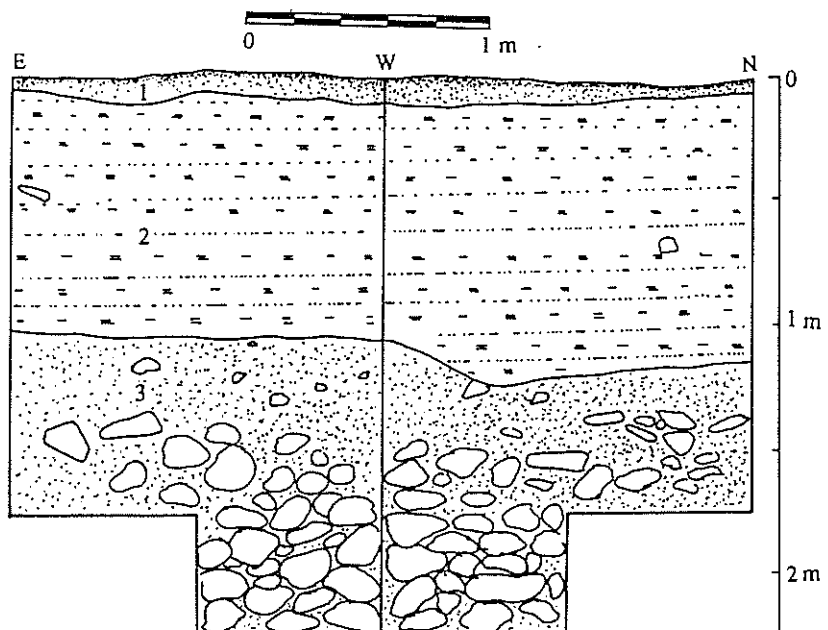


Table 3.3 The distribution of artifacts by layer and spit in SBN I

Layer	Spit (10 cm)	Sherd No Total	Sherd Weight (gram)	Chinese Ceramics	Metal Objects
1	1	259	380	-	-
	2	288	445	-	-
2	3	208	275	-	-
	4	119	140	-	-
	5	209	300	-	-
	6	215	250	-	-
	7	234	300	-	-
	8	331	520	-	-
	9	639	970	-	-
	10	1722	3615	-	5
	11	2771	6832	1	1
	3	12	613	1740	-
13		306	695	-	-
14		83	235	-	-
15		14	22	-	-
16		174	320	-	-
17		-	-	-	-
18		2	10	-	-
19		2	13	-	-
20		1	7	-	-
21		-	-	-	-
22		-	-	-	-
TOTAL		8190	17069	1	6

3.2.4 Sembiran II/III (SBN II/III)

The trench of SBN II/III was located about 500 m to the east of SBN I, 77.5 m southeast of the *Pura Sanghyang Marek* temple (dedicated to the gods of the sea and the wind), and 24.5 m from the head of the beach. It was 1.5 x 3 m in area and was dug to 3 m in maximum depth. The trench was placed here because the distribution of potsherds on the surface of the field was very dense, as it was in the cliff along the beach, particularly to the east of the *Pura Sanghyang Marek*. Trench II was excavated first and trench III formed an extension to it.

The upper layer of the trench produced two successive parallel stone facings for earthen house mounds. The earlier stone facing formed part of the eastern side of an earthen house platform. The later one was similar, but formed part of the western side of a platform. In other words, the two faced earthen platforms overlapped horizontally by about 30 cm. Both are similar to the foundations of existing huts around the site (see figure 3.9), and both faces slope slightly inwards into their respective earthen cores. Although the earthen platforms themselves were not recognised in the stratigraphy of the trenches it is clear that the later one was built over the edge of the earlier one, which might have been partly quarried for the fill of its successor. Both facings run in a southwest-northeast direction and are about 3 m long, but of uncertain width.

Pottery was discovered from the surface down to spit 24 in SBN II/III, and the 3 pieces found in spit 24 might have been disturbed downwards from the main pottery-bearing layers above spit 19. Seven layers were recognized, commencing from the layer 1 topsoil which is about 20 cm thick and reddish-brown (5YR5/6) in colour. Layer 2 consists of sandy alluvium, as do all the layers in this trench. It is about 30 cm thick, and reddish-brown (5YR 5/4) in colour. Layer 3, between 50 and 60 cm thick, is also sandy and reddish-brown (5YR 5/4) in colour.

Layer 4 includes fragments of burnt clay, and is between 50 and 60 cm thick. Layer 5, more compact than layer 4, is about 40 cm thick and dark red (2.5YR 3/6) in colour. Layer 6, more compact again than layer 5, is about 80 cm thick and reddish brown (2.5YR 5/4) in colour. Owing to the scarcity of the cultural materials this layer and layer 7 below were excavated only in one 75 x 75 cm quadrant.

Table 3.4 Distribution of artifacts by layer and spit in SBN II/III

Layer	Spit (10 cm)	Sherd No. Total	Sherd Weight (gram)	Description	
1	1	2635	3230	SBN II/III. - 1.5 x 3 m - -	
	2	2213	6565		
	2	3	1469		6280
		4	1471		6480
	3	5	1063		5865
6		845	4345		
7		497	1848		
8		883	3610		
9		573	2010		
10		401	2110		
11		611	3340		
12		400	1970		
13		285	1780		
4		14	483	2400	
		15	490	2190	
5	16	314	1740		
	17	403	2730		
	18	137	570		
6	19	18	50	Southwest Quadrant - - - - 0.75 x 0.75 m - - - - - -	
	20	-	-		
	21	-	-		
	22	-	-		
7	23	-	-		
	24	3	20		
	25	-	-		
	26	-	-		
	27	-	-		
	28	-	-		
	29	-	-		
	30	-	-		
Total		15194	59133		

Layer 7 was excavated to about 20 cm depth. It is looser than layer 6 but has the same colour. No archaeological remains were discovered in layer 7 so excavations were stopped prior to reaching the water table. The distribution of potsherds in this trench can be seen in table 3.4.

Sembiran III was dug to only 40 cm in depth, simply to expose more of the house floors. The stone faces of these floors were left *in situ* and not disturbed so it was impossible to dig SBN III any deeper.

Figure 3.8
Stratigraphy of SBN II/III

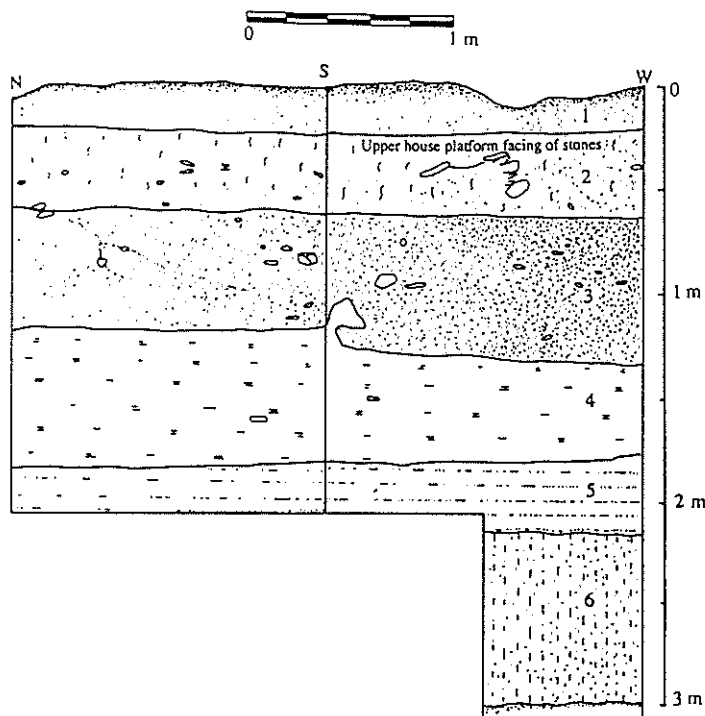


Figure 3.9

Upper stone platform in SBN II/III

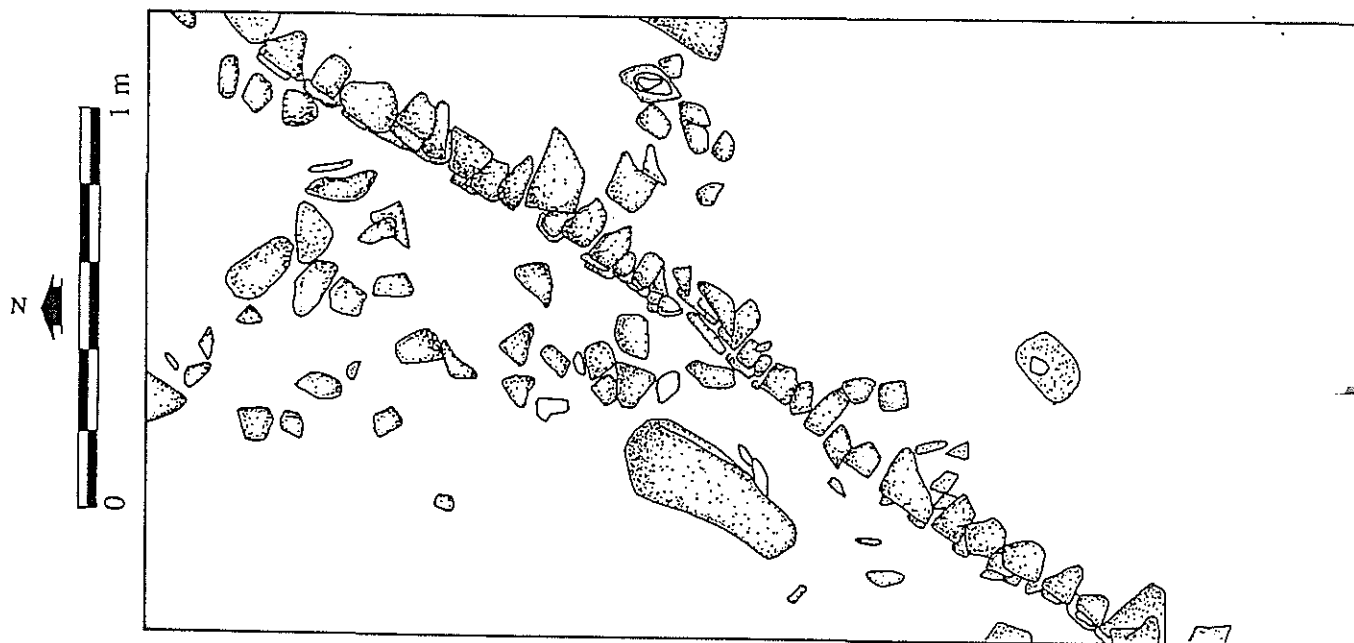


Figure 3.10

Upper and lower stone platforms in SBN II/III



3.2.5 Sembiran IV (SBN IV)

The trench of SBN IV was located about 80 m southeast of the *Pura Palisan* temple, where the ground surface is about 5 m above sea level. The name of the *Pura Palisan* may be derived from the word *melis*, a ceremony for purifying deities and temple paraphernalia in the sea held every New Year in the Saka calendar (around March). The *melis* ceremony for the village of Sembiran usually take place in the *Pura Palisan*, but for the other villages in Kecamatan Tejakula it is held in the *Pura Ponjok Batu* about 300 m west of BKH I.

SBN IV was chosen for excavation because of the discovery of decorated sherds around and in the sides of the well which had been dug 2 m away to the southwest. It was the first and only trench excavated in 1987 to produce material from the early Indian contact phase, and these discoveries led to the decision to focus on this area during the 1989 season of excavation

The trench was 1.5 m square and 3.4 m in maximum depth. Eight layers were recognized, and samples of all were analysed in the Waikato Rapid Sediment Analyser at ANU (see table 3.6).

All layers have similar grain size distributions with generally over 70 % silt and clay, and are all clearly of alluvial origin, perhaps subjected to cultivation in some cases (layer 1 is certainly a cultivation layer, still farmed today). Certainly never cultivated, however, was the thin, archaeologically-sterile, and light coloured layer 5 at a depth of about 220 cm; this appears to be an *in situ* and completely undisturbed layer of alluvium or volcanic ash. This circumstance is very important since it ensures the stratigraphic integrity of the archaeological layers beneath, which contain all the early Indian contact materials.

The topsoil layer 1 is about 15 cm thick. Beneath this occurs layer 2, which is more compact than layer 1, about 80 cm thick, and dark reddish-brown (2.5YR 3/4) in colour. Layer 3 is between 30 and 40 cm thick and dark red (2.5YR 3/6) in colour.

Layer 3a is only about 10 cm thick and is a fine sandy layer, dark reddish brown (2.5YR 3/4) in colour. Layer 4 is a soft layer almost 60 cm thick. It is reddish brown (5YR 5/4) in colour. Layer 5 is about 10 cm thick and reddish-yellow in colour (5YR 7/6). As noted, most archaeological remains were found below this layer, which is

complete and unbroken across the trench. The absence of archaeological remains in layers 3a, 4 and 5 indicates that the site of SBN IV was probably not under intensive use during the time span represented.

Layer 6, where the archaeological remains begin to appear in quantity, is more compact than layer 5 and about 25 cm thick. It is dark red in colour (2.5YR 3/6). Layer 7 was the lowest layer excavated and is about 80 cm thick and dark reddish brown (5YR 3/3) in colour. Ground water appeared in spit 30, about 3 m below the surface. However, excavations were continued until spit 34 because archaeological remains still continued in this level. Here they had to be stopped in the rainy season of 1987-88 because no pump was available, and the underlying sterile deposit, presumably beach sand (?) was never reached. Layer 7 also has many large rocks, perhaps from an ancient outwash fan deposit. The discovery of sherds of Indian Rouletted Ware can be used to date layer 7 to between approximately 200 BC and AD 200 (Wheeler 1946, Begley 1986, Deraniyagala 1989).

Figure 3.11

The stratigraphy of SBN IV

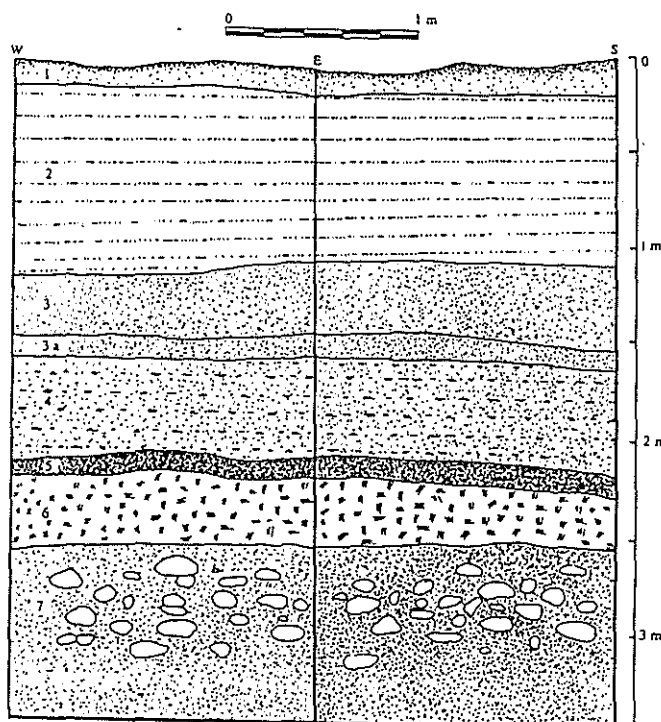


Table 3.5 Distributions of artifacts and animal bones by layer and spit in SBN IV

Layer	Spit (10 cm)	Earthenware Total	Earthenware Weight gram	Rouletted Ware	Bead no.	Metal Object	Bone Weight gram
1	1	8	25	-	-	-	-
	2	5	5	-	-	-	-
2	3	2	10	-	-	-	-
	4	-	-	-	-	-	-
	5	1	3	-	-	-	-
	6	3	5	-	-	-	-
	7	23	75	-	-	-	-
	8	20	60	-	-	-	-
	9	47	95	-	-	-	-
	10	3	15	-	-	-	-
	11	1	2	-	-	-	-
3	12	1	10	-	-	-	-
	13	2	7	-	-	-	-
	14	-	-	-	-	-	-
	15	1	5	-	-	-	-
3a	16	-	-	-	-	-	
4	17	-	-	-	-	-	-
	18	-	-	-	-	-	-
	19	-	-	-	-	-	-
	20	-	-	-	-	-	-
	21	-	-	-	-	-	-
	22	-	-	-	-	-	-
5	23	6	23	-	-	-	-
	24	15	105	1	-	-	-
6	25	13	50	-	-	-	-
	26	8	35	-	-	-	-
	27	28	120	-	-	-	-
	28	56	205	-	-	-	-
	29	140	881	-	-	-	-
	30	204	2860	2	-	-	8
	31	796	1815	4	7	2	18
	32	291	1137	1	3	-	2
	33	1186	4335	2	7	1	17
	34	1216	4220	-	7	-	3
TOTAL :		4076	16103	10	24	3	48

Table 3.6 The results of soil samples from SBN IV analysed by Waikato Rapid Sediment Analyser

Layer	Depth cm	Colour	Gravel %	Sand %	Silt&Clay %	Loss on Ignition %
1	0-15	2.5YR3/6	0.3	23.4	76.3	0.025
2	15-110	2.5YR3/4	0.2	15.7	84.1	0.033
3	110-155	2.5YR3/6	-	31.34	68.66	0.023
3a	155-165	2.5YR3/4	0.05	26.90	73.05	0.022
4	165-215	5YR5/4	-	12.0	88.0	0.030
5	215-225	5YR7/6	0.2	22.4	77.4	0.012
6	225-255	2.5YR3/6	-	10.47	89.53	0.029
7	255-340	5YR3/3	boulders	12.94	87.06	0.030

Mineralogical analyses of soil samples from all layers of SBN IV were carried out by X-ray diffraction in the Department of Geology, ANU (courtesy of Mr Chris Foudoulis). Dominant minerals in all layers are plagioclase, magnetite/maghemite, halloysite, and quartz. Other minerals are present but are impossible to identify because of their low peak intensities. In addition, loss-on-ignition test and grain size analyses were also carried out on samples from all the layers of SBN IV (see table 3.6). As might be expected of sediments of presumed alluvial origin these layers produced only low values for organic contents, between 0.012 and 0.033% by weight. The distributions of artifacts and animal bones in SBN IV are shown in Table 3.5.

3.2.6 Sembiran VI (SBN VI)

This trench was excavated one metre to the southwest of SBN IV during the second field work season in 1989. It was 2 x 2 m in size and 3.6 m deep. The aim of the excavation was to reveal more of the archaeologically productive lower layer of SBN IV. Unfortunately, as in SBN IV, the presence of the water table at about 3m depth meant that we were not able to reach the bottom of the cultural deposit.

As in SBN IV most artifacts from SBN VI were found below the undisturbed thin sandy layer 5, which is here again about 10 cm thick and reddish yellow in colour (5YR 7/6). Artifacts were absent in the higher layers 3,4 and 5, as in SBN IV.

Altogether, seven layers were excavated in SBN VI, exactly as in SBN IV, with the exception of layer 3a which only occurs in the latter square. Layer thicknesses in the two squares are almost the same. Between spits 34 and 35 occurred a hard layer, probably a heavily walked upon occupation surface to judge from the number of artifacts found generally in this zone. The distribution of artifacts and bones in SBN VI is shown in table 3.7.

3.2.7 Sembiran VII (SBN VII)

This trench was a western extension of SBN VI, 2 x 2 m in size and 3.7 m deep. So SBN VI and VII together formed a trench 2 x 4 m in size and about 3.7 m deep. The layers in both squares were similar. However, two human burials were discovered in

SBN VII, perhaps dug from layer 6, although no clear signs of the burial pits were observed during the excavations. The bodies were found between spits 33 and 34 in layer 7 (see figure 3.12).

Burial I was completely revealed and taken out from the trench. Unfortunately, burial II could not be taken out because it still remained mostly unexcavated in the section. Burial I was placed in a flexed position with its head toward the east; it seems that both arms were bent towards the chin and the right leg was also bent (see figure 3.13). The upper jaw and teeth are still complete, but the lower jaw has been damaged. No osteological analysis has been done and the skeleton is preserved in the office of National Archaeological Research Centre (Balai Arkeologi) in Denpasar. It was not possible to bring it to ANU for further analysis. The other skeleton was also in a flexed position but only the waist and knee bones were visible. As already noted, the trenches for these burials were no longer visible but the bodies themselves clearly postdate the absolute level at which they occur.

No intact grave goods were found in association with these burials, but it is interesting to note that the number of potsherds in layer 6 in SBN VII is four times that in the same layer in SBN VI (see table 3.7). It seems that these sherds were derived mainly from the underlying layer 7 when people dug the burial trenches, presumably from the top of layer 6. In addition, a very large number of glass beads tended to be concentrated above burial I; these may perhaps originally have been placed with the burial.

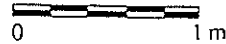


Figure 3.12
Stratigraphy of SBN VI/VII

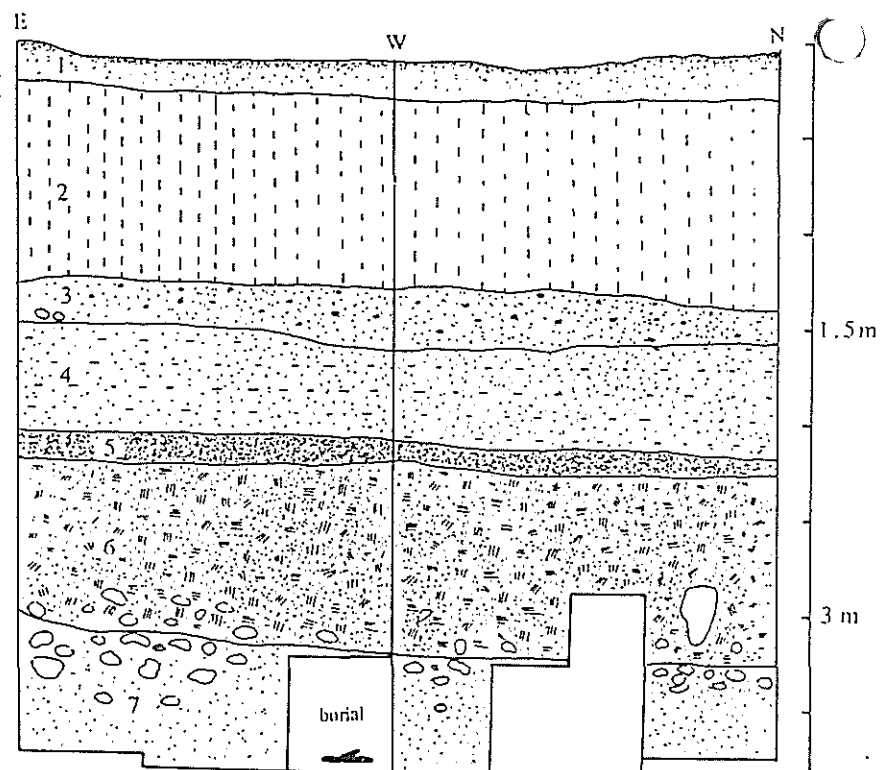


Table 3.7 Distribution of artifacts and animal bones by layer and spit in SBN VI

Layer	Spit	Earthenware No.	Earthenware Weight/gram	Rouletted Ware	Type 10 Sherd	Bead No.	Metal No.	Mould No.	Animal Locs/c
1	1	-	-	-	-	-	-	-	-
	2	9	25	-	-	-	-	-	-
2	3	3	18	-	-	-	-	-	-
	4	3	34	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-
	6	1	5	-	-	-	-	-	-
	7	39	91	-	-	-	-	-	-
	8	65	155	-	-	-	-	-	-
	9	18	49	-	-	-	-	-	-
	10	2	2	-	-	-	-	-	-
3	11	-	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-	-
4	15	-	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-	-
	17	-	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-	-
	19	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-	-
5	21	-	-	-	-	-	-	-	-
6	22	-	-	-	-	-	-	-	-
	23	-	-	-	-	-	-	-	-
	24	-	-	-	-	-	-	-	100
	25	-	-	-	-	-	-	-	-
	26	50	100	-	-	-	-	-	-
	27	78	340	-	-	-	-	-	-
	28	65	223	-	-	1	1	-	-
	29	198	756	-	-	-	1	-	-
7	30	141	325	1	-	6	-	-	-
	31	860	2435	3	-	13	1	-	10
	32	3729	18469	2	-	11	-	-	40
	33	4311	29036	9	-	17	-	-	200
	34	5722	30635	3	-	35	-	1	470
	35	2779	18335	5	1	27	-	-	400
	36	2627	11505	3	-	14	-	-	250
TOTAL		20028	112538	26	1	124	3	1	1470

Table 3.8 Distribution of artifacts and animal bones by layer and spit in SBN VII

Layer	Spit	Earthenware No.	Earthenware Weight/gram	Rouletted Ware	Inscribed sherd	Bead No.	Metal Object	Animal Bone/gr:
1	1	21	82	-	-	-	-	-
	2	4	10	-	-	-	-	-
2	3	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-
	6	2	10	-	-	-	-	-
	7	20	60	-	-	-	-	-
	8	36	270	-	-	-	-	-
	9	13	41	-	-	-	-	-
3	10	-	-	-	-	-	-	-
	11	-	-	-	-	-	-	-
	12	-	-	-	-	-	-	-
	13	-	-	-	-	-	-	-
	14	-	-	-	-	-	-	-
4	15	-	-	-	-	-	-	-
	16	-	-	-	-	-	-	-
	17	-	-	-	-	-	-	-
	18	-	-	-	-	-	-	-
	19	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	-
5	21	-	-	-	-	-	-	-
	22	-	-	-	-	-	-	-
6	23	1	20	-	-	-	-	-
	24	-	-	-	-	-	-	-
	25	5	15	-	-	-	-	-
	26	9	48	-	-	-	-	-
	27	56	250	-	-	-	-	-
	28	191	870	-	-	2	-	-
	29	1263	3390	5	-	21	1	15
7	30	973	3985	5	-	66	-	10
	31	1300	8042	8	-	44	-	65
	32	3442	17515	1	-	64	-	70
	33	3421	15903	2	-	27	-	210
	34	4744	18214	6	-	39	-	450
	35	2651	13625	1	1	50	-	300
	36	1732	8090	2	-	22	-	230
8	37	189	1047	-	-	20	-	30
TOTAL		20073	91487	30	1	355	1	1380

Figure 3.13

Burials I and II in SBN VII



3.2.8 Sembiran V (SBN V)

This trench was placed almost 150 m east of SBN IV and about 150 m inland. The excavation was carried out to see how far inland the layers represented in SBN IV continued. However, SBN V turned out to be virtually sterile. It was 1.5 m square and 3.5 m in maximum depth. Potsherds were discovered only down to spit 24 and below that was virgin soil. The trench was totally excavated to spit 27, and the southwest quadrant continued to spit 35. No grain size analysis was carried out since no soil samples from this trench were brought back to ANU.

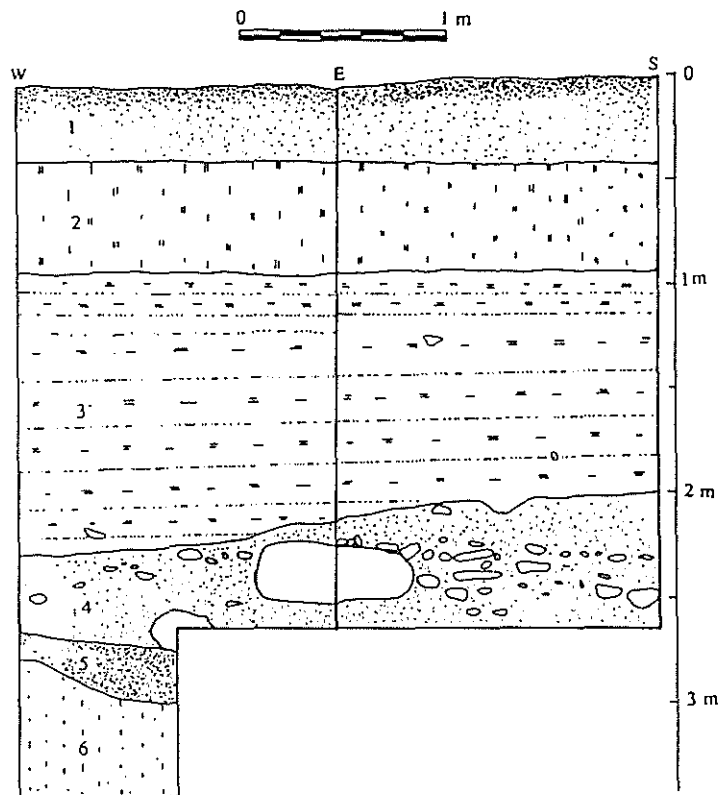
The layer 1 topsoil is about 40 cm thick and very soft due to cultivation. Layer 2 is alluvium, almost 50 cm thick, and dark reddish-brown (5YR 3/4) in colour. Layer 3 consists of a much coarser sand and gravel deposit about 10 cm thick and is dark-brown (7.5YR 4/4) in colour.

Layer 4 is coarser than layer 3 and consists of sand, gravel and large rocks. It is

about 70 cm thick, and like layer 3 in BKH II and layer 3 in SBN I may represent a outwash fan. Layer 5 was excavated only in the southwest quadrant of the trench. It is around 25 cm thick and consists of alluvial sand and gravel, much finer than layer 4. Its colour is reddish-brown (5YR 3/4).

Layer 6 was also excavated in the southwest quadrant of the trench. It is about 55 cm thick and dark reddish-brown (5 YR 3/4) in colour, but finer in texture than layer 5. This layer is alkaline (PH 9-10) and no archaeological evidence was discovered in it. The base of layer 6 was not reached.

Figure 3.14
The stratigraphy of SBN V



The distribution of artifacts in SBN V tends to be concentrated at the top of layer 3 (see table 3.9).

Table 3.9 Distribution of artifacts by layer and spit in SBN V

Layer	Spit (10 cm)	Local Earthenware Total	Local Earthenware Weight gram	Chinese Ceramics	
1	1	20	75	-	
	2	24	115	1	
	3	22	100	-	
	4	6	28	-	
2	5	6	10	-	
	6	5	10	-	
	7	10	55	-	
	8	4	12	-	
	9	18	77	-	
3	10	27	152	-	
	11	145	720	3	
	12	62	593	1	
	13	6	30	-	
	14	3	25	-	
	15	6	20	-	
	16	13	40	-	
	17	5	45	-	
	18	3	10	-	
	19	1	3	-	
4	20	2	18	-	
	21	2	29	-	
	22	1	5	-	
	23	-	-	-	
	24	-	-	-	
	25	-	-	-	
	26	-	-	-	
5	27	Southwest Quadrant	-	-	
	28	Quadrant	-	-	
6	29	-	-	-	
	30	-	-	-	
	31	-	-	-	
	32	-	-	-	
	33	-	-	-	
	34	-	-	-	
	35	-	-	-	
	TOTAL		389	2172	5

3.2.9 Pacung I (PCN I)

During the second excavation programme a re-excavation of the Pacung *moko* site was carried out. The find spot is located on land which belongs to Bapak Seleg, who is an inhabitant of the village of Pacung. The surface here is about 6.5 m above sea level and the trench lies 30 m east of the *Pura Dalem* temple of Pacung. This temple is dedicated to the goddess *Durga* who is associated with death. The modern cemetery lies nearby.

Trench PCN I was 1.5 x 1.5 m in area and was dug to about 4.0 m in depth. The aim of the excavation was to try to trace the stratigraphic location of the *moko* found in 1978, together with any associated artifacts.

Eight layers were recognized during the excavation; most of the artifacts were found in layers 6 and 7. The northern half of the trench was dug out during the well-digging activity which led to the discovery of the *moko*, but the villagers do not remember how deep from the surface it was found. The outline of the original *moko* burial pit has also been destroyed so it is not known from which level it was dug. However, the soil profile in the trench and the finding of a plastic bag and a ballpoint pen at 3.4 m depth indicate that the well (now refilled) was dug to at least this depth below the present surface (see figure). During the excavation the outline of this well unfortunately could not be traced very precisely, so it is likely that the sherds in layers 1-4 could have been disturbed out of main cultural layers 5-8 by the well-digging process. Owing to the uncertainty the contents of these upper layers are excluded from the pottery analyses.

The undisturbed layers of the trench can be described as follows. Layer 1 is a thin humic deposit 20 cm deep and dark red in colour (10 YR 3/6). Layer 2 is more compact than layer 1, about 140 cm thick, and dark-brown in colour (7.5 YR 5/8). Layer 3 is a thin layer similar to layer 2 (7.5 YR 4/6), but is only 15 cm thick. Layer 4 is also 15 cm thick and yellowish-red in colour (5 YR 4/6). Layer 5 is 40 cm thick and again yellowish-red in colour (5 YR 5/6), as is layer 6, which produced 1444 sherds or 61% of the total found in the trench. Layer 6 is 60 cm thick. Layer 7 beneath is 70 cm thick, greyish-red in colour (7.5 YR 2.5/4), and this layer produced an Indian Rouletted sherd (spit 34). Layer 8 is about 40 cm deep and yellowish-red in colour (5 YR 4/6). Although layer 8 is not culturally sterile, the excavation had to be stopped here because time and money at the end of the second excavation season had run out.

Grain sizes analyses of soil samples from all layers of this trench were carried out in the Waikato Rapid Sediment Analyser (see table 3.11).

It is clear that all the layers in this trench are very similar, differing mainly in colour. The whole deposit is a fairly fine alluvium, with sand percentages ranging between 14 and 32. Presumably the area around the trench has been affected fairly continuously by low energy alluvial sedimentation from a single inland source. The colour differences may relate to human activities such as occupation or cultivation on the site.

Figure 3.15
Stratigraphy of PCN I

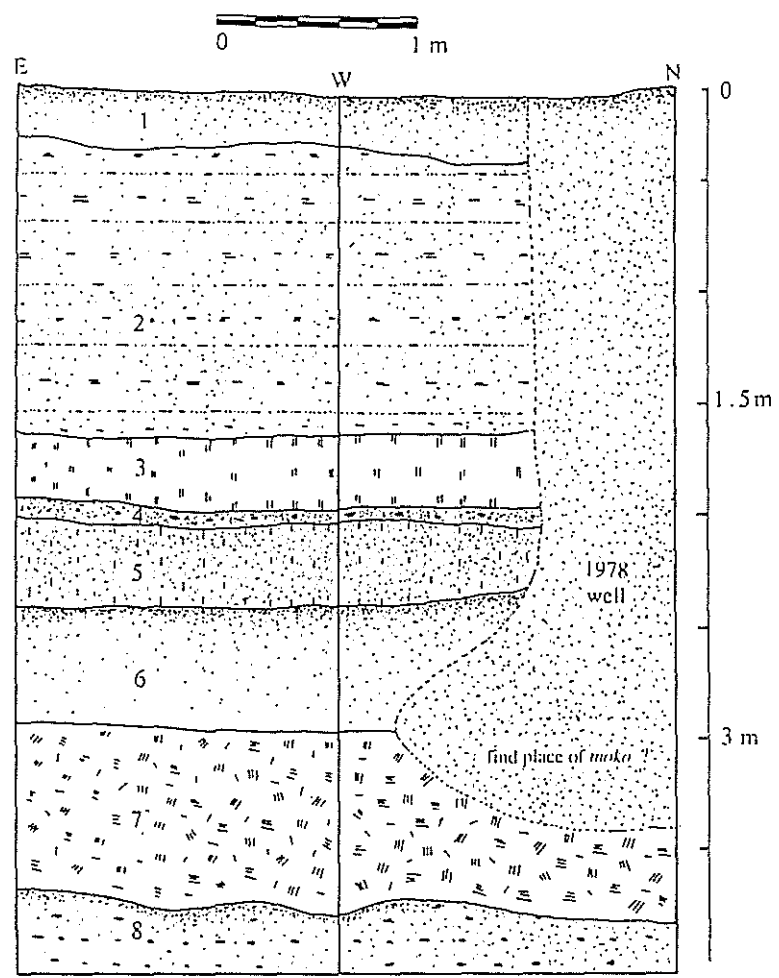


Table 3.10 Distributions of artifacts and animal bones by layer and spit in PCN I

Layer	Spit (10 cm)	Earthenware Total	Earthenware weight/gram	Rouletted Ware	Chinese Ceramics	BoneWeight gram
1	1	11	50	-	-	-
	2	34	250	-	-	-
2	3	13	87	-	-	-
	4	-	-	-	1	-
	5	-	-	-	-	-
	6	1	25	-	-	-
	7	2	70	-	-	-
	8	-	-	-	1	-
	9	4	55	-	1	-
	10	2	10	-	-	-
	11	-	-	-	-	-
	12	-	-	-	-	-
	13	-	-	-	-	-
	14	-	-	-	-	-
	15	3	45	-	1	-
	16	-	-	-	-	-
3	17	2	10	-	-	-
	18	-	-	-	-	-
4	19	-	-	-	1	-
	20	-	-	-	-	-
	21	-	-	-	-	-
5	22	9	80	-	-	-
	23	93	359	-	-	-
6	24	139	640	-	-	-
	25	466	2825	-	-	-
	26	439	2935	-	-	-
	27	91	695	-	-	-
	28	229	2510	-	-	-
	29	80	810	-	-	-
7	30	129	1195	-	-	-
	31	88	800	-	-	-
	32	38	145	-	-	-
	33	26	200	-	-	20
	34	111	820	1	-	-
	35	32	175	-	-	-
	36	33	150	-	-	-
8	37	8	70	-	-	-
	38	139	815	-	-	-
	39	49	275	-	-	-
	40	71	370	-	-	-
TOTAL		2342	16471	1	5	20

Table 3.11 The results of soil samples from PCN I analysed by Waikato Rapid Sediment Analyser

Layer	Depth cm	Colour	Gravel %	Sand %	Silt & Clay %
1	0 - 20	10YR3/6	0.10	25.40	74.50
2	20-160	7.5YR5/8	-	19	81
3	160-175	7.5YR4/6	0.10	14.60	85.30
4	175-190	7.5YR4/6	-	21	79
5	190-230	5YR4/6	-	31.60	68.40
6	230-290	5YR4/6	0.10	27.30	72.70
7	290-360	7.5YR2.5/4	0.08	26.85	73.07
8	360-400	5YR4/6	-	22.40	77.60

3.10 Julah I (JLH I)

The trench of JLH I was located 20 m inland from the present shore line, near four wells which are still used today by the people of Julah village, which lies further inland (see map). The excavation was placed here to search for archaeological evidence for the village of Julah as referred to in the inscriptions of the early tenth century AD. For instance, an inscription now kept in the main temple at Sembiran (termed Sembiran A II), dated to AD 975, mentions the existence of a *parhyangan* (shrine), a *pendem* (grave), a *pancuran* (bathing place), a *pasibwan* (also a bathing place), a *prasada* (shrine), and a *jalan raya* (main road) in or near the village of Julah at that time. The ancient Julah can be inferred to have been located closer to the sea than its modern descendant, and may have been founded around the wells which still exist today close to the excavation trench. The occurrence of these wells suggest the site may have been the bathing place mentioned in the inscription of Sembiran A II.

The trench JLH I was 1.5 m square and 2.5 m depth. Archaeological remains, including local potsherds, fragments of Chinese ceramics and animal bones, were found from spit 1 to 18 (see table 3.11). The water table was reached at spit 22 and excavation ceased at spit 25. Unfortunately, no structural remains were found in the trench.

Layer 1 is a top soil between 25 and 55 cm thick, brown in colour (7.5 YR 5/4). Layer 2, also brown in colour only appeared in the eastern part of the trench as a lens between 10 and 25 cm thick. This lens is more compact than layer 1, and may possibly be spoil from the digging or cleaning out of one of the nearby wells (?). Layer 3 is between 55 and 85 cm thick. The archaeological remains mostly came from this layer, which is dark-reddish brown in colour (5 YR 3/4). Layer 4, almost archaeologically sterile, about 100 cm thick and sticky because of the presence of ground water. A sample of layer 4 was analysed in the Waikato Rapid Sediment Analyser which contains 98.4% silt and clay, and only 1.4% sand. It is yellowish-red in colour (5 YR 5/6). Layer 5 is between 15 and 25 cm thick and reddish-brown in colour (5 YR 3/3). The results of soil sample from this layer consist of 9% sand and 91% silt and clay.

When compared to the sediments in SBN IV, VI, VII, and especially the sandy layers of BKH I, the Julah deposits are clearly rich in silt and clay, suggesting deposition under low energy alluvial conditions away from a major river course. The backswamp conditions which may once have existed here, especially during the build up of layer 4, might have been suitable for rice cultivation, although no evidence for this could be observed.

Figure 3.16
Stratigraphy of JLH I

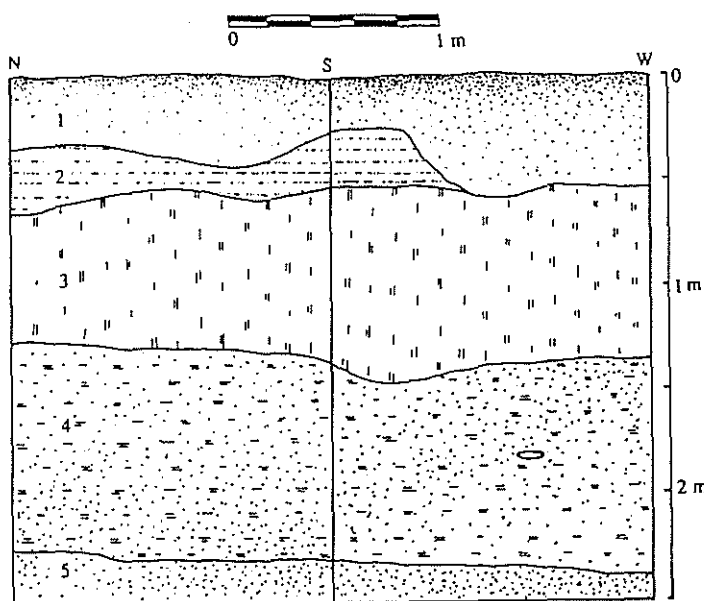


Table 3.12 Distribution of artifacts and animal bones by layer and spit in JLH I

Layer	Spit (10 cm)	Earthenware Total	Earthenware Weight/gram	Chinese Ceramics	Bone weight gram
1	1	4	40	-	-
	2	-	-	-	-
	3	1	2	-	-
2	4	1	1	-	-
	5	3	25	-	-
3	6	-	-	-	-
	7	27	130	-	-
	8	46	175	-	-
	9	338	1050	6	65
	10	187	590	3	30
	11	45	190	2	20
	12	27	90	-	25
	13	10	30	-	80
4	14	6	42	-	-
	15	-	-	-	-
	16	-	-	-	-
	17	-	-	-	-
	18	1	4	-	-
	19	-	-	-	-
	20	-	-	-	-
	21	-	-	-	-
	22	-	-	-	-
	23	-	-	-	-
5	24	-	-	-	-
	25	-	-	-	-
TOTAL		696	2369	11	220

Chapter 4

THE INDIAN POTTERY

4.1 Rouletted and other definite Indian wares

The archaeological excavations in northeastern Bali have produced 81 definite Indian potsherds and another 245 which are almost certainly from India. The definite ones consist of 8 rims of Rouletted Ware, 11 rouletted body sherds, 59 plain body sherds (many probably from Rouletted Ware), an inscribed black-slipped sherd, an orange sherd with an applied relief band, and a rim of Wheeler's Arikamedu type 10 (Wheeler *et al* 1946: 57, 59, fig: 17). These sherds were found between 2.4 and 3.6 m below the surface in the squares of SBN IV, VI, VII and PCN I (see table 4.1).

Table 4.1

Distribution of Rouletted Ware by trench in Sembiran and Pacung

Trench	Spit 10 cm depth	Rouletted Ware sherds	Arikamedu type 10 sherd	Graffito sherd	Other imported ware
SBN IV	24	1	-	-	-
	30	2	-	-	-
	31	4	-	-	-
	32	1	-	-	-
	33	2	-	-	-
SBN VI/VII	27	1	-	-	-
	28	1	-	-	-
	29	5	-	-	-
	30	6	-	-	-
	31	11	-	-	-
	32	13	-	-	18
	33	11	-	-	20
	34	9	-	-	53
	35	6	1	1	81
	36	5	-	-	46
37	-	-	-	4	
PCN I	34	1	-	-	-
Totals		79	1	1	245

Figure 4.1
Rims of Rouletted Ware from the Sembiran excavations

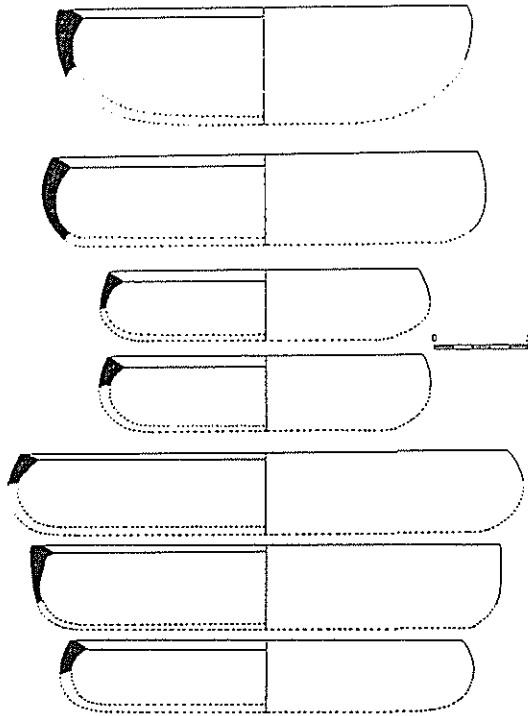
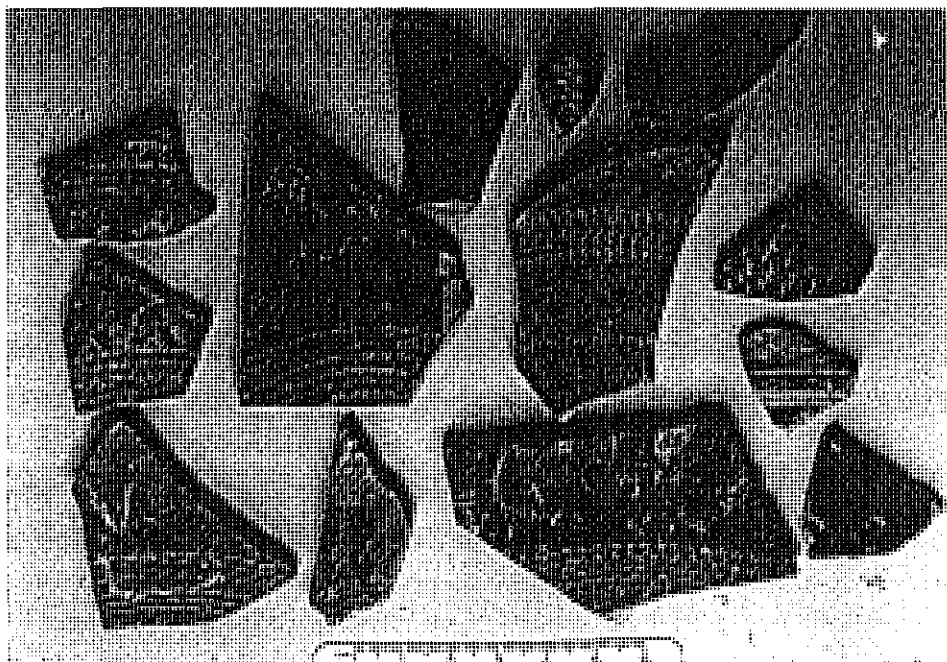


Figure 4.2
Rouletted body sherds from Sembiran and Pacung. The first sherd from left in the top row come from PCN I spit 34



The Indian early historical Rouletted Ware is a fine pottery made on a fast wheel usually slipped inside and outside before firing. This slip is highly glossy and sometimes has an almost metallic appearance. The pottery is always grey or black inside and various shades of grey, black, orange or brown outside. The shape is usually a flat basin dish with an incurved and slightly beaked rim. The central part of the inner base is decorated with two or three bands of concentric rouletted patterns (Wheeler *et al* 1946; Begley 1986: 311).

The fabrics of the Rouletted Ware sherds and of the Arikamedu type 10 sherds from SBN VI are very fine and well-fired, with an even light grey to pale orange colour through their thicknesses. All of the Rouletted Ware rims can be categorized as everted, inverted and thickened, with flattened lips (see Fig 4.1).

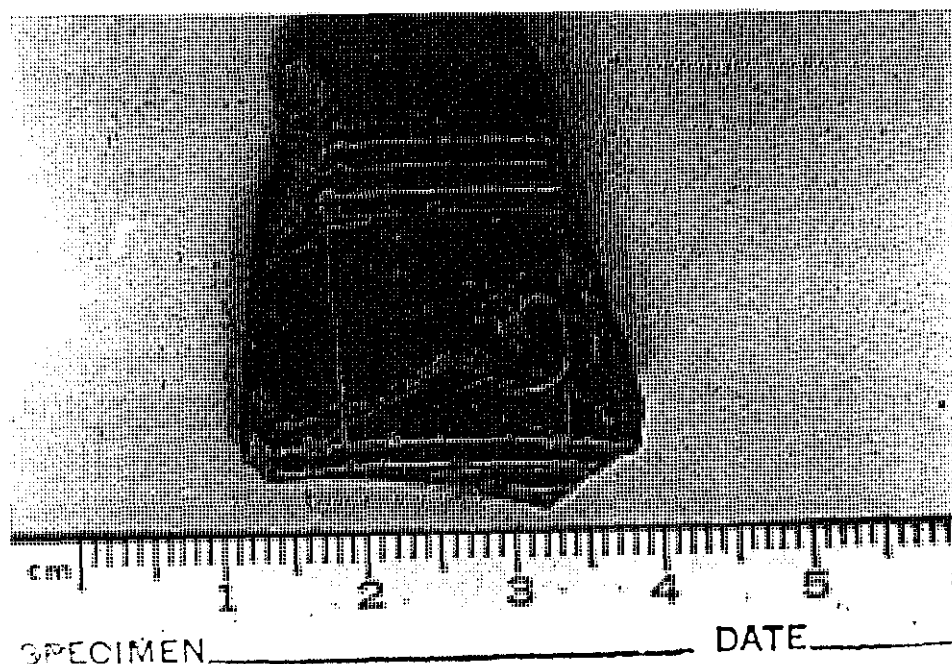
Diameters are between 17 and 26 cm. All these rims are slipped in various shades of pale grey, brown or orange on their exteriors and grey to black inside. They are similar to those of Rouletted Ware type 1 in Wheeler's classification for Arikamedu (1946: 49, fig. 12). They belong to a small bowl or platter form. The eleven rouletted body sherds are varied in terms of colour and the form of the rouletting. The rouletted motifs consist of triangles, diamonds, wedges and dots (see plate).

The rouletting patterns on the pottery from Arikamedu consist of triangles, diamonds or parallelograms, wedges, crescents, ovals or dots, and an eye-shaped motif. Triangles are the most common at Arikamedu and occur in all strata (Wheeler *et al* 1946: 48). Both fine and coarse types of rouletting also occur in Arikamedu and other sites. Ten of the Bali sherds have very fine rouletting and only one sherd from spit 25 SBN VII can be described as coarse. Typologically, the rouletted sherds from Bali are entirely within the range of those from Arikamedu and other sites in India.

One non-Rouletted Ware rim sherd from spit 35 in SBN VI belongs clearly to the specimen of Arikamedu type 10 (Wheeler *et al* 1946: 57, 59, fig. 17). This rim is everted, and has an unthickened lip. Both interior and exterior are glossy black-slipped. Impressed decoration occurs on the inside of the rim in the form of a rectangular panel with a bird, probably a peacock, depicted between bands of horizontal incision (see plate). This type of pottery has also been discovered in the site of Chandraketurgarh, West Bengal and at Alangankulam on the Vaigai river in Tamilnadu (Dr. H.P. Ray *et al* comm 1990). No information is at present available on its occurrence elsewhere, so the Bali find could be of great significance.

Figure 4.3

Sherd of Arikamedu type 10 from SBN VI spit 35



An inscribed sherd was found in spit 35 of SBN VII. The sherd is black-slipped inside and outside and the fabric is coarser than that of the Rouletted and Arikamedu type 10 sherds. Three characters are clearly visible on the inside surface of this sherd (see plate). According to Prof. B.N. Mukherjee of Calcutta University the script is Kharoshthi, and his preliminary reading is *te sra vi* (personal communication 20/12/90). Dr L.A. Hercus of the Faculty of Asian Studies, ANU, also agrees that the script is Kharoshthi (pers comm).

The Kharoshthi script was written from right to left. Examples have been discovered on stone carvings, coins, seals, pottery, and bronze vessels, particularly in Northwest India and Pakistan; at Taxila, at Manikiala, Kangra and Karnal in eastern Panjab, at Mathura in Uttar Pradesh, Mohenjo-Daro in Sind, Khawat in Afganistan, Tirath in Swat District and Khalatse in Ladakh (Konow 1929: xiii, map 1; Buhler 1963: 93). Buhler (1963: 112) believes that the Kharoshthi alphabet is derived from the Aramaic of the Achaemenian period. It might thus have been introduced to India by the Persians after Darius I conquered the greater portion of Punjab and Sind in 518 BC

(Konow 1929: xiii; Gupta 1958: 283; Buhler 1963). The script became an official alphabet in Northwest India between the third century BC and the fourth or fifth century AD (Konow 1929; Dani 1963: 251-258).

Prof. B.N. Mukherjee (1989a,b, 1990a,b) believes that a group of people who used the Kharoshthi script extended their interests from Northwest India to West Bengal, where they became very active as traders from about the last quarter of the 1st century AD to about the beginning of the 5th century AD. They were known as *Yueh Chih* (or Khusana) and traces of their presence, mainly in the form of Kharoshthi inscriptions, have been found in the region of Chandrakhetugarh in the district of 24 Parganas and in the area of Tamluk in Midnapur district. These traders probably conducted maritime commerce with Southeast Asia and reputedly had access to a supply of central Asian horses (Mukherjee 1990a: 2). In mainland Southeast Asian sites examples of Kharoshthi script have been found on seals in Oc-Eo in Vietnam and U-Thong in Thailand (Mukherjee 1990a:2,1990.b). If the script on the sherd from SBN VII is definitely Kharoshthi it is clearly important evidence for the beginnings of contacts between Bali and India.

The results of X-ray diffraction analysis indicate that this inscribed sherd from Sembiran contains dominantly quartz, and is thus very similar to the Rouletted Ware samples and different from the local Balinese sherds (see Appendix A). In terms of neutron activation analysis, however, the graffito sherd does not belong to the Rouletted ware group (see Appendix B) and could perhaps be derived from somewhere in northern India, where the Kharoshthi script was in use. To date, no examples of Kharoshthi script appear to have been reported from South India.

4.2 Other possible Indian Wares

As shown in Table 4.1, 245 possible Indian sherds, labelled "other imported ware", were found in layers 6 and 7 of SBN VI and VII, between 3.2 and 3.7 m below the surface. 222 (90.6%) of these sherds were found in SBN VII in probable association with the two burials excavated there. It is not absolutely certain, however, that these sherds actually came from pottery grave goods.

Figure 4.4

The inscribed sherd from SBN VII spit 35

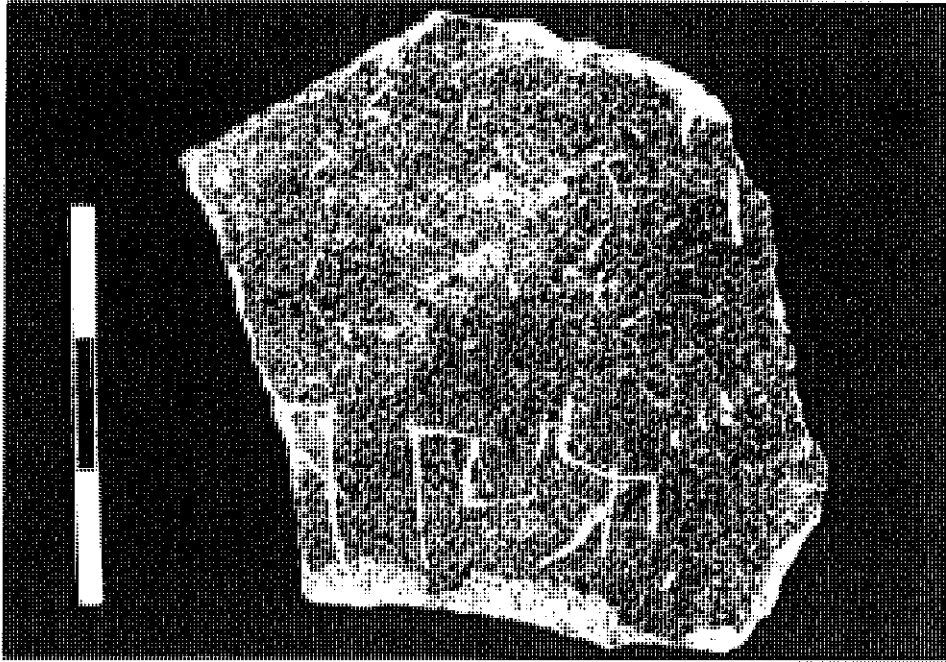
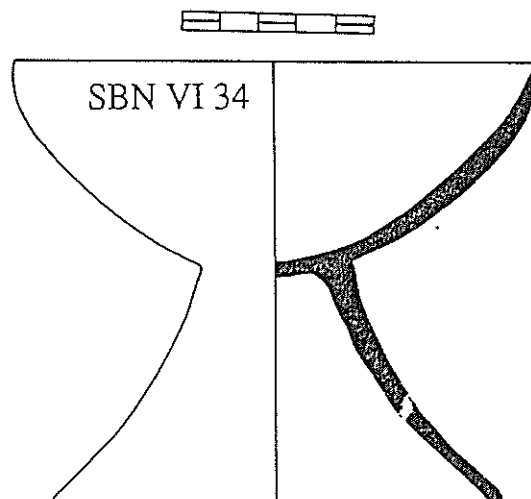


Figure 4.5

Small bowl on pedestal from SBN VI spit 34



Only 18 of these sherds could be brought back to ANU for further analysis and the rest are still kept in the office of the Archaeological Research Centre in Denpasar. Some of these sherds are black-slipped inside and outside and are of fairly certain Indian origin on typological grounds. It is interesting to note also that at least two of these black-slipped sherds contained rice chaff as a temper. One AMS radiocarbon date was obtained on the rice from one of these sherds, from spit 35 in SBN VII, the result being 2660 ± 100 bp (CAMS 723).

Another unslipped sherd from this possible burial group (from spit 33 in SBN VII) is decorated with comb incision similar that on many sherds from Oc-Eo in southern Vietnam (Malleret 1960: pl LXXII-LXXXII) and Chansen II in Thailand (Bronson 1979) (see figure 5.11). A further fourteen sherds of uncertain affinity are cord-marked and slipped dark-brown outside and greyish brown inside.

Three black-slipped sherds of this "other imported ware" (samples no 6, 7 and 8 in appendix A) have been analyzed by x-ray diffraction. The results indicate that quartz is always dominant, and traces of rutile, anatase and plagioclase feldspar are also present. The dominance of quartz makes these samples similar to the definitely Indian Rouletted Ware and also, presumably coincidentally, to pottery analyzed by XRD from Lubang Angin in Sarawak (research by Ipoi Datan). This dominance of quartz may be characteristic of sands formed in non volcanic environments such as India or the interior of Sundaland. It is interesting that both these sherd groups differ entirely from the local Balinese pottery and soil samples from Sembiran.

Neutron activation analyses of three of these black-slipped sherds (sample nos 10, 12, and 22 in appendix B), and two sherds with resin glazes (sample nos 13 and 14) also indicate a very close similarity between this group and the samples of Rouletted Ware, and again a major difference with the local Balinese sherds. Sherds with resin glazes probably belonged to small bowls on pedestals (see figure 4.5). At least three reconstructible vessels of this type were found in SBN VI and VII. These analyses suggest that the parent vessels for these sherds very probably were imported from outside Bali, most likely from somewhere in India, but from a source different from that of all the Rouletted Ware. Whether this source was in northern or southern India remains unknown. Although the Kharoshthi graffito was on a black slipped sherd which resembles this group in surface finish, the inner fabric of this sherd is quite different and the neutron activation results specify a different unknown source.

4.3 The cultural context of Rouletted Ware in India

Typologically, there can be no doubt that much of the pottery described so far is of Indian origin, presumably made somewhere on the eastern seaboard of the sub-continent between West Bengal and Sri Lanka. The graffiti on one of the black-slipped sherds obviously removes much of the doubt and the XRD and NAA analyses are clearly in support. The XRD and NAA analyses for all sherd samples will be discussed in the next section.

In India, Rouletted Ware has been discovered in many sites in the eastern half of the sub-continent, as well as in Sri Lanka (Begley 1983, 463)(see map). It was first reported from Arikamedu, excavated by Sir Mortimer Wheeler in 1945 (Wheeler *et al* 1946) and by Casal in 1947 (Casal 1949).

4.3.1 Arikamedu

According to Wheeler, Rouletted Ware occurred from the topmost to the lowest layer in the Northern Sector of Arikamedu (AK II), immediately overlying the natural soil. It appeared earlier than the imported Roman amphorae which were also found in all layers except the lowest one. It seems that Rouletted Ware became less popular in the post-Arretine layers after the middle of the first century AD. Similarly, in the Southern Sector (AK IV), Rouletted Ware occurred more commonly in the earlier than in the later deposits (Wheeler *et al* 1946: 46). Based on these circumstances Wheeler (1946: 46) proposed that the dating of Rouletted Ware at Arikamedu was from the late first century BC or early first century AD to c AD 200.

From Casal's excavations in 1947, Rouletted Ware appeared for the first time in the Southern Sector in association with the pre-Arretine ("Megalithic") black and red Ware (Begley 1983: 468). Casal did not report any amphora sherds from the layer immediately above the black and red ware in the Southern Sector which would suggest that the appearance of the Rouletted Ware preceded the import of Mediterranean amphorae (Begley 1986).

Wheeler's dating for the Rouletted Ware from Arikamedu has been widely accepted, and as a result Arikamedu has become the single most crucial site for the dating of related materials at other sites. Begley (1986: 297) however, on the basis of

stratigraphy and epigraphic evidence has proposed that the first appearance of Rouletted Ware at Arikamedu occurred in the second century BC, and that its overall period of manufacture extended from the second century BC to AD 200.

The co-occurrence of the Arretine Ware and Roman amphorae led Wheeler (1946, 1955: 123) to suggest that Arikamedu functioned as an Indo-Roman trading station, identifiable with the Podouke mentioned in the Periplus of the Erythraean Sea (second half of the first century AD).

4.3.2 Other sites in Tamil Nadu

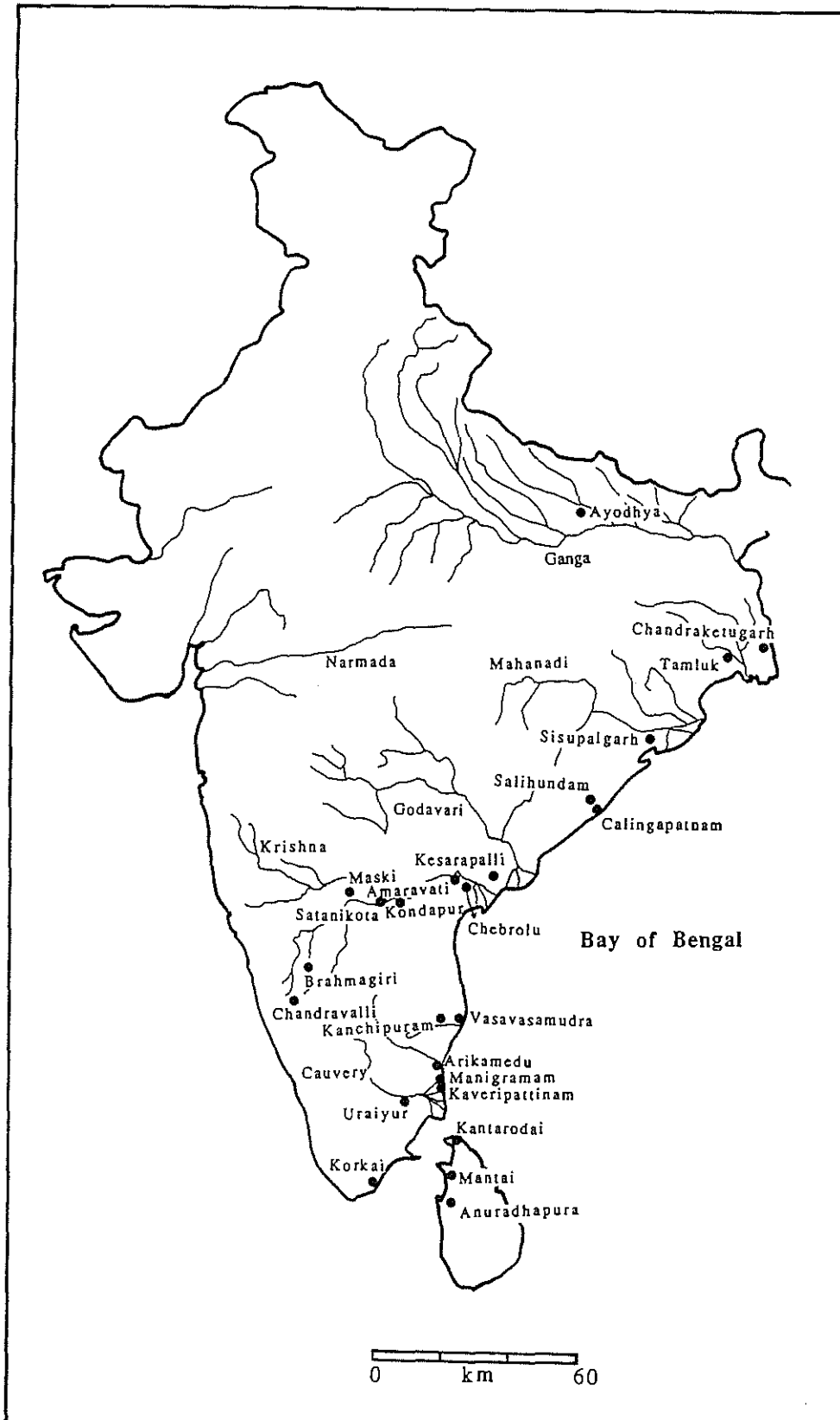
Archaeological explorations by Shri K.V. Raman in 1961 in the Cauvery basin in Thanjavur District, Tamil Nadu, produced forty important early historical and Medieval sites near Kaveripattinam (IAR 1961-62: 26). The early historical sites are located along the coast for about 8 km from Neidavasal in the north to Vanagiri in the south, including the present hamlet of Kaveripattinam. The Tamil epics refer to the existence of a settlement of Yavanas (Romans) at Kaveripattanam, as a port or trading station.

In this region, subsequent archaeological excavations at Vanagiri and Manigramam in 1962 yielded Rouletted Ware and the megalithic black and red ware in association (IAR 1963-64: 20). At Vanagiri the Rouletted Ware and the black and red Ware occurred in layers contemporary with a brick structure which appears to have been a small reservoir dated to the first-second century AD. The excavations at Manigramam produced black and red Ware, Rouletted Ware, terracotta figurines, beads, and a square copper coin with a standing tiger on one side and an elephant on the other.

In 1962, Dr. R. Subrahmanyam conducted excavations at Kanchipuram, District Chingleput, in Tamil Nadu. The excavation revealed about 4.8 m of deposit belonging to two successive cultural periods, with a dual subdivision in Period I (IAR 1962-63 : 12). Sub-period I A yielded the megalithic black and red Ware as well as red and black-slipped wares. Rouletted Ware and amphorae were found in the upper half of this sub-period. Nearly fifty conical amphorae were discovered in broken condition, together with copper Satavahana coins, one bearing the name *Rudra Satakarni* and of circa second century AD in date.

Figure 4.6

Map showing distribution of Rouletted Ware in India and Sri Lanka (After Begley 1986)



Sub-period I B was contemporary with the Pallava Period (fourth to ninth centuries AD), as indicated by lead coins. The IB pottery consists of a bright red-slipped ware, without Rouletted Ware.

Archaeological excavations conducted by T. V. Mahalingam at Kanchipuram in 1970 produced more sherds of Rouletted and Arretine Wares, terracotta human figurines, three coin moulds, bangles of shell, glass and terracotta, and various stone beads (IAR 1970-71: 32). No clear stratigraphy or cultural sequence was reported from this excavation.

The Department of Ancient History and Archaeology, University of Madras, undertook excavations at Uraiyur, District Tiruchchirappalli, in Tamil Nadu in 1964. The excavations revealed three cultural periods (IAR 1964-65: 25-26). Period I was characterized by the megalithic black and red Ware together with russet-coated painted, Rouletted and Arretine wares. Some inscribed sherds bearing Tamil inscriptions in the Brahmi script were also found. This period I deposit is dated circa third-second century BC to first century AD. Period II (circa second century AD to the fifth-sixth century AD) was distinguished by a gradual disappearance of the black and red Ware and other characteristic pottery of Period I. A red-slipped ware appeared in this period.

Karaikadu is another site on the Coromandel coast which has produced Rouletted Ware. Trial excavations conducted here by K. V. Raman revealed three ceramic groups including red-slipped ware, black and red ware and Rouletted Ware (IAR 1966-67: 21). In addition, a large number of finished and unfinished beads as well as a large quantity of vitreous glass slag was found, indicating that beads were manufactured here. Karaikadu seems to have been a port similar to Arikamedu.

Archaeological excavations at Vasavasamudram, District Chingleput, have also produced Rouletted Ware sherds and amphorae dated to the second century AD (IAR 1970-71: 33). Korkai is another important site in Tamil Nadu which has produced Rouletted Ware.

4.3.3 Sri Lanka

In Sri Lanka, Rouletted Ware has been found at Mantai near Tirukeswaram (Begley 1967: 23; Silva 1985: 46-47), and at Kantarodai on the Jaffna Peninsula (Begley

1967: 23-24). Korkai, Mantai and Kantarodai are all believed to have functioned as ancient ports.

Excavations in the Gedige area of the citadel of Anuradhapura have also uncovered Rouletted Ware (Deraniyagala 1972). Some sherds with Brahmi graffiti, and also megalithic black and red ware have been found here. Deraniyagala (1972: 104, 160) originally proposed dates for Rouletted Ware at Anuradhapura from 200 BC to AD 200, which are now supported by C14 dating (Deraniyagala 1986: 43).

4.3.4 Andhra Pradesh

Rouletted Ware has also been reported from Maski and Kondapur in Andhra Pradesh (Wheeler *et al* 1946: 308), although, no Rouletted ware was discovered at Maski during the excavation programme there in 1954 (Thapar 1957: 77). Maski is the site of an Asokan edict in which it is identified as Suvarnagiri (gold hill). About thirteen gold working sites are reported to be located in the region (Begley 1986: 301).

Two sherds of Rouletted Ware of Arikamedu type 1 have been reported from Amaravati and are now in the Government Museum, Madras (Wheeler *et al* 1946: 49). Krishna Murty and R. Subrahmanyam later carried out an excavation at Amaravati and brought to light a damaged stupa of the Satavahana period (IAR 1958-59: 5). Three cultural periods were recognized at that time; Northern Black polished (NBP) Ware is characteristic of Period I, Rouletted Ware appeared in Period II and Chinese celadon ware occurred in Period III.

Later excavations under I. K. Sarma at Amaravati produced evidence for five cultural periods (IAR 1973-74: 4-5). Period I (circa fourth-third century BC) has two sub-periods. Sub-period IA is characterized by the occurrence of black and red Ware and NBP wares, sometimes in association with iron implements. Two inscribed sherds in an early Brahmi script were discovered in this level (IAR 1973-74: 4). Sub-period IB is also characterized by a large number of NBP sherds and black and red Ware. NBP ware has also been reported from Dharanikota in the lower Krishna valley. The earliest occupation of Amaravati and Dharanikota thus appears to have been during the Iron Age (Begley 1986: 303). Period II (second-first century BC) at Amaravati is marked by continuing NBP ware, and black and red ware. Red-slipped ware and punch-marked coins first appeared in large numbers in this level.

Rouletted Ware occurred in Period III (circa first-second century AD). Other artifacts from this level are black and red polished ware, and Satavahana coins of copper, lead and potin. Stratigraphically, the Amaravati stupa also belongs to this period (IAR 1973-74: 5).

An excavation project under H. Sarkar and by K. Krishnamurty discovered Rouletted Ware at Vaikuntapuram and Chebrolu, respectively 29 km north and 11 km south east of Guntur in Andhra Pradesh (IAR 1960-61: 1). The excavation at Chebrolu also yielded NBP ware, black and red ware and black -slipped ware as well as neolithic artifacts.

Kesarapalli is another site in the Andhra region which has produced Rouletted Ware. Ten rims and two rouletted body sherds were discovered here by Sarkar and Khare (1966: 63). Four cultural periods were recognized and Rouletted Ware occurred in the early level of period III (III A). Period I is Chalcolithic from the middle of the eighth to the fifth century BC. Period II, described as "Megalithic", is characterized by the occurrence of NBP ware and dates from the middle of the fifth century BC to the middle of the first century AD. The end of the "Megalithic" period at Kesarapalli is contemporary with the same transition at Brahmagiri and Maski, namely during the middle of the first century AD. Period III A is characterized by the appearance of Rouletted Ware, dated from the first century to the beginning of the third century AD. Sub-period III B lacks Rouletted Ware and dates from the first or second quarter of the third to the fourth century AD. The last period at Kesarapalli is late medieval (Sarkar & Khare 1966: 46).

Salihundam is another important site in the Andhra region where a large amount of Rouletted Ware has been discovered. Rouletted Ware occurred in the middle period of the cultural sequence of this site, in association with Buddhist structures including a Chaitya Griha, Vihara, and stupas (Subrahmanyam 1964: 7).

The type of Rouletted Ware from Salihundam is very similar to that found at Arikamedu, Sisupalgarh, Amaravati and Tamluk (Subrahmanyam 1964: 8). An inscription on one rouletted sherd from Salihundam is read as *Bhammanasa* and this has been dated to the third or second century BC. Based on palaeographic evidence Subrahmanyam (1964: 9) proposes a tentative date for Rouletted Ware in India between the second century BC and the third or fourth century AD. He further argues that

Rouletted Ware was manufactured locally at Salihundam.

The Early Period at Salihundam is characterized by "Megalithic" black and red ware dated from the third or second century BC to the first century AD. The type of Black and Red ware at Salihundam resembles to that of Brahmagiri (Subrahmanyam 1964: 35). The Middle period is distinguished by the occurrence of Rouletted Ware, both inscribed and uninscribed. Other pottery industries from this period are black and red ware, black-slipped ware, grey ware, and red ware. The Late Period is also characterized by similar wares but without the Rouletted. This period of occupation is dated from the fourth or fifth century AD to the seventh or eighth century AD.

Archaeological excavations between 1977-80 at Satanikota in Andhra Pradesh revealed three cultural periods (Ghosh 1986: 78). Period I is characterized by the presence of Mesolithic tools. Rouletted Ware and other ceramic types including russet-coated painted Ware, black and red Ware, red polished ware and red ware occurred in Period II. Some structures appeared in this level which, on the basis of the Rouletted Ware, is dated from the last quarter of the first century BC to the third century AD (Ghosh 1986: 79, 108). The Rouletted Ware from Satanikota is stated to be similar to that found at Arikamedu, Brahmagiri, Chandravalli and Salihundam.

4.3.5 Karnataka

Wheeler's excavations at Brahmagiri and Chandravalli in Chitaldrug District, Karnataka, in 1947 produced more Rouletted Ware. In both sites it was found above the "Megalithic" pottery in association with Andhra pottery. Wheeler (1948: 236, 277) dated the Andhra culture layers at these sites as contemporary with the Rouletted Ware from Arikamedu, that is mainly in the first century AD.

4.3.6 Orissa and West Bengal

In northeastern coastal India Rouletted Ware was discovered at Sisupalgarh, in Orissa, during the excavation programme of 1948 (Lal 1949: 67, 68). Archaeological evidence indicates that this site was occupied overall from the beginning of the third century BC to the fourth century AD. Three cultural periods were determined here and Rouletted Ware occurred in the early Middle Period. At the beginning of the Middle Period (in layer 20) the black and red "Megalithic" pottery appeared for the first time, and the earliest specimens of Rouletted Ware occurred above this in layer 12 A. Twenty

Rouletted sherds were discovered at Sisupalgarh, comparable in form, texture, colour of slip and general appearance to the oldest examples of the same ware found at Arikamedu (Lal 1949: 71). Based on these similarities Lal (1949: 86) proposed that the oldest examples of Rouletted Ware from Sisupalgarh dated to c AD 50.

Archaeological excavations at Tamruk, District Midnapur, in West Bengal have also produced Rouletted Ware (IAR 1954-55: 19-20). This site is referred to in Indian literature under different names, such as Tamralipta, Damalipta, Tamralipti or Tamraliptika, a port from where Indian seacraft sailed to the islands of Southeast Asia and China. It is mentioned by Ptolemy as Tamalites, from Prakrit Tamalitti, and was visited by the Chinese pilgrims Fa-Hsien (AD 399-414), Hiuen-Tsang (AD 629-645), and I-Tsing (AD 673-693) (Sharma 1953: 154).

Four successive cultural periods have been recognized at Tamruk (IAR 1954-55: 20). Period I is characterized by neolithic axes and pottery. Period II (c third-second century BC) produced beautiful terracotta figurines, cast copper coins and pottery with close affinities to NBP. Rouletted Ware occurs in Period III (c first-second century AD). A brick-lined tank and a ring well also belong to this period. Period IV yielded some terracotta figurines of the third-fourth century AD showing Kushan and Gupta influences.

The site of Chandraketugarh, District 24 Parganas in West Bengal, has also produced Rouletted Ware. Archaeological excavations have been conducted here by the University of Calcutta under Shri K. G. Goswami (IAR 1956-57: 29-30). Five successive cultural periods have been determined. Period I is characterized by the appearance of a Red slipped ware, possibly Pre-Mauryan (IAR 1956-57: 30). Rouletted Ware was found in Period II in association with NBP ware, black-slipped ware, and polished and unpolished grey ware (IAR 1957-58: 51, 70). As already noted, pottery of Wheeler's Arikamedu type 10 has also been discovered recently at Chandraketugarh. Period II is considered to belong to the Mauryan and Sunga periods. Period III (post Sunga) is marked by the reappearance of red ware, one sherd bearing a stamped design. Other artifacts from this level included beads of different semi-precious stones, antimony-rods of copper and a copper punch-marked coin (IAR 1956-57: 30; 1957-58: 51, 70). Period IV (Kushan) yielded fragmentary but typical Kushan terracotta human figurines. Period V (Gupta) witnessed the introduction of burnt bricks for building.

4.4 Source of the Rouletted Ware

It is still not known where the Rouletted Wares were manufactured in India. Krishna Deva (Wheeler *et al* 1946:46) believed that they might have been produced locally at Arikamedu. As already noted, Salihundam may have been another site where Rouletted Ware was produced (Subrahmanyam 1964: 8). It is accepted that the inspiration for the rouletting technique might have been derived from the Mediterranean region (Wheeler *et al* 1946: 46; Begley 1986: 316), but there is no reason to suspect that any of the pottery was imported from the Mediterranean region rather than made in India. It is worthy of note that the results of neutron activation analysis on samples of Rouletted Ware from Anuradhapura, Arikamedu, Karaikadu and Sembiran (to be described in the next section) all indicate that the Rouletted Wares analysed were manufactured from a single source of clay, presumably in a single factory complex somewhere in India. Since Rouletted Wares have been mostly found in port sites, including Arikamedu, Kaveripattinam, Karaikadu, Korkai, Kantarodai, Mantai, Tamluk and of course Sembiran, this pottery was no doubt traded by sea.

Suggested chronologies and cultural contexts for Rouletted Ware in India and Sri Lanka are detailed in the following table (table 4.2).

Table 4.2

Suggested dates and associations of Rouletted Ware in India and Sri Lanka

Sites	Suggested Dates	Cultural Association
<u>Tamil Nadu</u> 1. Arikamedu	c 200 BC - AD 200	It appears in all layers from top to bottom, and first appears earlier than Roman amphorae. Other artifacts include glass beads, Arikamedu type 10 and Arretine wares.
2. Kaveripattinam, Vanagiri and Manigramam	c AD 100 - 200	Black and Red ware
3. Kanchipuram	c AD 200	Black and Red ware, amphorae, Arretine wares, Satavahana coins and stone and glass beads
4. Uraiyur	c 200 BC - AD 100	Black and Red wares,

		Arretine ware, Russet-coated Painted ware.
5. Karaikadu	?	Red slipped ware, Black and Red ware and beads of glass
6. Vasavasamudram	c AD 200	Amphorae
7. Korkai	?	?
<u>Sri Lanka</u>		
8. Anuradhapura	c 200 BC - AD 200	Black and Red ware, sherds with Brahmi graffiti.
9. Kantarodai	?	Black and Red ware and Roman coins.
10. Mantai	c AD 100	North Indian grey ware, Roman pottery.
<u>Andhra Pradesh</u>		
11. Maski and Kondapur	c AD 100 ?	?
12. Amaravati	c AD 100 - 200	Black slipped ware, Red slipped ware and Satavahana coins.
13. Chebrulo and Vaikuntapuram	?	Black and Red ware, Black slipped ware.
14. Kesarapalli	c AD 100- 300	?
15. Salihundam	c AD 100 - 400	Black and Red ware, Black slipped ware, grey ware and Red ware.
16. Satanikota	c 100 BC - AD 300	Russet-coated painted ware, Black and Red ware, Red polished ware.
<u>Karnataka</u>		
17. Brahmagiri & Chandravalli	c AD 100	Andhra pottery (russet coated painted ware).
<u>Orissa</u>		
18. Sisupalgarh	c AD 50	Beads, iron implement.
<u>West Bengal</u>		
19. Tamluk	c AD 100 - 200	Brick structure.
20. Chandraketugarh	Mauryan-Sunga	NBP wares, Black slipped ware, polished and unpolished grey wares
<u>Uttar Pradesh</u>		
21. Ayodhya	c AD 100-200	?

4.5 The x-ray diffraction (XRD) and neutron activation (NAA) analyses

In order to approach questions of origin, several sherds from excavated or surface-collected Indian sites were brought to ANU for analysis. These are as follows:

1. A sample of sherds of Rouletted Ware from Arikamedu, Tamil Nadu (Wheeler *et al* 1946), made available by the Institute of Archaeology in London (through the kind offices of Dr I. C. Glover and Professor D. R. Harris). These come from the Wheeler excavations of 1945.
2. A single Rouletted ware sherd from Karaikadu, Tamil Nadu, provided by Dr. I. C. Glover. (Surface collection).
3. Excavated sherds of Rouletted Ware from the Gedige excavations in Anuradhapura, Sri Lanka, kindly sent by Dr. Siran Deraniyagala (Deraniyagala 1972, 1986).

These sherds were used for comparison with sherds both Indian and local from Sembiran and Pacung. The methods of analysis used were X-ray Diffraction (Courtesy Dr R. A. Eggleton and Mr Chris Foudoulis, Geology Department ANU), and Neutron Activation Analysis (courtesy Dr B. Chappell, Dr David Ellis and Mr R. Doyle, Geology Department ANU). In addition, some sherds from the excavations of Ipoi Datan in the Lubang Angin site in Sarawak were also subjected to the same methods of analysis and so are available for comparison, together with some sherds from the Niah Caves (Ipoi Datan: 1990)

4.5.1 Results

X-ray diffraction (XRD)

Analysis of one Sembiran IV Rouletted Ware sherd by XRD indicates that it is very similar to sherds of Rouletted Ware from Arikamedu (XRD samples no 2 , 3 and 4) and Anuradhapura (XRD sample no 5)(see fig. 4.7). All these samples contain predominantly quartz with minor amounts of mica and traces of plagioclase feldspar. The Sembiran Rouletted sherd is quite different in composition from soil samples and local potsherds from the Sembiran site (see Appendix A).

It should be noted that a group of the imported black-slipped and resin glazed sherds (XRD samples nos 6 - 9 and 12 in appendix A) also contain dominantly quartz and possible traces of rutile (Ti_2O) and plagioclase feldspar. No mica was detected in these samples. These sherds are labelled as "other imported ware" together with the graffito sherd (XRD sample no 9) in Table 4.1. The results of XRD on these sherds agree with

the results of NAA (see below). It is possible that all of them, like the Rouletted Ware, were derived from India, but the Rouletted ware, black-slipped ware and graffito sherd represent at least three different sources.

Neutron activation analysis (NAA)

Neutron activation analysis of two Rouletted sherds from Sembiran (NAA sample nos 6 and 7), one Rouletted sherd from Pacung I (NAA sample no 8) and an orange but not rouletted Indian sherd from Sembiran (NAA sample no 9), suggests that these sherds have identical compositions to sherds from Arikamedu (NAA sample nos 3 &4), Karaikadu (NAA sample no 5) and Anuradhapura (sample nos 1&2)(see appendix B). This is a very important observation which suggests that the Rouletted Ware from these three widely separated sites was all made from one clay source, presumably in one site or factory complex. Discovery of the location of this manufacturing complex will be a major goal for future archaeological research in India. In addition, the black slipped sherds (NAA sample nos 10, 12, 16 and 22) and sherds with a resin glaze (NAA sample nos 13, 14 and 15) are also close to but not identical with the rouletted group. These sherds were probably also manufactured in India, although this can not be proven decisively.

It is surprising that the sherd with the graffito (NAA sample 11) does not belong to this black-slipped and resin glazed group (see fig B1 in Appendix B). In terms of the NAA results, the graffito sherd is very close to the locally-made Balinese sherds. However, the XRD results indicate that the graffito sherd is very similar to the Rouletted Ware samples which contain dominantly quartz, and very different from the local Balinese sherds and soil samples. The dominance of quartz in the graffito sherd from Sembiran suggests that the vessel was not made locally in Bali, because quartz is rare in the sediments of this volcanic region. The graffito sherd may have been made somewhere in India, and possibly in the north, where the Kharoshthi script was in common use.

The combined results of the XRD and NAA analyses, therefore, suggest that not only were the Rouletted Ware, the Wheeler Arikamedu type 10 vessel and the sherd with Kharoshthi characters made in India, but so also were the black slipped and resin glazed wares. These observations are of great importance, as is the evidence for a single source for all the Rouletted ware analysed. Further discussion is presented in Appendix A.

4.6 Dating

The dating of the Rouletted Ware from northeastern Bali is very important as a starting point for discussing the beginnings of contacts between India and Bali. In India, Rouletted Ware has been used widely to date many Early Historical sites. However, there is still debate about the most appropriate date range. Rouletted ware was found more abundantly in the pre-Arretine than in the post-Arretine layers at Arikamedu. As noted above, Wheeler (1946) dated it at this site to between the late first century BC or the beginning of the first century AD, and AD 200.

Chakravarti (Wheeler *et al* 1946: 109) and Subrahmanyam (1964: 8-9), on the basis of palaeography, suggested that the reported examples of inscribed Rouletted Ware date between the second century BC and the third or fourth centuries AD. Begley (1983: 468-471; 1986) also argues on the basis of stratigraphy and palaeography that the tentative dating of Rouletted Ware in India should be between the second century BC and AD 200. Recent C14 dates from Gedige, Anuradhapura, indicate that the Rouletted Ware there dates between 250 BC and AD 1 (Deraniyagala 1986: 46-47).

In the Sembiran excavations, one C14 date of 1010 ± 110 BP (ANU 7218) was obtained from spit 25 in SBN VI. The calibrated age for this is AD 900 (1015) 1160 (ANU 7218) (Ardika and Bellwood 1990). This sample derives from the upper part of layer 6, and Rouletted Ware first appeared about 0.5 - 1 m below this level (see Table 4.1). It should be noted that a rim sherd of Rouletted Ware was found in spit 24 of SBN IV, although this might have been disturbed upwards from the main concentration.

Another date by AMS radiocarbon on rice husks in a sherd from the 3.5 m level in trench SBN VII is 2660 ± 100 bp (CAMS 732). This gives an age of 910 (818) 790 calibrated BC (Ardika and Bellwood 1990). This AMS date is obviously several centuries earlier than that for Rouletted ware according to the Indian evidence, and its interpretation poses a number of unresolved problems.

Given the overall date ranges of Rouletted Ware in India between 200 BC and AD 200, it seems that the most likely date range for the Rouletted Ware from Sembiran and Pacung falls in the same time span. However, since Mukherjee (1989a,b; 1990a,b) dates the Kharoshthi inscriptions in West Bengal to between the first and fifth centuries AD, the most likely date span for the Rouletted Ware in Bali is probably the first and second centuries AD. The AMS date raises the possibility that Sembiran might have already

become an ancient port several centuries prior to the appearance of Rouletted Ware and other Indian sherds in North Bali.

4.7 The Historical Significance of the Rouletted Ware

The appearance of Rouletted Ware in northeastern Bali may indicate the beginning of contacts between India and the island during the early part of the first millennium AD. It is still not clear whether this early contact was direct, or indirect via Sumatra and Java. Rouletted Ware has also been found accidentally in Kobak Kendal and Cibutak in northwest Java (see plate 4.6)(Walker and Santoso 1977, 230, fig 1.c). The Rouletted vessel from Cibutak is different from those found in Sembiran. It is notched on the rim and has incised decoration on its exterior.

Apart from the Indian pottery, about 501 glass beads, together with two of carnelian and one of gold were also discovered in Sembiran (as will be discussed later). Glass, carnelian and gold beads have also been found in Gilimanuk, as well as in inland sarcophagus burial sites in Bali (Indraningsih 1985, Soejono 1977.1983; Ardika 1987: 29-30). Some scholars believe that many of these glass and carnelian beads derive from India, particularly from Arikamedu (Hoop 1932: 132; Arkell 1936; Sleen 1958: 208; Lamb 1965: 94).

It is worth noting also that gold foil eye covers have been found in Gilimanuk and in sarcophagus burial sites at Pangkungliplip and Margatengah (Soejono 1977, 1983:193; Miksic 1990: 41-42). Similar gold foil eye covers have also been discovered at Oton on Panay island in the Philippines and at Santubong in Sarawak (O'Connor and Harrison 1971: 72-73). These gold foil eye covers are similar to the artifacts reported from graves at Adichanallur on the Tamil Nadu coast (O'Connor and Harrison 1971; Ray 1989: 51). A face mask of metal was also reported recently from a probable burial context at Pasir Angin in West Java (Angraeni & Awe 1983).

As far as early Indian contact with Bali is concerned, there are no explicit historical accounts which refer to Bali prior to c AD 800. However, Indian texts dated from the third century BC onwards mention several places in Southeast Asia. For instance, the *Arthasastra* of Kautilya (c 300 BC) mentions *Suvarnabhumi*, as does the *Sanka Jataka* (c third century BC). It is mentioned that the Brahmin Sanka sailed from Varanasi to *Suvarnabhumi* (Sarkar 1981: 303). Sarkar(1981: 296) suggests that *Suvarnabhumi* was located somewhere in Lower Burma, but other authors consider it

refers more generally to Southeast Asia as a whole.

The *Maha Nidessa* from about the middle of the third century BC refers to 24 places, among which are Java and *Suvarnabhumi*. The *Ramayana* of Valmiki, which is usually dated between the fourth century BC and the second century AD, describes the island of Java (*Javadvipa*) with its seven kingdoms, and the island of Sumatra (*Suvarnarupyakadvipa*) (Coedes 1975; Wolters 1967; Hall 1979; Sarkar 1981).

Based on these accounts, it is possible that the islands of Sumatra and Java were known to Indian traders as early as the third century BC. Bali might have also been reached by Indian traders at that time.

The *Manusrimulakalpa*, dated to c AD 800, is the only Indian text to mention specifically the island of Bali. This text also refers to Java (Sarkar 1981:308).

Historical Balinese accounts also state that contacts with foreign traders occurred during the late first millennium AD. The inscription of Bebetin AI, dated to AD 896, mentions a *banyaga* (long-distance or seafaring merchant) landing at an unidentifiable location called *Banua Bharu* in north Bali (Goris 1954: 54-55; Wheatley 1975: 268). The term *banigrama* (Sanskrit *Vanigrama*) meaning a merchant guild is also mentioned in the inscriptions of Sembiran B (AD 955) and Sembiran A II (AD 975) (Goris 1954; and see chapter 7).

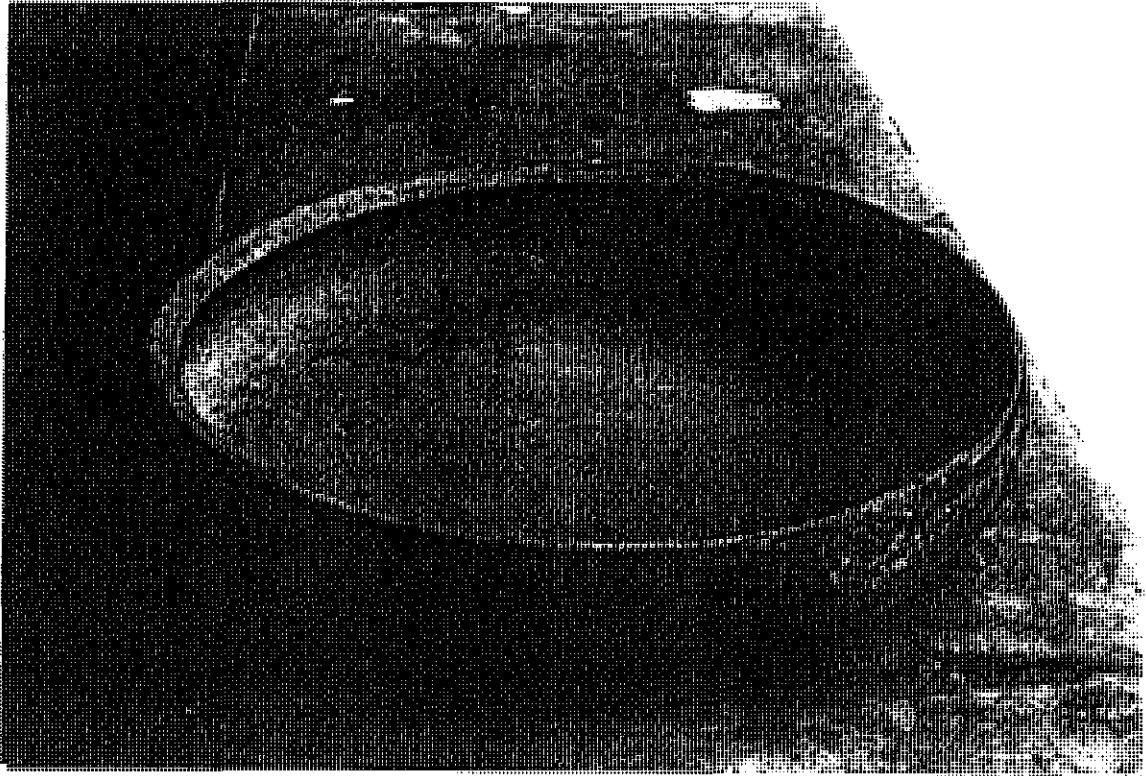
Given the notion that Indian traders had already reached Bali by the beginning of the first century AD, the question then arises of what sorts of commodities were traded. On the basis of the archaeological evidence, it is presumed that Indian pottery, beads and perhaps textiles (?) were traded into Bali and other regions in Southeast Asia. In terms of exports the *Ramayana* text refers to gharu wood and sandalwood from eastern Indonesia (Wolters 1967: 65-66). The *Raghuvamsa* of Kalidasa, who is believed to have been alive in AD 400, mentions cloves (*lavanga*) from a place called *dvipantara*. Wolters (1967:66) argues that the term *dvipantara* referred to the Indonesian archipelago. Sandalwood is found from East Java to Timor and the clove tree is indigenous to the five small islands of Ternate, Tidore, Moti, Makian and Bacan in the Moluccas (Wheatley 1959; Miller 1969: 60-62). Sandalwood and cloves were also mentioned in the *Periplus* (Schoff 1959; Harmington 1986).

Since sandalwood and cloves were probably derived from islands located to the east of Bali, it may be that Sembiran and other coastal sites in north Bali served as

intermediate stations located on the trade routes between eastern and western Indonesia.

Figure 4.8

Rouletted ware from Cibutak in West Java



Chapter 5

THE NON-IMPORTED EARTHENWARES

Locally-manufactured earthenware sherds are the most numerous category of finds from the archaeological excavations in northeastern Bali. 85,308 sherds were recovered in total, 94% (80,134) of which are plain, and 6% (5174) decorated. Only 8125 sherds (9.5% of the total assemblages) are classified as diagnostic i.e rims, carinations, bases, handles and decorated body sherds. Diagnostic sherds were mostly derived from the lower levels of SBN IV, VI, and VII (89.78% of the total diagnostic samples), and of these 59% are decorated body sherds (see table 5.1). Plain body sherds were discarded and returned to the trenches after being counted and weighed.

Based on typology, stratigraphy and associated artifacts I will divide the excavated earthenware sherds from northeastern Bali into two chronological periods: Early and Late. Stratigraphically, the earthenwares from layers 6 to 8 in SBN IV, VI, VII and PCN I are classified as Early Period, with overall date limits of c. 2800-1500 BP but with a more likely concentration in the first and second centuries AD. The earthenwares from layers 1 to 3 in SBN IV, VI and VII and 1 to 5 in PCN I, as well as all the earthenwares found in BKH I, BKH II, SBN I, SBN II/III, SBN V and JLH I, are categorised as Late Period, presumably 1500 BP to (?) recent. The distributions of diagnostic sherds per site and period can be seen in Table 5.1. It will be seen that, apart from plain rim sherds, the majority of all decorated sherds come from Early Period contexts. Late Period vessels are mostly plain.

Note for Table 5.1:

- a. Plain rim sherds
- b. Decorated rim sherds
- c. Decorated body sherds
- d. Carinations
- e. Flat bases
- f. Handles

Table 5.1. Distribution of diagnostic earthenware sherds by site and period.

Site and Period	Diagnostic sherds						Total
	a	b	c	d	e	f	
LATE PERIOD							
JLH I	40	-	-	-	-	-	40
BKH II	13	-	-	-	-	-	13
SBN I	99	-	7	-	-	-	106
SBN II/III	151	-	2	-	-	-	153
BKH I	159	-	4	-	1	-	164
Upper Layers							
SBN IV	4	-	1	-	-	-	5
Upper Layers							
SBN VI	6	-	3	-	-	-	9
Upper Layers							
SBN VII	9	1	-	-	-	-	10
SBN V	41	-	1	1	1	-	44
Upper Layers							
PCN I	12	-	3	2	-	-	17
	534 6.6%	1	21 0.2%	3	2	-	561 7%
EARLY PERIOD :							
Lower Layers							
SBN IV	165	17	210	13	-	-	405
Lower Layers							
SBN VI	914	160	2243	138	-	3	3458
Lower Layers							
SBN VII	824	157	2296	112	9	10	3408
Lower Layers							
PCN I	231	4	24	34	-	-	293
Total :	2134 26.2%	338 4.2%	4773 58.7%	297 3.7%	9 0.1%	13 0.1%	7564 93%

Percentages are of all diagnostic sherds from both periods.

5.1 Classification and Vessel Forms

In this study the earthenwares will be analysed according to attributes and stratigraphy in order to determine a sequence of pottery types through time in northeastern Bali. Typologically, they will be classified on the basis of rim and lip forms, vessel shapes and decoration.

5.1.1 Rim and lip forms

The major rim categories recognised in this classification are;

1. Direct rims of shallow bowls and platters
2. Indirect and everted rims of restricted vessels
3. Indirect and non-everted rims of restricted vessels
4. Vertical flask spouts
5. Unique rims

Rim and lip cross-sections consist of;

1. rounded at lip
2. flattened or bevelled at lip
3. tapered towards lip
4. thickened at lip
5. abruptly out-turned at lip
6. 3-angled lip ("Buidane type")
7. rolled lip ("Gilimanuk type")
8. corrugated outer profile
9. internally hollowed profile
10. inturned lip
11. rolled lip ("Pacung type")

These rim and lip forms are illustrated schematically in figure 5.1

Rim and lip combinations which actually occur in the assemblages are the following:

1. Direct rims

1.1 (direct rims of shallow bowls and platters with rounded lips), 1.2 (direct rims of shallow bowls and platters with flattened or bevelled lips), 1.3 (direct rims of shallow bowls and platters with tapered lips), 1.4 (direct rims of shallow bowls and platters with thickened lips), 1.5 (direct rims of shallow bowls and platters with abruptly out-turned lips). Rim type 1.6 (direct rims of shallow bowls and platters with 3-angled lips) might

also be present, but surviving fragments are too small for certainty.

2. Indirect and everted rims

2.1 (indirect and everted rims of restricted vessels with rounded lips), 2.2 (indirect and everted rims of restricted vessels with flattened or bevelled lips), 2.3 (indirect and everted rims of restricted vessels with tapered lips), 2.4 (indirect and everted rims of restricted vessels with thickened lips), 2.5 (indirect and everted rims of restricted vessels with abruptly out-turned lips), 2.6 (indirect and everted rims of restricted vessels with 3-angled lips ["Buidane type"]), 2.7 (indirect and everted rims of restricted vessels with rolled lips ["Gilimanuk type"]), 2.8 (indirect and everted vessels with externally corrugated rims), 2.9 (indirect and everted rims of restricted vessels with internally hollowed rims) and 2.10 (indirect and everted rims of restricted vessels with inturned lips). Type 2 rims are the most common type in both Early and Late Periods.

3. Indirect and non-everted rims

3.1 (indirect and non-everted rims of restricted vessels with rounded lips), 3.2 (indirect and non-everted rims of restricted vessels with flattened or bevelled lips), 3.3 (indirect and non-everted rims of restricted vessels with tapered lips), 3.4 (indirect and non-everted rims of restricted vessels with thickened lips) and 3.9 (indirect and non-everted rims of restricted vessels with internally hollowing). Rims of type 3 are quite rare, and only occur in the Early Period.

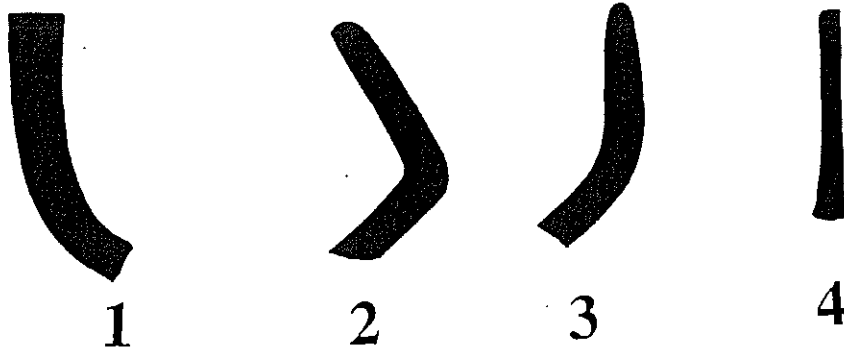
4. Vertical flask spouts

4.1 (vertical flask spout with rounded lip), 4.2 (vertical flask spout with flattened lip), 4.3 (vertical flask spout with tapered lip). Flasks are not common and occur only in the Early Period.

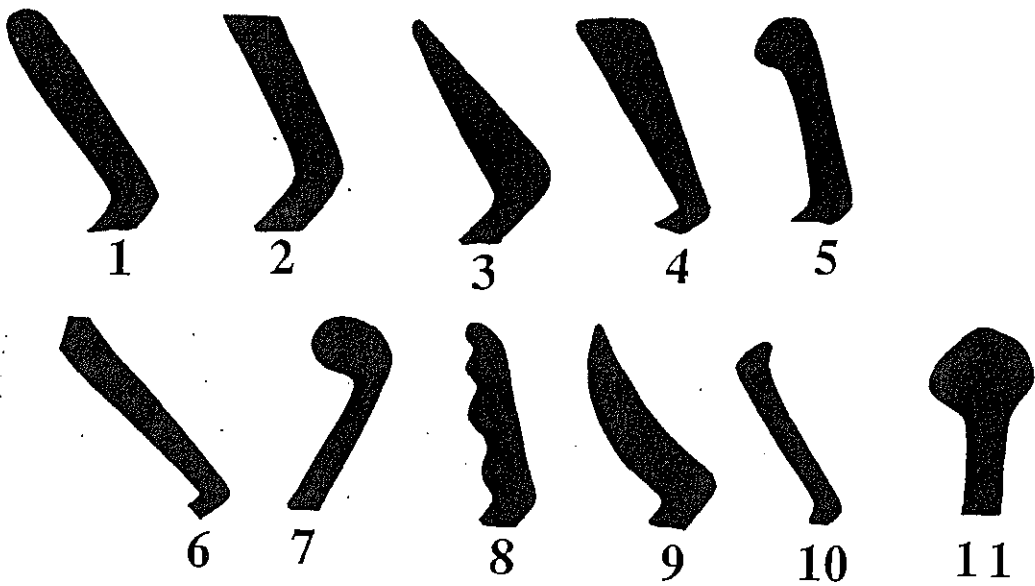
Figure 5.1

Example of each rim type and lip type (see page 76 for listing)

1). Rim forms



2). Lip forms



5.1.2 Stratigraphic distribution of the rim and lip forms

In tables 5.2 and 5.5 the distribution of rim and lip combinations are given by number for each site and layer. It should be noted that these tables only record those rims which are sufficiently complete in vertical cross-section for the orientation to be recordable. There are many lip fragments which have ambiguous orientations and these cannot be included in these tables. This applies particularly to the type 11 (Pacung type) rolled lips shown in page 93; in most cases it is unclear whether these capped everted, vertical or inverted rims and whether they were direct or indirect. Many would appear belong to direct vertical rims but this is unsure, so they are not included in the following tables.

Direct rims of shallow bowls and platters (rim category 1) only occur in the Early Period, and their distribution by site and layer is shown in Table 5.2.

Table 5.2. Distribution of direct rims of shallow bowls and platters (rim category 1).

Site	Lip cross-sections						Totals
	1	2	3	4	5	6	
Lower Layers							
SBN IV	1	6	-	3	1	2	13
SBN VI	1	15	10	30	-	12	68
SBN VII	3	24	8	17	-	11	63
PCN I	3	3	-	-	-	-	6
TOTALS	8	48	18	50	1	25	150
	5.3%	32%	12%	33.3%	0.6%	16.6%	100%

Table 5.3 Distribution of indirect everted rims (rim category 2)

Site/ Period:	Lip cross-sections									
	1	2	3	4	5	6	7	8	9	10
LATE PERIOD										
JLH I	2	-	-	-	-	-	-	-	-	-
BKH II	1	-	-	-	-	-	-	-	-	-
SBN I	17	-	-	-	-	-	1	-	-	-
SBN II/III	46	-	1	-	-	-	-	-	-	-
BKH I	51	-	3	-	-	-	-	-	-	-
SBN V	3	-	-	-	-	-	-	4	-	-
Upper Layers										
SBN IV	4	-	-	-	-	-	-	-	1	-
SBN VI	6	-	-	-	-	-	-	-	-	-
SBN VII	9	-	-	-	-	-	-	-	-	-
PCN I	6	1	-	-	-	-	-	-	-	-
TOTALS	145	1	4	-	-	-	1	4	1	-
	13.8%									
EARLY PERIOD										
Lower Layers										
SBN IV	15	4	5	2	-	1	15	10	16	-
SBN VI	136	36	8	-	6	2	51	36	192	-
SBN VII	83	46	8	1	1	6	66	35	64	-
PCN I	23	-	-	-	-	-	2	1	20	4
TOTALS	257	86	21	3	7	9	134	82	292	4
	24.45%	8.1%	2%				12.7%	7.7%	27.8%	

Percentages in Table 5.3 are of total rims of this type (1051).

Indirect and non-everted rims (rim category 3) only occur in the Early Period of SBN VI and VII.

Table 5.4. Distribution of indirect and non-everted rims (rim category 3)

Site/ Period :	Lip cross-sections					Totals
	1	2	3	4	9	
EARLY PERIOD						
Lower Layers						
SBN VI	4	-	3	3	1	11
SBN VII	4	2	1	1	-	8
TOTALS	8	2	4	4	1	19

10 vertical flask spouts (rim category 4) were discovered only in the Early Period layers of SBN IV, VI and VII. All these rims are decorated with either incision, impression, red slip, burnishing, or combinations of these.

Table 5.5 Distribution of vertical flask spouts (rim category 4)

Site	Lip cross-sections			Totals
	1	2	3	
SBN IV	1	-	-	1
SBN VI	3	-	3	6
SBN VII	1	2	-	3
Totals :	4	2	3	10

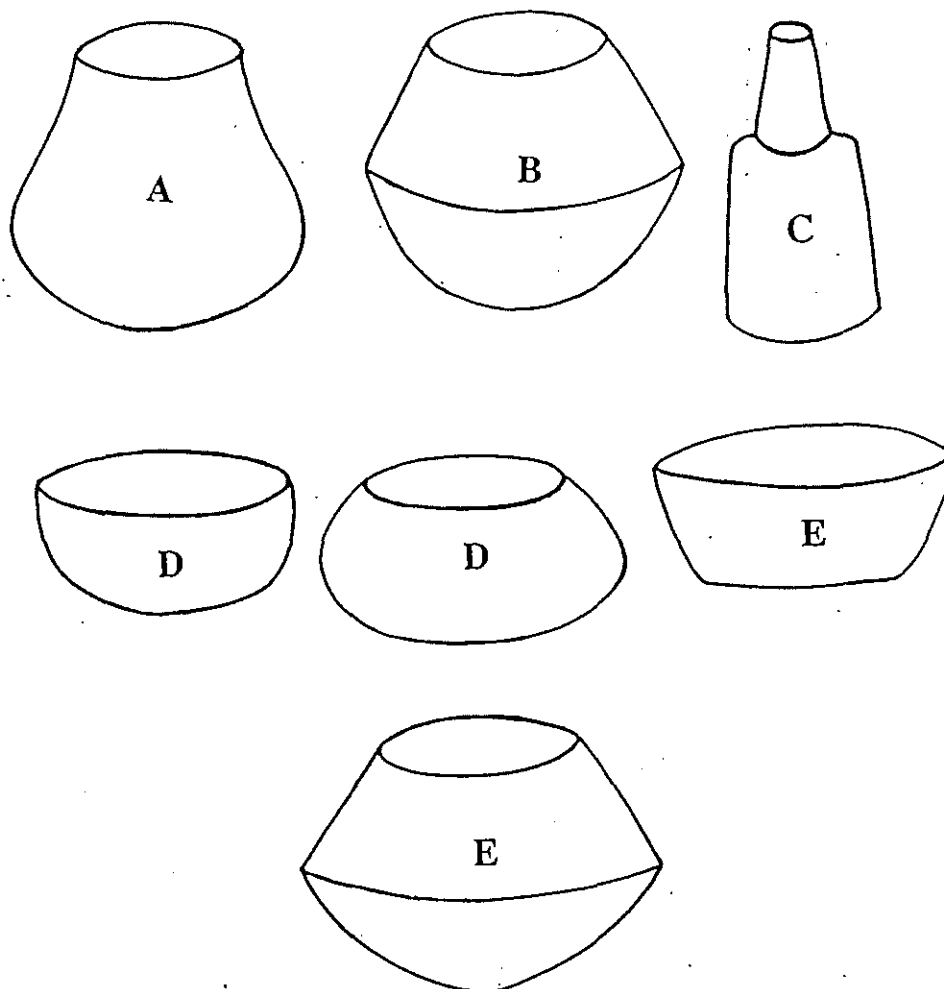
5.1.3 Vessel forms and attribute combinations

The major vessel forms can be described further, following Shepard (1968) and Bellwood (1980, 1988: chapter 11)

- A. Simple globular restricted vessels
- B. Deep restricted vessels with carinated contours
- C. Restricted vessels with complex contours (flasks)
- D. Shallow bowls and platters, both restricted and unrestricted, with rounded contours and flat or rounded bases
- E. Shallow bowls and platters, both restricted and unrestricted, which are
 - a) carinated and round or flat based, or
 - b) flat based with a sharp angle between base and sides
- F. Lamps
- G. Pedestal vessels.
- H. Lids.

Figure 5.2

Schematic vessel forms from northeastern Bali (indirect rim modifications not indicated)



Vessel form A: These are simple restricted vessels of globular shape, with mouth diameters between 14 and 24 cm. Most have indirect everted rims. Several rim variants are recognised for this vessel type; *indirect everted* with rounded lip (rim type 2.1), *indirect everted* with flattened or bevelled lip (type 2.2), *indirect everted* with rolled lip (type 2.7) and *indirect everted* with internally hollowed lips (type 2.9). One example from SBN II/III (Late Period) and another from spit 34 of SBN VII (Early Period) have externally grooved lips (type 2.8).

Vessel form B: These are dependent restricted vessels with carinated contours and mouth diameters between 18 and 23 cm. Only three specimens of this type of vessel can be reconstructed, all from SBN VI and VII. However, carinated sherds were also found in the lower levels of SBN IV, VII, V and PCN I (see table 5.1). Two rim types are definitely recognised for this vessel type; unclassified direct with rounded lip (type 5.1) and *indirect everted* with internally hollowed lip (type 2.9) (see figures 5.3 and 5.4).

Vessel form C: These are independent restricted vessels with complex contours which functioned as flasks or bottles. One almost completely reconstructible flask was found in SBN VII spit 34 (see figure 5.6). However, 9 other fragments of vertical flask necks with diameters between 2 and 4 cm perhaps belonged to this type of vessel. Lip cross-sections identified on this type of vessel are rounded (4.1), flattened or bevelled (4.2) and tapered (4.3)(see table 5.5). Seven of these small rims are decorated with either incision, impression, incision and impression, burnishing, or red slip. This type of vessel was found only in the Early Period layers in SBN IV, VI and VII.

Vessel form D: These are simple shallow bowls, restricted or unrestricted, generally with diameters between 9 and 25 cm. Partial profiles of 101 specimens from PCN I, SBN IV, VI and VII can be reconstructed (see figure 5.3). These vessels range from everted to slightly inverted in rim orientation, with rounded lips (rim type 1.1), flattened or bevelled lips (1.2), tapered lips (1.3), thickened lips and abruptly out-turned lips (1.5)(see table 5.2). These vessels seem to have had either round or flat bases. Some of these vessels have almost identical rim shapes to the Indian Rouletted ware.

Vessel form E: These are shallow bowls, restricted or unrestricted with composite contours, mostly with carinated bodies or sharp basal angles. 26 specimens of this type can be partially reconstructed, with rim diameters between 13 and 26 cm. This type of vessel only occurred in the lower levels of PCN I, SBN IV, VI and VII. At

least 4 types of lip can be recognised on these vessels, including rounded (1.1), flattened with impressed or incised decoration (1.2), tapered (1.3) and thickened (type 1.4) (see figure 5.3).

Vessel form F: Three specimens of shallow and unrestricted vessels with open spouts, possibly lamps, were found in the lower level of PCN I (see figure 5.7). The specimen from spit 28 of PCNI might once have had a stand or pedestal. Each of these vessels showed signs of burning around the spouts.

Vessel form G: At least four pedestals with cut-out decoration were found in SBN VI and VII (see figure 5.8).

Vessel form H: Two specimens of saucer-shaped lids with central knobs were found in SBN VII. Three other knobs possibly belonging to domed lids were also found in SBN VII and SBN VII (see figure 5.9).

The distributions of the above major vessel forms by excavation trench are as follows:

Table 5.6 Distribution of vessel forms per site and period.

Site & Period	Vessel Forms							
	A	B	C	D	E	F	G	H
LATE PERIOD								
JLH I	-	-	-	-	-	-	-	-
BKH II	-	-	-	-	-	-	-	-
SBN I	-	-	-	-	-	-	-	-
SBN II/III	1	-	-	-	-	-	-	-
BKH I	-	-	-	-	-	-	-	-
Upper Layers								
SBN IV	-	-	-	-	-	-	-	-
Upper Layers								
SBN VI	-	-	-	-	-	-	-	-
Upper Layers								
SBN VII	-	-	-	-	-	-	-	-
SBN V	-	-	-	-	-	-	-	-
Upper Layers								
PCN I	-	-	-	-	-	-	-	-
Total :	1							
EARLY PERIOD								
Lower Layers								
SBN IV	2	-	1	6	1	-	-	-
SBN VI	27	2	6	50	11	-	3	-
SBN VII	10	1	3	41	12	-	1	2
PCN I	1	-	-	4	2	3	-	-
Total	40	3	10	101	26	3	4	2
	21.16%	5.3%	53.43%	13.76%				

Percentages are of total of reconstructed vessels forms (189) from both periods.

It should be noted that the actual figures need not reflect the true percentages for each type. For instance, the presence of only one reconstructible vessel shape in the Late Period reflects the fact that the majority of Late Period rims were only small and unmatching fragments, so vessel forms simply cannot be reconstructed with complete confidence. Likewise, in the Early Period the seeming predominance of vessel types D and E is probably artificial because these simple vessel forms are more easily recognisable

from fragmentary sherdage than the others. Vessel type B was probably much more common than shown here, but this form can only be recognised if matching rims and carinations are available - a rare event amongst small sherdage. The figures given are for minimum numbers only.

Table 5.5 indicates that SBN IV, VI and VII produced nearly all the vessel forms recognised in the above classification. Stratigraphically, the earthenwares and other artifacts as well as the burials were discovered in layers 6 and 7 in SBN IV, VI and VII, between 2.3 and 3.7 m below the surface. 97% of the total sherds in SBN IV, 99,3% in SBN VI and 99,5% in SBN VII were found in these layers (see chapter 3). It should be noted that no artifacts were found in layers 5 and 4 in SBN IV, VI and VII, which indicates that the Early Period intense occupation was followed by a period of site and probably areal abandonment.

As already noted, decorated sherds, carinations and handles were almost absent in Late Period contexts. The vessel forms from this Period are plain with simple contours, both restricted and unrestricted. Only one fully reconstructible vessel has been recognised, from SBN II/III, and this is a restricted vessel with an indirect everted rim and grooving on the rim exterior (A 2.8).

The only other rim forms which can be identified from the Late Period assemblages are *indirect everted* with round lips (rim type 2.1) and heavy rims of uncertain orientation with interior or exterior thickening (rim type 1.5 or 2.5). It is likely that restricted vessels with globular bodies with indirect everted rims and round lips (type A 2.1) formed the most common vessel type in these assemblages.

The results of the pottery analysis suggest that there was a dramatic change in vessel form and decoration in northeastern Bali between the Early and Late Periods, sometime between the cessation of early Indian trade c. AD 200 and the period of the inscriptions in the 9th -12th centuries. The pottery identified as Late Phase could well overlap with the period of the inscriptions. It is not clear whether this situation was caused by ecological factors such as lack of access to raw materials, technological constraints, or a change of cultural values with respect to aesthetics within the society. At the present time no pottery is made in the villages near the excavations and it is bought from other villages, particularly Banyuning which is located near Singaraja about 25 km to the west of Sembiran (see Appendix B on neutron activation analysis).

Notes on figures 5.3 and 5.4:

- 1). Capital letter indicates vessels with securely reconstructed shapes
- 2). Capital letter in brackets indicates vessels with uncertain shapes

Figure 5.3

Rims category 1 and vessel forms D and E

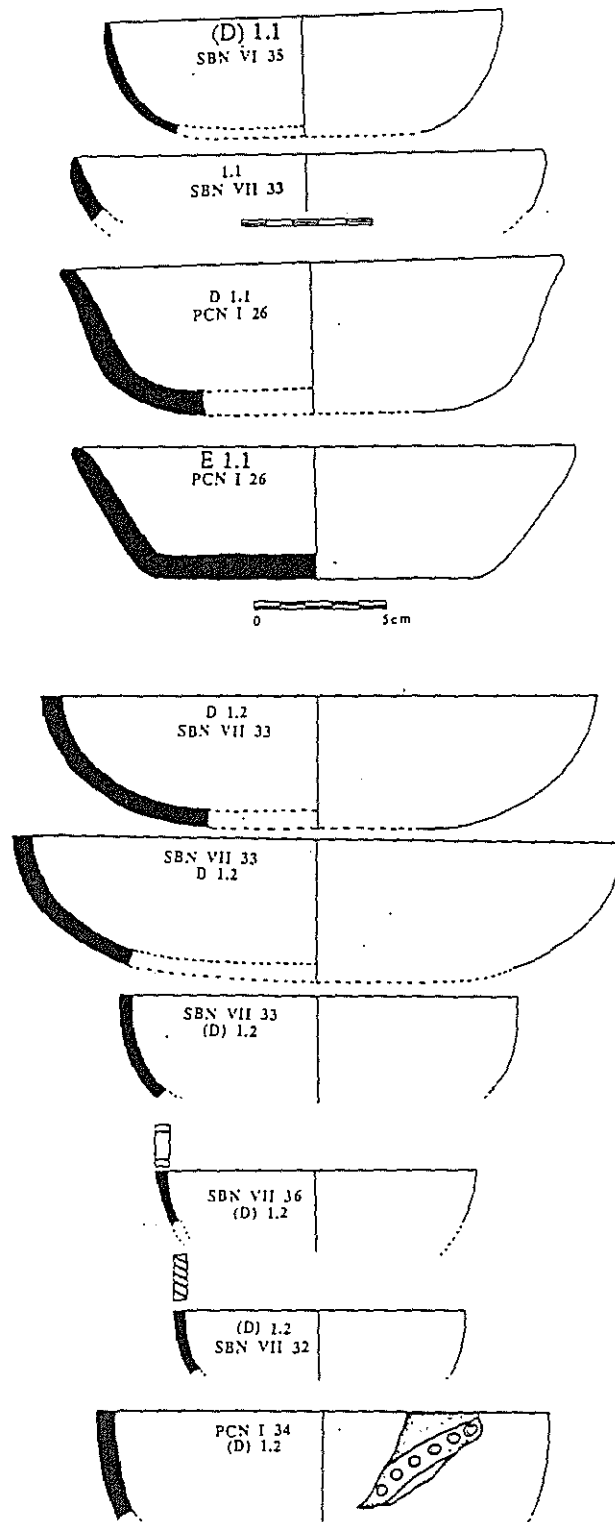


Figure 5.3 continued

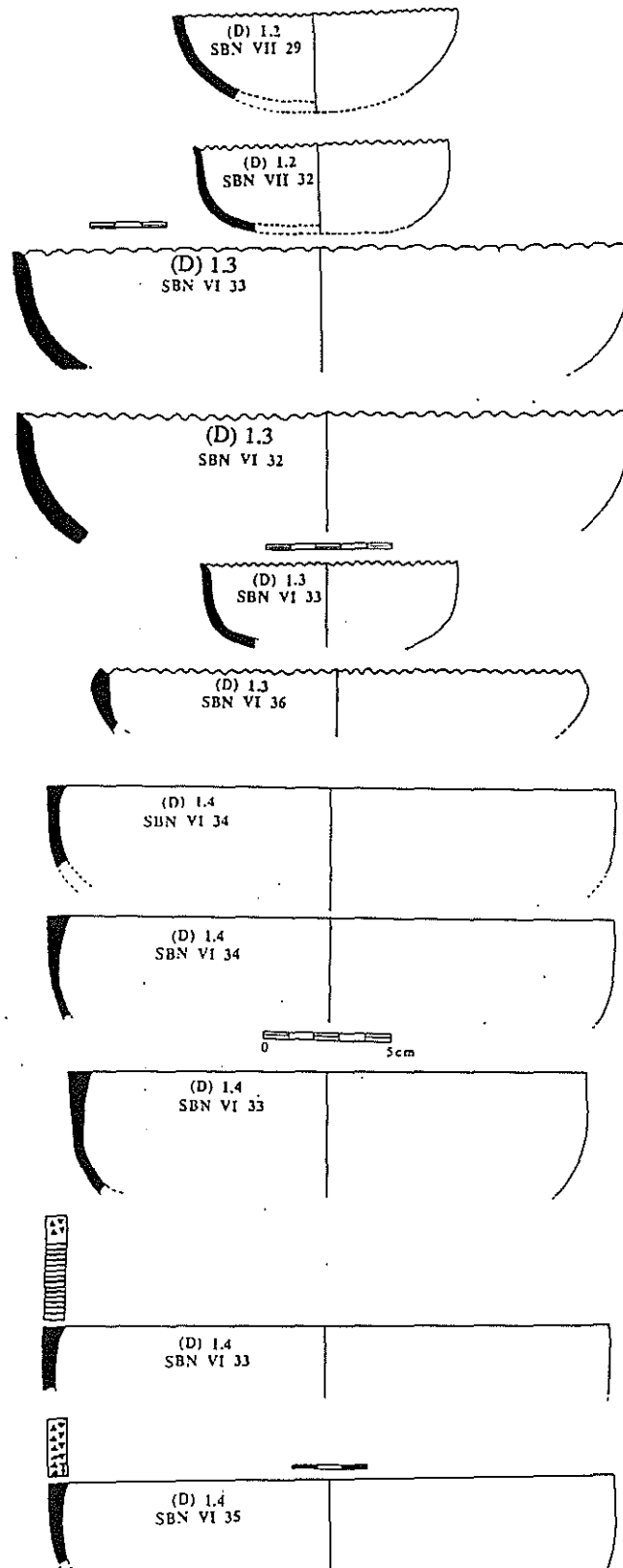


Figure 5.3 continued

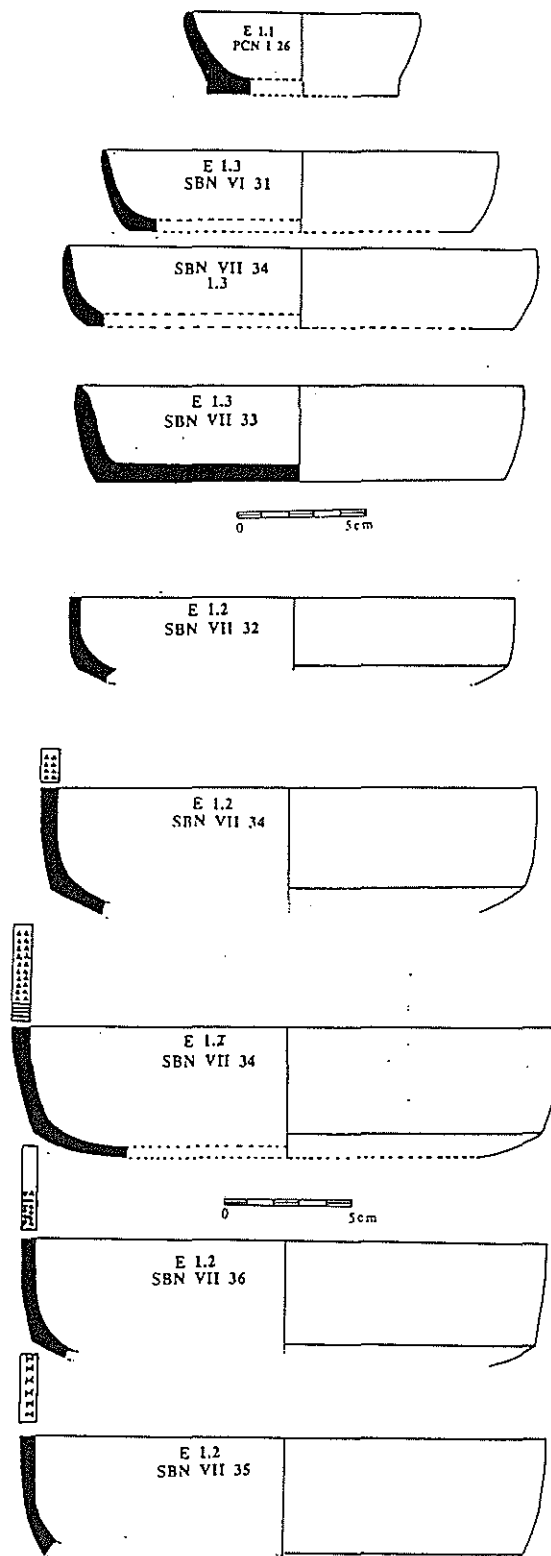


Figure 5.3 continued

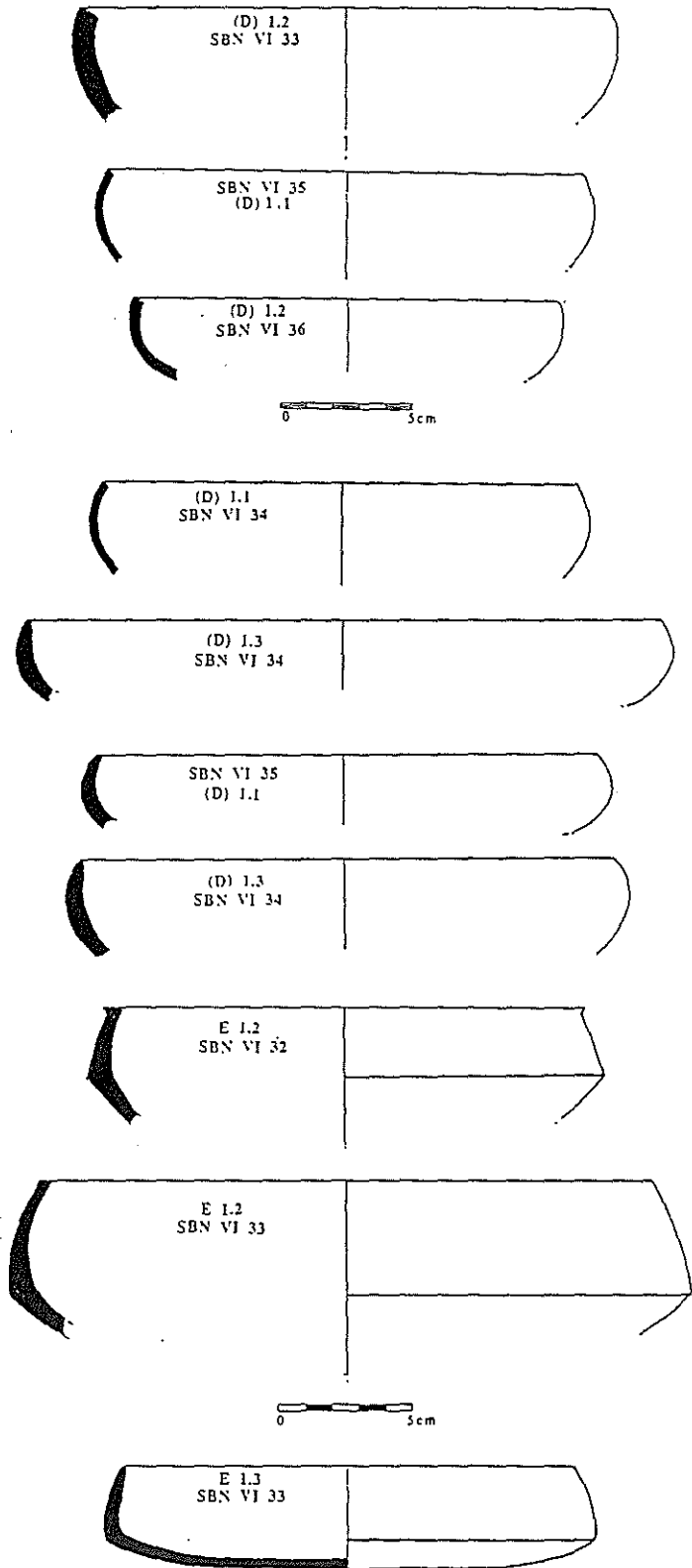


Figure 5.3 continued

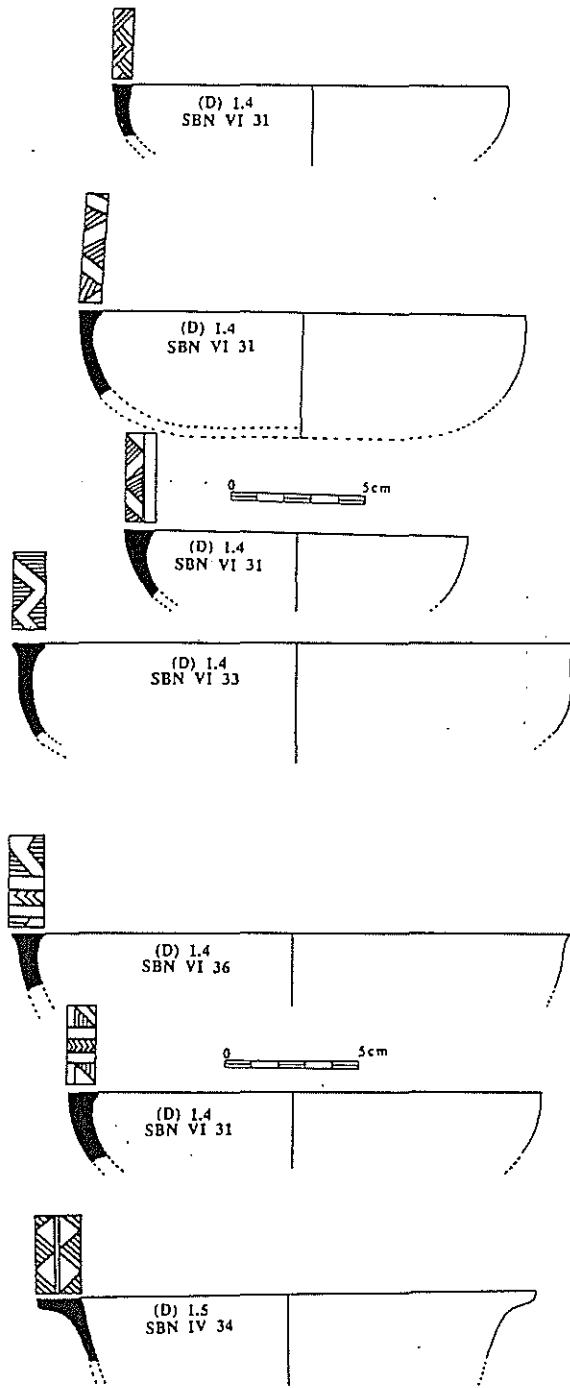


Figure 5.3 continued

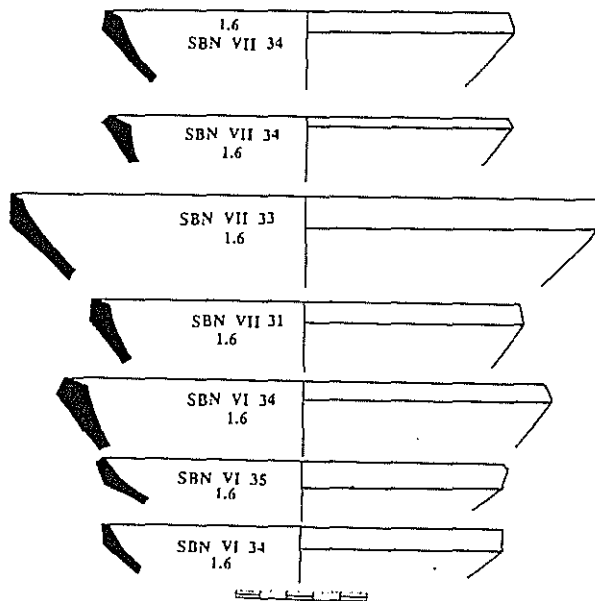


Figure 5.3 continued

Lip type 11 (Pacung type) both Early and Late Period

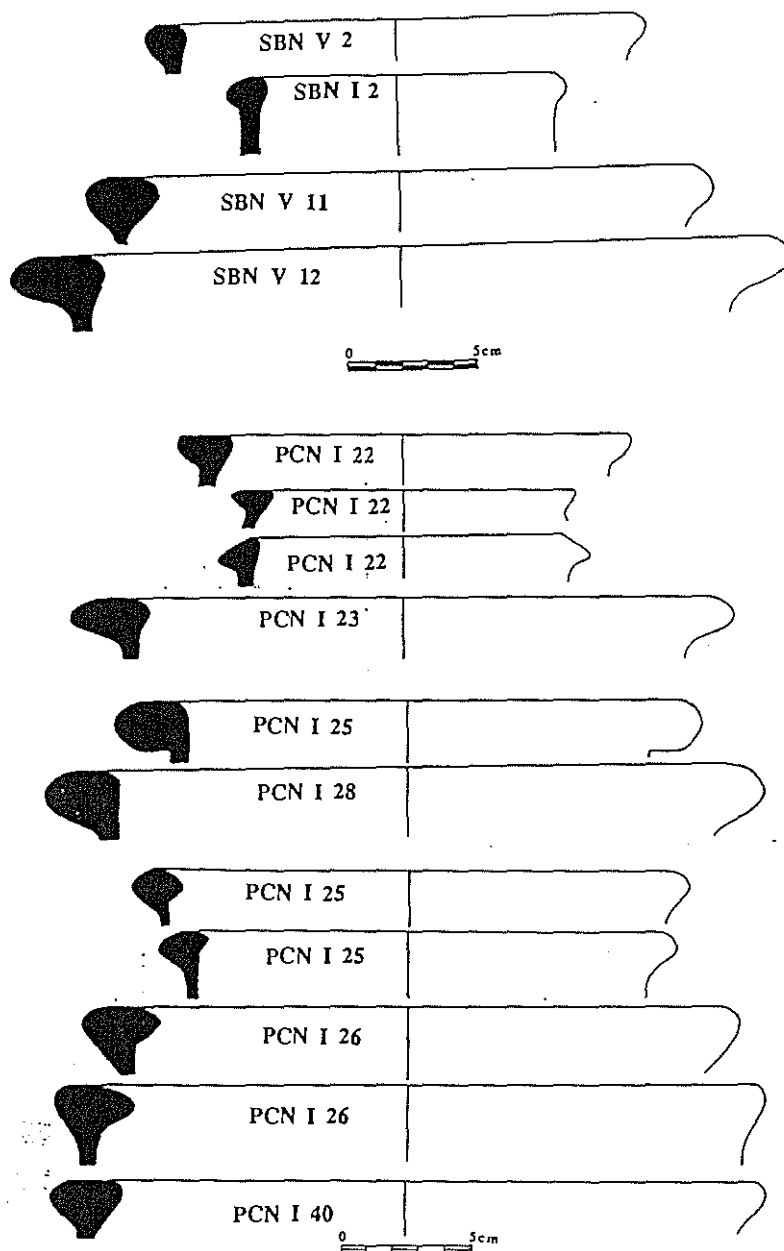


Figure 5.4

Rims category 2 and vessel forms A and B

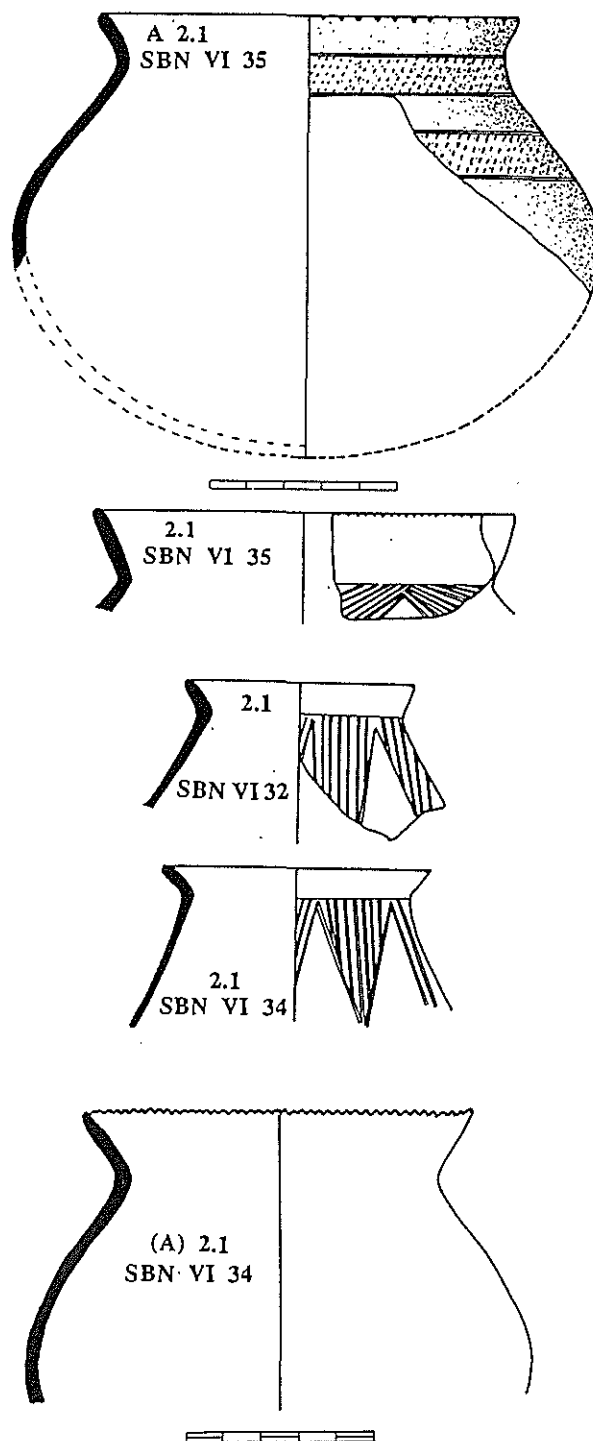


Figure 5.4 continued

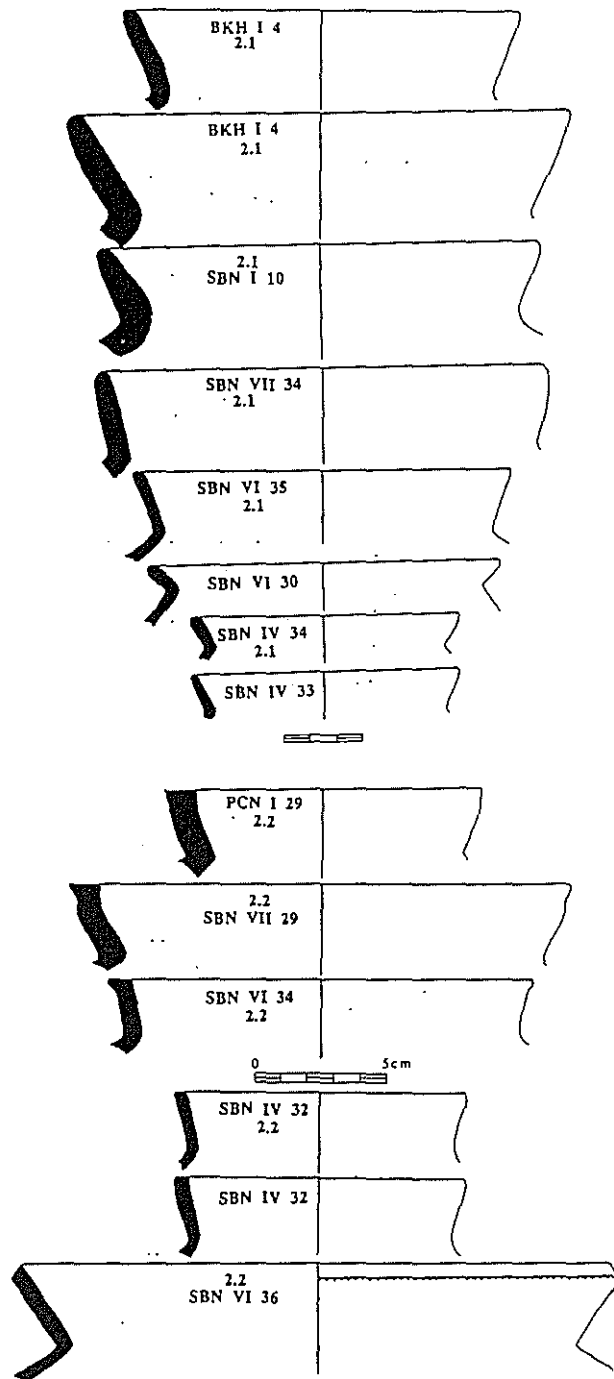


Figure 5.4 continued

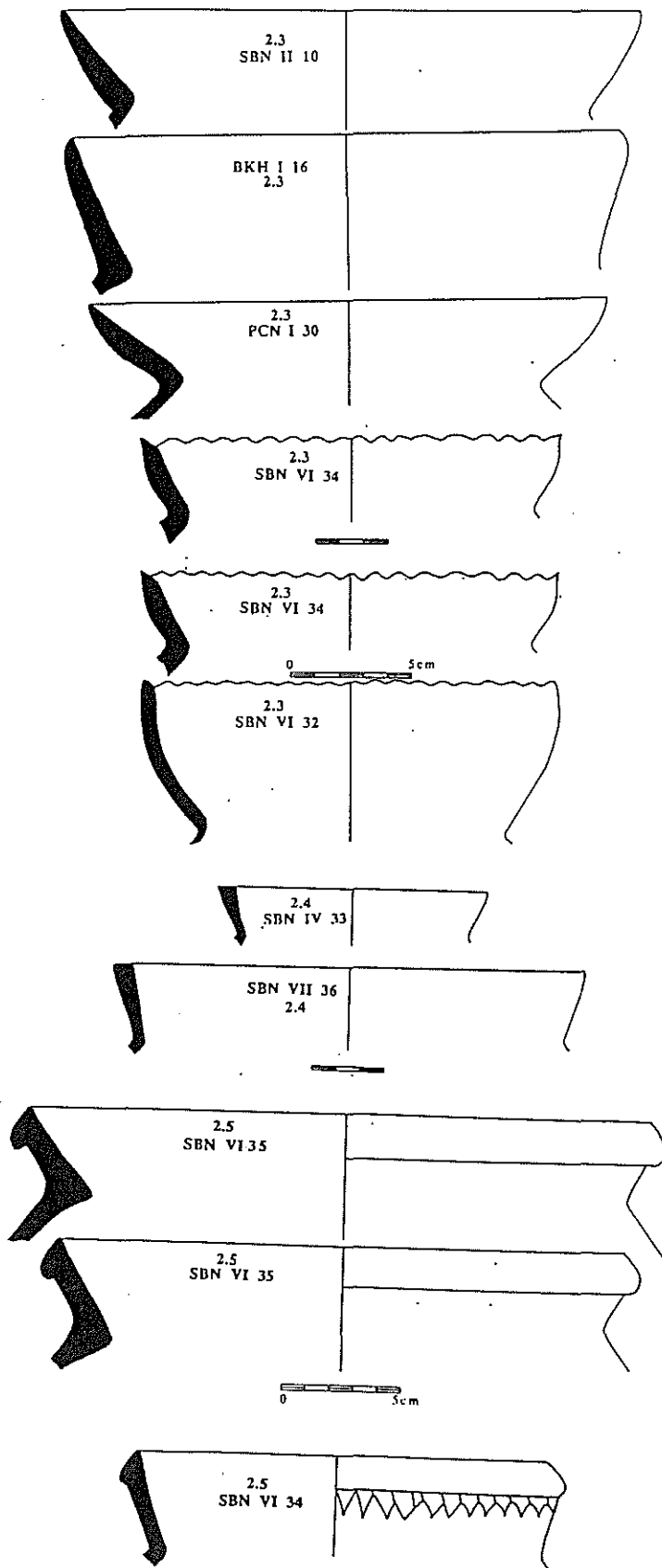


Figure 5.4 continued

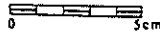
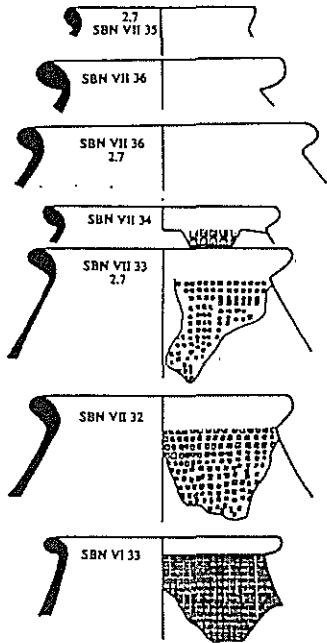
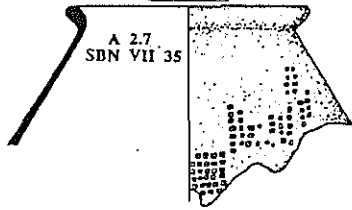
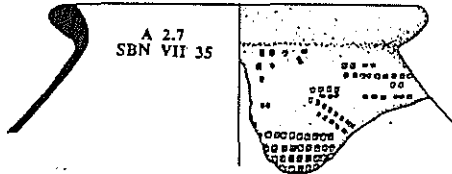
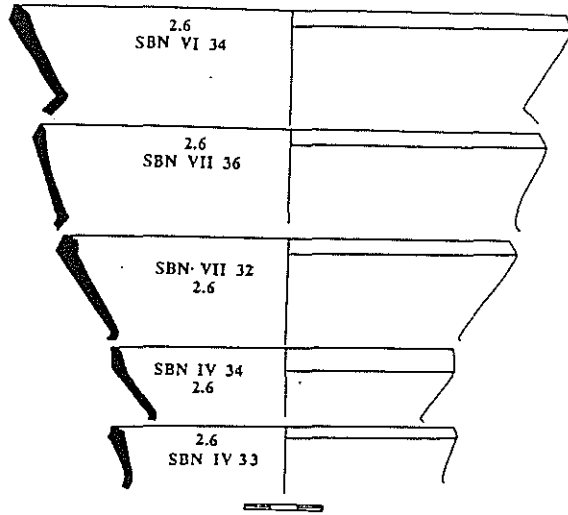


Figure 5.4 continued

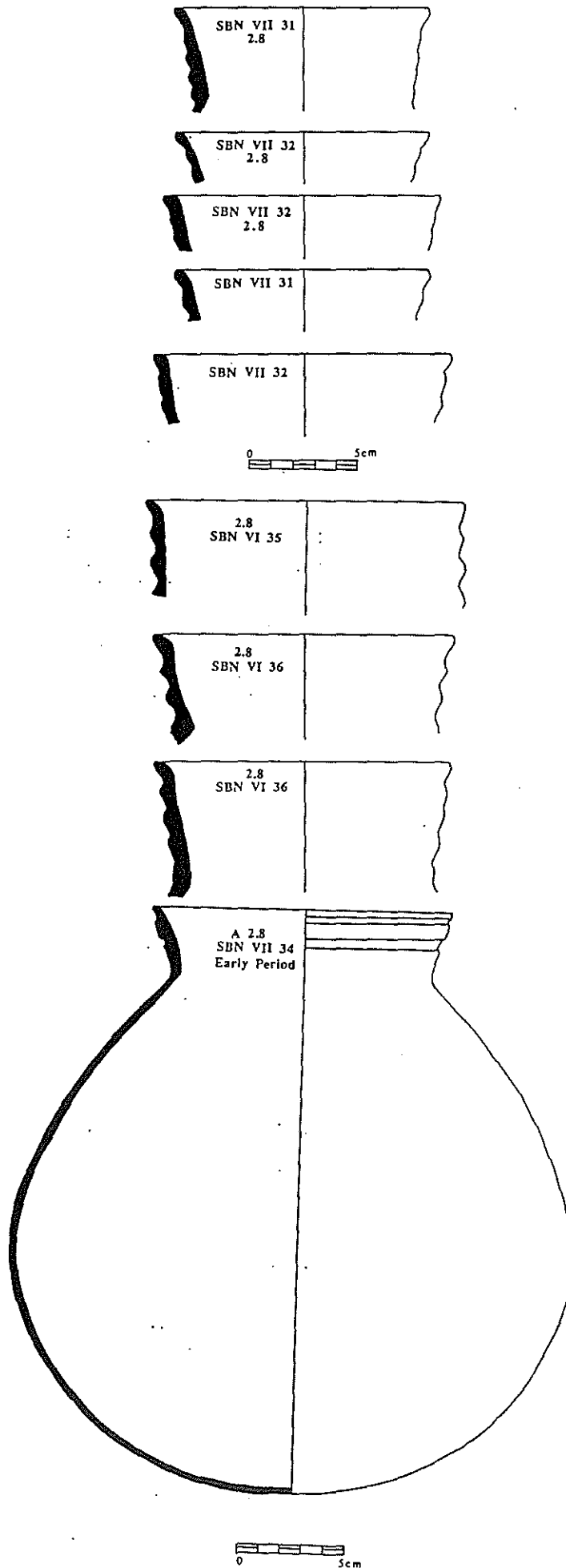


Figure 5.4 continued

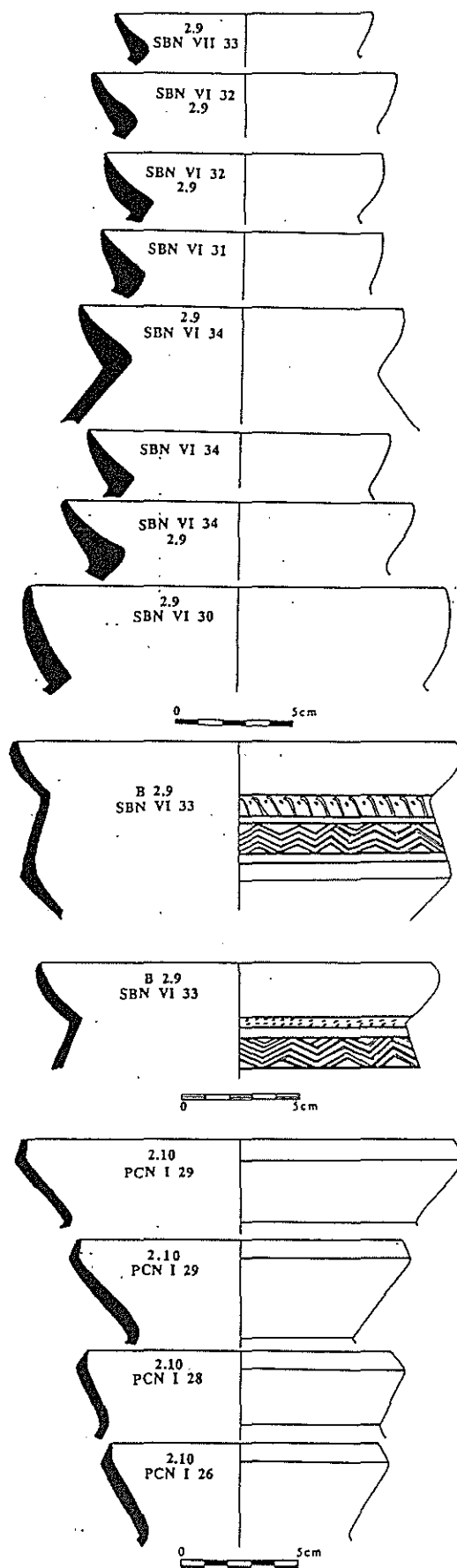


Figure 5.5
Rims category 3

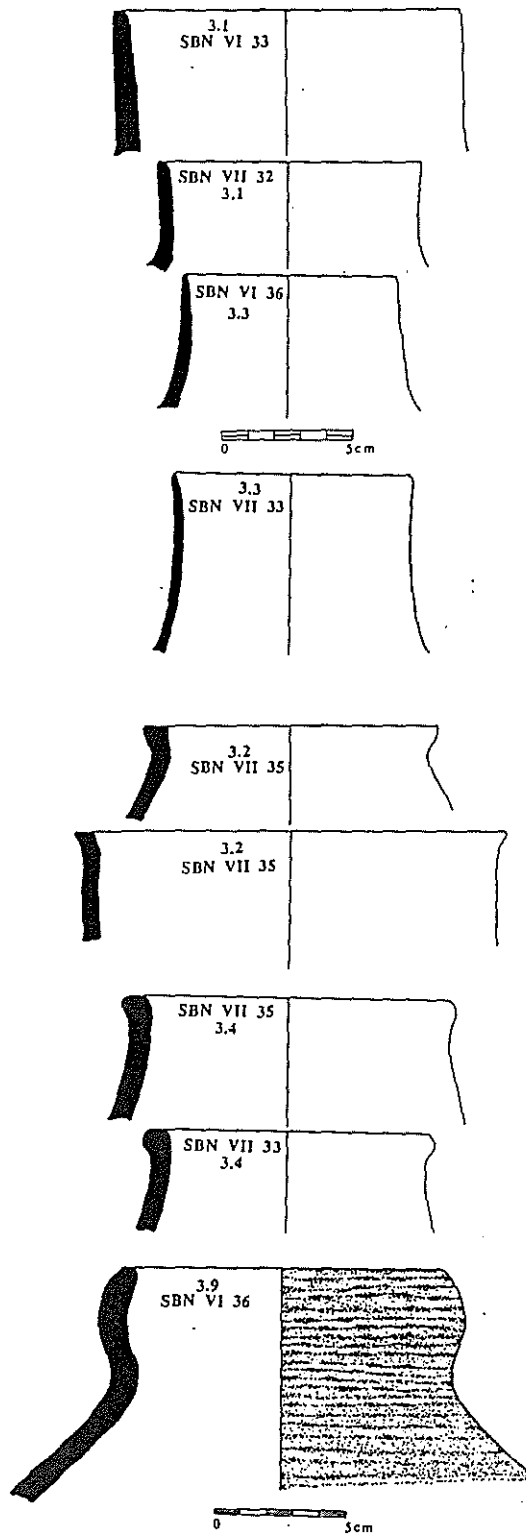


Figure 5.6
Rims category 4 and vessel form C

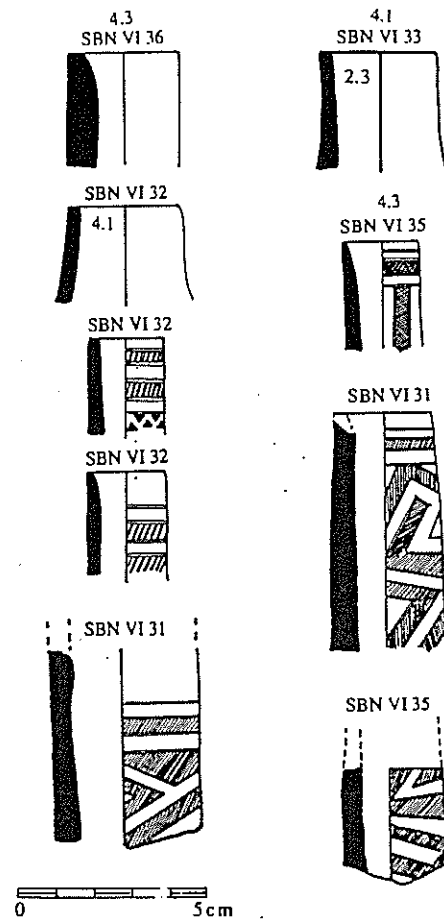


Figure 5.6 continued

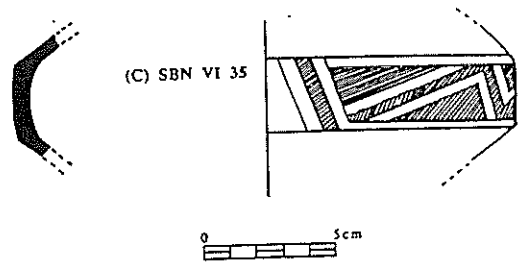
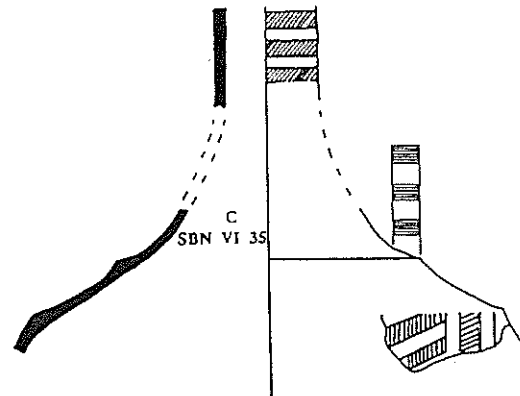
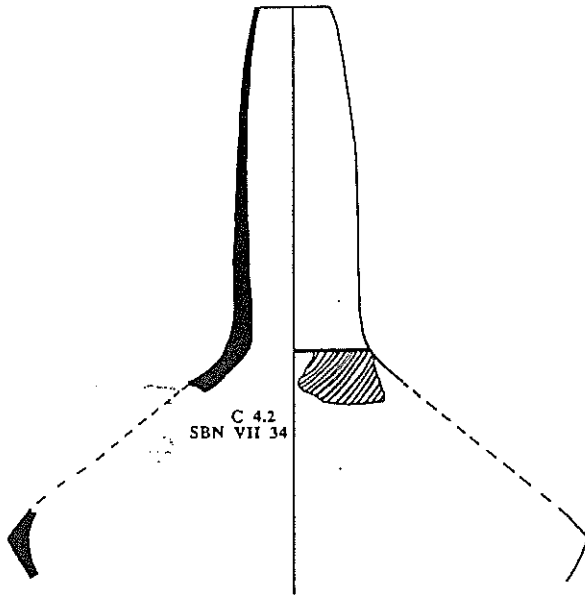
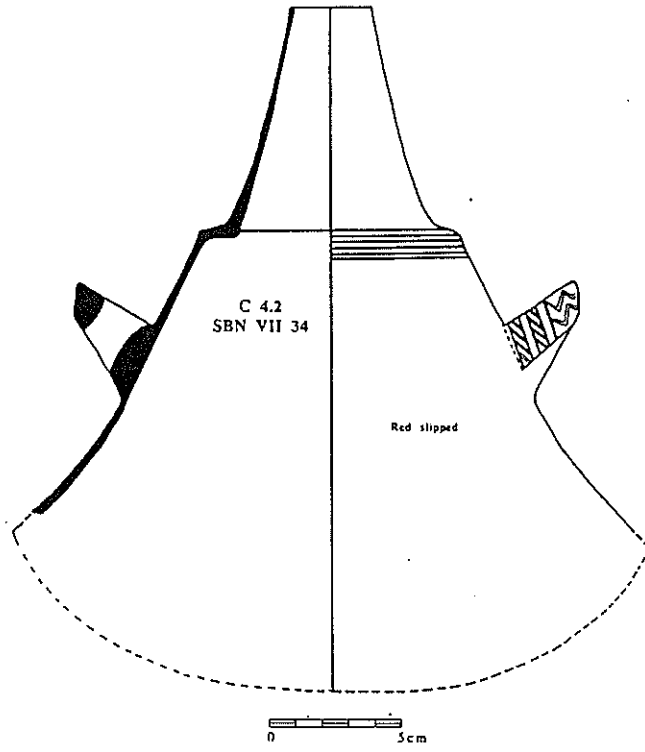


Figure 5.7

Lamps from the lower level of PCN I (Vessel form F) and vessel B 5.1

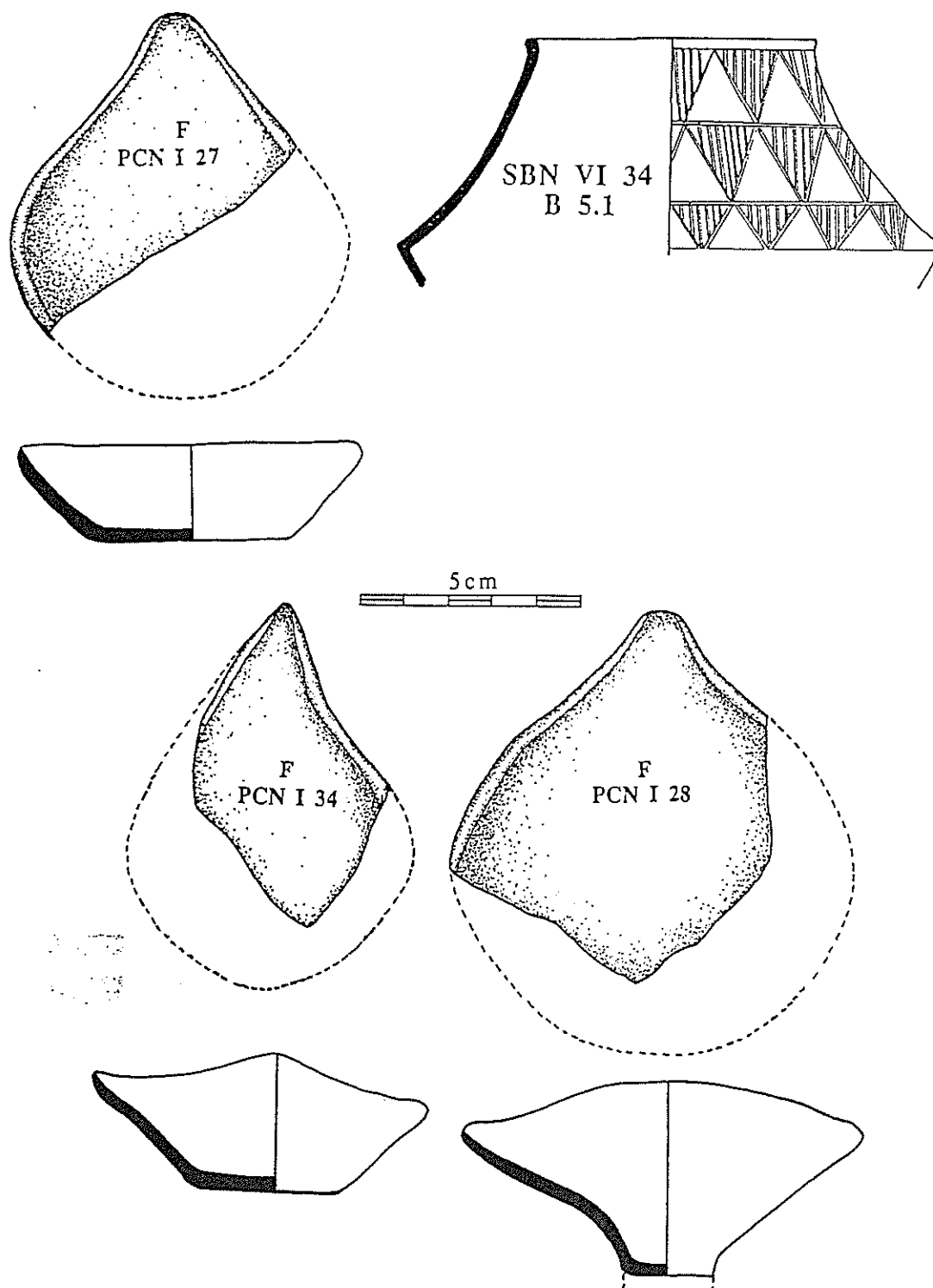


Figure 5.8

Pedestals with cut-out decoration (Vessel form G)

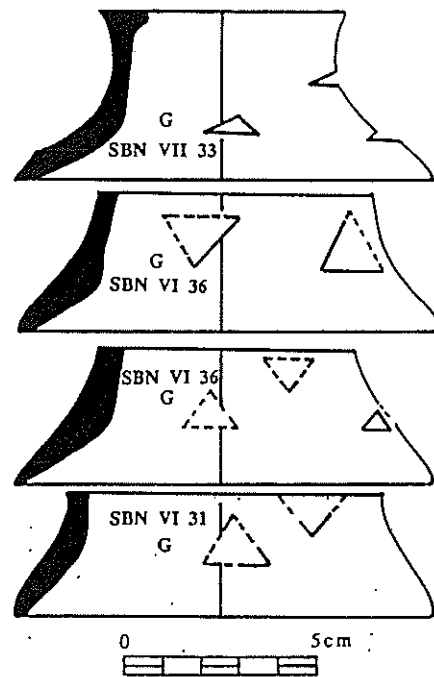
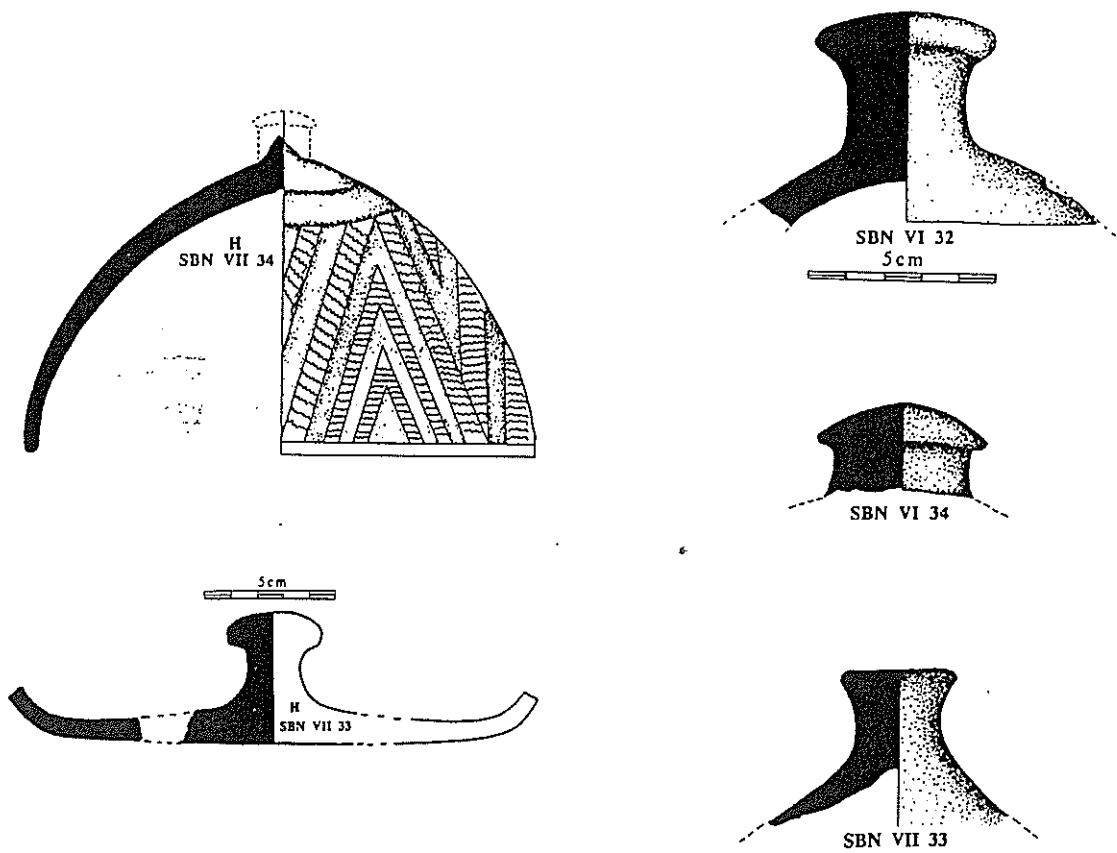


Figure 5.9

Lids and knobs (Vessel form H)



5.1.4 Decoration

As already noted, only 6% of the total of excavated sherds was decorated. Decoration was applied to rims, necks, shoulders, carinations, bodies and handles of vessels. 10 combinations of decorative techniques are recognised in the pottery assemblages; (i) incision, (ii) impression, (iii) notching on lips, (iv) red slipping, (v) burnishing, and (vi) applique. The major combinations of these techniques on individual sherds include; (i/ii) incision and impression, (i/iii) lip notching and incision, (ii/iii) lip notching and impression, and (i/iv) incision and red slipping.

(i) Incision can occur on the interiors or exteriors of rims, and on lips, necks, shoulders and bodies. Major incised motifs consist of 1. triangles, 2. triangles filled with incisions, 3. groups of parallel lines, 4. squares, 5. single and concentric circles, 6. cross-hatching, 7. meanders, 8. dashes, 9. punctations, and 10. regular or irregular lines (see figure 5.12). The triangle is the most common pattern. It should be noted that single examples of a incised swirling star on a rim and exterior curvilinear comb incision also occur (see figures 5.10 and 5.11). The latter has affinities with pottery from Oc-Eo.

(ii) Impressed decoration accounts for the largest number of decorated sherds; 73.2% in SBN IV, 89.1% in SBN VI, 86.3% in SBN VII and all decorated sherds in all other trenches including PCN I. Impressed decoration was applied to the interiors of rims, lips, and also to the exteriors of shoulders and bodies. Both carved and cord-bound paddles were used and patterns include triangles, squares, diamonds or parallelograms, and irregular squares (see figure 5.13). Impressed decoration also occurs on the flat lips of small bowls of vessel forms D and E, usually in the form of two rows of triangles (see figure 5.3). Impressed overall body decoration is also found on simple restricted vessels (vessel form A) with indirect everted rolled rims of type 2.7, a type common in the site of Gilimanuk in West Bali. As far as the Gilimanuk pottery assemblage is concerned, X-ray diffraction suggests that both this and the Sembiran local pottery are in general composed of similar minerals; dominantly plagioclase feldspar and magnetite/maghemite with minor haematite. Impressed decoration is very common in Gilimanuk (Soejono 1962:36; Santoso 1985).

(iii) Lip notching can occur on the indirect or direct rims of vessels. A simple tool seems to have been used for this technique.

(iv) Only a few red slipped sherds were discovered, all in the lower layers of

Sembiran IV, VI and VII. This type of decoration occurs on the interiors or exteriors of rims and also on body sherds. Forms with red slipping include small bowls and a flask from SBN VII (see figure). It also occurs on several indirect everted rims with 3-angled lips (Buidane type) (type 2.6); a type very common in Leang Buidane in Talaud and in the Atas Period in Madai Cave in Sabah (Bellwood 1988).

Painting also occurs on two sherds from SBN VII, one being part of a lid and the other a body sherd perhaps from a flask (see figure 5.6). The paint occurs in bands between incised lines. This type of decoration is also present in the Early Metal Period layers in Madai and the Tabon Caves.

(v) Burnishing is found on small bowls of vessel class D, on some indirect everted rims usually with lip notching (type 2.1 and on the long neck of a flask. Overall, it is fairly rare.

(vi) Finally, an appliqué band occurs on the neck of a single sherd; a fillet of clay was added by the potter and then subjected to fingertip impression.

The distribution of decorated body sherds per site and phases is as follows

Table 5.7 Distribution of decorated body sherds

Trenches	Layers	Spit	Incision	Impression	incision & impression
LATE PHASE					
BKH I	2	7	-	2	-
	-	14	-	1	-
	3	17	-	1	-
	-	19	-	2	-
SBN I	2	9	-	1	-
		10	-	2	-
		11	-	4	-
SBN II/III	2	3	-	2	-
SBN V	5	12	-	1	-
PCN I	2	3	-	1	-
	5	23	-	1	-
				18	
EARLY PHASE					
SBN IV	6	23	-	1	-
	7	27	-	2	-
		28	-	4	-
		29	1	2	-
		30	2	14	-
		31	13	8	-
		32	5	9	-
		33	23	38	-
		34	14	29	-
SBN VI	6	26	-	1	-
		27	-	1	-
		28	-	3	-
		29	-	9	-
	7	30	4	37	-
		31	23	72	2
		32	21	312	8
		33	30	365	3
		34	33	345	5
		35	15	193	12
		36	21	191	7
SBN VII	6	25	-	1	-
		28	-	6	-
		29	-	93	-
		30	-	65	-
	7	31	-	231	-
		32	26	441	-
		33	37	314	3
		34	26	325	-
		35	25	218	-
		36	10	170	-
		37	-	19	-
PCN I	6	24	-	1	-
		26	-	1	-
		33	1	1	-
		34	1	2	-
TOTAL :			331	3114	40

Table 5.8 Distribution of decorative patterns on grab samples of incised sherds from SBN IV, VI and VII counted and drawn by Ketut Gangga Suranadi, one of my students at Udayana University in Denpasar.

Decorative motif	SBN IV	SBN VI	SBN VII	Total	%
1.triangle	5	20	14	38	12.9
2.isosceles triangle	-	19	9	28	9.5
3.equilateral triangle	-	2	3	5	1.7
4.right angled triangle	-	13	8	21	7.1
5.ellipses aranged in a circle	2	9	3	14	4.7
6.meander	2	1	-	3	1
7.crossed lines	-	25	10	35	11.9
8.straight lines	27	15	30	72	24.5
9. circle and concentric circle	5	12	1	18	6.1
10. scroll	1	1	2	4	1.4
11. herring bones	2	1	5	8	2.7
12. wavy lines	2	4	4	10	3.4
13. broken lines	-	16	21	37	12.6
Total :	46	138	110	294	

Table 5.9 Distribution of decorative pattern on grab samples of impressed and burnished sherds from SBN IV, VI and VII counted and drawn by Ketut Gangga Suranadi.

Decorative pattern	SBN IV	SBN VI	SBN VII	Total	%
Square	8	922	384	1314	54.1
Rectangular	131	148	81	360	14.8
Diamond	7	239	226	472	19.5
Burnished	-	193	88	281	11.6
Total	146	1502	779	2427	100%

Figure 5.10
Sherd with swirling star decoration from SBN VI spit 36

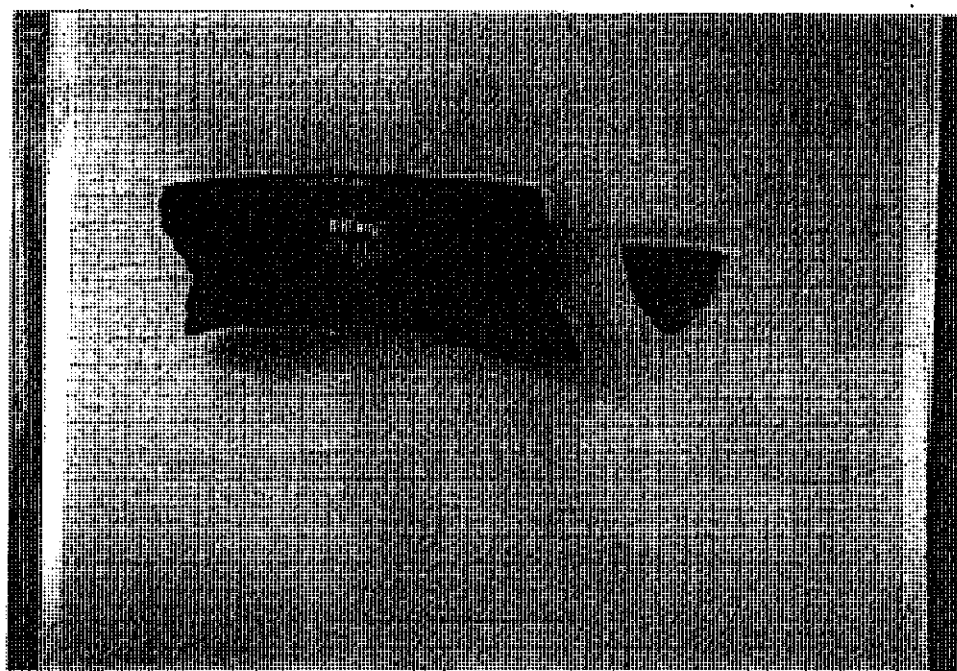


Figure 5.11
Sherd with comb incision from SBN VII spit 33

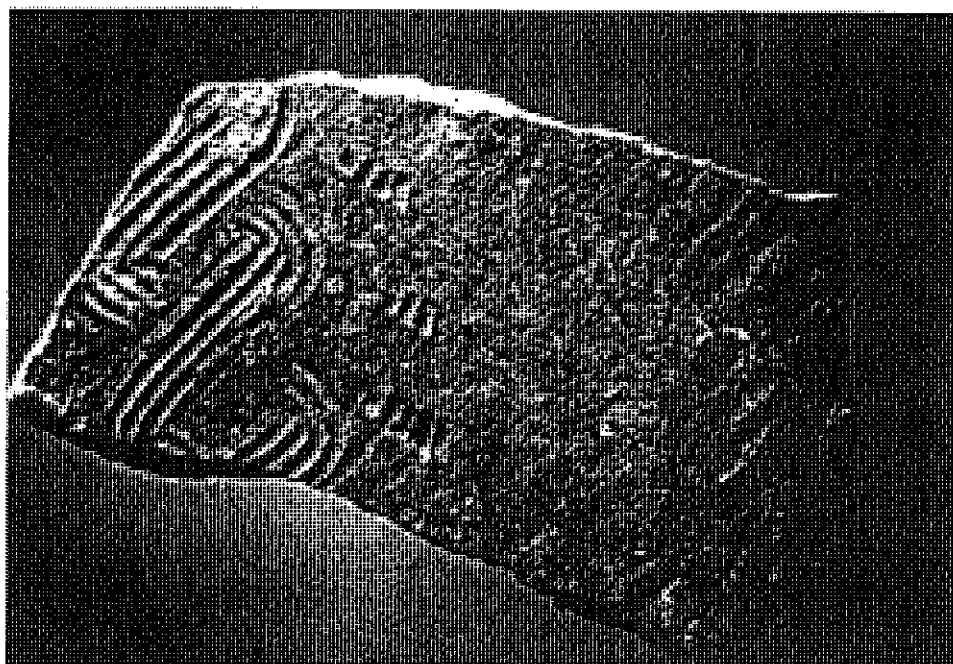
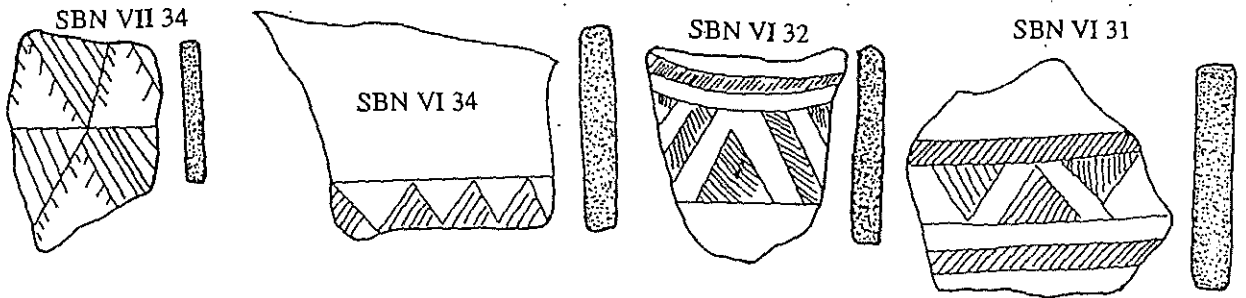
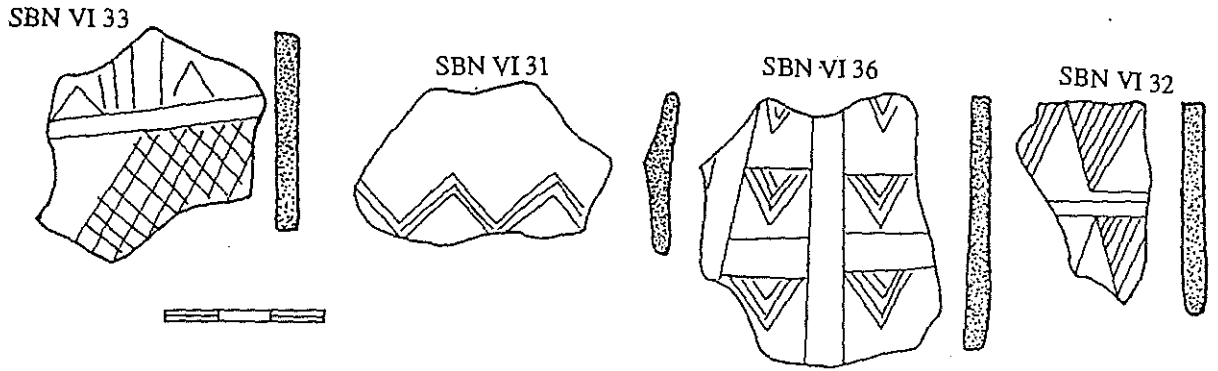


Figure 5.12
Incised decoration
1). Triangle



2). Ellipses

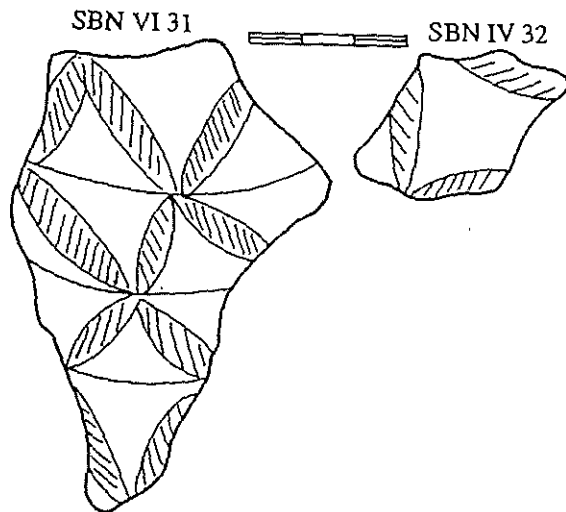
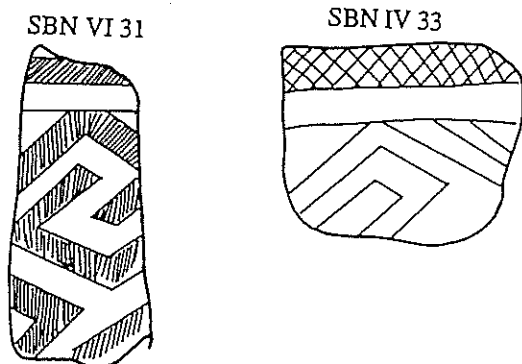


Figure 5.12 continued

3). Meanders

Flask neck



4). Cross and straight lines

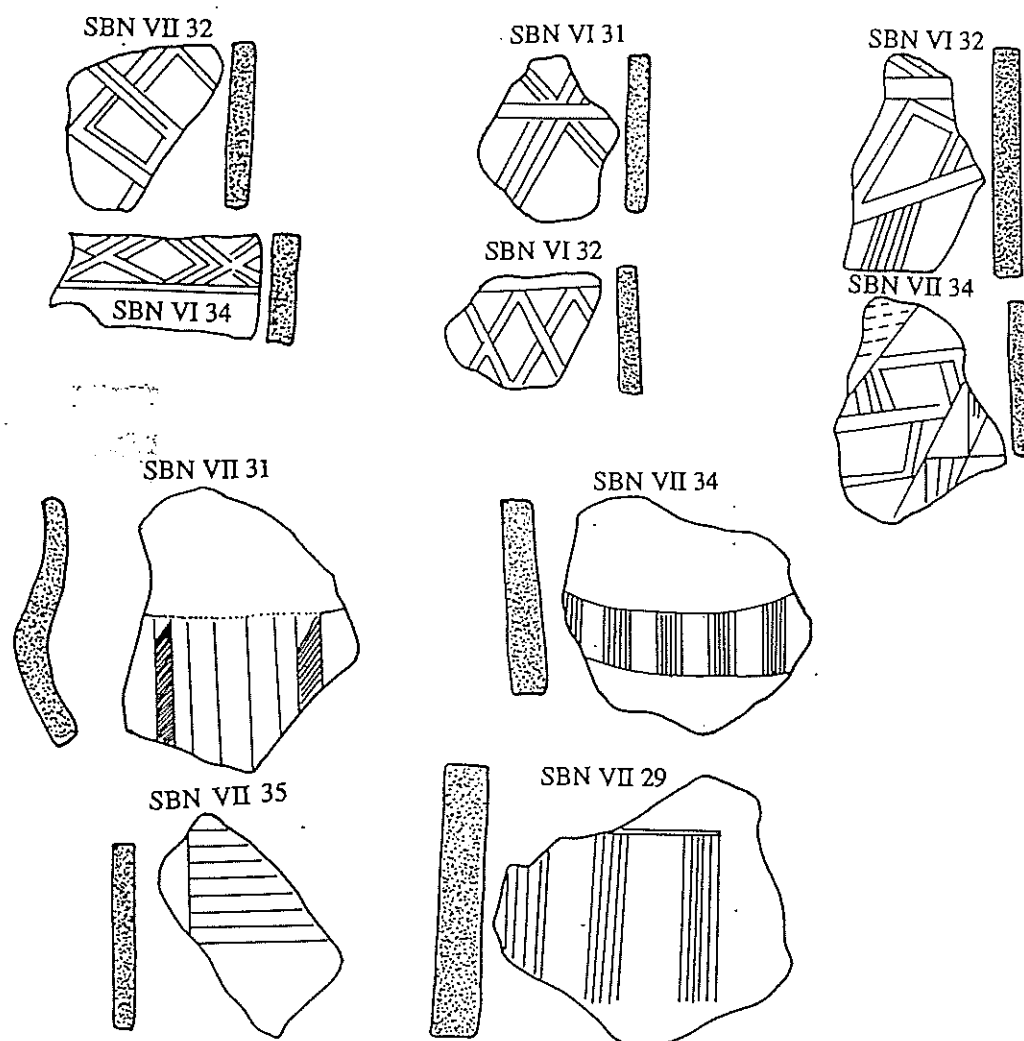


Figure 5.12 continued

5). Circle and concentric circle

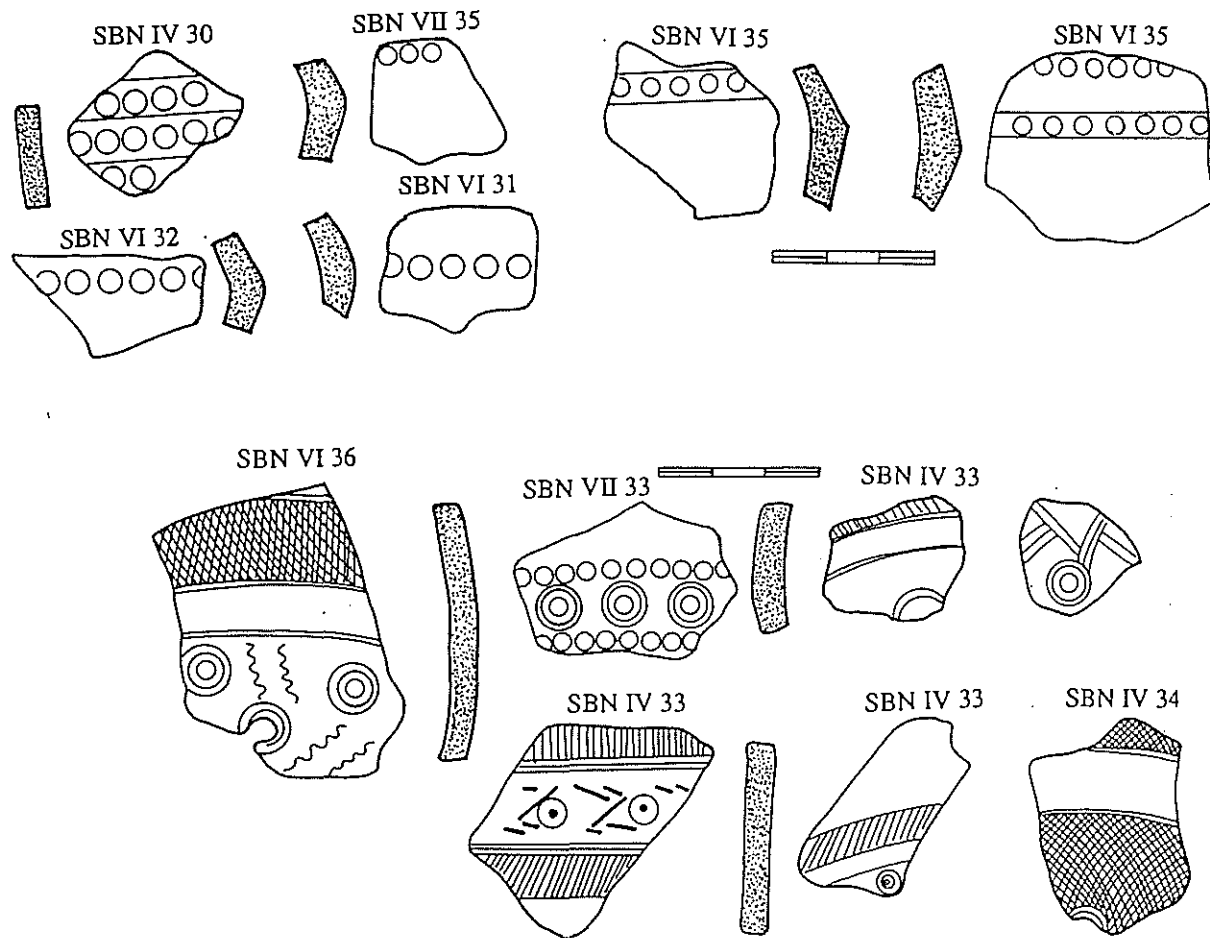
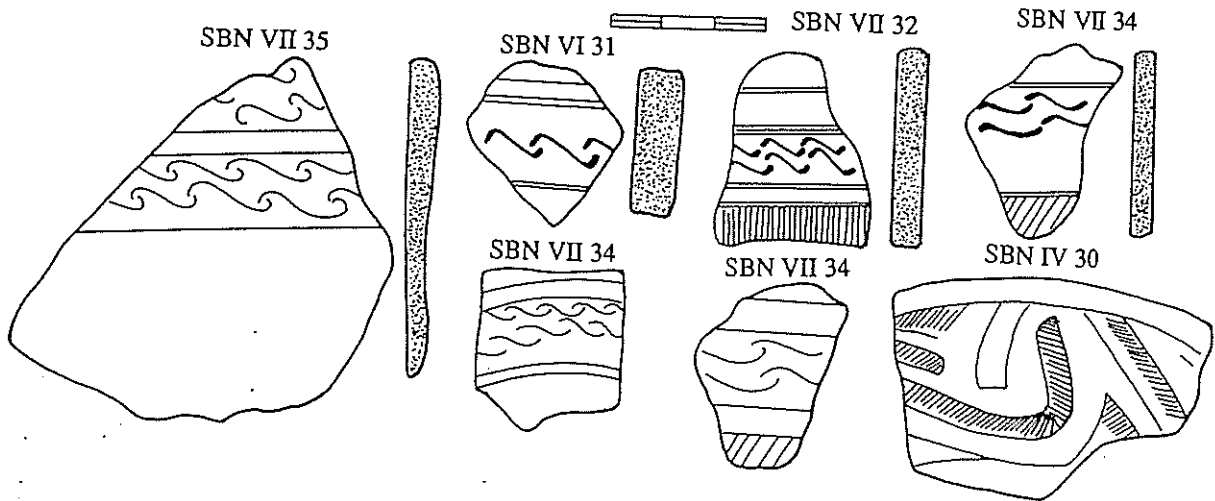


Figure 5.12 continued

6). Scroll



7) Herring bones, wavy and broken lines

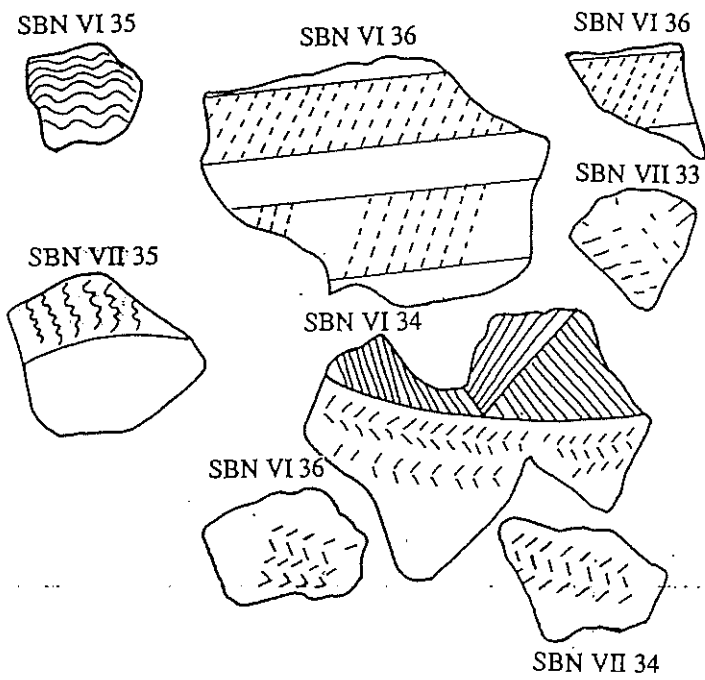


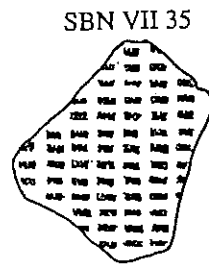
Figure 5.13

Impressed decoration

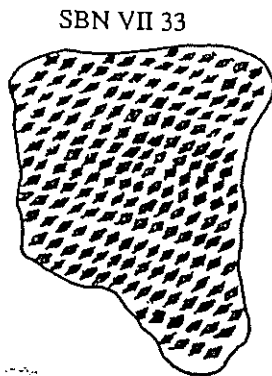
1). Square



2) Rectangular



3). Diamond



5.1.5 Vessel shapes, rim forms and decoration combinations

As shown in table 5.5, the majority of the reconstructible vessels come from the lower layers of SBN IV, VI, VII and PCN I. This section will describe each type of these vessels with their rims and decorations.

Vessel form A : 40 presumed simple restricted vessels were recognized from the Sembiran assemblage. 4 rim categories occur on these vessels, including; 2.1 (indirect everted rim with rounded lip [35% of the total example]), 2.3 (indirect everted rim with tapered lips [7.5%]), 2.7 (indirect everted rolled rim [Gilimanuk type, 37.5%]) and 2.9 (internally hollowed rim [20%]) (see figure 5.4).

Decorative techniques recognized on these vessels include incision, impression, lip notching and combinations of these. Carved paddle impression is very common, particularly on those vessels with rolled rims (type 2.7) (see table 5.10 below). Incision and lip notching mostly occur on the vessels with rim type 2.1. The distribution of vessel form A with rim forms and decoration in the Early Phase by trenches is as follows:

Table 5.10 Distribution of Vessel form A with rim forms and decoration

Trenches	Decoration	Rim categories				Total
		2.1	2.3	2.7	2.9	
SBN IV	Plain	2	-	-	-	2
SBN VI	Plain	-	-	-	7	7
	Incision	2	-	-	-	2
	Impression	2	1	10	-	13
	Lip notching	4	-	-	-	4
	Notching & Incision	1	-	-	-	1
SBN VII	Plain	1	-	-	-	1
	Impression	-	2	5	1	8
	Lip notching	1	-	-	-	1
PCN I	Plain	1	-	-	-	1
Total		14	3	15	8	40

Vessel form B : Only 3 definite examples of this type were recognized in the assemblage. All vessels are decorated with incision, and triangles are the most common motif (see figure 5.4).

Vessel form C : One almost completely reconstructed vessel form C came from SBN VII spit 34. The whole body of this flask was decorated with red slip, except for the handle. Incision was also applied to the upper part of its body and handle. Seven rim sherds which possibly belong to flasks or bottles were also decorated with incision, impression and burnishing. One carinated body sherd from SBN VII spit 35 which was probably a part of a flask was decorated with incision, and bands between the incised decoration were painted red (see figure 5.6 bottom right).

Vessel form D: This type has the largest number of examples reconstructible from the Sembiran assemblage. These vessels have 5 types of direct everted rims, with rounded lips (1.1), flattened or bevelled lips (1.2), tapered lips (1.3), thickened lips (1.4) and abruptly out-turned lips (1.5)(see table 5.6).

56 (50.45%) of the 111 partially reconstructible vessels are plain and 55 (49.55%) are decorated. Decorative techniques include incision, impression, red slipping, burnishing and combinations of these. Incision is the most common (30.4%), followed by impression (17.9%), lip notching (14.2%), red slipping and burnishing (each 10.7%). Except for red slipped and burnished, other decorative techniques were applied to the flat upper surface of the lips. The distribution of vessel form D by trenches is as follows:

Table 5.11 Distribution of Vessel form D

Trenches	Decoration	Rim categories					Total
		1.1	1.2	1.3	1.4	1.5	
SBN IV	Plain	1	2	-	-	-	3
	Incised	1	1	-	-	-	2
	Lip notched	1	-	-	-	-	1
SBN VI	Plain	-	7	5	4	1	17
	Incised	-	2	-	7	4	13
	Impressed	-	-	-	5	-	5
	Incised & Impressed	-	1	-	2	-	3
	Red slipped	1	-	-	1	-	2
	Burnished	-	1	4	-	-	5
	Lip notched	1	-	1	1	-	3
	Lip notched & Impressed	-	-	-	1	-	1
	Lip notched & red slipped	1	-	-	-	-	1
	SBN VII	Plain	3	10	5	2	-
Incised		-	2	-	1	-	3
Impressed		-	1	-	4	-	5
Red slipped		-	1	2	1	-	4
Burnished		-	-	1	-	-	1
Lip notched		-	1	2	1	-	4
Lip notched & incised		-	-	-	2	-	2
Lip notched & impressed		-	-	-	2	-	2
PCN I	Plain	1	2	-	-	-	3
	Incised	-	1	-	-	-	1
Total		10	32	20	34	5	101
		9.9%	31.7%	19.8%	33.7%	4.9%	100%

Vessel form E: A total of 22 reconstructed vessels of this type can be recognized. Three rim types occur on these vessels, including 1.1 (direct rim with rounded lip), 1.2 (direct flattened or bevelled lip) and 1.4 (direct gradually thickened lip). 12 of these vessels are plain and the rest are decorated with incision, impression, burnishing or combination of these. The distribution of these vessels by trenches is as follows:

Table 5.12 Distribution of vessel form E by trenches

Trenches	Decoration	Rim categories				Total
		1.1	1.2	1.3	1.4	
SBN IV	Plain	-	1	-	-	1
SBN VI	Plain	2	4	1	-	7
	Impression	-	3	-	1	4
SBN VII	Plain	2	4	-	-	6
	Impression	-	3	-	1	4
	Incision & impression	-	1	-	1	2
PCN I	Plain	2	-	-	-	2
	Total	6	16	1	3	26

Vessel form F: Three almost complete lamps were found in the lower layer of PCN I (see figure 5.7).

Vessel form G: 4 pedestals with cut-out triangular decoration were recognized from the Sembiran assemblage (see figure 5.8).

Vessel form H: Two almost completely reconstructed lids can be recognized from SBN VII. One specimen is decorated with incision and the bands between the decorative patterns are painted red. The plain lids look like saucers with central knobs (see figure 5.9). This type of lid also occurs in Arikamedu (Wheeler, et al 1946: 66: fig 23).

5.2 Early Period Comparisons

The pottery assemblages from the Early Period in Sembiran and Pacung show great variation in terms of form and decoration. In general, they are similar in vessel form and decoration to other contemporary pottery assemblages, such as those from Gilimanuk in northwest Bali (Soejono 1962:36; Santoso 1985), Buni in west Java (Sutayasa 1972: 182; Walker and Santoso 1977; Summerhayes 1979), Leang Buidane in the Talaud Islands (Bellwood 1976; 1980), the Madai and Baturong sites in Sabah (Bellwood 1988), and the Tabon (Fox 1970), Kalanay (Solheim 1959: 160-161; 1964: 14-15) and Sa-Huynh (Solheim 1959: 97-108) complexes of the Philippines and Vietnam. The shallow vessels of forms D and E are often very similar to the forms of the Indian Rouletted ware, which they might have been copying. These forms seem to be rare in other Island Southeast Asian sites of this period.

Like Sembiran, the Gilimanuk assemblage includes globular vessels of form A with everted rims, bowls and platters of form D, open bowls on pedestals, flasks and lids. The decoration techniques recognised on Gilimanuk pottery include impression, incision, red slipping, burnishing and appliqué (Santoso 1985; 47-48, fig.1). Some similarities also occur in rim and lip forms between Gilimanuk and Sembiran, particularly with respect to round lips (Sembiran rim type 1.1 or 2.1), flattened or bevelled lips (Sembiran 1.2 or 2.2), thickened lips (Sembiran 1.4 or 2.4), out-turned lips (Sembiran 1.5 or 2.5), rolled lips (Sembiran type 2.7), and concave interiors (Sembiran rim type 2.9)(Santoso 1985: 54, fig.4).

Both the forms and decoration of the Gilimanuk pottery are thus very similar to the Sembiran pottery range. Solheim (1964: 205) has pointed out that the Gilimanuk pottery also has some similarities with the Sa-Huynh and Kalanay pottery traditions.

Nine C14 samples are available from habitation layers in Gilimanuk (Bronson and Glover 1984:41). The 1 sigma date ranges are from 195 BC to AD 425. Two samples from sector XX, square A, between 60 and 70 cm in depth, are dated to 1725 ± 80 BP (AD 210-425 calibrated age at 1 sigma range, University of Washington Calibration programme) (GrN-7125) and 1650 ± 55 BP (AD 240-450) (GrN 7126). Two samples from sector XXI, square A, between 110 and 120 cm in depth, are dated to 1940 ± 115 BP (40 BC-AD 85) (GrN-7127) and 1859 ± 55 BP (AD 30-225) (GrN 7128). Five samples from sector XXII squares A, B and C, between 70 and 160 cm in depth, are dated to 2020 ± 165 BP (195 BC- AD 65) (GrN-7129), 2000 ± 70 BP (155 BC - AD 40) (GrN-7130), 1965 ± 50 BP (35 BC-AD 55) (GrN-7131), 1800 ± 85 BP (AD 40-335) (GrN-7132), and 1890 ± 100 BP (10 BC-AD 230) (GrN-7133).

These dates from sectors XXI and XII in Gilimanuk are approximately contemporary with the Early Period pottery assemblages at Sembiran. It should be noted that Rouletted Ware has never been recognised from Gilimanuk, although thousands of glass beads have been found there.

The Early Period pottery assemblages from Sembiran also share many common elements with the Buni pottery complex in West Java. The Buni assemblages include the same vessel forms as Sembiran and Gilimanuk (Sutayasa 1972: 182-83; Walker and Santoso 1977: 228; Summerhayes 1979: fig. 1.6-1.19). Decorative techniques on the pottery include impression, incision, red slipping, burnishing, and cut-out decoration on pedestals.

Two fragmentary Rouletted ware vessels have also been discovered in the village of Kobak Kendal in the Buni region, and one complete Rouletted vessel was found in the village of Cibutak (Walker and Santoso 1977:230, fig.1). Two C14 dates are available from the site of Pejaten, which has pottery of Buni type. These are 2550 ± 200 BP (ANU 1520) and 1830 ± 250 BP (ANU 1519)(Sutayasa 1979: 68). As with Gilimanuk, these dates also overlap with the Early Period at Sembiran.

In terms of form and decoration the Early Period pottery assemblages from Sembiran also share some common elements with the Plawangan pottery assemblages from Northern Central Java. The Plawangan assemblages include many globular vessels and bowls (Sukendar and Awe 1981: 22-23, photos 9, 12 and 16). Decorative techniques on the pottery consist of impression, incision and applique' (Sukendar and Awe 1981:22-23, figs: 25-28, 30-31).

The Early Period pottery from Sembiran also resembles that from Leang Buidane in the Talaud Islands. The vessel forms from Buidane include restricted globular and carinated vessels, open carinated vessels, flask and lids. But there are few shallow bowls or platters of the generalised Rouletted ware shape, and no saucer lids. Decorative techniques on the Buidane pottery consist of red slipping, incision, impression, and notching on lips (Bellwood 1976; 1980). As already noted, the Buidane class 1 rim (Bellwood 1980:74) is also found in Sembiran (here termed rim type 2.6). Bellwood (1976: 278; 1980:69) originally dated the Buidane pottery assemblages between AD 700 and 1200, but now prefers a date of c 200 BC-AD 500 on the basis of dates for the similar assemblages from Madai in Sabah.

The Madai assemblage, particularly that from layers 10 to 4 in Agop Atas Cave (Bellwood 1988: 187), has pottery very similar to Leang Buidane. The same vessel shapes occur and Buidane class 1 rims (Sembiran type 6) were also common at Madai (Bellwood 1988: 175). Red slipping, incision, impression and lip notching are again the most common decorative techniques in Madai pottery. Bellwood (1988: 187) suggests that the date of the Mature Atas Phase at Madai falls between 200 BC and AD 500, which is again contemporary with the Early Period at Sembiran.

There are also relationships between the pottery assemblages from Sembiran and those of the Tabon Caves on Palawan in the Philippines. Tabon vessel forms are similar to those from Madai and Leang Buidane. Incision, impression, lip notching and painted decoration are all common (Fox 1970: fig 26, fig 28), with carved paddle impressed decoration as the most common accounting for 21% of the "Late Neolithic" pottery

assemblage from Manunggul Chamber A, and 41% of the Metal Age pottery assemblage from Duyong Cave (Fox, 1970, table VII). As already noted, the percentages of impressed decoration in the Bali assemblages are higher, being between 73.2 and 100% of the total decorated sherds in each trench.

Tabon incised motifs, like those of Sembiran, emphasised triangles, cross-hatching, radiating lines, circles, diamonds and curvilinear scrolls. Painting also occurred on a few sherds between incised lines (Fox 1970: 87). This type of decoration also occurred in Sembiran (see above), as in the Agop Atas assemblage from Madai in Sabah.

The Sembiran Early Phase pottery also has similarities with the Kalanay pottery complex in the central Philippines (Solheim 1964: fig 2 and 3). Decorative techniques again consist of incision, impression, appliqué, and cut-out designs. The incised patterns include paired diagonals and borders, triangles, curvilinear scrolls and triangles, rectangular scrolls and fields of punctuation. Cutout triangles in ring stands or pedestals, distinctive for the Bagupantao pottery of the Kalanay complex, also occur in Sembiran. The rectangular meander, which is another distinctive feature of the Kalanay complex, occurs in Sembiran but not in the Tabon Caves.

Some similarities also exist in terms of vessel shapes and decoration between Sembiran and the Sa-Huynh pottery of Southern Vietnam. Sa-Huynh vessel shapes include A, B, D and E (Bellwood 1978: 192, fig 7.29). Decorative techniques consist of incision with triangular patterns, and impression. Paddle impressed (not cord-marked) decoration is the most common element in both the Kalanay and Sa-Huynh assemblages (see Solheim 1959: 103: fig 1, 2). However, the Sembiran and Pacung Early Phase assemblages differ from those listed above in that much of the local pottery follows Indian forms, particularly the bowls and platters of types D and E, and the saucer-shaped lids. All other forms, including the flasks, are probably of local Early Metal Phase origin.

Solheim (1959:186) stated that the wide distributions of the vessel forms and decoration typical of the Kalanay and Sa-Huynh complexes in Southeast Asia was not a result of trade, but of the movement of people, particularly through intermarriage. He also (Solheim 1964a: 206; 1964b:384) argued that the pottery had a common origin and that it was originally associated with the spread of Austronesian speakers in Southeast Asia and the western Pacific. Bellwood (1985: chapters 4 and 9) also points out that this pottery tradition belonged to Austronesian speaking people, although he dates it to after 1500 BC and thus long after the initial dispersal of Austronesian speaking groups into the region. The similarities, at least in the Early Metal Phase, probably represent trade and

contact rather than colonization.

As already noted, Bali was involved in the inter-island trade of copper and tin during the Early Metal phase. It is possible that pottery was another commodity which was also traded during this period. X-ray diffraction and neutron activation analyses indicate that the non-Indian pottery assemblages from Sembiran can be divided into several groups in terms of composition. The results of XRD and NAA are discussed in the following sections.

5.3 X Ray Diffraction Analysis of Balinese pottery

As already discussed in the previous chapter, a number of excavated sherds have been subjected to X-ray diffraction analysis (XRD)(see Appendix A), which provides information on the mineral composition of sherd fabrics. The XRD results indicate that the samples form the following groups;

- 1) The Rouletted Ware from Sembiran, Arikamedu and Anuradhapura (XRD sample nos 1 - 5 in appendix A).
- 2) The "other imported sherds" (XRD sample nos 6-8).
- 3) The black slipped sherd with the Kharoshthi graffito (XRD sample 9).
- 4) Another black slipped sherd (XRD sample 12) with a coarse interior fabric similar to the sherd with the Kharoshthi character (sample 9).
- 5) A number of sherds (XRD samples 10, 11 and 13-18) of presumed local Balinese origin from Sembiran, Bangkah and Gilimanuk, and a series of seven soil samples from all layers in Sembiran IV.

The Rouletted Ware (XRD sample nos 1-5) contains dominantly quartz with minor traces of mica, plagioclase feldspar, dolomite and calcite. The other imported sherds (XRD sample nos 6-8) also contain dominantly quartz, except for the surface slip of sample 7. This group also differs from the Rouletted Ware in having rutile, but no mica or feldspar. The sherd with the Kharoshthi characters (XRD sample no 9) and the coarse black slipped sherd (XRD sample 12) fall together, although another reading for the graffito sherd (XRD sample 9a) clearly differs. These sherds (XRD sample nos 9 and 12) are also different from the Rouletted Ware, but they still can be grouped close to the other imported sherds. The sherd with the applique' (XRD sample 11) may also fall in this group, which seems to be defined by a ratio of relatively high feldspar to low quartz.

In terms of XRD, the Rouletted Ware, the graffito sherd with Kharoshthi characters and other imported sherds are very different from the local Balinese sherds.

The local sherds, mostly from Sembiran, Bangkah and Gilimanuk, contain dominantly plagioclase feldspar, magnetite, and minor haematite. The results of XRD on these sherds are similar to those on soil samples from the seven layers in SBN IV (see appendix A). It can be argued that these sherds, which contain very little quartz, were made locally in northeast Bali.

5.4 Neutron Activation Analysis (NAA)

The XRD and NAA results present very useful compositional data for the pottery assemblages from northeastern Bali and provide valuable complementary information. NAA, unlike XRD, provides information about a range of trace elements rather than major minerals. In the case of the samples analysed here the NAA results allowed further subdivisions which would not have been visible in the XRD results alone.

NAA has been used very successfully by many scholars to determine the origin of potting clay. For instance, it has been used to determine the sources of Late Bronze Age potsherds from Knossos and Mycenae (Harbottle 1970). Hancock (1984) also used this method to determine the source of clay for Roman pottery found in Cologne. He found that the source of clay used for the Cologne pottery derived from Frechen, which is 15 km west of Cologne. Recent studies on Okinawa pottery using NAA suggest that at least three different sources of clay are represented in the island's assemblages. (Takamiya *et al* 1990).

Twenty six sherds in this project have been subjected to neutron activation analysis (NAA) (see appendix B). Percentage by weight or parts-per-million values for 23 or 24 rare elements were determined for each sherd.

The results were then analysed statistically by average linkage cluster analysis and principal components analysis. The average linkage cluster analysis indicates that the sherds can be divided into two groups. Group 1 consists of sherds 1 to 10 plus 12, 13, 14 and 22 (see figure B.1). Sherds 1 to 8 are Rouletted Ware from Anuradhapura, Arikamedu and Sembiran (see appendix B). Sherd 9 is an orange Indian sherd, but not Rouletted Ware, from Sembiran. Sherds 10, 12 and 22 are black slipped sherds from Sembiran, and samples number 13 and 14 are sherds with a resin glaze, also from

Sembiran. Principal components analysis also shows that these samples belong to one broad group (see figure B.2). As already noted, XRD also suggests a similar result in that the Rouletted, black slipped and resin glazed sherds belong to a group which contains dominantly quartz.

NAA group 2 consists of sherds 11, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25 and 26 (see appendix B). The graffito sherd with Kharoshthi characters (NAA sample 11) is different from the Rouletted group and falls very close to presumably local Balinese sherds, although it differs from them in its XRD signature. In terms of Average Linkage Cluster Analysis, NAA sample nos 17, 18, 23 and 24 form a distinctive group (see dendrogram). NAA sample nos 17 and 18 are corrugated rim sherds from SBN VI. Sample 23 is a modern Banyuning sherd and sample 24 is a rolled rim sherd (Gilimanuk type). These sherds possibly come from one or closely related sources, and to have been locally made in Bali, perhaps near Banyuning. Principal components analysis indicates that sample numbers 15, 21 and 25 also belong to one subgroup (see figure B.2), but the rest do not form a coherent group. Sample 19, the bottle rim with red-slipped decoration, is of a type very widespread in the Early Metal Phase in Southeast Asia, and was perhaps manufactured at a limited number of places. NAA sample 20, the Buidane type rim, could have been derived from Sulawesi or Borneo where this type of rim is very common. A rim sherd with an incised swirling star motif (NAA sample 26) separates widely from all the others in the cluster and principal component analyses. These results thus suggest that the Sembiran "local" pottery probably came from a number of Indonesian sources, perhaps from other islands such as Java and Sulawesi. These XRD and NAA results are presented in more detail in appendices A and B.

Table 5.13

Table of concordance in the numbering of the XRD and NAA samples

N A A Samples		XRD Samples	
Sample No:	Site	Sample No:	Site
1 Rouletted Ware	Anuradhapura	5	Anuradhapura
2 Rouletted Ware	Anuradhapura	5	idem
3 Rouletted Ware	Arikamedu	2	Arikamedu
4 Rouletted Ware	Arikamedu	3	idem
5 Rouletted Ware	Karaikadu	-	-
6 Rouletted Ware	Sembiran VI	-	-
7 Rouletted Ware	Sembiran IV	1	Sembiran IV
8 Rouletted Ware	Pacung I	-	-
9 Orange Indian sherd	Sembiran VII	-	-
10 Black slipped sherd	Sembiran VII	7	Sembiran VII
11 Graffito sherd	Sembiran VII	9	Sembiran VII
12 Black slipped sherd	Sembiran VII	12	Sembiran VII
13 Resin glazed sherd	Sembiran VII	6	Sembiran VII
14 Resin glazed sherd	Sembiran VII	8	Sembiran VII
15 Pedestal sherd (vessel form G)	Sembiran VII	-	-
16 Black burnished bowl	Sembiran VI	-	-
17 Rim type 2.8 (red)	Sembiran VI	-	-
18 Rim type 2.8 (brown)	Sembiran VI	-	-
19 Rim type 4.1 (bottle rim)	Sembiran IV	-	-
20 Rim type 2.6(Buidane type rim)	Sembiran VII	-	-
21 Local sherd	Sembiran IV	-	-
22 Coarse black slipped ware	Sembiran VII	-	-
23 Banyuning modern sherd	Banyuning/Bali	-	-
24 Rim type 2.7 (Gilimanuk type)	Sembiran VI	-	-
25 Rim sherd with stamped lip (rim type 1.2)	Sembiran VII	-	-
26 Rim sherd with incised motif (rim type 2.1)	Sembiran VII	-	-
-	-	4 Rouletted Ware	Arikamedu
-	-	10 Sherd with comb incision	Sembiran VII
-	-	11 Sherd with applique	Sembiran VI
-	-	13 Presumed local Balinese sherd	Sembiran IV
-	-	14 Presumed local Balinese sherd	Sembiran IV
-	-	15 Presumed local Balinese sherd	Sembiran VII
-	-	16 Presumed local Balinese sherd	Bangkah I
-	-	17 Presumed local Balinese sherd	Gilimanuk
-	-	18 Presumed local Balinese sherd	Gilimanuk
-	-	19 Soil samples	Sembiran IV

Chapter 6

SMALL FINDS

Apart from pottery, other artifacts discovered in the excavations in northeastern Bali include beads, a fragment of a mould used during bronze drum manufacture, and metal objects (see chapter 3). These artifacts will be described in the following sections.

6.1 Beads

A total of five hundred and one beads of glass, two of carnelian and one of gold was found in the Early Period layers of SBN IV, VI and VII. These beads were found in association with the Indian sherds and they tended to be concentrated close to the burials in SBN VII. It is likely, therefore, that many of them functioned as burial goods, although none were observed to be in situations which could make placement on or with the dead a certainty. Their distributions are as follows;

Table 6.1 Sembiran: Distribution of beads by trench and spit

SITE	Spit by 10 cm depth	G L A S S							Stone	Gold
		C o l o u r s								
		a	b	c	d	e	f	g		
SBN IV	31	7	-	-	-	-	-	-	-	-
	32	3	-	-	-	-	-	-	-	-
	33	6	1	-	-	-	-	-	-	-
	34	7	-	-	-	-	-	-	-	-
		23	1	0	0	0	0	0	0	0
SBN VI	28	-	-	-	-	-	-	1	-	-
	30	4	-	-	2	-	-	-	-	-
	31	10	1	1	-	-	1	-	-	-
	32	11	-	-	-	-	-	-	-	-
	33	13	2	-	1	-	-	1	-	-
	34	28	5	2	-	-	-	-	-	-
	35	22	4	1	-	-	-	-	-	-
36	3	10	1	-	-	-	-	-	-	
		91	22	5	3	0	1	2	0	0
SBN VII	28	-	1	-	1	-	-	-	-	-
	29	14	6	-	1	-	-	-	-	-
	30	51	4	2	6	-	-	3	1	-

Table 6.1 continuous

31	28	9	4	3	-	-	-	-	-
32	38	5	15	3	1	-	2	-	-
33	20	2	4	1	-	-	-	-	-
34	32	5	-	1	-	1	1	-	-
35	30	11	5	3	-	-	-	1	-
36	13	7	-	-	1	-	-	-	1
37	12	3	2	2	-	-	-	-	-
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	238	53	32	21	2	1	6	2	1
<hr/>									
TOTAL	352	76	37	24	2	2	8	2	1
	70%	15%	7.3%	5%	0.4%	0.4%	1.6%	0.4%	0.2%

Colours:

a = Red d = Yellow g = Brown

b = Blue e = White

c = Green f = Black

6.1.1 Glass Beads

It can be seen from Table 1 that red glass beads or *mutisalah* were the most common ones at this time in this region of northeastern Bali. A similar situation also occurs in Oc-Eo where 41% of the total beads are *mutisalah*. Likewise, *mutisalahs* account for 29% of glass beads at Kuala Selinsing, 32.5% at Pengkalan Bujang, but only 4.4% at Ahichchatra, in north India (Lamb 1965: table VI). As Lamb (1965) has pointed out, red glass *mutisalah* beads are very rare in north India, but are common in south Indian sites, particularly Arikamedu (Francis 1990).

Blue glass beads were less common at Sembiran, forming only 15% of the total assemblage. However, blue glass beads were very common at Kuala Selinsing and Pengkalan Bujang in Malaysia, at Oc-Eo and at Ahichchatra. Occurrences of blue glass beads in these sites range between 26 and 32% of total assemblages.

Other colours of glass beads, including yellow, green, black, white and brown are rare in Sembiran as in other sites of this age in Southeast Asia. Overall, the colours of the glass beads from Sembiran are very similar to those from other contemporary sites in Indonesia, including Gilimanuk, Plawangan and Leang Bua (Ratna Indraningsih 1985: 137), although no percentages for different colours from these Indonesian sites have yet been published.

Table 6.2 (After Lamb 1964)

Percentages of glass beads by colour in selected Southeast Asian and Indian sites

Colours	S i t e s			
	Kuala Selinsing (First millennium AD)	Pangkalan Bujang (8th-13th centuries AD)	Oc-Eo (Early-Mid) (first mill.AD)	Ahichchatra (3rd c BC to 11th c AD)
Black	0.5	17.5	6.0	13.0
Red	29.0	32.5	41.0	4.4
Blue	32.0	30.0	26.0	28.4
Blue-green	-	-	-	-
Turquoise	1.0	-	-	-
Yellow	13.0	14.0	15.5	-
Orange	13.0	2.5	-	6.0
Green	11.0	2.0	9.5	24.2
Polychrome, & Misc	0.5	1.5	2.0	24.0
	100%	100%	100%	100%

The most common bead shapes from Sembiran are barrel, spheroid, short or long cylinder, cylinder disc and oblate. Like the colour, these shapes are also very similar to those in other bead assemblages from contemporary sites in Indonesia (Ratna Indraningsih 1985). Some beads are not symmetrical at both ends which implies that they were drawn rather than wound during manufacture (Bronson 1990). Bead diameters range from 1 to 7 mm. 111 glass beads, 2 carnelian and 1 gold were brought to Canberra for further analysis. Shapes and colours of these beads are given in table 6.3 below.

Figure 6.1

Shapes of beads from Sembiran

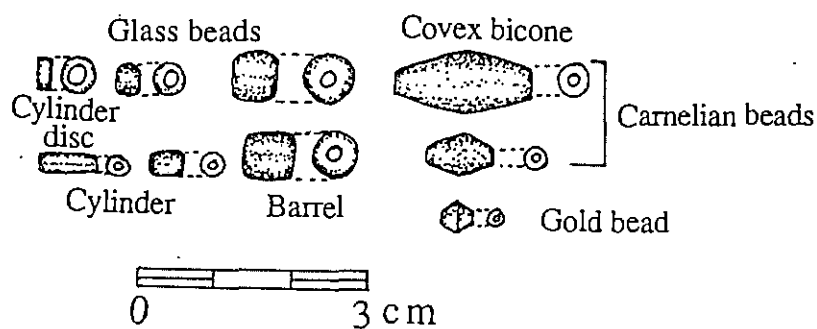


Table 6.3

Bead shapes and colours from SBN IV, VI, and VII in the sample of 114 which was brought to Canberra

Shapes	G l a s s					Carnelian	Gold
	Red	Blue	Green	Yellow	White		
Barrel	23	9	2	3	1	-	-
Barrel disc	16	-	-	-	-	-	-
Cylinder	22	-	-	-	-	-	-
Cylinder disc	8	-	-	-	-	-	-
Oblate	6	-	-	-	-	-	-
Oblate disc	16	-	-	5	-	-	-
Convex bicone	-	-	-	-	-	2	1
	91	9	2	8	1	2	1
	80%	8%	1.7%	7%	0.8%	1.7%	0.8%

Several authors have suggested that glass beads were manufactured in Southeast Asia using raw materials imported from the Mediterranean or India (Harrisson 1964; Lamb 1965; Bronson 1986; Francis 1990). Such manufacturing sites include Kuala Selinsing and Pengkalan Bujang in Malaysia, Khuan Lukpad in southern Thailand, and Oc-Eo in Vietnam. It is not clear whether beads were actually manufactured in Sembiran, since only one possible fragment of scrap glass blue in colour was found (in SBN VI). Five glass beads from Sembiran IV have been analysed by Kishor Basa at the Institute of Archaeology in London. One can be categorized as mixed-alkali glass and four are potash glass (Basa 1991; Basa *et al* 1991). Basa (1991) believes that the Sembiran beads are similar to south Indian samples in terms of raw materials, and were probably manufactured at Arikamedu.

6.1.2 Stone Beads

Only two orange carnelian beads were discovered, both in SBN VII (see table). Both have long barrel shapes with diameters of 3 and 4 mm respectively at both ends, and 4 and 5 mm in their middles. Carnelian beads have also been discovered in Balinese sarcophagus burials at the sites of Nongan, Bona, Selasih, Margatengah, Pujungan and Ambiarsari, as well with the burials at Gilimanuk (Ardika 1987; fig 3.2). These carnelian beads are generally believed to have been imported from India, although some may have been made in Southeast Asia since carnelian scrap occurs in some sites, including Kuala Selinsing in West Malaysia.

6.1.3 Gold Bead

One gold bead was found in spit 36 of SBN VII. It is a truncated bicone in shape with diameters of 3 mm at both ends and 4 mm in its middle. A gold bead was also reported from sarcophagus E at Margatengah. The Sembiran gold bead is very similar to specimens from Oc-Eo, published by Malleret (1962: Plate XII, top right).

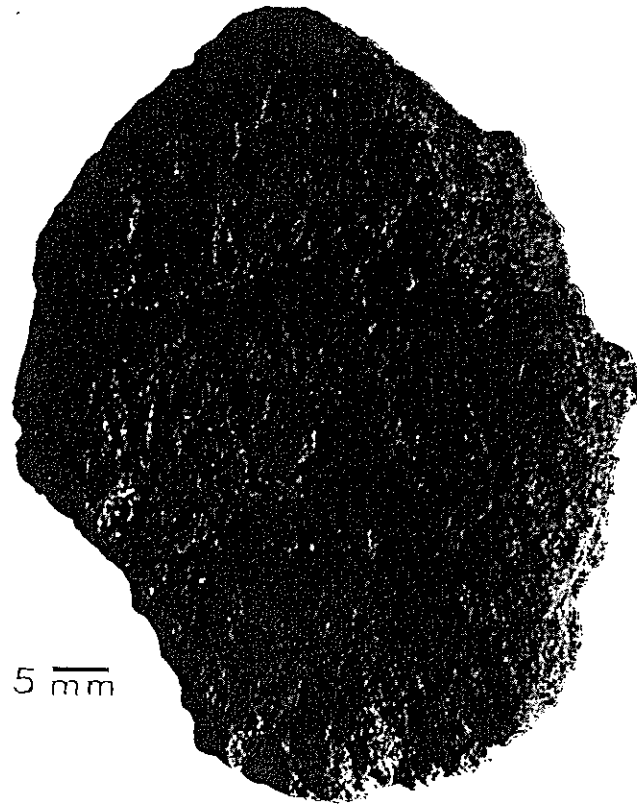
6.2 The Sembiran Mould

A fragment of a volcanic tuff stamp or mould carved with two parallel bands of triangles was found in SBN VI at 3.4 m depth. This artifact is 6.9 cm in length, 5.2 cm in width and 4.1 cm in thickness (see figure 6.2). The triangle decoration is very similar to that on the larger mould fragment with a face design from Manuaba in central Bali, and also to the triangles on the large drum from Pejeng itself. However, the sizes of the triangles on the Sembiran mould (8 mm high) are smaller than those of Manuaba and the Pejeng drum.

Based on the illustration drawn by Nieuwenkamp, the triangles on the Pejeng drum are about 17 mm high and those on the mould from Manuaba are 12 mm high (Kempers 1988: pl 3.01e, 495). Overall, the Pejeng drum is 186 cm high and the drum manufactured from the Manuaba mould is believed to have been 107 cm high.

The triangles on the Sembiran mould are very similar to those on the Pacung drum, which are also 8 mm high. McConnell and Glover (1990: 14-15, fig 4, 5) state that the Pacung drum is 86 cm high. Due to the small size of the Sembiran mould fragment, it is difficult to know exactly how large were the drums manufactured from it. However, it is likely that they were of medium size in Bernet Kempers (1988: 329) classification, as are the drums from Bebitra, Pondok/Peguyangan and Pacung. According to Bernet Kempers (1988: 24), this type of mould was probably used for impressing decoration into wax during the production of a Pejeng-type drum, rather than for use as part of a casting mould into which molten bronze was poured.

Figure 6.2
The Sembiran Mould



It should be noted that the Sembiran mould fragment was also found in association with pieces of bronze wire and a fragment of an iron object which could possibly be an iron harpoon. Similar iron harpoons have been discovered in burial contexts at Ban Don Ta Phet in Kanchanaburi Province, Thailand, dated after the 4th century BC (Glover 1990: 155). In Vietnam and Thailand the use of iron commenced in the first half of the first millennium BC (Huyen 1984; Bronson 1985; Murowchick 1988; 184). Bronson (1985: 207) also suggests that the use of iron in Thailand was well developed before the period of the first intensive Chinese and Indian contacts. However, it is not clear whether the bronze and iron technologies of Southeast Asia were derived from the same or different geographical sources.

The occurrences of mould fragments in Sembiran and Manuaba indicate that drums of Pejeng type and possibly other distinctive metal objects were manufactured in Bali by perhaps 2000 years ago. It is still not clear whether the drum manufacturing tradition in Bali was a result of direct or indirect contact with the Dongson drum tradition. It should be noted that no Heger type drums have ever been found in Bali. Bernet Kempers (1988: 331) suggests that Heger I drums might have been derived from a drum or some gong-like instrument placed on a stand, whereas the prototype of the

Pejeng and *moko* - type drums was perhaps a *tifa*-shaped drum, consisting of a wooden body covered by a membrane at one end and open at the other. This type of drum is still found in eastern regions of the Indonesian archipelago.

Several fragments of baked clay or stone moulds for casting socketed bronze axes have also been discovered in other Early Metal sites in Island Southeast Asia, including Pejaten in the southern region of Jakarta in West Java (Sutayasa 1979: 68), Leang Buidane in the Talaud Islands (Bellwood 1976), Pusu Lumut cave in Sabah (Harrison 1971: 210; Bellwood 1988), and Tabon Cave in the Philippines (Fox 1970). These finds all seem to belong to the period between 200 BC and AD 1000 and all suggest strongly that metal artifacts were manufactured locally in Island Southeast Asia, rather than imported ready-made from outside.

The development of metal working in Bali, which lacks sources of copper and tin, suggests the existence of inter-island trade (Ardika 1987). This notion is supported by the appearance of the Indian sherds and beads. Copper exists in several Southeast Asian islands, including Sumatra, Java, Sulawesi, Timor, the Philippines and New Guinea (Bemmelen 1949; Bronson 1985, 1991). Tin occurs much more rarely but is mined in Bangka, Balitung, Riau, Singkep and other adjacent islands, and in the Malay Peninsula (Bemmelen 1949: 91-104). Owing to the absence of both copper and tin in Bali, it is likely that bronze drums and some of the other metal artifacts functioned as prestige goods during the Early Metal Period (Ardika 1987). Most bronze artifacts found in Balinese sarcophagus burials and in the necropolis site of Gilimanuk can be classified as ornaments or tools. They include bracelets, finger protectors, arm protectors, necklace units, waist belts, ear rings, finger rings, pentagonal plates, chains and axes (Ardika 1987; 1991). These artifacts might have indicated the social status of the deceased. The long distance import of copper and tin and the working of these metals in Bali could have been encouraged or even monopolized by elite groups in order to maintain their social status. A ranked society thus probably already existed in Bali during the Early Metal Period, just as social ranking is believed to have existed during the Dongson period in Vietnam (Tan 1991).

6.3 Other Metal Objects

Several other fragments of metal objects were also discovered. A bronze fish-hook and another unidentified bronze object 5 cm long were found in spit 10 in BKH I (see plate). These artifacts are both from Late Period contexts and the fish-hook is very

similar to one excavated at Plawangan in Central Java (Sukendar and Awe 1981, plate 21).

Five pieces of bronze wire were discovered in spit 10 and one in spit 11 in SBN I (see chapter 3). These pieces are each less than 1 cm in length and only 1 mm in diameter. The C14 date for spit 10 in SBN I is 770 ± 180 bp (ANU 6543).

Three fragments of unidentified bronze objects were also found in SBN IV (two fragments in spit 31 and another in spit 33), three in SBN VI (spit 28, 29 and 31) and one in SBN VII spit 29 (see distributions of artifacts in chapter 3). As already noted, an iron artifact from spit 34 in SBN VI was probably a fragment of an iron harpoon. So far no metallographic analysis has been done on the bronze or iron artifacts from Sembiran, although conservation has been undertaken at the University of Canberra.

Figure 6.3

The bronze fish-hook and unidentified metal object from BKH I spit 10

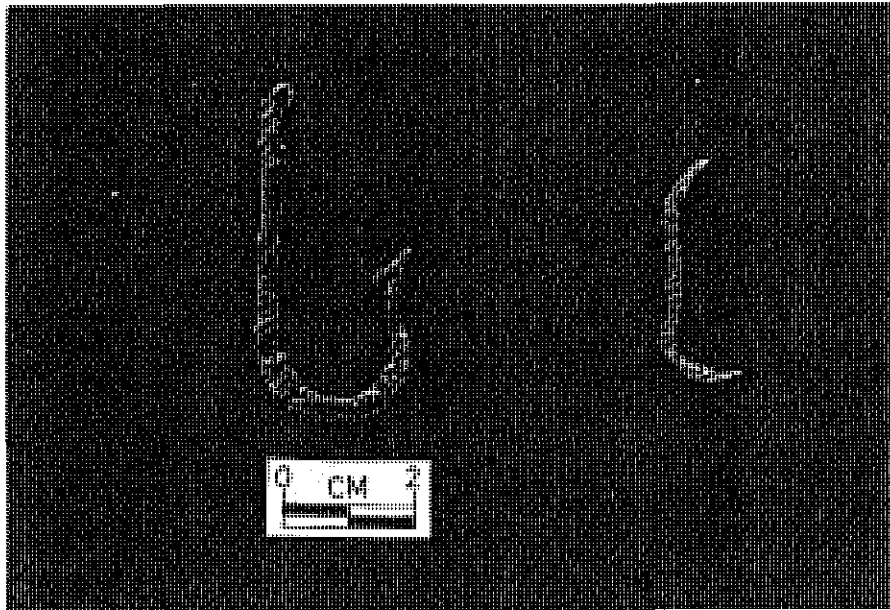
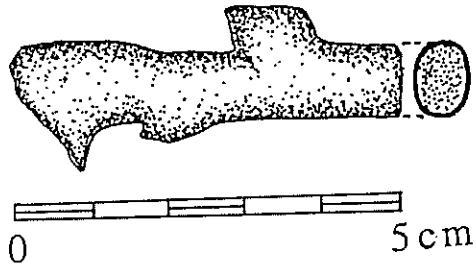


Figure 6.4

Possible iron harpoon fragment from SBN VI spit 34



Chapter 7

THE ANIMAL BONES

During the excavations in northeastern Bali about 3158 grams of animal bone were discovered in the trenches of BKH I, JLH I, SBN IV, SBN VI, SBN VII, and PCN I. These bones were most heavily concentrated in habitation layer 7 in SBN IV, VI and VII (see table 7.2) and are undoubtedly food bone of the Early Phase of occupation at Sembiran. Food bone of the Late Phase was found in much smaller amounts in BKH I and JLH I.

Most of these bones are fragmentary. Therefore, it is difficult to identify the species of animals to which they belong. Also, several of the bones were definitely burnt. One large piece of a dog mandible from SBN VII spit 35 can be confidently identified, and the other animals are identified mainly from teeth. Identifications are listed in Table 7.1

Table 7.1 Identified animals.

Species	Periods					Number of identifiable teeth/ jaws
	Late Period		Early Period			
	JLH I	SBN IV	SBN VI	SBN VII	PCN I	
Pig	x	x	x	x	-	49
Bovine	x	?	?	?	?	1
Goat/deer	-	?	-	?	-	3
Dog	-	-	-	x	-	1 mandible
Fish	-	x	x	x	-	8 jaws
Bird	-	-	?	?	-	

x = present
? = uncertain

Of the identified species, pig was the most popular throughout and clearly served as the main food animal. Other possibly identified animals, including goat and cattle, are mentioned in the Sembiran inscriptions dated between the 10th and 12th centuries AD (see chapter 8). Goat (*kambing*), cattle (*sampi*) and water buffalo (*karambo*) are all mentioned in the inscription of Sukawana AI, dated to AD 882 and the oldest Old Balinese inscription ever found (Goris 1954).

From the available teeth preserved in the sample it is impossible to distinguish between goat and deer, and also between cattle and water buffalo (Dr Colin Groves, pers comm).

The identified species from northeastern Bali are quite similar to those excavated by Glover in caves in East Timor. The identified domesticated species from East Timor include pig, dog, goat, sheep, and bovids (Glover 1972: 358). The oldest pig tooth was found in East Timor, in Horizon VII of site T02, with an associated date of 5520 ± 60 BP (Glover 1972: 367). Glover (1972) also pointed out that pig was the earliest introduced animal in most excavated sites in East Timor. Domesticated dog and a bovid first appeared in the site of Bui Ceri Uato in Horizon VI, dated to 2500 - 3500 BP.

Capra/ovis (probably goat) first appeared in site T02 between Horizon VII (5000-6000 BP) and Horizon IX (3500-4000 BP). Goat bone appears in quantity only in site T02, Horizon X, and in T01, Horizon V, dated to 2000-3500 BP and 1400-1800 respectively (Glover 1972:368). These dates overlap with those of the Early Phase of Sembiran and Pacung.

As shown in table 7.1, bovines (cattle and buffalo) were not definitely present in the Early Phase at Sembiran. It is still not clear whether domesticated cattle and buffalo appeared in Bali before or after Indian contact since the bone fragments are too small for positive identification.

Table 7.2 Distribution of animal bones by spits and layers from excavated trenches in Northeastern Bali.

Trench	Layer	Spit, by 10 cm depth	Number of pieces	Bone weight in grammes
BKH I	2	14	4	20
JLH I	3	9	18	65
	3	11	4	30
	3	12	2	55
	3	13	2	40
	3	14	8	30
SBN IV	7	30	1	8
	7	31	2	18
	7	32	1	2
	7	33	1	17
	7	34	3	3
SBN VI	6	24	6	100
	7	31	7	10
	7	32	14	40
	7	33	53	200
	7	34	156	470
	7	35	107	400
	7	36	66	250
SBN VII	6	29	7	15
	6	30	1	10
	7	31	2	65
	7	32	16	70
	7	33	101	210
	7	34	190	450
	7	35	114	300
	7	36	89	230
	8	37	14	30
PCN I	7	33	4	20
TOTAL			1032	3158 grams

Chapter 8

THE INSCRIPTIONS

Six inscriptions dated between AD 922 and 1181 and consisting of a total of 20 rectangular copper or bronze plates are kept in the villages of Sembiran and Julah. These inscriptions are coded as Sembiran AI-AIV, B and C (Goris 1954). Sembiran AI-AIV are written continuously on 12 plates, each following its predecessor, often ending and beginning on the same side of a plate. Sembiran B is on three plates and Sembiran C on five. In 1889 these inscriptions were all kept in Sembiran but by 1965 ten of the plates had been moved to Julah (Brandes, 1889; Goris and Poeger 1965). The plates that are now kept in Julah include three plates of the Sembiran AI-AIV series; the fifth (Sembiran AII), the seventh (Sembiran AIII), and the eleventh (Sembiran AIV). In addition, the first and third plates of Sembiran B and all five of Sembiran C are also kept in Julah. It seems that they were divided by the villagers of Julah and Sembiran sometime prior to 1965.

In terms of language, Sembiran AI-III and B are in Old Balinese and Sembiran AIV and C are in Old Javanese. These inscriptions contain information on calendrical, social, economic and religious aspects of Balinese society during the 10th to 12th centuries AD. The contents of each are summarised in the following sections and transcriptions and transliterations are provided in Appendix E. Exact translations are impossible since not all words can be translated. This chapter lists the main contents of the inscriptions, without necessarily specifying how they all relate together.

8.1 Sembiran AI

This inscription consists of 4 plates. The first side of plate 1 (1.a) was not inscribed, and the inscription ends on the first side of plate 4 (4.a). Each side of Sembiran AI consists of six lines in Old Balinese, although Sanskrit and Old Javanese words also occur. About 25% of the words in the whole known sample of Old Balinese inscriptions are Sanskrit and 29% are Old Javanese (Sutjiati Beratha, pers. comm.). Sembiran AI begins with the *Yumu pakatahu* phrase ("you have to know"), and ends with calendrical information which includes the Saka year 844 (AD 922), the month of *Magha* (January-February), and the fifth day before the full moon, during the market day of *Bwijayamanggala*.

The inscription mentions that the villagers of Julah, particularly those who lived in the fortified settlement (*kuta*), were attacked by their enemies. Therefore, some of them had fled to other villages. For that reason the ruler, *Sang ratu sri* Ugrasena, orders them to come back to the *kuta* at Julah. The boundaries of the *kuta* are established to include Air (River) Lutung to the west, Duri Lwarlwar to the south, Air Hyang to the east, and the sea to the north. The exact locations of the first three of these features are unknown.

Several taxes and responsibilities demanded of the villagers by Ugrasena are mentioned. The taxes include manufacturing planks, building canoes or ships, making lime, making charcoal, pounding rice, building a hall, and building a shelter for visiting officials. Other responsibilities listed include provision of livestock (for meat ?), provision of rope, maintenance of graves and roads, and payment of a tax on cockfighting. Such activities were undertaken to provide for the *Sang ratu* (Ugrasena himself), other state officials termed the *nayaka* and the *caksu*, and the music players who travelled with them. For more detail on these taxes see the literal translation in Appendix E.

Several kinds of coinage are mentioned, including *suwarna*, *masaka*, *kupang* and *piling*. According to Stutterheim (1940: 17), 1 *suwarna* = 1 *tahil* = 16 *masa* = 64 *kupang*. 1 *tahil* = 1/16 *kati*. 1 *Suwarna* = 0.038601 kg, 1 *masa* = 0.002412 kg, 1 *kupang* = 0.000603 kg.

Apart from these responsibilities, the villagers also had to provide goods for a ceremony called *sambar*, including rice, cotton, thread, mung beans, palm sugar, palm oil, *cabya* (cabe in bahasa Indonesia—today this word is used for the American chili red pepper, although its original meaning was presumably different), candlenut, leather, and dried fish. Several types of volume measurement are mentioned in connection with these goods, including *raga*, *gunja*, *karundung*, and *rimpi* (a basket). Also mentioned are sheets of leather (*kulit salambar*). Animals mentioned include goats, cattle, buffaloes and mules. Musical instruments including a kind of violin (?) and a conch shell are mentioned.

Titles mentioned in this inscription include the *sang ratu* (ruler), *sarbwa*, *dinganga*, *nayakan makarun*, *nayakan leran*, *tuhan jawa*, *caksu*, *ser pasar* and *manuratang ajna*. The *sang ratu* (Ugrasena) seems to have been the highest ranking person in Balinese society during this period. The title *ratu* is cognate with *datu*, a widespread Austronesian word for a person of rank. The functions of the other title

holders, except for *ser pasar* and *manuratang ajna*, are still not clear. The *ser pasar* might have been in charge of the market and *manuratang ajna* can be translated as scribe. It should be noted that the term *sarwwa* or *sarbwa* and *dinganga* also appear in the later inscriptions, preceded by the title *senapati*. For instance, the inscription of Sembiran AIII (AD 1016) mentions a *senapati dinganga*, and a *senapati sarbwa* is mentioned in the inscription of Bwahan A (AD 994; Goris 1954: 85). It seems that both *sarwwa* and *dinganga* were titles of very high rank.

Other functionaries mentioned in this inscription are *dikhara*, *panundun*, *pratikaya*, and *karaksayan*. These might have been village officials (Ardika 1983). If so, they indicate that administrative organization at the village level of Balinese society was well established by at least the 10th century AD.

It is interesting to note that regulations concerning the property of childless married couples are also listed. When a childless married couple died their property, including gold, silver, bronze jars, copper jars, slaves, wet or dry fields and livestock, reverted to the village. Only property to the value of 4 *masaka* was kept for the death ceremony. If the husband died first then one-third of the joint property was kept by the widow and two-thirds reverted to the village. However, if the woman died first then two-thirds of their property would be kept by the widower and only one-third taken by the village. This regulation is called *suhunan tanggungan* in the inscription. Perhaps it suggests that men had higher status than women in early 10th century AD Bali.

Several kinds of metal are mentioned in Sembiran AI, including gold (*mas*), silver (*pirak*), bronze (*kangsa*), and copper (*tambra*). The terms *kangsa bhajana* and *tambra bhajana* refer to bronze and copper jars.

Concerning agriculture, the inscription classifies fields into both wet (*huma*) and dry (*parlak*) types. Both wet and dry rice cultivation were thus practiced by the early 10th century in Bali.

The regulations of *taban karang* (*tawan karang*) refer to the cargoes of stranded maritime vessels. The cargoes of stranded vessels within Julah territory were used for *wrdahi* (welfare). This rule suggests that Julah and nearby areas were involved in maritime trade by at least the 10th century AD, and of course the finding of Indian sherds nearby in Sembiran and Pacung already supports this hypothesis. This inscription provides the oldest evidence concerning the regulation of *taban karang* found in Bali. In 1906 these regulations were still being followed, a circumstance which

caused conflict between the *raja* of Badung in southern Bali and the Dutch East India company.

After listing all these regulations and responsibilities for the villagers of Julah, the inscription closes with a *sapatha*, or curse, invoking the name of *Bhatara Punta Hyang* (or *Agastya*). After the inscription was carved an offering of a seal in Sinhalese style set with a symbol representing the *Sang ratu* was made to the deity.

Overall, this inscription contains important information about life in Julah during the early 10th century AD. Within the Julah territory there was a *kuta*, a term which literally means a fortified settlement. In the *kuta* there was a market (*pasar*) where local and foreign traders could buy and sell goods (see Sembiran AII below). It seems that the *kuta* of Julah was perhaps located close to the sea. Were the excavated sites of Sembiran and Pacung within the *kuta* of Julah?

It should be noted that the terms *kuta* and *ser pasar* (market officer) are also mentioned in the inscription of Bebetin AI (AD 896: Goris 1954:54), which also mentions a *kuta* within the territory of *Banwa Bharu*. *Banwa Bharu* could have been another port site in north Bali, possibly located near the modern village of Sangsit, about 15 km west of Julah, where a small port still exists.

The Bebetin AI inscription also states the regulations concerning the properties of *banyaga* (seafaring merchants) who died at *Banwa Bharu*. Their properties had to be divided into two parts, although it is not mentioned what the two divisions were used for. It is also mentioned that timber from the wrecked ships of the *banyaga* were to be used for fences or palisades around the fortified settlement (*kuta*) at *Banwa Bharu*. It thus seems that the fortified settlements at Julah and *Banwa Bharu* were both surrounded by wood or bamboo fences. This was also characteristic of city ports in Southeast Asia between the fifteenth and seventeenth centuries AD (Reid 1980: 242).

Regarding the social disturbance recorded in this inscription some questions arise. Why was the *kuta* at Julah attacked by enemies? Was Julah a port with a lot of merchandise held in storage? Who were their enemies, Balinese or people from outside? Possibly they were pirates. Could it be that competition between port sites in north Bali caused the social disturbances at Julah? As mentioned above, *Banwa Bharu* could be another port site in north Bali, although this site has not yet been located.

At the end of Sembiran AI it is mentioned that the inscription was made in the court of justice (*panglapuan*) at Singhamandawa. Singhamandawa is also mentioned in several other Old Balinese inscriptions, including Sukawana AI (AD 882), Trunyan AI (AD 891), Bebetin AI (AD 896), Trunyan B (AD 911), and Gobleg/ Pura Desa I (AD 914) (Goris 1954). Several questions arise concerning the place called Singhamandawa. Where was it located ? Was it the capital of Bali at that time ? It seems that Singhamandawa was not located in or near Julah or Banwa Bharu. Judging from the distribution of sarcophagus burials and the early evidence for Hinduism and Buddhism in Bali, it seems to me that the political centre of Bali during the ninth and tenth centuries was probably located in the southern part of the island, in the alluvial plain between the Pakerisan and Petanu rivers (Ardika 1987: 48, figure 4.1). However, contacts between Bali and outside regions were certainly carried out through several of the port sites on the northern coast , including Julah and Banwa Bharu.

8.2 Sembiran AII

This inscription begins immediately after the end of Sembiran AI on the first side of plate 4 (4.a), and ends on the second side of plate 5 (5.b). Each sides of each plate has six lines in Old Balinese. The inscription starts with the phrase of *punah* “(again)”, followed by calendrical information including the Saka year 897 (AD 975), the month of *Cetra* (February-March), and the fifth day after the full moon, during the market day of *Bwijayamanggala* .

Like Sembiran AI, this inscription mentions the villagers of Julah who lived in the *kuta* . By this time, many villagers had already come back after their dispersal, and the inscription records that they were originally ordered to come back to the *kuta* by the previous ruler (*Sang ratu*), who was entombed at *Bwah Rangga*. This information verifies that provided in Sembiran AI.

Sembiran AII was written during the reign of *Sang ratu Sri Janasadhu Warmmadewa*. As in Sembiran AI, several titles of probable state level functionaries are also mentioned in this inscription, including *ser* , *senapati*, *nayaka*, *caksu*, *dikarana*, *mangilala drbya haji* (tax collector) and *manuratang ajna* (scribe). Officials at the village level in Julah included the *dhikara*, *panundun*, *hulu kayu*, *karaksayan*, *jurru*, *banigrama*, *tuha gusali*, *astakula*, *dangwan astakaya*, and *pratikaya*.. As far as the roles of these functionaries are concerned our knowledge is still very limited. We only can guess their functions through the literal meanings of their titles. For instance; the *hulu*

kayu was probably an official in charge of forestry and the *tuha gusali* may have been a blacksmith or metalworker. This term may be significant given the finding of the fragment of a mould for impressing decoration into wax during the production of a Pejeng-style drum in the trench of Sembiran VII (see chapter 6).

The *banigrama* was possibly the leader of a foreign merchant community/guild who lived in the *kuta*. This term also occurs in contemporary East Javanese inscriptions, particularly in port areas. In Javanese inscriptions the term *banigrama* is associated with foreign traders (Barret Jones 1984; Wisseman 1977). The names of several kinds of foreigners have been identified in the 10th century Javanese inscriptions, including Chams, Khmers, Mons, Sinhalese, Bengalis, Kalingas, Pandikiras, Karnatakas, Dravidis and Aryyas (Barret Jones 1984: 23; Wisseman 1977: 207).

Like Sembiran AI, this inscription also mentions taxes and goods which had to be provided by the villagers of Julah. The villagers had to provide a payment of a *parjuluk* (spear) and *sara* (arrow ?) for the ceremony called *rah tirtha* every month of *Kartika* (September-October). Other provisions required included *nasi balun* (a kind of rice), pork, yogurt, mung beans, palm wine, garlic, and ginger.

The villagers had a duty to maintain the bathing places, graves, fish ponds, terrace, shrines, the main road and *pagar kambang* (harbour fence ?) of Julah. If these structures were damaged, the expenditure of repair was to be shared by the villagers of Julah, Indrapura, Buwundalem, and Hiliran. In addition, the villagers of Julah had also to maintain and protect the monastery called Baleswara and the grave of *Sang ratu's* father, both located at Dharmmakuta in the village of Bungkulan. If the monastery was attacked by enemies, the villagers of Julah with their weapons had to protect it.

It seems that Julah had developed as a central place in northeastern Bali by the end of the 10th century AD. Among the other villages mentioned, Bungkulan and Buwundalem still exist. Bungkulan is located about 15 km west of Julah and Buwundalem, or the present village of Bondalem, only 3 km east. Indrapura and Hiliran have not yet been identified.

8.3 Sembiran AIII

This inscription begins with the phrase *punah* “(again)” and calendrical information including the Saka year 938 (AD 1016), the month of *Acuji* (September-October), and the 6th day before the full moon, during the market day of *Bwijayakranta*. The inscription starts from plate 5b, fifth line, and ends with plate 7.b second line. Each plate consists of six lines in Old Balinese. Sembiran AIII is similar to Sembiran AII, which also begins with the *punah* phrase.

This inscription mentions that the officials of the village of Julah, particularly those who live in the *kuta*, pay respect to *Sang ratu sri sang* Ajnadewi. It reports that the villagers had been scattered and had fled to other villages. Some of them were killed and captured by their enemies. Therefore, there remained in the village only 50 families out of an original 300. For that reason, the village asked *Sang ratu sri sang* Ajnadewi for a reduction of their taxes and other responsibilities. Their request was approved.

The village officials mentioned in this inscription include *dhikara*, *pratikaya*, *prakula*, *astakula*, *tuha gusali*, *karaksayan*, *banwa tuha*, *hulu kayu*, *manuratang* (scribe), and *panundun*. These functionaries are similar to those mentioned in the previous inscriptions. *Banwa tuha* is a new term mentioned in this inscription, which may mean village head. State officials mentioned include *samgat*, *senapati*, *ser*, *nayaka*, *caksu*, *manuratang ajna* (scribe) and the Sivaite and Buddhist priests.

The villagers had to provide provisions, including 2 *karundung* of unspecified produce for the *sambar* ceremony, rice for the shrine at Dharmmakuta, and bamboos. They also had to provide liquor, coconut leaves and palm wine for the ceremony. However, they were freed from taxes on the purchase of spices, dyes and livestock, of which the inscription mentions cattle, *haturan* (?), *besara* (mules), goats, pigs, dogs, cocks and birds.

Several types of volume measurement are also mentioned, including *karundung*, *lamak* (especially for rice), *pulu* (jar for liquor), and *kadung* (for palm wine). The coinages mentioned include *masaka* and *kupang*.

This is the first inscription to mention the population of the *kuta* at Julah as originally 300 families. This figure can be used to estimate a total population of perhaps 1500 people (?).

8.4 Sembiran AIV

This inscription, in Old Javanese, has six lines on each side of each plate. It begins in line 3 of plate 7.b and ends on plate 12.b. The inscription begins with the phrase *muwah* "(again)", followed by calendrical information including the Saka year 987 (AD 1065), the month of *Bhadrawantan* (August-September), the 6th day before the full moon, *paniron* (the 4th day of the 6-day week), *paing* (2nd day of the 5 day week), and *buda* (4th day of the 7-day week of *Wariganing wariga*).

In this inscription the officials of Julah pay respect to *Paduka haji* Anak Wungsu, the youngest son of *Bhatari*, the princess who was entombed at Burwan, and *Bhatara dewata*, the prince who was entombed at Banu Wka. The villagers request permission to write the inscription on copper plates. The original inscription was written on palm leaves and would not last for ever. It should be noted that the term *paduka haji*, as referring to the title of highest rank in Balinese society, had already replaced the older term *sang ratu*.

The inscription also records how the decision concerning this request by the villagers of Julah was made. The request was considered by the members of the royal assembly (*tanda rakryan ring pakirakiran i jro*), including the Saivite and Buddhist priests. After the decision has been made by the royal assembly the result was transmitted to the *Paduka haji*, Anak Wungsu, who approved it.

The rights and responsibilities of the villagers are then listed. They have to pay 5 *masaka* of currency for *sipat* (a tax?) during the *sambar* ceremony. They also provide several other taxes every year, including 4 *masaka* for *aceleng* (another tax?). A tax called *talitali* (some kind of tax on rope?) is half a *piling*, or 3 *saga* for the head of a family.

If artists come to Julah, the villagers must give 1 *masaka* to the royal singer, and 2 *kupang* to the non-royal singer. One *kupang* must be given to the royal *gamelan* players and flautist. The non-royal flautist must be given 3 *saga*. The royal mask dancer, clown and dramatist must each be given 2 *kupang*, and the non-royal ones must be given 1 *kupang*.

The villagers are freed from the tax of *pakupat* and are allowed to manufacture crowbars and *kris*. They are allowed to cut several protected trees including *waringin* (banyan), *sekar kuning* (?), *wungkudu* (a tree which produces a red dye), *mundah* (?), *bodhi* (bodhi tree), *camalagi* (tamarin), and *lumbang* (?), if they overshadow coconut trees or hinder the visibility necessary to see the ships of plunderers which come in the night.

They are responsible for looking after the *pager kambang* (harbour fence?) at Kuta Hanar (a new fortified settlement?). They are allowed to use a thorny plant (*surusuru*) for fences.

The villagers have to help and provide a roofed working area for the *banyaga*, seafaring merchants, who anchored at Manasa, if the hulls of their ships were damaged when they arrived. For this service each *banyaga* had to pay one *masaka*, a sum which could be increased according to his status.

In Javanese inscriptions the term *banyaga* appears as early as the eighth century AD, when it is associated with merchants connected with overseas trade (Wiseman 1977: 205; Barret Jones 1984: 25). The *banyaga* in Javanese inscriptions is mentioned as a member of the *mangilala drwya haji*, or collectors of the lord's revenue (Barret Jones 1984: 25).

The Julah villagers also have to provide shelter for the *Sang senapati Tunggalan*, the *samgat Kalasantan*, and the priest or monk at *Hyang Slat*. The return payment for this service is 200 unspecified units of currency every year, which can be increased according to the status of the *mahajana* (important person?).

The villagers are not allowed to disturb, plunder or pick certain kinds of unspecified forbidden fruits or tubers. They are also not allowed to bring into a house any kind of wild animals. They are not allowed to attack or abuse animals such as buffaloes, cattle, goats and pigs. However, they are allowed to make fish ponds along the seashore and to catch turtles and fish trapped therein. If they are attacked by an enemy, the villagers of Julah have to bring their weapons and paddles, and to follow the ships of their enemies if necessary.

In order to render inviolable all the regulations mentioned in the inscription, a curse (*sapatha*) is added invoking *Bhatara Punta Hyang* (or *Agastya*), the four cardinal points, the sun, the moon, the earth, water, wind, fire, semi-divine beings, and

other deities . Those who want to falsify the contents of the inscription will be killed. They will suffer in life, and seven times be reborn. In this part of the inscription more names of semi-divine beings and deities are mentioned than in any other Sembiran inscription (see Appendix D). It seems to me that the *sapatha* or curse in this inscription offers important data for studying the religion of ancient Bali.

Finally, the inscription gives a list of the officials who witnessed this grant of *Paduka haji* Anak Wungsu to the village of Julah. For more detail on these officials see the text and translation in Appendix D.

8.5 Sembiran B

This inscription consists of three plates. Plate 1 was inscribed on both sides, but only one side each of plates 2 and 3 was inscribed. Five lines of Old Balinese occur on each side of plate 1, six on plate 2 and seven on plate 3. This inscription was written very badly with a lot of repetition. It is dated *Saka* 873 and does not mention a king's name, although some functionaries as well as the boundaries of the village of Julah are mentioned. The boundaries are very similar to those mentioned in the inscription of Sembiran C (see next section), and include Tukad (River) Mamurpur, Poh (Poh = mango tree in modern Balinese) Talur, Poh Tanduk, Balimbing, Rnek or Renek, Air (River) Balatuk, Air Runusan, Air Tampiken, Air Hepu, Beru, Poh Bacang, baringin, Lijong, Batu Kamodi and tring wor.

The inscription also mentions a *parkapasan* (cotton plantation ?) at Julah, and the term *banigrama* referring to a merchant guild.

8.6 Sembiran C

This inscription, dated *Saka* 1103 (AD 1181), consists of 5 plates. Except for the first, all are inscribed on both sides in Old Javanese. The first plate is only inscribed on its second side. Each side consists of six lines.

Paduka sri maharaja haji Jayapangus, who was descended from the sun, and his wives *Paduka bhatarasri* Parameswari and *Paduka sri* Mahadewi, both descended from the moon, give the orders contained in the inscription to the royal assembly (*tanda*

rakryan ri pakirakiran i jro) and to the Sivaite and Buddhist priests. *Paduka Sri Maharaja* had heard that the villagers of Julah had had additional taxes imposed on them by the tax collectors.

It is mentioned that the villages of Julah and Kaduran together formed an autonomous unit, and that Kaduran was governed by Julah. The rights and responsibilities of Julah are stated.

The villagers have to pay a tax of 4 *masaka* for *taruh karung* (boar fighting ?), and a tax of 12 *saga* for each family or married couple. They are freed from paying taxes on the breeding of animals (*tangkalik ageng*, *tangkalik alit*), and also freed from *pangleye palaris* (?), *pakupat* (?), *papuncagiri* (?), *patalitali* (a tax on rope ?), *parmrm* (?) *marnit* (?), *pangempung* (?), *patimtim* (?), and *bakat bakat* (?). More kinds of tax are mentioned in this than in any other Sembiran inscription.

Regulations concerning maritime vessels anchored at Julah are also mentioned. The *Samgat badwa haji* and the *Kabayan Gosti* had authority to inspect the cargos of these ships.

Also mentioned are regulations for villagers who wish to marry descendants of brahmins, *hunjeman* (descendants of outstanding people), *juru kling* (Indians ?), and slaves. Who ever they married, their liabilities for corvee' at Pakuwwan are not reduced (the meaning of this is unclear).

Physicians who live at Julah are allowed to provide medicine to other villages. They are not taxed by *Ser walyan* (officials ?) and are free from the taxes of *rot* (?), *pasiki* (?) and *pawija*. (?).

Descendants of monk's and priests are allowed to live at Julah, and are not considered as beggars. The villagers are also allowed to cut protected trees, including candlenut, banyan, bodhi and *sekar kuning*, if they interfere with a house or coconut trees.

The boundaries of the village of Julah are determined to include Air (River) Mamurpur, Air Tabar, Air Lamesung and Rangreng to the east; the sea to the north; Bali(m)bing, Air Nangka, Air Po Tanduk, Beru, Air Repu, Po Bacang and Air Tapiken to the south; and Cading, Bakah, *renek* (swamp ?) and Air Karakas to the west.

At the end of the inscription are listed the officials with their personal names who witnessed the making of the inscription.

Summary

Based on the contents of these inscriptions, Julah and nearby areas seem to have been involved in maritime trade between the early 10th and 12th centuries AD. The archaeological data reported in this thesis now suggest that about 1000 years before these inscriptions such trade activities had already begun. In addition, it should be noted that Chinese and Thai ceramics were also discovered in Julah during the excavations in 1987. These ceramics are discussed in Appendix D. Thus, the archaeological and inscriptional data in combination suggest that Julah and nearby areas served as an ancient port zone from at least 2000 to about 500 years ago.

During the early 10th century AD the trade activities at Julah were probably carried out from a *kuta* or fortified settlement. Foreign traders or (*banyaga*) came to Julah and lived there in guilds (*banigrama*). The settlement was plundered many times, perhaps by pirates, and the inhabitants were sometimes killed, captured, or fled to other villages.

These inscriptions were made to establish the rights and responsibilities of the people who lived in Julah, particularly those who lived in the *kuta*.

Chapter 9

CONCLUSIONS

My archaeological discoveries in northeastern Bali indicate that the coastal plain adjacent to the villages of Sembiran, Pacung and Julah contains archaeological deposits dating from perhaps 2800 BP to the present. The finds include Indian potsherds, later Asian traded ceramics, earthenwares, beads of glass, stone and gold, a fragment of a stone mould used during the manufacture of a Pejeng-type drum, fragments of bronze and iron implements, animal bones, and two human burials.

The excavations also revealed some important information on the geomorphology, environment, vegetation and food animals of this region during the last 2000 years. The processes of deposition of colluvial and alluvial sediments which formed this region occurred very rapidly during the past 2000 years. As sediments accumulated the river banks and adjacent terrain would have become raised further above the river beds and overbank flooding would have become less frequent. This means that less surface water is available now than in the past. Today, the water table under the plain along the coast lies around 2.5 and 3.0 m below the surface, so people must dig wells in order to obtain fresh water during the dry season.

Phytolith analysis of sediment samples from Pacung I indicate that rice was growing on or near the site during the period of layers 6 and 7, between 2.4 and 3.8 m below the surface. The presence of a Rouletted sherd in layer 7 in this trench indicates that *Oryza* was being grown on this coastal plain by c. 2000 years ago. The presence of cytoplasmic carbon in the phytolith cells also suggests that a catastrophic event, perhaps a volcanic eruption, occurred between layers 6 and 5 (2.4 m depth) and caused a dramatic reduction and change in the local vegetation. This catastrophic event might have caused the abandonment of the site as suggested by the virtual absence of artifacts above these layers. This circumstance also occurred in Sembiran IV, VI and VII.

On the basis of bones and teeth several species of food animals can be identified in the trenches including pig, dog, cattle, goat or deer, bird and fish. A bovine molar was found in the Late Phase layer at Julah. However, most bones were concentrated in habitation layer 7 in SBN IV, VI and VII. They are undoubtedly food bone of the Early Phase of occupation at Sembiran c. 2000 years ago.

The Indian sherds include Rouletted Ware sherds, black slipped sherds, a rim sherd of Arikamedu type 10, and a sherd with characters in Kharoshthi script. These and the hundreds of glass beads suggest that contact between Bali and India had already begun by about 2000 years ago. It is likely that Indian traders visited Sembiran searching for spices and aromatic wood from the eastern regions of the Indonesian archipelago.

The increasing demand for spices during the Roman period encouraged Indian traders to search for these products in Southeast Asia, particularly in Indonesia. The *Ramayana* and the *Periplus* both mention cloves and sandalwood. The clove tree is native to the islands of Ternate, Tidore, Motir, Bacan and Makian in the Moluccas and the best sandalwood occurs in Sumba and Timor. Sembiran might have been one of the trading centres in northern Bali located on a major spice trade route between western and eastern Indonesia.

The region of Julah (including Sembiran ?) continued to be a trading centre between the 10th and 12th centuries AD, as recorded in the six copper plate inscriptions which are now kept in these two villages. The discoveries of Chinese, and Vietnamese ceramics during the excavations in 1987 and 1989 also extend this time span to a little later, perhaps to the 15th century AD.

Topographically, the villages of Sembiran and Julah are located on a sheltered coastline and adjacent to a deeply shelving sea bed; they would have been in an excellent strategic location for a roadstead. The southwest coast of Bali is more difficult for approach by large trading vessels and it is logical to assume that early trading activity was focused on sheltered ports of the north and southeast coasts, particularly if rice was locally grown and available there for trade at that time. It is not clear why Sembiran and Julah eventually ceased to be used as trading centres. Volcanic eruption and security are possible reasons for abandonment, since the inscriptions indicate that the villagers of Julah were on at least one occasion plundered, captured and killed by their enemies.

Banwa Bharu was another contemporary trading centre in northern Bali, mentioned in the inscriptions of Bebetin AI-III and B (AD 896, AD 989, AD 1050). However, this place has not been identified yet. It was possibly located in the village of Sangsit, about 15 km west of Sembiran and Julah. Further research is still needed in order to explore archaeological deposits in this area.

As a trading centre Sembiran might have also become a manufacturing centre. This is suggested by the discovery in SBN VI of a fragment of a mould for impressing decoration into wax during the production of Pejeng-type bronze drums. Some fragments of a larger mould for drum manufacture are also kept today in the village of Manuaba in central Bali. Copper and tin, used for drum casting in Bali during the early first millennium AD, might have been imported into the island through Sembiran. On the basis of the archaeological evidence and the historical data it seems that the coastal region around the villages of Julah, Sembiran and Pacung developed as "a gateway community", commencing at least 2000 years ago.

The development of ranking and social complexity during the Early Metal period in Bali might have also increased the demand for the exotic goods such as glass beads and metals that served as indicators of rank. These exotic goods were obtained through long distance trade which ultimately could have encouraged the development of a gateway community such as Sembiran. The function of such a settlement could have been to satisfy demand for commodities through trade, and to link its hinterland regions to external trade routes.

Gateway communities tend to be located to one side of their hinterlands in order to reduce the transportation costs involved in the movement of goods. The hinterlands look much like fans, which radiate outward from their respective gateway. Hinterland communities are linked to their gateway communities via linear or dendritic market networks (Hirth 1978: 37).

It can also be argued that not only exotic goods such as glass beads and metal but also information and local products flowed from the northeastern coastal region to parts of central Bali. Ethnographic and historical data suggest examples of this. For example, salt and fish are traded today from the northeastern coast to the area around Kintamani in central Bali. Rice and cloth from Kintamani or southern Bali flow in the other direction.

The inscription of Kintamani E (AD 1200) states that only people from the village of Kintamani, but not the villagers around Lake Batur (*Wingkang ranu*), were allowed to trade cotton at that time to the northern coastal villages of Les, Paminggir, Bondalem, Julah, Indrapura and Purwasiddhi. Les, Bondalem and Julah still exist, but Paminggir, Indrapura and Purwasiddhi are as yet unidentified. Paminggir was possibly the present village of Tejakula. It is thus likely that ecological diversity led to symbiotic exchange

relationships between the northeastern coast and central Bali, perhaps from at least 2000 years ago.

Given the notion that the Sembiran - Julah region had already developed as a gateway community by at least 2000 years ago, it is necessary to consider the nature of the link between this community and its hinterland. The inscription of Sukawana AI, dated to AD 882 and the oldest Old Balinese inscription ever found, mentions a *satra* or hospice in the mountains near Kintamani. Cooking pots and mats were provided in the *satra* for those who travelled in the night (Goris 1954: 54). A village called Satra still exists today, although it is not clear whether the *satra* mentioned in the inscription was located on the present site. During my survey in 1987, I was told that people from several villages in northeastern Bali travel to Kintamani today to buy or sell their goods. For example, the villagers of Bondalem, Julah and Sembiran travel via Madenan, Satra and Dausa to Kintamani. The villagers of Les and Panuktukan usually travel in the afternoon and spend the night in the village of Siakin, before they buy or sell goods next morning in the market of Kintamani. It seems that several land routes connected the northeastern coast and central Bali, and Kintamani could have been a meeting place for the people from both regions.

As far as the market network is concerned, the Old Balinese inscriptions mention three market days, including *wijayapura*, *wijyamanggala* and *wijyakranta*. These market days still exist today and are named respectively *pasah*, *beteng*, and *kajeng*. This three day cycle is used to arrange the circulation of products within market networks. For example, the market day in Kintamani falls on every *pasah*, whereas in Tejakula it is on *beteng* and in Les on *kajeng*. Therefore, traders can travel to Kintamani, Tejakula and Les in order to attend markets on successive days.

As discussed in chapter 8, foreign traders (*banyaga*) might have lived in Julah and Banwa Bharu during the late 9th and early 10th centuries AD. Trade activities in the *kuta* at Julah and at Banwa Bharu were possibly under the supervision of officials called *ser pasar* (market officers). Regulations concerning the cargoes of stranded ships (*taban karang*), wrecked ships, and the properties of foreign traders who died at *kuta* are also mentioned. The question arises of the roles of these *banyaga* in relation to socioeconomic and political change in Balinese society at that time. Several Old Javanese inscriptions from the 10th century AD indicate that foreign traders (*banyaga*) became members of the *mangilala drbya haji* (the collectors of the ruler's revenue). Whether this also occurred in Bali at this time is unknown.

SUGGESTIONS FOR FUTURE WORK

The excavations in northeastern Bali have revealed only a small part of the whole site which contains Indic cultural deposits dated to c.2000 years ago. The whole site could have been at least 300 m in diameter. The excavations in SBN IV, VI and VII removed about 33 cubic metres of soil and produced at least 80 definite Indian sherds and 245 other imported sherds. One Rouletted sherd was also found in the trench of Pacung I which is 300 metres away from the Sembiran trenches. There must be hundreds or possibly thousands of Indian sherds still in the ground within that radius of 300 metres. Therefore, more excavations need to be done in the future, particularly around the trenches of SBN IV, VI and VII.

Further excavations also need to be carried out near the trench of BKH I in order to reveal the stone platforms which were found during a post-excavation visit to the site with other participants of the Yogyakarta IPPA conference in 1990. These stone platforms possibly mark the beginnings of occupation at the site, dated to c. 1000 years ago and contemporary with the Sembiran and Julah inscriptions.

As already noted, *Banwa Bharu* and *Manasa* could have been other port sites in northeastern Bali between the 9th and 11th centuries AD. These sites have not been identified yet. Like Julah, *Banwa Bharu* was also close to the sea and was possibly located at the present village of Sangsit. Test excavations here could probably be rewarding.

Based on archaeology and inscripational data it seems that the coastal plain from Kecamatan Sangsit in the west to Kecamatan Tejakula in the east contains many archaeological deposits dating from perhaps 2800 BP to the present. This region has been involved in long distance trade since at least 2000 years ago. Further intensive research is needed in order to reveal more of the archaeological deposits of the region.

APPENDIX A

X-Ray-Diffraction Analysis

Eighteen sherds from sites in India and Bali were subjected to X-Ray Diffraction analysis (XRD) in the Department of Geology at ANU. The analyses were undertaken by Mr Chris Foudoulis and Dr Tony Eggleton of that department. The analyses indicated the quantities of certain minerals, especially quartz, mica and feldspar, in the sherd fabrics. The results complement those from Neutron Activation Analysis, which gives information on the trace elements in the vessel clay (see Appendix B).

The 21 sherds analysed form the following groups in terms of typology and visible fabrics:

1. Eight sherds of Rouletted Ware from 3 sites in India and Bali (XRD samples 1-5), each tested for its external slip as well as its internal fabric.
2. Three sherds from Sembiran with either black-slipped or resin-glazed exteriors and a distinctive fabric with frequent occurrences of rice chaff temper ("other imported Ware" in Chapter 4 ; XRD samples 6-8). These sherds were also tested both internally and externally.
3. The black slipped sherd with the Kharoshthi graffito (XRD sample 9), also tested internally and externally.
4. Another black slipped sherd (XRD sample 12) with a coarse interior fabric similar to that of the graffito sherd 9.
5. A number of sherds (XRD samples 10, 11 and 13-18) of presumed local origin from Sembiran, Bangkah and Gilimanuk, plus a series of seven soil samples from all the layers in Sembiran IV.

Because the raw data plots from these analyses are difficult to interpret, Dr Eggleton kindly plotted the data for quartz, mica and feldspar for all samples on two triangular coordinate graphs (Figure A.1). Relevant observations from these plots can be listed as follows:

1. The eight samples of Rouletted Ware form an extremely tight cluster separate from all the other sherds. Quartz is dominant in their fabrics.
2. Samples 6-8 also cluster in that they only contain quartz, except for the surface slip of sample 7. This group also differs from the Rouletted Ware in having traces of rutile, and no mica and almost no feldspar. XRD sample 10, an unusual comb-incised sherd, also has high quartz but differs slightly from this group in having some feldspar.

3. The graffito sherd and the other coarse black slipped sherd (sample 12) fall together, although another reading for the graffito sherd (sample 9a) clearly differs. This may reflect internal variation in the fabric of the pot. The sherd with the appliqué (sample 11) may also fall in this group, which seems to be defined by a ratio of relatively high feldspar to low quartz.

4. The other XRD samples (13-18, plus the Sembiran soil samples) contain little or no quartz and are dominated by minerals such as plagioclase feldspar, magnetite, haematite, goethite and calcite (the latter from shell temper?). Since the minerals in the soil samples are the same it is clear that all the sherds in this group originate in the Balinese general volcanic region and are not Indian.

Leaving aside the last group, which cannot be differentiated further from XRD results, it is apparent that there are three kinds of apparently-imported pottery in the Sembiran site. The Rouletted group and samples 6-8 form two groups which equate exactly with the NAA results, to be described in Appendix B. The graffito sherd stands apart from these two groups, as also reinforced by NAA. Samples 10, 11 and 12, however, all non-Balinese on typological appearance, are a little indeterminate. Black-slipped sample 12 is also rather indeterminate in the NAA results, where it is listed as NAA sample 22. XRD samples 10 and 11 were unfortunately not subjected to NAA, but both their XRD signatures and typology stamp them as imports into Sembiran. The comb incision on sherd 10 is paralleled at Oc-Eo in Vietnam (see page).

The main results of XRD analysis are therefore to reinforce an Indian origin for the Rouletted Ware and to make it highly likely for the "other imported ware" discussed in Chapter 4, and for the graffito sherd. The NAA results which follow render these conclusions even stronger.

Table A.1 XRD results for sherds from Ceylon, India and Bali

Sample No:	Site	Result
1. Rouletted	Sembiran IV spit 31	<u>Surface</u> : This sample contains dominantly quartz with minor mica and a trace of plagioclase feldspar and possibly potassium feldspar. Magnetite and haematite may also be present. <u>Interior</u> : Mineralogy is identical to the surface sample except this has apparently less mica than on the surface. Since mica is a platy mineral, this could be related to the process of smoothing the surface of the article during manufacture.
2. Rouletted Ware 53/496	Arikamedu	Only quartz was detected in this sample. No clays.
3. Rouletted Ware 53/497. Plain	Arikamedu	<u>Slipped surface</u> : Quartz is dominant with minor mica and a trace of plagioclase feldspar. The XRD pattern is almost identical to sample no 1. <u>Interior</u> : Quartz is also dominant with a trace of plagioclase feldspar. Mica was not detected. This sample is very similar to sample no 1, (interior) showing a relative concentration of mica at the surface of the article.
4. Rouletted Ware Ar 4N (7) Plain sherd	Arikamedu	The dominant mineral is quartz with a trace of feldspar and possibly a trace of mica and dolomite.
5. Rouletted Ware Four Rouletted sherds	Anuradhapura	The mineralogy of all these sherds appears to be very similar. Quartz is always dominant with minor muscovite, potassium feldspar and plagioclase feldspar. Trace to minor quantities of Calcite, dolomite and possibly haematite may also be present. There is no significant

		difference between the surface "glaze" and interior of each sample, except for a possible trace of haematite in the orange portion of one rim sherd. This mineralogy is very similar to sample no 1.
6. Resin-glazed sherd	Sembiran VII spit 34	<u>Interior:</u> Dominantly quartz with possible trace of rutile (TiO ₂). <u>Surface:</u> Dominantly quartz and possibly a trace of rutile (TiO ₂).
7. Black slipped sherd	Sembiran VII spit 35	<u>Interior:</u> Dominantly quartz. Possible trace of rutile (TiO ₂). <u>Surface:</u> Dominantly quartz. Possible minor plagioclase.
8. Resin-glazed slipped cord-marked sherd	Sembiran VI spit 35	<u>Slipped surface</u> Dominantly quartz minor rutile (TiO ₂) or K- feldspar. <u>Interior:</u> Dominantly quartz, possible minor rutile (TiO ₂) and anatase (TiO ₂).
9. Sherd with graffito	Sembiran VII spit 35	<u>Slipped surface</u> Dominantly quartz. Possible trace of mica and plagioclase feldspar. <u>Interior</u> Dominantly quartz. Possible trace of K- feldspar and plagioclase feldspar.
10 Sherd with comb incision	Sembiran VII spit 33	Dominantly quartz. Possibly trace of amphibole.
11 Sherd with applique	Sembiran VI spit 32	Quartz is dominant with a trace of plagioclase and K- feldspar.
12 Black slipped sherd	Sembiran VII spit 35	Quartz is dominant. Mica and plagioclase also present.
13 Presumed local Balinese sherd	Sembiran IV spit 34	Contains plagioclase, haematite and possibly magnetite. A trace of quartz was detected. Clay minerals were not detected.

14 Presumed local Balinese black sherd	Sembiran IV spit 34	Contains plagioclase feldspar, magnetite and haematite (apparently less haematite than sample no 9). A trace of quartz is present. Clay minerals were not detected.
15 Presumed local Balinese sherd	Sembiran VII spit 31	Dominantly plagioclase feldspar and magnetite with minor haematite.
16 Presumed local Balinese sherd	Bangkah I spit 9	Dominantly haematite and plagioclase feldspar. The feldspar may be similar to the one found in the SBN IV soil samples. Goethite, a hydrated iron oxide, sodalite, a sodium aluminium, chloride silicate were also detected. Sodalite could possibly form by firing clay with salt (sodium chloride).
17 Presumed local Balinese sherd	Gilimanuk XXXIV, 12	<u>Interior:</u> Dominantly plagioclase feldspar and magnetite. <u>Surface:</u> Dominantly plagioclase feldspar, magnetite with minor haematite.
18 Presumed local Balinese sherd	Gilimanuk XXXIV 18	Dominantly plagioclase, magnetite and calcite.
19 Soil samples (Layers 1-7)	Sembiran IV all layers	The mineralogy of the soil is almost identical throughout the profile. The dominant minerals in the soil are: Plagioclase feldspar, magnetite/maghemite and halloysite, a clay mineral from the kaolin group. Quartz is occasionally present in trace amounts. Some other minerals are present but difficult to identify because of low peak intensities.

Figure A.1
Triangular coordinate diagrams of XRD results for sample nos 1 -12

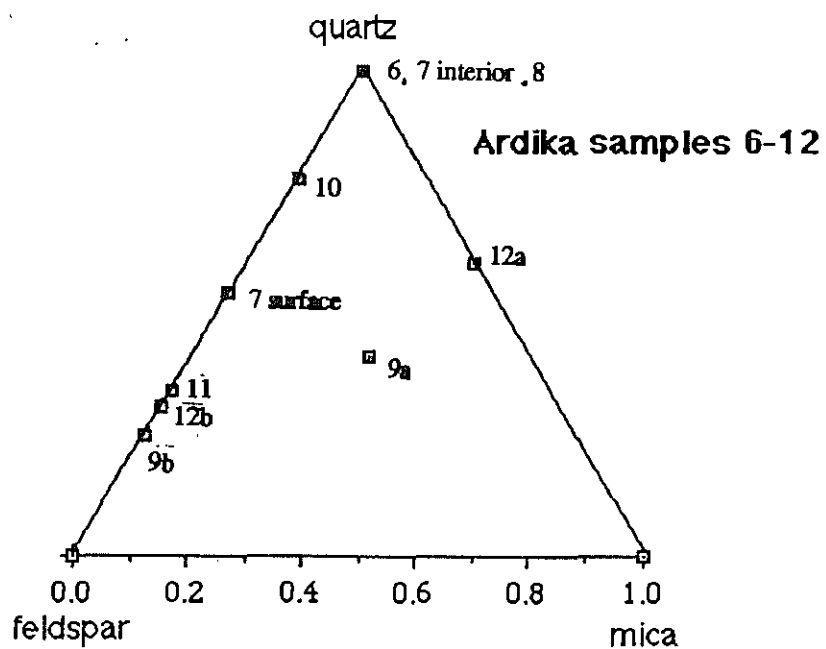
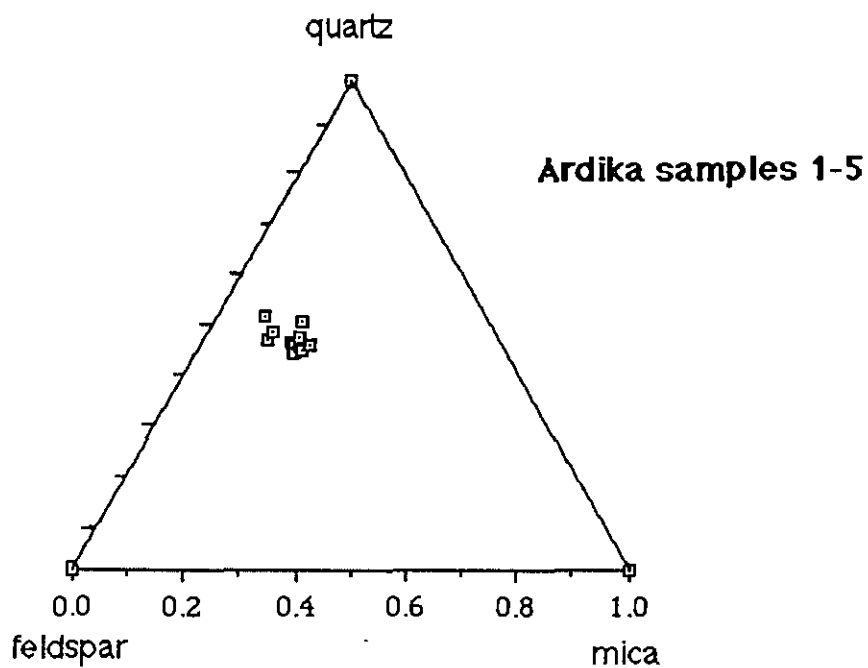


Table A.2
The results of XRD on quartz, mica and feldspar for samples 1-18

Processed data.

columns 1-3: peak heights ratioed to quartz = 1 unless qtz=0, in which case feldspar = 1.

column 4: sum of columns 1-3 ($M+F+Q = \Sigma$)

columns 5-7: mica, feldspar and quartz scaled to sum = 1. These data used in plots.

	mica 5.0	mica 4.5	feld	M+F+Q	m4.5/ Σ	feld/ Σ	qtz/ Σ
Ard 1 surface	0.249	0.393	0.849	2.242	0.175	0.379	0.446
Ard 1 interior	0.143	0.412	0.819	2.231	0.185	0.367	0.448
Ard 2 rim	0.172	0.308	0.657	1.965	0.157	0.334	0.509
Ard 3 interior	0.098	0.246	0.888	2.134	0.115	0.416	0.469
Ard 3 surface	0.140	0.239	0.818	2.057	0.116	0.398	0.486
Ard 4	0.085	0.169	0.768	1.937	0.087	0.396	0.516
Ard 5 rim sur	0.222	0.432	0.749	2.181	0.198	0.343	0.459
Ard 5 surface	0.152	0.348	0.813	2.161	0.161	0.376	0.463
Ard 5 interior	0.096	0.393	0.847	2.240	0.175	0.378	0.446
Ard 5 surface	0.146	0.387	0.802	2.189	0.177	0.366	0.457
Ard 5 interior	0.172	0.362	0.819	2.181	0.166	0.376	0.459
Ard 5 interior	0.182	0.354	0.753	2.107	0.168	0.357	0.475
Ard 5 surface	0.191	0.358	0.748	2.106	0.170	0.355	0.475
Ard 5 surface	0.000	0.000	0.000	1.000	0.000	0.000	1.000
Ard 6 surface	0.000	0.000	0.000	1.000	0.000	0.000	1.000
Ard 6 interior	0.000	0.000	0.000	1.000	0.000	0.000	1.000
Ard 7 surface	0.000	0.000	0.849	1.849	0.000	0.459	0.541
Ard 7 interior	0.000	0.000	0.000	1.000	0.000	0.000	1.000
Ard 8 interior	0.000	0.000	0.000	1.000	0.000	0.000	1.000
Ard 8 surface	0.000	0.000	0.000	1.000	0.000	0.000	1.000
9 Graffito b	0	0	3.035	4.035	0.000	0.752	0.248
9 Graffito a	0.428	0.743	0.669	2.412	0.308	0.277	0.415
Ard 10	0	0	0.288	1.288	0.000	0.224	0.776
Ard 11	0	0	1.939	2.939	0.000	0.660	0.340
Ard 12	0	0	2.234	3.234	0.000	0.691	0.309
Ard12 a	0	0.667	0.000	1.667	0.400	0.000	0.600
Ard 13	0	0	1.000	1.000	0.000	1.000	0.000
Ard 14	0	0	1.000	1.000	0.000	1.000	0.000
Ard 15	0	0	1.000	1.000	0.000	1.000	0.000
Ard 16	0	0	1.000	1.000	0.000	1.000	0.000
Ard 17 surface	0	0	1.000	1.000	0.000	1.000	0.000
17 interior	0	0	1.000	1.000	0.000	1.000	0.000
17 brown surf	0	0	1.000	1.000	0.000	1.000	0.000
18 interior	0	0	1.000	1.000	0.000	1.000	0.000
18 surface	0	0	1.000	1.000	0.000	1.000	0.000

Table A.3
Table of concordance in the numbering of the XRD and NAA samples

N A A Samples		XRD Samples	
Sample No :	Site	Sample No:	Site
1. Rouletted Ware	Anuradhapura	5	Anuradhapura
2. Rouletted Ware	Anuradaphura	5	idem
3. Rouletted Ware	Arikamedu	2	Arikamedu
4. Rouletted Ware	Arikamedu	3	idem
5. Rouletted Ware	Karaikadu	-	-
6. Rouletted Ware	Sembiran VI	-	-
7. Rouletted Ware	Sembiran IV	1	Sembiran IV
8. Rouletted Ware	Pacung I	-	-
9. Orange Indian sherd	Sembiran VII	-	-
10 Rouletted ware	Sembiran VII	7	Sembiran VII
11 Graffito sherd	Sembiran VII	9	Sembiran VII
12 Black slipped sherd	Sembiran VII	12	Sembiran VII
13 Resin glazed sherd	Sembiran VII	6	Sembiran VII
14 Resin glazed sherd	Sembiran VII	8	Sembiran VII
15 Pedestal sherd (vessel form G)	Sembiran VII	-	-
16 Black burnished bowl	Sembiran VI	-	-
17 Rim type 2.8 (red)	Sembiran VI	-	-
18 Rim type 2.8 (brown)	Sembiran VI	-	-
19 Rim type 4.1 (bottle rim)	Sembiran IV	-	-
20 Rim type 2.6 (Buidane type)	Sembiran VII	-	-
21 Local sherd	Sembiran IV	-	-
22 Coarse and black slipped ware	Sembiran VII	-	-
23 Banyuning modern sherd	Banyuning north Bali	-	-
24 Rim type 2.6 (Gilimanuk type)	Sembiran VI	-	-
25 Rim sherd with stamped lip (rim type 1.2)	Sembiran VII	-	-
26 Rim sherd with incised motif	Sembiran VII	-	-
-	-	4. Rouletted ware	Arikamedu
-	-	10 Sherd with comb incision	Sembiran VII
-	-	11 Sherd with applique	Sembiran VI
-	-	13 Presumed local Balinese sherd	Sembiran IV
-	-	14 Presumed local Balinese sherd	Sembiran IV
-	-	15 Presumed local Balinese sherd	Sembiran VII
-	-	16 Presumed local Balinese sherd	Bangkah I
-	-	17 Presumed local Balinese sherd	Gilimanuk
-	-	18 Presumed local Balinese sherd	Gilimanuk
-	-	19 Soil samples	Sembiran IV

APPENDIX B

Neutron Activation Analysis

In order to determine trace element concentrations in samples of pottery sherds from Sembiran and Pacung, 26 sherds were analysed by neutron activation analysis (NAA). By using this method, it can be established with fair certainty whether a group of sherds was manufactured from the same or different sources of clay. Pottery sourcing can also be undertaken if samples of clay are available from known manufacturing sites and quarries, but precise sourcing was not feasible in this research project. The NAA analyses were initially undertaken to demonstrate that the Rouletted Ware from Bali was really of Indian origin (even though typological considerations offered no other reasonable conclusion). Owing to success in this quarter the initial 14 analyses were extended by a second round, to a total of 26 samples.

The 26 sherds analysed form the following groups in terms of typology and visible fabrics:

1. Nine sherds of Rouletted Ware (NAA samples 1-8 and 10) from five sites in India and Bali (see Table A.3). To this group can be added NAA sample 9 - a small sherd with a bright orange slip (rather like Roman Samian Ware) and a relief band. Sample 9 is clearly not Rouletted Ware, but since the NAA analyses place it so firmly with the Rouletted Ware in terms of fabric it must stay in this group.
2. Sherds with well-fired fabrics, varying amounts of rice chaff temper, and either black-slipped or resin-glazed exteriors ("other imported ware" in Table 4.1). As noted (pages 56), this ware is of Indian appearance, and black slips of this type seem not to have been reported from other Early Metal Phase assemblages in Island Southeast Asia. NAA samples 11-13 are in this group.
3. Two sherds with black slips but coarser fabrics than the above. At first these were thought to be of possible local Balinese origin since the gritty fabrics matched many local sherds, but both the NAA and XRD results proved otherwise. These two sherds are NAA samples 11 and 22, both from black-slipped and probably flat-based bowls, a form resembling that of the Rouletted Ware. Sample 11 has the Kharoshthi graffito - perhaps a sure sign of an Indian origin.
4. NAA samples 15-21 and 24-6 form a varied group of sherds, all typologically of local Metal Phase origin, although not necessarily all manufactured in Bali. Sample 23 is a modern sherd from Banyuning in north Bali, put in for sourcing

information. Subdivisions within this group will be discussed later, after the NAA results are presented.

Procedure.

The 26 sherd samples were each ground into powder with a pestle and mortar following instructions given by Mr Roy Doyle of the Geology Department at ANU. They were then placed in the standard capsules used for NAA analysis. The samples were submitted by Dr Bruce Chappell of the Geology Department to the Australian Nuclear Science and Technology Organisation at Lucas Heights in Sydney for the NAA analyses. Funding for fourteen of these samples was provided by AIDAB, while the rest were kindly submitted by Dr Chappell with samples from other projects.

The results came back from ANSTO in the form of parts-per-million readings for 20 or 22 trace elements (two extra elements were added for the second set of samples run). Percentages by weight of Na₂O and FeO were also provided. Visual inspection of the columns of figures quickly showed that the first ten samples - all Rouletted Ware except for the orange sherd (NAA sample 9) - were so closely related that a single source of manufacture seemed to be the only possible conclusion. However, the other sherds were impossible to differentiate with clarity, except for the black-slipped and resin-glazed examples of other imported ware (samples 12, 13, 14, and also sample 22, but not 11) which looked very similar, but not identical, to the Rouletted Ware. The next step, therefore, was to request Dr Ross Cunningham of the Department of Statistics at ANU for assistance in the manipulation of the data by average link cluster analysis and principal components analysis.

The results of these analyses, set out in figures B.1 and 2, clearly suggest the following conclusions:

1. Samples 1-10 and 12-14 form a tight group, with 22 placed a little more distant on principal components. In the Average link cluster diagram it can be seen that samples 12, 13 and 22 form a subgroup slightly removed from the others, whereas 14 goes in with the Rouletted sherds. This suggests two sources for all these sherds, both perhaps geographically close to each other and using closely related clays.
2. All the other sherds are clearly more diverse in trace element quantities and the two statistical methods used do not offer any consistent groupings apart from that for NAA samples 15, 21 and 25. Sample 26 stands apart in both diagrams.

Following further discussion with Geology staff members it was decided to extend the comparisons by using a technique of graphical comparison for a more restricted number of trace elements, rather than for all the readings. The necessary calculations were kindly carried out by Dr David Ellis of the Geology Department, who also provided the "spider" diagrams reproduced here. Dr Ellis describes the technique as follows:

Spider diagrams. Rare earth elements are arranged on the horizontal axis of an X-Y graph in a particular order. The abundances of elements in each sherd sample are then divided by the abundances of the same elements in another reference sample. The result is that widely varying absolute abundances of elements are reduced to similar ratios. Samples with the same-shaped plot are therefore indicative of the same source material used to make the pottery. The different relative abundances are likely to be due to a mixture of clay with, for example, beach sand, which generally does not contain anything other than silica (SiO₂) and thus serves merely to dilute the amount of the elements, without changing the pattern.

Four reference samples were used to produce the ratios in the spider diagrams - North American shale, Oceanic island basalt, primitive mantle, and one of the samples of Rouletted Ware from Anuradhapura. These spider diagrams are shown as figures B.3 and Dr Ellis' major observations (pers. comm.) are as follows

1. In terms of rare earth elements (Fig B3, 1-3), samples 1-10 form an exceptionally coherent group which almost certainly came from the same source/factory, using clay from a single location. The high reading for zircon in sample 7 in the Ceylon 1 diagram can be accounted for by the fortuitous presence of a grain of zircon in the analysed sample.
2. Samples 12, 13, 14, and 22 are also very similar to samples 1-10, but are not so homogeneous and may reflect minor source variation.
3. Sample 11 (the graffito sherd) reflects a different source from all the other Indian samples.
4. Of the presumed Balinese sherds, samples 17, 18, 23 and 24 are from one source, presumably in the vicinity of Banyuning in northern Bali (sample 23 is the modern sherd from Banyuning). They are characterized by a distinct depletion in the abundance of light rare earth elements (LREE) - La, Ce and Nd, compared to the heavy rare earth elements. It is interesting that these four sherds also form a subgroup in the average link cluster analysis.
5. Sample 19, the bottle rim, appears to have a unique signature, which is interesting since red-slipped and high-necked bottles are very widespread in Early

Metal Phase Island Southeast Asia. Perhaps they were made in a limited number of places.

6. Sample 26, a jar sherd with an incised swirling star motif on its rim, also has a unique signature. This sherd also separates widely from all the others in the principal component and cluster analyses.

7. The remaining samples (15, 16, 20, 21 and 25) do not form a coherent group, although (as noted above) samples 15, 21 and 25 cluster in both of the multivariate analyses, as do 16 and 19.

Summarising all this information, we have the following groups in order of internal consistency:

1. The Rouletted Ware (including orange sherd sample 9), all from one place of manufacture. The significance of this observation for the study of early historical India needs no emphasis - Rouletted Ware has been found in many eastern Indian sites, and if further samples show the same signatures as the ones analysed here it is clear that Indian archaeologists are one day destined to locate a mega-factory complex of kilns.
2. The black-slipped and resin-glazed sherds, (samples 12, 13, 14), presumably Indian (they are certainly not Balinese on typological grounds) and quite possibly made in or very close to the source of the Rouletted Ware. Sample 22 may also belong to this group.
3. The graffito sherd sample 11 - could this be from a Ganga source, perhaps somewhere in West Bengal in accordance with the existence of other Kharoshthi epigraphic materials there?
4. Balinese vessels with corrugated or rolled rims of type 2.7 - made in or near Banyuning (samples 17, 18 and 24).
5. The high-necked flasks (sample 19), made in unknown locations (and not necessarily in Bali).
6. Sample 26 with its unusual incised design - of unknown origin.
7. Samples 15, 21 and 25 - one local Balinese source?
8. Sample 16 - a black-burnished bowl of presumed local (i.e. Indonesian) manufacture, possibly related to the flask sample 19.
9. Sample 20 - the Buidane type rim - could this be from a Sulawesi source?

If any conclusion is possible for the above, it can only be that pottery was being brought into Sembiran around 2000 years ago from a very large number of sources. Even if the Indian imports are excluded, we are still left with the observation that the local wares probably came from a number of Indonesian sources, many perhaps in other

islands such as Java and Sulawesi. Perhaps this is no more than would be expected, given the nature of the Sembiran site and its obvious international connections.

Further NAA analysis of Indonesian sherds from this period is clearly warranted. It is quite possible that Indonesian pottery manufacture during the Early Metal Phase, like that of today, was not undertaken by all communities across the archipelago. Certain villages would have specialised in making certain kinds of pots, which would then have been exported by perahu to destinations often hundreds of kilometres distant. Indeed, many of the villages which specialised in potting into the ethnographic period (and still now in some cases) might have held monopolies for centuries. A major programme of pottery sourcing, using potting clay samples as well as archaeological sherds, would clearly produce some very interesting results. The only drawback at present is the high expense of NAA analysis, at around AUD \$1000 for a set of 14 samples.

Figure B. 1
 Dendrogram of Average Linkage Cluster Analysis of NAA results for sherds from Sri Lanka, India and Bali

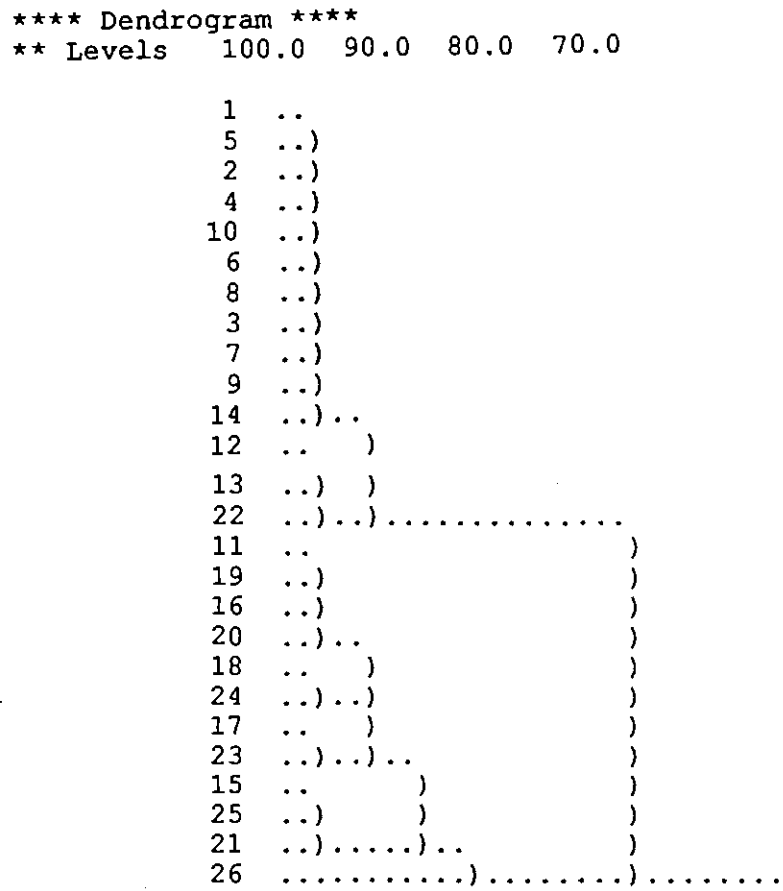


Figure B.2
 Diagram of Principle Components Analysis of NAA results for sherds from Sri Lanka,
 India and Bali

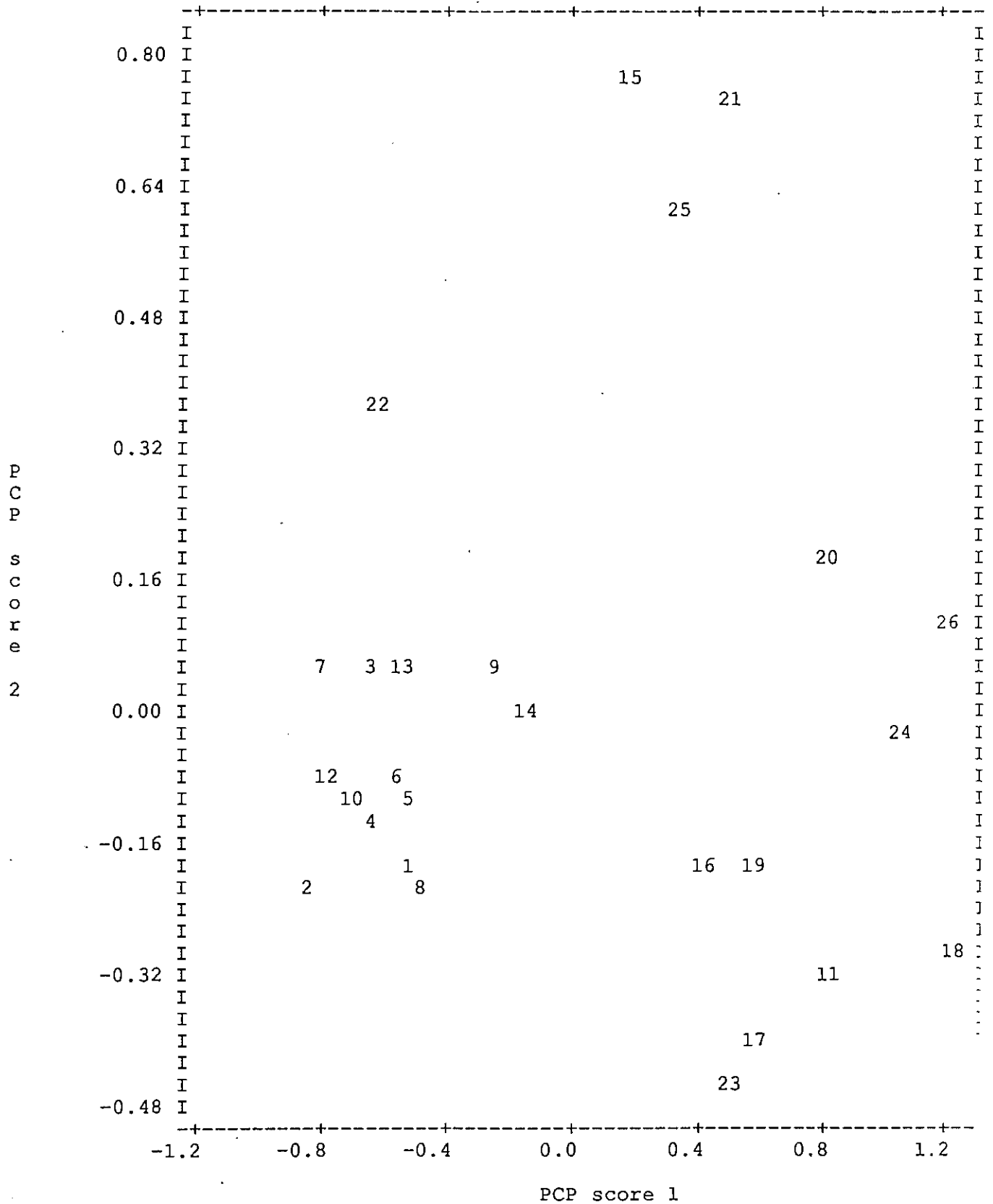
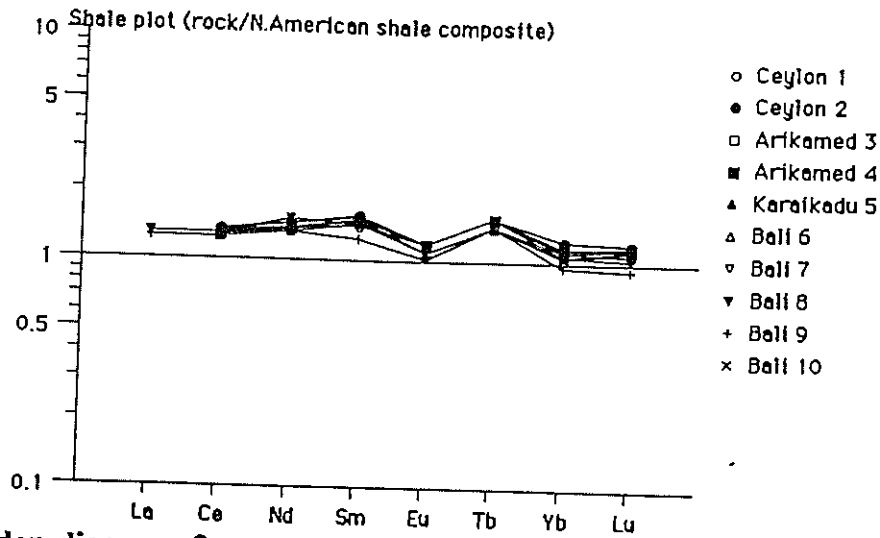
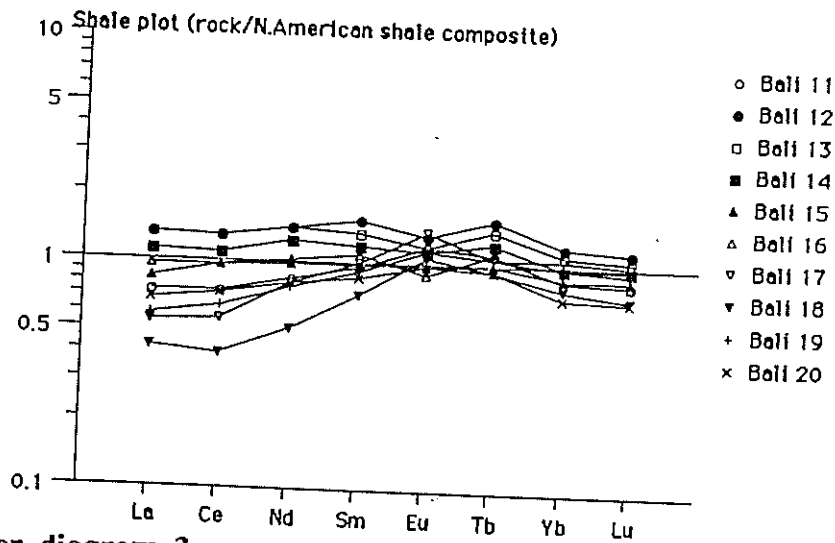


Figure B.3: Rare earth element plots for Balinese, India and Sri Lanka pottery.

Spider diagram 1



Spider diagram 2



Spider diagram 3

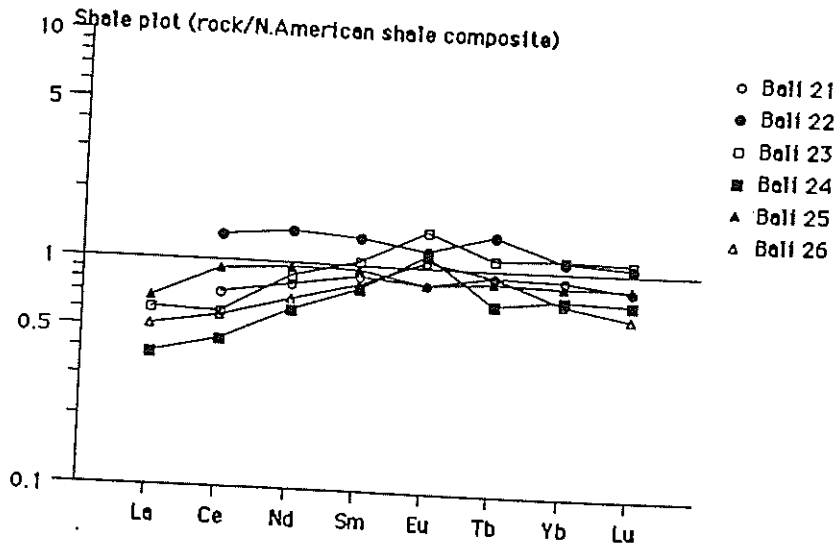
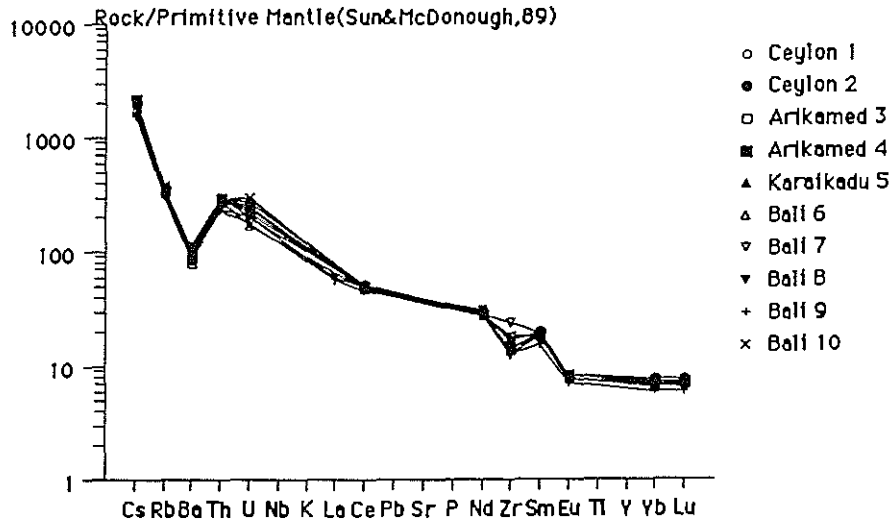
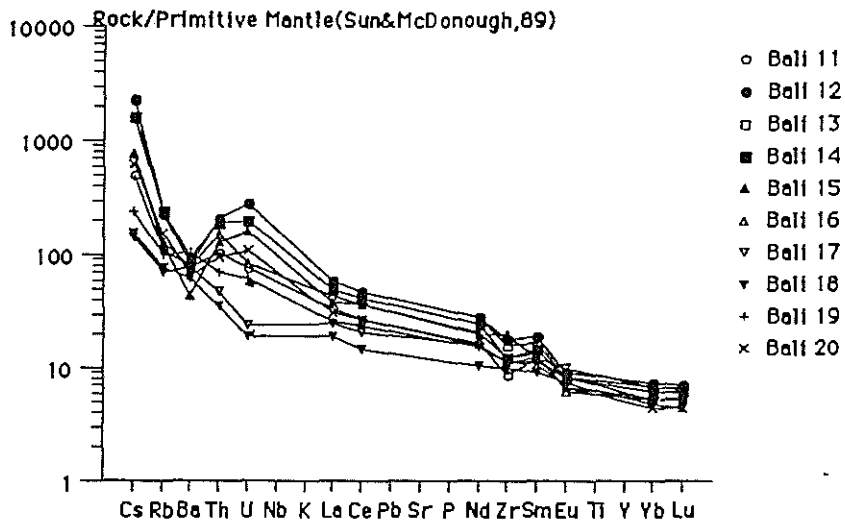


Figure B.3 continued

Spider diagram 4



Spider diagram 5



Spider diagram 6

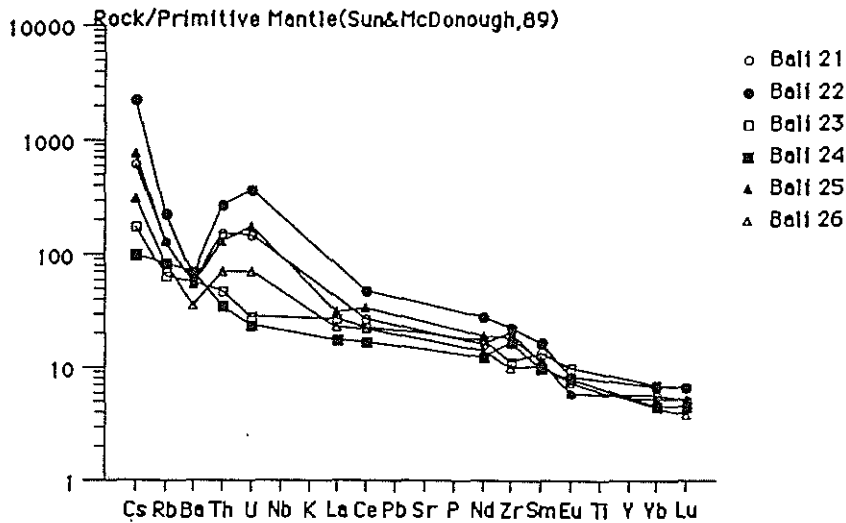
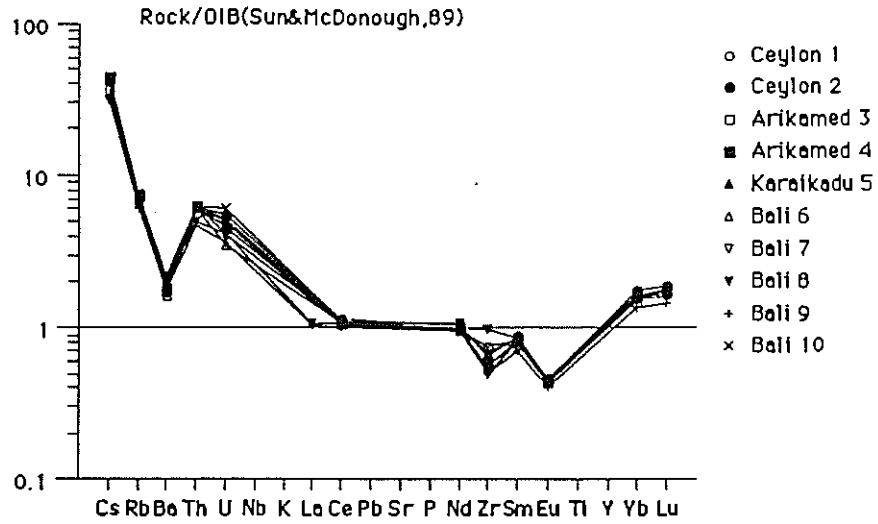
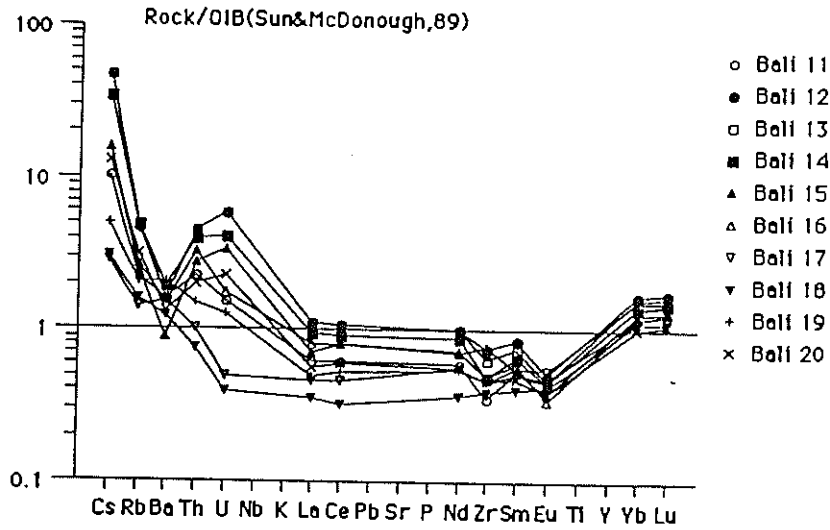


Figure B.3 continued

Spider diagram 7



Spider diagram 8



Spider diagram 9

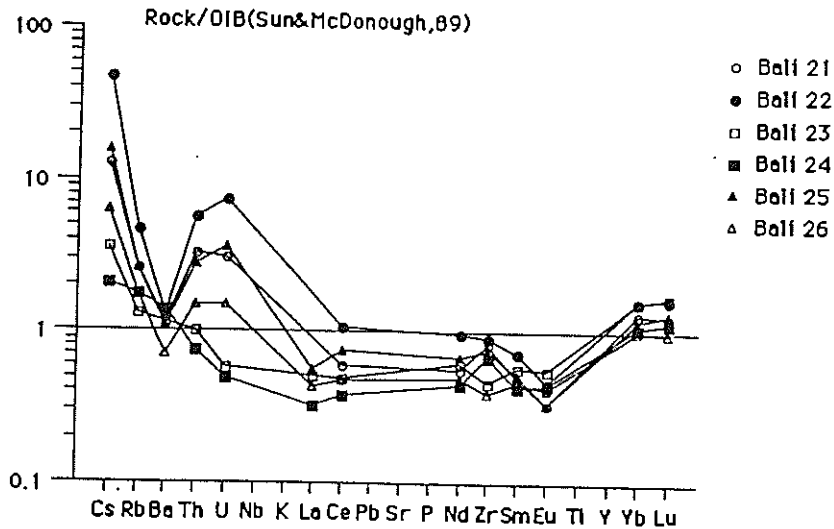
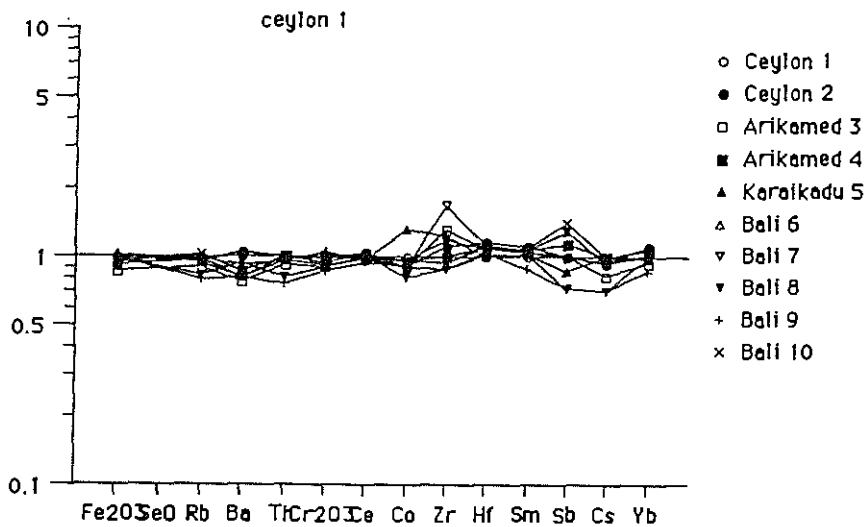
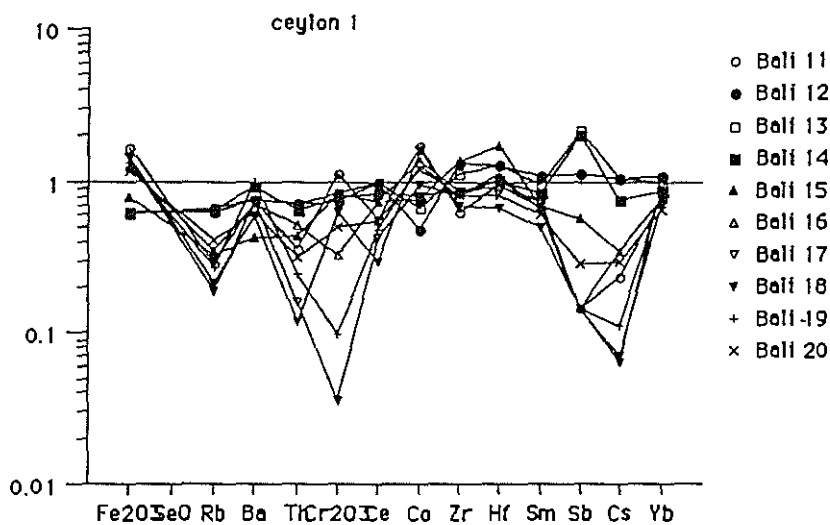


Figure B.3 continued

Spider diagram 10



Spider diagram 11



Spider diagram 12

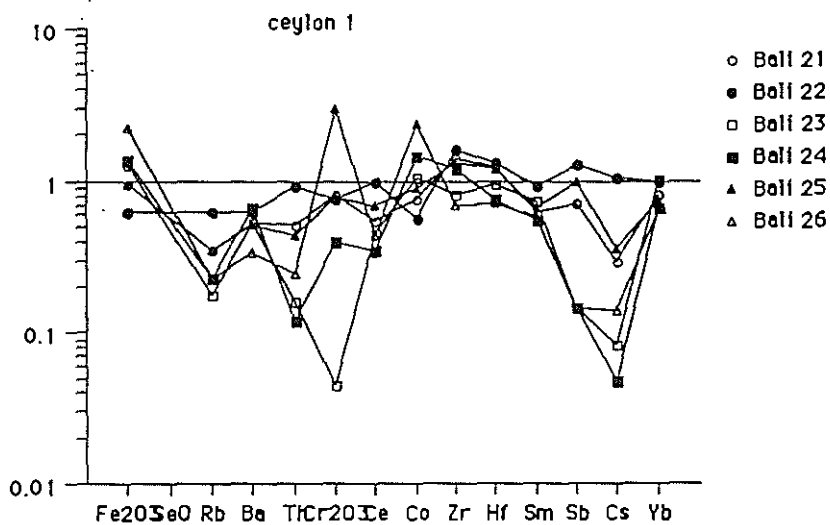


Table B.1

NAA parts-per-million concentrations for the analysed samples (Na₂O and FeO are percentage weights)

	SAMPLES							
	1	2	3	4	5	6	7	8
Na ₂ O %	-	-	-	-	-	-	-	0.66
Fe %	6.8	6.2	5.9	6.6	6.8	7.0	6.3	6.61
Sc	20	19	17	19	19	19	19	19
Cr	112	110	100	110	116	103	106	101
Co	21	19	19	20	28	20	19	17
Rb	235	226	210	226	228	220	230	195
Zr	160	180	210	160	200	150	270	140
Sb	0.7	0.7	0.7	0.8	0.6	0.9	0.9	0.5
Cs	17	16	14	17	17	16	16	12
Ba	740	780	570	630	680	590	600	690
Hf	3.7	4.3	4.0	4.1	3.7	4.1	4.2	3.8
Ta	-	-	-	-	-	-	-	3.8
W	4	5	6	5	4	6	6	4.5
Th	25	25	23	25	24	24	25	20
U	4.2	5.7	5.0	4.6	5.1	3.6	5.3	4.2
La	-	-	-	-	-	-	-	40
Ce	87	91	85	87	83	85	89	87
Nd	38	40	38	38	36	37	38	41
Sm	7.9	8.8	8.3	8.4	8.1	8.4	8.5	8.0
Eu	1.4	1.4	1.3	1.4	1.3	1.3	1.4	1.4
Tb	1.3	1.3	1.2	1.3	1.2	1.2	1.3	1.3
Ho	3.4	3.8	3.2	3.6	3.3	3.4	3.5	3.3
Lu	0.50	0.56	0.52	0.53	0.52	0.53	0.54	0.48

Table B.2

	S A M P L E S								
	9	10	11	12	13	14	15	16	17
Na ₂ O %	0.79	-	0.84	0.40	0.50	0.75	1.23	1.48	2.23
FeO %	6.68	6.4	11.24	4.25	4.18	4.31	5.37	8.52	9.54
Sc	18	20	32	19	20	18	14	17	24
Cr	97	112	126	83	95	88	93	36	4
Co	19	20	36	10	14	17	16	29	20
Rb	186	240	68	146	157	150	76	83	44
Zr	140	190	100	210	180	140	220	140	130
Sb	0.5	1.0	<0.1	0.8	1.5	1.4	0.4	0.1	<0.1
Cs	12	17	4	18	18	13	6	6	1.1
Ba	600	630	550	560	560	680	310	530	540
Hf	3.9	4.0	3.5	4.7	4.7	3.8	6.4	3.4	3.8
Ta	3.2	-	1.6	2.9	2.9	2.5	1.7	1.7	1.0
W	4.5	5	1.5	3.5	3.5	3.5	3.5	2.0	1.5
Th	19	25	9	18	18	16	11	13	4
U	3.7	6.1	1.6	5.9	5.9	4.2	3.4	1.8	0.5
La	39	-	23	41	41	35	26	30	17
Ce	82	89	49	86	86	73	64	64	37
Nd	36	40	23	39	39	34	27	28	22
Sm	7.0	8.6	5.3	8.6	7.5	6.6	5.5	6.1	5.6
Eu	1.2	1.4	1.40	1.55	1.40	1.35	1.15	1.05	1.65
Tb	1.2	1.3	0.95	1.35	1.20	1.05	0.85	0.95	0.90
Ho	1.3	1.3	1.05	1.70	1.45	1.20	1.15	1.05	1.30
Yb	2.9	3.6	2.6	3.7	3.4	3.0	2.7	2.6	3.3
Lu	0.43	0.52	0.38	0.53	0.49	0.45	0.40	0.38	0.47

Table B.3

S A M P L E S

	18	19	20	21	22	23	24	25	26
Na ₂ O %	2.00	1.99	1.63	-	-	2.69	1.78	0.44	0.73
FeO %	9.92	9.11	7.88	6.6	4.2	8.70	9.32	6.42	15.27
Sc	45	22	21	16	18	24	28	15	15
Cr	70	11	56	91	84	5	44	89	340
Co	34	27	25	16	12	22	31	19	50
Rb	50	64	97	81	146	41	54	81	54
Zr	110	130	130	230	260	130	190	210	110
Sb	0.1	0.1	0.2	0.5	0.9	<0.1	<0.1	0.7	<0.1
Cs	1.2	1.9	5	5	18	1.4	0.8	6.1	2.4
Ba	430	730	460	400	460	400	490	380	250
Hf	2.5	4.2	3.0	4.6	4.9	3.5	2.8	4.5	2.6
Ta	0.6	1.0	1.4	-	-	0.9	0.9	2.5	1.5
W	1.5	2.0	2.0	3	3	2.0	1.5	3.5	1.5
Th	3	6	8	13	23	4	3	11	6
U	0.4	1.3	2.3	3.1	7.6	0.6	0.5	3.7	1.5
La	13	18	21	-	-	19	12	21	16
Ce	26	42	48	48	86	40	30	61	38
Nd	14	21	22	22	38	24	17	26	19
Sm	4.0	5.1	4.8	5.0	7.4	5.9	4.4	5.3	4.6
Eu	1.25	1.35	1.15	1.0	1.40	1.70	1.35	1.00	1.25
Tb	0.80	0.90	0.80	0.80	1.2	0.95	0.60	0.75	0.80
Ho	1.00	1.15	0.90	0.60	1.2	1.45	1.05	1.20	1.00
Yb	2.4	3.0	2.2	2.8	3.4	3.5	2.3	2.6	2.2
Lu	0.33	0.43	0.32	0.38	0.49	0.51	0.34	0.39	0.29

Notes:**Samples No:**

- 1 Rouletted Ware
- 2 Rouletted Ware
- 3 Rouletted Ware
- 4 Rouletted Ware
- 5 Rouletted ware
- 6 Rouletted Ware
- 7 Rouletted Ware
- 8 Rouletted Ware
- 9 Orange Indian sherd
- 10 Rouletted ware
- 11 Graffito sherd
- 12 Black slipped sherd
- 13 Resin glazed sherd
- 14 Resin glazed sherd
- 15 Pedestal sherd (vessel form G)
- 16 Black burnished bowl (rim type 1.2)
- 17 Rim type 2.8 (red)
- 18 Rim type 2.8 (brown and coarse)
- 19 Rim type 4.1 (bottle rim)
- 20 Rim type 2.6 (Buidane type rim)
- 21 Local sherd
- 22 Coarse and black slipped ware
- 23 Banyuning modern sherd
- 24 Rim type 2.7 (Gilimanuk type)
- 25 Rim sherd with stamped lip (rim type 1.2)
- 26 Rim sherd with incised motif

Sites:

- Anuradhapura (Ceylon)
idem
Arikamedu (Tamil Nadu/India)
idem
Karaikadu (Tamil Nadu/India)
Sembiran VI spit 33 (Bali)
Sembiran IV spit 31 (Bali)
Pacung I spit 34 (Bali)
Sembiran VII spit 30 (Bali)
Sembiran VII spit 35 (Bali)
Sembiran VII spit 35 (Bali)
Sembiran VII spit 34 (Bali)
Sembiran VII spit 34 (Bali)
Sembiran VII spit 36 (Bali)
Sembiran VII spit 34 (Bali)
Sembiran VI spit 36 (Bali)
Sembiran VI spit 28 (Bali)
Sembiran VI spit 33(Bali)
Sembiran IV spit 34 (Bali)
Sembiran VII spit 34 (Bali)
Sembiran IV spit 33 (Bali)
Sembiran VII spit 36 (Bali)
Banyuning north Bali
Sembiran VI spit 36 (Bali)
Sembiran VII spit 33 (Bali)
Sembiran VII spit 33 (Bali)

APPENDIX C
Phytolith Analysis
by
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A 'quick-look' analysis has been carried out on this group of five sediments. An easily recognisable phytolith cell was selected for scanning purposes. The cell selected was the large bulliform or motor cell secreted by many grasses. A phytolith reference collection is not available for Indonesian vegetation. However, by reference to illustrations of this cell published by Fujiwara (1976, 1978, 1982), Kondo (1977) and Sato *et al* (1990) it was possible to distinguish between rice and other grasses. Table 1 lists these findings.

Table 2 summarises data noted during extraction procedures and microscope scanning. Included are starch grains and carbon particles which survived the extraction procedures. The quantitative representation of these materials is not known. The column 'Defloculation changes' indicates the relative presence of clay in the sediments.

Comments on individual sediment samples are as follows:

Sample 478 (300-380 cm)

100% scan High presence of grasses. Total of 20 bulliform cells, 12 of these *oryza* and possibly four other *oryza* cells. Many phytoliths contain cytoplasmic carbon. No starch grains or carbon particles noted. Lowest number of defloculation changes.

Sample 477 (240-300 cm)

100% scan High presence of grasses. Total of 22 bulliform cells, six of these *oryza* and possibly three other *oryza* cells. Many phytolith contain cytoplasmic carbon. Palmaea cell noted. A few starch grains were observed. No carbon particles noted. Increase in clay content.

Sample 476 (200-240 cm)

100% scan Very phytoliths present. Total of 5 bulliform cells, no *oryza* cells. High presence of cells containing cytoplasmic carbon. A few starch grains observed. No carbon particles. Increase in clay content.

Sample 475 (c 200 cm)

50% scan Highest density of phytoliths. High presence of grasses. Total of 20 bulliform cells, possibly one *oryza* cell. Palmea cell noted. Reduction of cells containing cytoplasmic carbon to c 30%. No starch grains observed. Few carbon particles noted. Reduction in clay content.

Sample 474 (156-190 cm)

100% scan High presence of grasses. Total of 15 bulliform cells, possibly one *oryza* cell. Increase in number of cells containing cytoplasmic carbon. Starch grains and carbon particles noted. Increase in clay content.

Table 1: Bulliform cells, Pacung site

Slide	Depth cm	Total bulliform cells	Oryza cells	Possible Oryza
474	156-190	15		1 (6.6%)
475	200	20		1 (5%)
476	200-240	5		
477	240-300	22	6 (27.2%)	3 (13.6%)
478	300-380	20	12 (60.0%)	4 (20.0%)

Conclusions

It is suggested that *oryza* was growing at the site during the period of the two oldest horizons (478-477). Presence of cytoplasmic carbon in the phytolith cells indicates carbon in the atmosphere during a plant's growth period. Perhaps evidence for a volcano emitting carbon or erupting nearby. From the phytolith evidence, it is suggested that a catastrophic event occurred between sediments 477 and 476 (240 cm), causing a dramatic reduction and change to the vegetation. sediment 476 shows sparse vegetation and grasses of a different species to those growing at the site before this event. At 475 (200 cm) the number of phytoliths deposited are the highest seen for the profile. The lowest number of cells containing cytoplasmic carbon occur in this horizon, indicating the cleanest atmosphere for profile. By 474 (156-190 cm) cytoplasmic carbon has increased and vegetation is less dense than in the previous horizon.

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TABLE 2: Summary of lacung site phytolith extraction + microscope scanning data (Quick scan)

Sample #	Depth below surface cm	Approx age ky	Extraction process			Residue sg < 2.3 ϕ	Phytolith		Microscope scanning	
			Defolculator changes* (Egm sample)	Discard 25 μ sieve	% sample discarded		Bulliform cells	Oryza cells	Possible Oryza cells	starch grains
474	156-190		31	16.6	1.77-1.30 (lat c.4.25)	0.04	15	-	present	present
475	200		24	31.78	< 2000 μ	0.24	20 (50% scan)	-	1(5%)	few
476	200-240		31	20.00	< 250-2000	0.04	5	-	present	-
477	240-300		24	33.4	upto 4.20 v. post sort	0.18	22	6 (27.2%)	3 (13.6%)	few
478	300-380		12	40.58	< 88-170 mod. sort	0.18	20	12 (60.0%)	4 (20.0%)	-

* Indicates presence of clay
 @ Includes biogenic silica + other material with specific gravity less than 2.3

APPENDIX D

THE TRADEWARES FROM THE SEMBIRAN EXCAVATIONS

by

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Introduction

Ardika's excavations in and around Sembiran, northeast Bali, recovered 41 tradeware sherds weighing 165 grams and representing probably 39 vessels. Most of the sherds come from the trench of Julah I (JLH I) between 80 and 110 cm below the surface, above one other sherd much lower in the profile. The three sherds from Sembiran I (SBN I), and four of the five sherds from Sembiran V (SBN V), were excavated at depth between 90 and 110 cm. The only sherds from the upper excavated spits are one from Sembiran V and the three from Bangkah II (BKH II). If we group together the spits of similar depth within each trench, we see that the total assemblage consists of quite evenly distributed proportions of "coarse stoneware" sherds from jars of coarse manufacture, and other sherds from open small covered vessels (Table 1).

Table 1. Distribution of the Sembiran tradeware sherds by trench and spit.

Trench and 10 cm spit	Coarse stoneware sherds		Other sherds	
	Number	Weight (gm)	Number	Weight (gm)
BKH II (1)	0	0	1	3
BKH II (2)	1	3	1	3
SBN V (2)	0	0	1	13
SBN V (10)	0	0	1	5
SBN V (11)	2	6	0	0
SBN V (12)	0	0	1	3
SBN I (10)	2	6	0	0
SBN I (11)	0	0	1	5
JLHI (9)	8	38	7	22
JLHI (10)	9	40	3	4
JLHI (11)	0	0	2	7
JLHI (17)	1	2	0	0
TOTAL	23	95	18	70

My identifications follow the tradeware classification system developed in South Sulawesi (see Hadimulyono and Macknight, 1983), as modified during the "South Sulawesi Prehistorical and Historical Archaeology Project" (SSPHAP) which recorded 11th to 20th century tradeware from Bugis-Makassar historical sites. SSPHAP's modification were based on a number of key sources including Anon (1974), Macintosh (1977), Harrison (1979), Medley (1980), Willetts (1981), Adhyatman and Ridho (1984) and Guy (1986). Unusually, SSPHAP's system divides the Swatow category into "Ming Swatow", "Swatow" and "Qing Swatow", but as we shall see this division can be useful. One advantage of the system is the internal evidence on chronology from the systematic co-occurrences of tradeware classes within assemblages, including the first ever statistically based seriation of tradeware classes. The other advantage lies in the pains taken to identify the tradewares by Karaeng Demmanari (of Suaka Peninggalan sejarah dan Purbakala Sulawesi Selatan) and myself. Macroscopic features of the decorations, body, and glaze provided no more than a preliminary identification, subsequently corrected or confirmed by the microscopic traits seen with a 30X (hand lens) view of the body (at a location where the sherd wall was snapped to expose a fresh cross-section) and the glaze (Kallupa *et al.*, 1989).

SSPHAP's tradeware study included the description of approximately 2,000 South Sulawesi tradeware specimens with a standardised set of metric and semi-discrete traits. Of these 24, the nine which appeared most useful for identifying tradewares were entered into a Borland (1987) *Reflex* database, along with certain other tradeware data (Bulbeck, in prep). This report describes the Sembiran sherds for these nine traits and compares them with SSPHAP's samples.

Brief Overview of Tradewares within Island Southeast Asia

Despite the claims that some Chinese wares dating to the early 1st millennium AD found their way to the Indo-Malaysian archipelago, there is as yet no clear archaeological evidence of Chinese wares traded to the archipelago before the 9th century (e.g. Guy, 1986). But tradeware of the late Tang Dynasty and Five Dynasties (9th-10th centuries) have been recovered from scattered sites in the Philippines, Borneo, Java, Sumatra and Malaya (Guy, 1986, 1987) and fall within a wider distribution of similarly sporadic

occurrences from Japan to Iraq (Feng, 1981). The Changsha wares comprise a distinctive type, but the other main classes, early Yue-type wares, stoneware whiteware bowls with externally fattened rims ("Samarra" wares), and the oldest examples of the gusi and related stoneware jars, are not easily distinguished from their Song dynasty counterparts (see Guy, 1986 and Harrison, 1986). The Song dynasty have been recovered widely from the parts of the archipelago listed above (Guy, 1987), and also from South Sulawesi-Selayar island (Naniek, 1983), sites near Ujung Pandang (Bulbeck, 1988), and less certainly Soppeng (Kallupa *et al.*, 1989).

During the Song dynasty some new types also found their way to the archipelago. These include rare iron-painted wares such as those recovered from Tioman island (Lam, 1985), but especially a range of porcellanous whitewares and stoneware monochromes whose production continued into the Yuan and early Ming dynasties (e.g. Kwan and Martin, 1985). Abundant sites in island Southeast Asia have produced 13th-14th century wares (e.g. Guy, 1986, 1987), reflecting the culmination of a policy originally adopted by the Northern Song court to stimulate the shipbuilding industry and promote the export of Chinese manufactures (Lo, 1969, Feng, 1981).

Overglaze enamels had been developed in north China to decorate some Jizhou wares by the end of the 12th century (Medley, 1974:115), and the technique of cobalt decorations under the glaze, producing blue and white (BW) wares on firing, was adopted from Persia by Chinese potters in the early 14th century (Guy, 1986:25). Particularly the latter technique grew to dominate Chinese decorated wares from the early 15th century onwards (Guy, 1986: 34 ff.). However, the early Ming (late 14th to early 15th century) emperors attempted to bring international trade within the realm of tributary relationships by banning their subjects from private export trade. The policy caused a sharp decline in the export of Chinese tradewares to the islands, and indirectly facilitated the expansion of production at the Vietnamese kilns, and the Si Satchanalai kilns in central Thailand, to meet export as well as local demands. Even though imperial China's prohibition against private exports was not formally rescinded until the end of the 16th century, traders within China or attached to Southeast Asian ports participated in a wave of Chinese commercialism during the late 15th and 16th centuries. Nonetheless by this time the Vietnamese and Thai kilns had well established capacities for export production which did not suffer a notable diminution until the 17th century (Guy, 1986). As the upshot of all this, a clear "Ming horizon" is present in numerous habitation, graveyard and shipwreck sites throughout the Indo-Malaysian archipelago. With few exceptions the assemblages are dominated by Chinese BW wares, with smaller proportions of: Chinese iron-painted wares, enamelled polychromes, whitewares and monochromes; Vietnamese

wares of the same types as their Chinese counterparts; iron-painted Thai wares with smaller frequencies of Sawankhalok greenwares and other monochromes; and coarse stoneware jars from all three places (Guy, 1986, 1987; Bulbeck 1988).

At the end of the 16th century, and apparently throughout the 17th century, the distinctive Swatow wares (named after a port in South China) became a major trade item. Stoneware and coarse porcellanous plates dominated the otherwise wide range of forms, usually decorated with a distinctive range of motifs, mainly BW but also in overglaze enamels (Harrisson, 1979). The "Ming Swatow" category in the South Sulawesi system describes a class of wares clearly contemporary with the well known, 16th century "Ming BW" tradewares (Kallupa *et al.*, 1989). These Ming Swatow wares differ from the Swatow wares (as described by Harrisson, 1979) in being coarser, both in body and decorations, with the decorations often dominated by splotchy floral motifs. (Numerous examples are depicted in Goddio, 1988). The South Sulawesi "Qing Swatow" category (on the other hand) refers to the application of Swatow motifs, especially those used to decorated Swatow plate rims, to fine porcelains, notably bowls. Seriation shows these Qing Swatow wares were exported in the early Qingdynasty (Kallupa, *et al* 1989).

During the Qing dynasty a new range of motifs became established, as well as the addition of a gold and tin oxide enamel to the repertoire of overglaze enamels (Medley, 1980). The technology for producing fine porcelains in bulk was perfected, resulting in the "Chinese Imari" and related BW and enamelled wares (as dominated the 1760s Geldermalsen cargo - van der Waals and Sheaf, 1986), and their developed descendants which comprise most of the "Kitchen Ch'ing" BW wares described by Willetts (1981). Stoneware bowls and plates, similar to Swatow wares in terms of the forms potted and the rustically charming BW decorations (but not the actual motifs applied), were also produced during the Qing dynasty. These include wares 3201-3241 from the Geldermalsen cargo (van der Waals and Sheaf, 1986), and the Fu and related plates within Willetts (1981) "Kitchen Ch'ing". China continued to export large stoneware jars (e.g. Harrisson, 1986) and pinkish-bodied greenwares and other monochromes (the "Siam" category of Hadimuljono and Macknight, 1983).

Japanese porcelains, similar overall to their Chinese counterparts, began to be exported to and through Southeast Asia in the 17th century (Jenys, 1979:56-65). In the 19th and early 20th centuries, Europe became a major exporter of tradewares to Southeast Asia (Kwan and Martin, 1985:80). For instance, between the mid 19th and initial 20th centuries, the Netherlands Indies consistently expended more on its tradewares imported from Holland than from all other places combined (see Koloniaal Verslagen).

Introduction to the Tables

Before we describe the Sembiran sherds, some explanation of SSPHAP's descriptive traits, as summarised in the tables, is required. Comparative data on the South Sulawesi tradewares classes are given to help secure the identifications of the Sembiran specimens. Hence the observed variability will be packaged to reflect specifically on the variants shown by the Bali sherds. In the tables, traits present externally or generally will be shown as "X", specifically internal traits will be shown as "I", while "C" stands for core traits.

Body colour

Reading are taken from the Munsell (1975) *Soil Color Charts* at a fresh section of the body exposed by snapping the sherd wall. Especially with the porcelains readings tend to be concentrated around the Munsell "white" to "light grey" spectrum. Within this range, finer determinations than allowed for by the Munsell readings are often desirable, and these are recorded as whiter than (<) or darker than (>) the closest Munsell reading. Outside of the white to light grey spectrum, recorded body colours tend to be widely dispersed and the Munsell readings must be pooled for the purposes of tabulation and comparison. Such pooling can be achieved firstly with reference to the Munsell colour names (e.g. combining all Munsell "reddish brown"), then with reference to the main colour determinants (e.g. combining the "reddish brown" with other Munsell "brown"), and finally by constructing still broader classes. The appropriate pooling steps vary with the wares considered, as detailed in the tables. Finally, walls, cores and other variations are recorded for heterogeneously coloured bodies.

Glaze colour

To fix a reading on glaze colour, I ignore areas of decoration (including where the glaze colour is affected by body surface relief) and weathered or otherwise discoloured sections. Once again the Munsell "white" to "light grey" spectrum is prominent, but here including the greenish and other greys set out in the Munsell (1975) "Color Chart for Grey". As with body colours, finer determinations and pooled categories are abstracted

from the colour charts, as explained in the tables. However, the potters also achieved glaze colours on their greenwares (and Bluewares) well beyond the Munsell range. Most non-Munsell colours can be satisfactorily addressed with the *Pottery Colour Chart* designed for Romano-British pottery (which Peter Bellwood kindly lent me for SSPHAP's fieldwork programme). Hence I distinguish between "gleywares" (greenwares whose glaze colour is covered by the Munsell gley colours) and "celadons" (greenwares with richer glaze colours). Further, glaze colour are noted as occurring on the sherd's interior or exterior surface wherever one of the surfaces is unglazed or the surfaces present different glaze colours. (With the BW wares, internal glaze colour is used because some types, e.g. the "Batavian wares", have a brown monochrome glaze externally. With the coarse stonewares, internal surfaces tend to be unglazed and so the external glaze is used).

Further body traits

"Percentage of inclusions" within the body matrix is estimated from the 30X inspection of the freshly exposed sherd wall. "Hardness" also determined at the fresh section, follows the Moh scale up to "6". However, "7" signifies harder than iron but softer than quartz, "8" signifies quartz hardness, and "9" signifies the body can scratch quartz but not vice versa. "Transcendency" is determined by shining a small torch with a concentrated light through the wall. These observations and body colour determine the "body type". "China porcelains" are white, hard, free of inclusions and transcendent. "Semi-porcelains" approach China porcelains, but appear sugary with glassy splinters when viewed at 30X. Stonewares are hard and opaque, but otherwise variable. "Proto-porcelains" are a type of homogeneous stoneware which appears chalky at 30X. "Earthenwares" are soft (hardness less than 7), porous, opaque, and usually inclusion-rich.

Further glaze traits

Thickness is ranked as "1" for vestigial glaze, "2" for glaze applied as a thin even sliver, "3" for glazes clearly visible as a macroscopic band in cross-section, "4" when the glaze becomes thick in places (e.g. at points of inflection), "5" for moderately thick glazes, and "6" for very thick glazes. The number of glaze applications is determined by 30X inspection of the glaze in cross-section. Finally, slips are determined by inspection of the cross-section or tell-tale variations in surface colour.

Inspection of the tables will show that some classes (e.g. Late Qing BW and

Sawankhalok monochrome) have not been adequately sampled, while other classes are copiously documented, especially the early whiteware and monochromes (whose identification is most prone to challenge and whose documentation I accordingly concentrated on). The number of observations for any tradeware class varies with the trait considered, for all sorts of reasons including the occasional omission of an observation, or isolated observations made during the laboratory work.

Finally, the tables include two changes from the system used by Kallupa *et al.* (1989). Firstly, SSPHAP's "Ming celadon cf. Yuan" and "Ming celadon" categories are here combined, because seriation demonstrated these categories, contemporaneity (Kallupa *et al.*, 1989). Secondly, coarse stoneware sherds are here classified to follow Harrison (1986). Wherever the same or very alike museum specimens of stoneware jars are concerned, Harrison (1986) gives age estimates highly comparable to those of Adhyatman and Ridho (1984). However, her research takes a step forward in using features of the sherds to describe seven classes from the 15th-16th century site of Kota Baru in Brunei. In order of frequency the classes are Sawankhalok (Ming antiquity); the often similar Brittle and Guangdong wares from China (10th to 20th centuries); two apparently Vietnamese types (Coarse Red and Go Sanh Red); and two Cambodian or rarer Thai classes (Coarse Brown and Wavy Line). But I may not have perfectly interpreted Harrison's (1986) sherd-based descriptions, so the quantitative descriptions given here may diverge slightly from what Harrison had envisaged.

Bangkah II

Bangkah II spit 1 sherd 1 (BKH II-1-1). This basal sherd to an open vessel has a fine, almost pure white stoneware body and a light, blue-green gley glaze (Munsell 5BG7/1). The extant greyish blue decoration consists of a weakly banded sheet which is not clearly diagnostic but resembles the Swatow style. Several of the characters are more typically early Qing or "Qing Swatow" than Swatow (Tables 2 to 5). These include the sherds regularly glaze base, as characterises over 90% of SSPHAP's sample of Qing bases, but which gives way to unglazed, chocolate, glaze splashed, dirty or pinkish-glazed bases in 23/32 Swatow bases. Nonetheless a Swatow (17th century) identification is preferable, especially because of the stoneware body and decorative style, with a "Qing Swatow" (c. 1650-1750) identification the next most likely option.

BKH II-2-1. This lower cavetto sherd to an open vessel has scarcely detectable, concentric bands of cobalt decoration, which have fired blue-greenish gley (Munsell 5BG6/1), and the outer section of an unglazed stacking ring on the inside (Figure 1). The

gley-coloured glaze, 5Y7/1 interiorly and 5G6/1 exteriorly (Table 2), is murky and crazed. The initial impression is late Qing, especially because unglazed stacking rings are so typical of Fu plates and related wares (e.g. Willetts, 1981:14; Geldermalsen specimens 3201-3328; four SSPHAP specimens). But stacking rings occur on much earlier wares, not only Vietnamese (e.g. Guy, 1986; 107) but also six Ming Swatow and two Swatow sherds in SSPHAP's comparative sample. The mottled, reddish to pinkish grey body of BKH II-2-1 (Munsell 5YR/2-6/2) falls beyond the range of observed Qing body colours but within the Ming Swatow and Swatow ranges (Table 3). Also, the concentric underglaze bands on the lower cavetto are typically Ming, so overall a Ming Swatow (16th century) identification is to be preferred.

BKH II-2-2. This body sherd to a vase or tall thin jar has a thin glaze which is mostly discoloured white, owing to an extremely dense presence of white specks and fibres at the glaze surface. The white discolouration clears away sporadically, particularly above depressions in the body, to reveal a greenish gley glaze. Interiorly, the reddish yellow (5YR6/6) slip thins away in places, leaving rust-like marks whose reddish brown (5YR5/3) colour is affected by the dark underlying body. Actually, only the body's thin walls are dark (N5/- or grey); the body's thick core is pale red (2.5YR6/2). The sherd's glaze and slip characters are shared with some greenware monochromes, notably Qing and Vietnamese, but these classes cannot match the sherd's body colours (Table 6 to 10). The sherd's body is fine and hard by the standards of most coarse stonewares, but within the range of some classes, notably Sawankhalok, Brittle and Guangdong, which can also show cored bodies with colours like those of BKH II-2-2 (Tables 15 and 16). None of SSPHAP's coarse stonewares matches the glaze colour of BKH II-2-2, but one Sawankhalok sherd had a green-brown glaze, and Adhyatman and Ridho (1984:184) describe a Thai jar 'with a pitted light green glaze'. Other Sawankhalok characteristics are the brown and white speckling of the body and the rust-like marks inside (cf. Harrison, 1986:36-37). BKH II-2-2 would therefore seem to be an example of a finer Sawankhalok jar.

The stratigraphic position of these three sherds within the uppermost spits of Bangkah II, and some of the characters of the sherds, might appear to suggest a Qing dating. However, as also confirmed to some degree by the lack of European sherds, close study suggests a Ming dating, more specifically the 16th to 17th centuries. By implication the Bangkah II excavated deposits are all 17th century and older.

Sembiran V (SBN V)

SBN-V-2-1. This brown glazed sherd (7.5YR5/4), probably from a plate but possibly a bowl, includes the footring whose diameter was around 8 cm. An unusual feature is the concentric line of grit atop the interior glaze, apparently left by a pontil rather than a disc spur, possibly reflecting seepage of the glaze into what was meant to be an unglazed stacking ring (Figure 1). The faintly cored body is unusual for a monochrome, with similar cores among SSPHAP's sample restricted to a few early monochromes. However, the sherd's fully glazed base (which includes a glaze-brushed footring base) suggests a Ming or Qing identification (Table 11). Other characters, including the pinkish body, suggest a Vietnamese or even better a Qing identification (Tables 6 to 11). Particularly given the sherd's stratigraphic position, it is most likely an (earlyish) Qing monochrome, with Vietnamese the next best suggestion.

SBN V-10-1. This sherd preserves the rim to a lotus bowl of around 18 cm diameter. The greyish blue decorations, a key fret interiorly and plantain leaves or a waterweed on the reverse, are "Yuan" in style, but particularly resemble the Yuan-inspired decorations which characterise Vietnamese BW tradewares (cf. Guy, 1986). The pinkish white body is more typical of Chinese than Vietnamese wares (Table 3), but other traits, including the pinkish white glaze (5YR8/2), could equally be Vietnamese or early Chinese (Tables 2, 4 and 5). The natural identification is 15th century Vietnamese, though Early BW (late 14th to early 15th century) remains possible.

SBN-V-11-1. The broken base with this sherd suggests a basal diameter of around 18 cm, while the unglazed interior suggests a jar or covered bowl (figure 1). The exterior is slipped greyish brown (2.5YR6/2) except for a peculiar sliver of glaze, Green-Brown A4 of the *Pottery Colour Chart*, present on the base. The specimen is quite clearly Sawankhalok as shown by its brownish rust-like spots inside, black and white speckled body (cf. Harrison, 1986:36-37), and hard stoneware body with few inclusions and pink to (light) grey core and walls (Tables 15 and 16). But the form of the foot - clearly inflected with respect to the body junction, and possibly even representing a footring, is most unusual for a Sawankhalok (or other) jar and unusual for a covered bowl. The basal diameter would also seem to be excessive for a covered bowl. Nonetheless a range of Sawankhalok vases and jars do show a clear footstand (Spinks, 1978:68,171-9), and SBN-V-11-1 probably represents one of these.

SBN-V-11-2. This thin, tiny sherd from the body or shoulder of a small jar shows a white slip (2.5Y8/2) both interiorly and exteriorly, remnant patches of a brown glaze (7.5YR5/4) exteriorly, and grey (N5/-) and very pale brown (10YR8/3) body walls. These traits suggest a Guandong or Brittle ware equally, while the soft body favours the

Brittle ware identification (Tables 12 to 16).

SBN-V-12-1. This thin rim to a conical bowl (Figure 1) suggests a rim diameter of around 18 cm. The thin "celadon" glaze is common for Vietnamese and pre-Qing Chinese greenwares (Tables 6 and 7); the grey body colour (10YR5/1) specifically suggests early Chinese (Table 8); while the lustreless glaze, quality of the paste, and conical form indicate Vietnamese. I prefer an early Vietnamese (13th to 14th century) monochrome, although some early Chinese (13th to 14th century) monochromes are not readily distinguishable.

The sherds from Sembiran V spits 10 to 12 could all belong to the 14th to 15th centuries. The sherd from spit 2 appears early Qing. These identifications would suggest that much of the top metre or so of deposits at Sembiran V represents Ming occupation.

Sembiran I (SBN-I)

SBN-I-10-1/2. These two sherds do not join but fairly clearly originated from the same coarse stoneware jar. Their minimal curvature suggests the cover or shoulder region. The dark "celadon" glaze (Green-Brown A2) covers both the interior and exterior surfaces, while the earthenware body varies between very dark grey (5YR3/1) and dark reddish grey (5YR4/2) on both sherds. Green-brown glazes occur on some large Chinese jars (e.g. Adhyatman and Ridho, 1986: Nos 12,17,24,40,77 and 91), while the other traits suggest a Brittle ware. The jar cannot be dated but may be early.

SBN-I-11-1. This footring and basal sherd (Figure 1) is a clear example of an early whiteware with a *qingbai* glaze (<5GY7/1) inside and an unglazed, light grey (10YR7/2) exterior. The footring diameter was around 9 cm and the vessel was probably an undecorated bowl. The short fat foot is unusual, although shared with some other early whitewares (e.g. Kwan and Martin, 1985: 90), and more unusually the original vessel apparently stood on the smoothed line around its inner footring. Other characters of this non-translucent semi-porcelain whiteware are given in Tables 7 to 11.

Ardika has informed me of a radio-carbon date corresponding to c. 1200 AD from SBN-I spit 10. Both sherds described here could well be Song (12th-13th centuries); the whiteware SBN-I-11-1 is too small and undiagnostic to prefer either a Song or a Yuan date over the other. However, the equally deeply stratified sherds from Sembiran V apparently represent an early Ming assemblage, indicating some degree of stratigraphic disconformity between squares I and V.

Julah I (JLH I)

JLH-I-9-1. This lower cavetto sherd to an open vessel has an unglazed, reddish brown (5YR5/4) exterior and a thin, greenish brown glaze interiorly (Figure 1). The reddish brown body (5YR5/3) has been recorded for Chinese but not for Vietnamese SSPHAP monochromes (Table 8), while the glaze traits are typical of early Chinese and especially Vietnamese monochromes (Tables 7, 9 and 11). On balance an early Chinese (13th to 14th centuries) identification is to be preferred.

JLH-I-9-2. This thin shoulder sherd to a jar retains a remnant of the handle attachment (Figure 1) around which the generally light olive brown glaze (2.5YR5/4) forms a very dark brown ring (10YR2/2). The handle would have been horizontally directed, hardly substantial at the section where it broke, and close to the neck. It closely matches the handles shown by Adhyatman and Ridho (1984:Plate No. 171) on a 14th-15th century Vietnamese brown jar, although similar handles can occur on Ming and earlier Chinese jars (Adhyatman and Ridho, 1984; Harrison, 1986). The individual traits suggest a Brittle or Guangdong jar (Tables 12 to 16), more probably Guangdong because of the fineness of the white and (still smaller) black inclusions in the body (cf. Harrison, 1986:40-42). (Harrison further suggests that Guangdong glazes were apparently poured in two coats, but SSPHAP's sample found only one coarse stoneware, and that a Sawankhalok sherd, with two glaze coats. Indeed the trait appeared too rare to warrant inclusion in the tables describing coarse stonewares).

JLH-I-9-3. The curvature on this small sherd suggests either the shoulder region or possibly the cover of a jar. The unglazed interior is reddish grey (5YR5/2), while the very dark greyish brown glaze (2.5YR5/2) appears curdled in places and overlies a thin white slip. The glaze and body colour together suggest a Guangdong ware (Tables 12 and 13), and the further body and slip traits (Table 16), including the predominance of small white inclusions in the body (cf. Harrison, 1986:40-41), agree.

JLH-I-9-4. The curvature of this rather thin sherd and its clear wheel lines inside suggest a jar cover, or possibly a shoulder. The interior is dark reddish grey (5YR4/2), and the grey body (5YR5/1) is covered by a black (5YR2.5/1) temmoku-like glaze which appears streaked in places. The traits shown in Tables 12 to 16 are compatible with Guangdong and Sawankhalok types, but the predominance of white inclusions in the non-porous body point to a (coarser) Guangdong ware (cf. Harrison, 1986:40-41).

JLH-I-9-5/10-4. These two sherds do not join but evince such similar traits that they must have come from the same large, wheel-made jar. JLH-I-9-5 come from the body and JLH-I-10-4 from the shoulder. The interior is glaze evenly, if very thinly, dark reddish brown (5YR3/2), while the slightly curdled exterior glaze is generally dark brown (7.5YR3/2). The body is finer than that of the two previously described specimens but otherwise similar, and the other traits (Tables 12 to 16) also point to a Guangdong ware.

JLH-I-9-6. This body sherd to a jar is of much coarser manufacture than the three previously described sherds, but similar in the emphasis on white inclusions in the body. The exterior glaze is predominantly olive brown (2.5YR4/4) with pale yellow curdling, while the extremely thin interior glaze is mostly curdled pale yellow and remains olive grey (5Y4/2) only in patches. The body shows a broad grey (N5/-) exterior wall and a very dark grey (N3/-) interior wall. Despite this last trait (Table 14), a Brittleware classification (cf. Harrison, 1986; see also Tables 12 and 16) is preferred.

JLH-I-9-7. This unglazed basal sherd shows fine wheel lines and an inflexion marking the start of the body interiorly, and the smoothed-over surface typical of jar bases exteriorly. From the wheel lines, basal diameter can be estimated as slightly greater than 22 cm. The body's walls are equal thickness; pink (5YR8/3) interiorly and grey (>N6/-) exteriorly. A SSPHAP Brittle ware sherd shows, and a SSPHAP Guangdong sherd approaches this last trait (Table 14). The sherd's thinnish base and concave exterior are described by Harrison (1986:41) as one type of Guangdong base. The other body traits (Table 7), including the nature of the inclusions and smoothness to the touch, are also commensurate with a Guangdong identification.

JLH-I-9-8. JLH-I-9-8 suggests a rim diameter of around 24 cm. Concentric bands of a dark brown glaze (7.5YR3/2) occur exteriorly (Figure 1). It has a similar body to the previous one, including the same coloured external wall and a similar coloured (7.5YR7/2) internal wall. Its fine wheel lines further suggest that both Guangdong sherds possibly came from the same original vessel.

JLH-9-9. This jar sherd has a concave shape on its glazed (exterior) surface, suggesting it might have come from the neck or the cover. A thin white slip underlies the dark yellow brown (10YR4/6) glaze, while the fine grained but soft body is reddish yellow (7.5YR7/6). Interiorly the surface retains the body colour, except where it is marked with dark reddish brown lines which would represent splashed glaze. These traits suggest Go Sanh Red (Harrison, 1986:38-39), a type not recorded in SSPHAP's sample but similar to the Coarse Red class (see Tables 12 to 16).

JLH-I-9-10. This sherd is a clear example of an early whiteware with a semi-porcelain body and *qingbai* glaze (<5B7/1). The well bevelled, unglazed rim suggests a covered bowl (Figure 1) with a rim diameter of around 16 cm.

JLH-I-9-11. This is another rim sherd to a classical "early whiteware", in this case a *Dehua* covered box. The extant decorations are moulded vertical ribs below a moulded horizontal ridge (Figure 1). The chalky, proto-porcelain body is coloured 10YR8/3, while the yellowish white glaze reads as 2.5Y8/2. (See Tables 7 to 11 for all traits).

JLH-I-9-12. This basal sherd to an open vessel, probably a plate to judge from the thickness, shows an unglazed base and a contoured centre (Figure 1). Its glaze colour is found with both whitewares and greenwares (Table 7), but the thinness (Table 9) and especially the clarity of the glaze, as well as the white stoneware body (Tables 8 and 11), point to an "early whiteware" identification.

JLH-I-9-13. This sherd come from the lower cavetto of a plate with a fairly glassy "celadon" glaze. Its fine stoneware body (evocative of *Longguan* bodies) and other traits are found equally with early and Ming celadons (Tables 6 to 11), and only the associated whitewares make the early (13th to 14th centuries) dating preferable.

JLH-I-9-14. The wheel lines beneath the external glaze of this small cavetto sherd suggest a large vessel, probably a plate. Despite the Sawankhalok-like glaze, the body is clearly Chinese (and very similar to the previous specimen's), so the greenish gley glaze tentatively indicates an early rather than a Ming greenware (Tables 6 to 11).

JLH-I-9-15. This thin sherd shows a faint vertical furrow exteriorly and may have come from a vertically ribbed bowl. The body could be Sawankhalok or Chinese, but the "celadon" rather than "gley" glaze would be unusual for a Sawankhalok greenware (Tables 6 to 11). Again, the associations suggest early rather than Ming Chinese.

JLH-I-10-1. The exterior surface of this rim/cavetto junction to a thin bowl displays greyish blue decorations which just catch the fringes of some BW design. The cobalt is fairly heaped beneath the glaze, suggesting an early date, but otherwise too little is present to decipher the possible age or motif. The light green gley glaze (5G7/1) could be any age (Table 2), while the technically perfect porcelain body suggests a Ming or

Qing dating (Tables 3 to 5). It is hard to date this Chinese BW sherd any earlier than the 15th century.

JLH-I-10-2. This cavetto sherd to an open vessel has a light grey proto-porcelain body which looks typically Vietnamese (see Tables 8 and 11), an impression strengthened by the plastic-like quality of the whitish (gley 5Y7/1) glaze. All its traits have been observed among SSPHAP's Vietnamese sample (Tables 6 to 11). Based on SSPHAP's seriation (Kallupa *et al.*, 1989: 93) this Vietnamese whiteware sherd would date between the 13th and 15th centuries.

JLH-I-10-3. This small sherd, with its pronounced wheel line interiorly, could represent a bowl cavetto or a plate rim. The body looks Chinese while the plastic quality to the greyish gley glaze looks Vietnamese. I would prefer a Vietnamese identification, and in any case a 13th to 15th century dating.

JLH-I-10-5. The orientation of the closely spaced wheel lines on the interior surface indicates a cover sherd to a jar (Figure 1). The body has a grey exterior wall (N5/-) and a light reddish brown interior wall (5YR6/3) which weathers to the reddish yellow (5YR6/6) colour of the interior surface. The body is hard but coarse, with quite large white and black inclusions, and the surfaces are poorly finished off, especially the exterior which takes a dark reddish brown (5YR2.5/2) glaze. All traits suggest a Brittle ware.

JLH-I-10-6. This small sherd to a jar is as coarse as the previous specimen, and with the same glaze colour, here very thin and rather flaky. Brittle ware is again the best classification, even if the sherd's grey body (N5/-) might usually occur in striped Brittle wares (Tables 14 and 15).

JLH-I-10-7. This shoulder sherd to a wheel-made jar has a body similar to that of JLH-I-9-9, except that a thin, darkgrey wall (N4/-) exteriorly flanks the otherwise pink body (5YR7/3). The pink interior surface (7.5YR7/4) has dark brown, mould-like spots. Exteriorly a thin white slip underlies the dark yellow brown glaze (10YR4/4). All in all, the same Go Sanh Red (or possibly Coarse Red) identification suggested for JLH-I-9-9 applies to this sherd.

JLH-I-10-8. Although the strong brown glaze (7.5YR4/6) is not dissimilar from that of the previous specimen, the lack of slipping and the pinkish grey body (7.5YR6/2) point to a different identification, possibly Brittle ware (Tables 12 to 16). It too is a

shoulder sherd from a wheel-made jar.

JLH-I-10-9. This thin sherd has no trace of curvature, a well-bonded olive glaze exteriorly (5YR5/3) and a coarsely smoothed light brownish grey interior (10YR6/2), and a coarse light grey body full of largeish white and black inclusions. Brittle ware (see Tables 12 to 16).

JLH-I-10-10. This small sherd has come from the body of a quite large jar. It is not glazed but carries an iron-rich wash, reddish to dark reddish brown (2.5-5YR 3/4-5/4), interiorly and exteriorly. The body has a faint coring effect involving the same colours. The presence of the wash (cf. Harrison, 1986:37-38) and the body traits (Tables 15 and 16) all point to a coarse Brown ware.

JLH-I-10-11. This body sherd to a wheel-made jar has a thin and largely degraded, reddish brown glaze (5YR4/3) above an even thinner white slip. Faint walls, more a gradation in body colour, is shown by the pinkish grey exterior body (7.5YR6/2) and the light brown interior body (7.5YR6/4). The latter colour also characterises the unglazed interior surface. JLH-I-10-11 resembles JLH-I-10-7 in being externally slipped, showing brown mould-like specks interiorly, and to some degree the type of body and presence of mainly white inclusions. However, for JLH-I-10-11, coarse Red is a more preferable identification than Go Sanh Red.

JLH-I-10-12. This basal sherd shows wheel lines and ridges as well as a roughened depression in the obverse centre (figure 1). It would appear to have broken close to the basal diameter which would therefore not greatly exceed 5 cm. The base would appear too flimsy, and the grey body rather too fine, to have come from a coarse stoneware. The dark brown and white speckled body indicates Sawankhalok as do the other body traits shown in Tables 8 and 10 to 12. The lack of any glaze would not be anomalous for a jarlet or small covered bowl, and Sawankhalok (monochrome?) is the natural choice.

JLH-I-11-1. This tiny sherd has the greenish gley glaze and light grey body typical of Sawankhalok greenwares (Tables 6 to 8). But it is clearly Chinese from the thickness of the glaze (Table 9), including the thick and rather lustrous quality to the glaze, and the *Longguan*-like body. The glaze quality and colour possibly suggest an early (13th-14th centuries) rather than a Ming dating.

JLH-I-11-2. Probably from a plate to judge from the thickness, this small sherd

shows an unglazed base and central nipple exteriorly (Figure 1). Its watery glaze on the observe is coloured the same as with the previous specimen. The body has a light grey interior wall, and a pinkish white exterior wall which lends the base its pink (7.5YR7/4) colour. The unglazed base, body walls, and possibly the glaze colour suggest an early (13th-14th centuries) rather than a Ming Chinese greenware.

JLH-I-17-1. This sherd comes from the lower body of a jar where its glaze came to a neat finish above the grey (5YR6/1) exterior body. Where it finishes the glaze is dark reddish brown (5YR3/2), but higher up a yellowish white slip (2.5Y8/2) underlies the glaze and lends it a brown colour (7.5YR5/4). In addition, the interior surface carries a very pale brown slip (10YR8/4). The quite fine, grey stoneware body shows a slight predominance of white over black inclusions. All in all, a Guangdong identification is indicated (Tables 12 to 16).

The point that spits 9 and 10 each produced a sherd from the same Guangdong brownware jar indicates that their tradeware assemblages should be joined, along with the two sherds from spit 11. Generalising from my experience of South Sulawesi assemblages, I infer that these spits present a predominantly early assemblage on the following counts: the large number of coarse stoneware sherds compared to other sherds; the absence of Sawankhalok sherds amongst the coarse stonewares; the identification of some clearly early whitewares and greenwares; and the rarity of BW sherds. In this context the single BW sherd and the possible Sawankhalok base appear anomalous, either reflecting the disturbance of two Ming sherds into a predominantly "Yuan assemblage", or suggesting that the BW sherd is of Yuan age and the base may be early Chinese or Thai but not Sawankhalok. The absence of tradewares higher in the excavated deposits could fit either interpretation. Conceivably the whole assemblage could be 14th century, but the identifications more suggest a range spanning the 13th to 15th centuries. As a Yuan to early Ming assemblage, it carries considerable archaeological value.

The stratigraphic of JLH-I-17-1 suggests greater antiquity, Song or even earlier. Guangdong (and Brittle) wares had been exported to island Southeast Asia since around the 10th century (Harrison, 1986:45), but such an early dating could scarcely be identified on the basis of a single undiagnostic sherd.

Conclusions

The period suggested by the tradeware identifications spans the 14th to 17th

centuries at a minimum, and the 12th (?) to 18th centuries at a maximum. Early Qing and Ming sherds occurred mainly in the top spits, giving way to pre-Ming sherds by spits 9 to 11, although SBN-V and possibly JLH-I contained Ming sherds at these levels. On the whole early tradewares predominate, or coarse stonewares which could well be Song or Yuan in age (Table 17). Certain factors had apparently led to the import of tradewares to Sembiran specifically between the 12th/13th and 14th/15th centuries.

Table 17. Summary of Sembiran Tradeware Identification

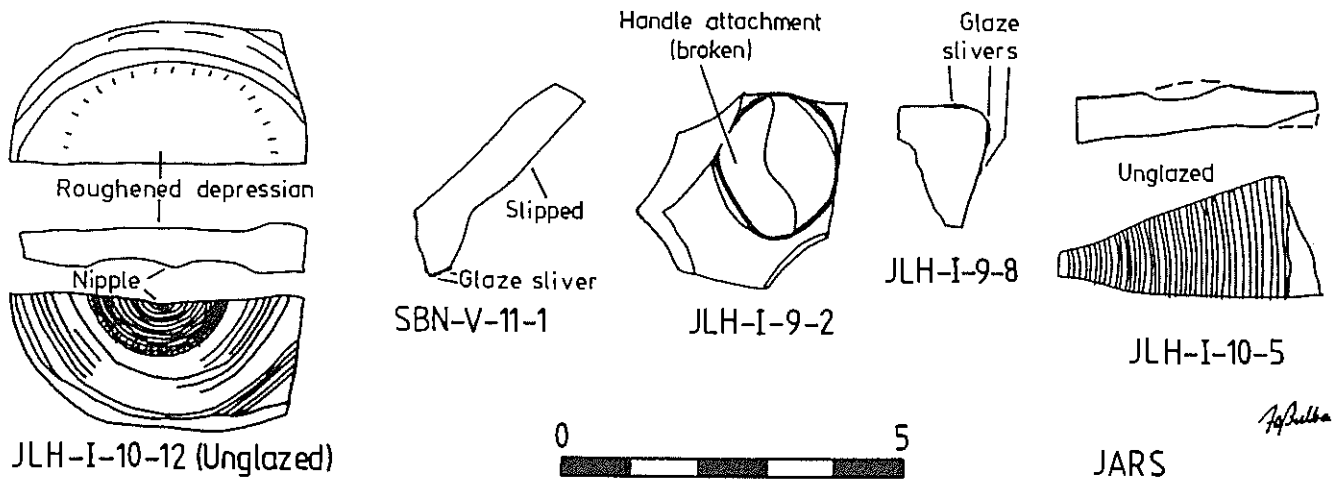
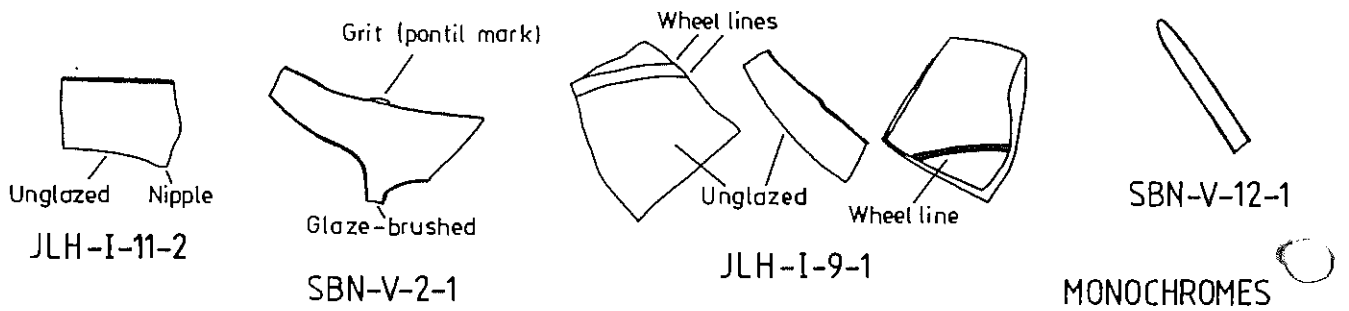
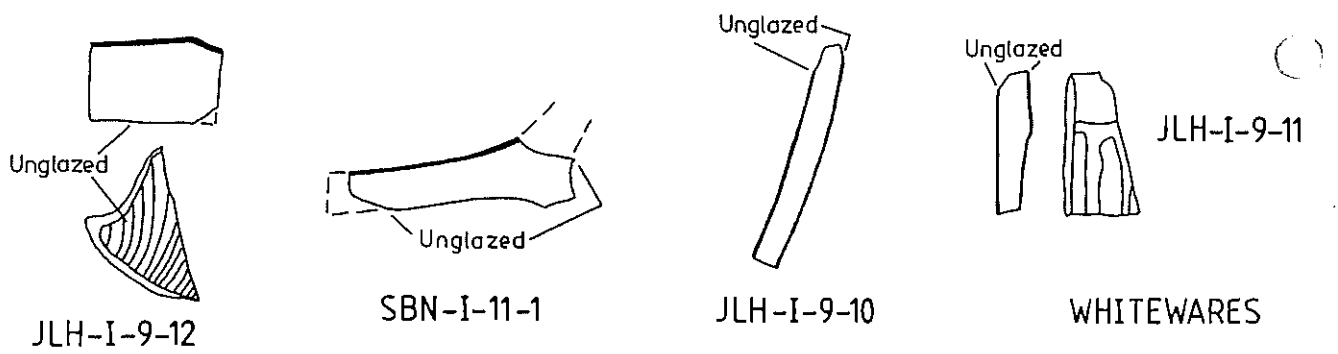
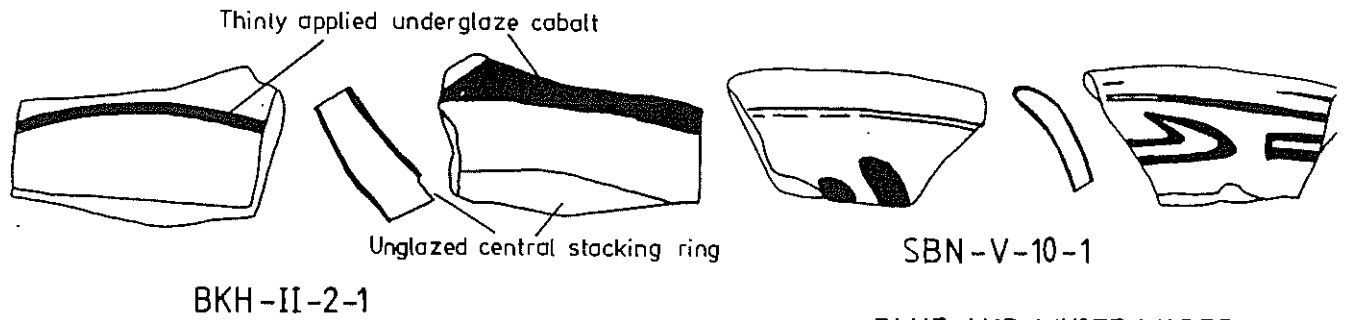
	BKH-II	SBN-V	SBN-V	SBN-I	JLH I	JLH-I
	1-2	2	10-12	10-11	9-11	17
Qing Monochrome		1				
Swatow	1					
Ming Swatow	1					
Sawankhalok	1		1		1	
Vietnam BW			1			
Early Ming BW					1	
Coarse Brown					1	
Coarse Red					1	
Go Sanh Red					2	
Brittle			1	1	5	
Guangdong					6	1
V-nam Monochrome			1		2	
Early Monochrome					6	
Early Whiteware				1		3

Ardika informs me that six Sembiran inscriptions point to Julah or adjacent site as a port between AD 922-1181. Some of the tradewares, notably JLH-I-17-1 and the SBN-I sherds, could well belong to this early juncture, and in my experience Song Yuan tradeware sherds need not be readily distinguishable. However, the assemblage's

mainstream clearly carries into early Ming wares, confirming the natural Yuan (13th to 14th century) dating for most of the early wares. The slight discord between the inscriptional and tradeware data could readily reflect China's particular emphasis on exporting manufactures during the Yuan dynasty. Indeed the tradeware identifications make the positive contribution of suggesting that the Sembiran area continued to act as a port into the 14th or even the 15th century.

The tradeware identifications overall support the stratigraphic integrity of the excavated deposits. However, slight departures from a perfect chronological sequence were identified, including the deep baulk of Ming deposits in Sembiran V, suggesting that chronological interpretations based on stratigraphy should look at general trends rather than very fine points of discrimination.

Figure D.1: Illustrations of some Sembiran tradeware sherds



Aspelt

TABLE 2. INTERIOR GLAZE COLOUR PERCENTAGES - BLUE AND WHITE WARES

	White	Pink	Other	-----LIGHT GLEY-----					Greenish	EARTHY	OTHER
	White	White	White	Blue	Blue-Green	Green	Green-Grey	Grey	Gley		
VIETNAM (n=15) (C ¹⁵)	0.0	6.7	0.0	0.0	0.0	6.7	0.0	0.0	0.0	80.0	6.7
EARLY (n=19) (1350-1450)	0.0	5.3	5.3	0.0	26.3	36.8	10.5	0.0	0.0	15.8	0.0
MID-MING (n=14) (C ¹⁵ or C ^{15/16})	0.0	0.0	7.1	0.0	7.1	35.7	28.6	7.1	7.1	7.1	0.0
C ¹⁶ MING (n=86)	5.8	0.0	3.5	0.0	8.1	26.7	44.2	5.8	1.2	4.7	0.0
LATE MING (n=69) (C ^{16/17} to C ¹⁷)	10.1	0.0	0.0	1.4	8.7	37.7	27.5	10.1	1.4	2.9	0.0
MING SWATOW (n=124) (C ¹⁶)	1.6	0.0	4.8	0.0	1.6	4.8	38.7	23.4	4.0	21.0	0.0
SWATOW (n=135) (C ¹⁷)	6.7	3.0	1.5	0.0	1.5	11.1	50.4	16.3	2.2	6.7	0.7
QING SWATOW (n=61) (1650-1750)	24.6	0.0	0.0	1.6	18.0	41.0	8.2	4.9	0.0	1.6	0.0
EARLY QING (n=104) (1650-1800)	13.5	0.0	0.0	5.8	18.3	33.7	20.2	6.7	0.0	1.9	0.0
LATE QING (n=18) (C ^{18/19} or C ¹⁹)	22.2	0.0	0.0	5.6	0.0	38.9	11.1	5.6	0.0	16.7	0.0
BKH-II-1-1						X, I					
BKH-II-2-1								I	X		
SBN-V-10-1		X, I									
JLH-I-10-1						X, I					

N.B. White: N/8- as closest reading; Pink White: 5YR-7.5YR 8/1-8/2; Other White: 10YR-5Y 8/1-8/2. Light Gley Blue <= 5B7/1; Light Gley Blue-Green <= 5BG7/1; Light Gley Green <= 5G7/1; Light Gley Green-Grey <= 5GY7/1; Light Gley Grey <= 5Y7/1 (gley); Greenish Gley includes 5BG6/1, 5G6/1, 5GY6/1 and 5GY5/1. (<= signifies equal to or whiter than.) Other: Green/Brown A6 and Neutral 6 of the Pottery Colour Chart. Earthy: all other shades.

TABLE 3. BODY COLOUR PERCENTAGES - BLUE AND WHITE WARES

	N8/-	>N8/-	<N7/-	N7/- -N5/-	5YR 8/1	10YR- 5Y8/1	7.5YR- 5Y8/2	Light Pink Grey	Pink Grey	Red Grey	Dark Red Grey	Other Grey	Col- oured
VIETNAM (n=17) (C ¹⁵)	0.0	5.9	0.0	5.9	0.0	17.6	11.8	17.7	0.0	0.0	0.0	35.3	5.9
EARLY (n=18) (1350-1450)	16.7	5.6	11.1	22.2	11.1	5.6	5.6	5.6	0.0	0.0	0.0	16.7	0.0
MID-MING (n=13) (C ¹⁵ or C ^{15/16})	15.4	15.4	23.1	0.0	7.7	0.0	15.4	0.0	7.7	0.0	0.0	15.4	0.0
C ¹⁶ MING (n=91)	13.2	16.5	14.3	15.4	12.1	1.1	4.4	2.2	0.0	0.0	0.0	19.8	1.1
LATE MING (n=71) (C ^{16/17} to C ¹⁷)	29.6	25.4	14.1	15.5	4.2	0.0	5.6	0.0	0.0	0.0	0.0	5.6	0.0
MING SWATOW (n=126) (C ¹⁶)	0.0	1.6	4.8	8.7	3.2	4.0	7.1	4.8	0.8	0.0	0.8	32.5	31.7
SWATOW (n=135) (C ¹⁷)	1.5	7.4	24.4	25.9	1.5	2.2	3.7	3.0	1.5	0.0	0.0	27.4	1.5
QING SWATOW (n=61) (1650-1750)	45.9	14.8	16.4	6.6	6.6	1.6	0.0	0.0	0.0	0.0	0.0	8.2	0.0
EARLY QING (n=104) (1650-1800)	32.7	18.3	10.6	15.4	7.7	0.0	5.8	3.8	0.0	0.0	0.0	5.8	0.0
LATE QING (n=18) (C ^{18/19} or C ¹⁹)	33.3	16.7	0.0	11.1	11.1	0.0	22.2	5.6	0.0	0.0	0.0	0.0	0.0
BKH-II-1-1		X											
BKH-II-2-1									X	X			
SBN-V-10-1					X								
JLH-I-10-1	X												

N.B. Some body colours are summarised from the Munsell (1975) soil colour charts. Light Pink Grey: Chroma/Value = 7/1 to 6/1 (Hue disregarded) plus one case of 10YR7/2. Grey: Chroma/Value = 5/1, Hue disregarded. Pink Grey: 5YR-7.5YR 7/2-6/2. Red Grey: 5YR5/2. Dark Red Grey: 5YR4/2. Coloured includes Brownish Grey, Brown Yellow, Pink and Weak Red bodies.

TABLE 4. PERCENTAGES OF FURTHER BODY, AND SLIP CHARACTERISTICS - BLUE AND WHITE WARES

	-----HARDNESS-----					----% INCLUSIONS----					TRANSLUCENCY			SLIPPING	
	3-5	6	7	8	9	0	1	2-3	4-5	10-40	No	Faint	Yes	Yes	No
VIETNAM (n=17) (C ¹⁵)	5.9	0.0	58.8	23.5	11.8	5.9	23.5	17.6	35.3	17.6	100	0.0	0.0	47.1	52.9
EARLY (n=18-19) (1350-1450)	5.3	0.0	36.8	52.6	5.3	0.0	33.3	38.9	11.1	16.7	94.4	0.0	5.6	0.0	100
MID-MING (11-14) (C ¹⁵ to C ^{15/16})	0.0	0.0	42.9	50.0	7.1	7.1	35.7	21.4	21.4	14.3	90.9	0.0	9.1	14.3	85.7
C ¹⁶ MING (n=65-91)	1.1	0.0	26.4	57.1	15.4	6.6	60.4	19.8	7.7	5.5	75.4	13.8	10.8	2.3	97.7
LATE MING (54-71) (C ^{16/17} to C ¹⁷)	0.0	0.0	23.9	53.5	22.5	18.3	50.7	21.1	5.6	4.2	53.7	14.8	31.5	0.0	100
MING SWATOW (n=75-125)	14.4	5.6	63.2	15.2	1.6	0.0	22.4	37.6	25.6	14.4	98.7	0.0	1.3	2.4	97.6
SWATOW (n=88-135) (C ¹⁷)	0.7	1.5	40.3	43.3	14.2	0.0	51.9	31.1	10.4	6.7	94.3	4.5	1.1	3.0	97.0
QING SWATOW (n=47-62)	0.0	0.0	13.1	41.0	45.9	6.6	77.0	11.5	4.9	0.0	27.7	21.3	51.1	0.0	100
EARLY QING (n=92-104)	0.0	0.0	23.1	40.4	36.5	9.6	58.7	23.1	5.8	2.9	34.8	18.5	46.7	0.0	100
LATE QING (15-18) (C ^{18/19} or C ¹⁹)	0.0	0.0	38.9	33.3	27.8	16.7	38.9	27.8	5.6	11.1	73.3	0.0	26.7	0.0	100
BKH-II-1-1				X					X		X				X
BKH-II-2-1			X						X		X				X
SBN-V-10-1					X		X				X				X
JLH-I-10-1				X			X						X		X

N.B. Hardness follows Moh scale except for "7" (harder than iron, scratched by quartz), "8" (equally hard as quartz), and "9" (scratches quartz).

TABLE 5. PERCENTAGES OF BODY TYPES, AND FURTHER GLAZE CHARACTERISTICS - BLUE AND WHITE WARES

	China Porc- elain	Almost China Porcelain	Semi- Porc- elain	Proto- Porc- elain	Earth- Stone- ware	Earth- en- ware	-----INTERNAL GLAZE-----						
							---THICKNESS---				--NUMBER--		
							1	2	3	4-6	1	2	3-4
VIETNAM (n=15-17) (C ¹⁵)	0.0	0.0	0.0	64.7	35.3	0.0	0.0	46.7	53.3	0.0	100	0.0	0.0
EARLY (n=18-19) (1350-1450)	0.0	5.3	42.1	10.5	42.1	0.0	0.0	31.6	57.9	10.5	94.4	5.6	0.0
MID-MING (n=14) (C ¹⁵ or C ^{15/16})	14.3	14.3	35.7	7.1	28.6	0.0	7.1	0.0	78.6	14.3	92.9	7.1	0.0
C ¹⁶ MING (n=86-91)	18.7	11.0	41.8	4.4	24.2	0.0	0.0	15.1	73.3	11.6	100	0.0	0.0
LATE MING (69-71) (C ^{16/17} or C ¹⁷)	38.0	8.5	31.0	0.0	22.5	0.0	1.4	11.6	79.7	7.2	98.6	1.4	0.0
MING SWATOW (n=125) (C ¹⁶)	0.0	0.0	0.8	1.6	92.8	4.8	0.0	8.0	56.0	36.0	80.0	18.4	1.6
SWATOW (n=135) (C ¹⁷)	0.0	3.0	31.9	0.0	65.2	0.0	0.7	5.9	63.7	29.6	83.7	15.6	0.7
QING SWATOW (n=61) (1650-1750)	54.1	26.2	13.1	0.0	6.6	0.0	0.0	6.6	88.5	4.9	98.4	1.6	0.0
EARLY QING (n=104) (1650-1800)	51.0	12.5	13.5	1.0	22.1	0.0	0.0	8.7	85.6	5.8	96.2	2.9	1.0
LATE QING (n=18) (C ^{18/19} or C ¹⁹)	38.9	0.0	11.1	0.0	50.0	0.0	0.0	11.1	83.3	5.6	100	0.0	0.0
BKH-II-1-1					X				X		X		
BKH-II-2-1					X				X		X		
SBN-V-10-1					X			X			X		
JLH-I-10-1	X								X		X		

N.B. Glaze Thickness: "1" = Vestigial; "2" = Thin; "3" = Medium; "4-6" = Thick.

TABLE 6. EXTERNAL GLAZE COLOUR PERCENTAGES - WHITEWARES AND MONOCHROMES

	----"CELADONS"----				-----"GLEYSWARES"-----												WHITE 8/- 8/1 8/2	OTH- BROWN ER
	Green/Brown		Other	BLUISH			-----GREENISH-----				GREYISH							
	A2-A3	A4 A5-A7		5B <7/1	5BG	5G(<) 7/1	5G 6/1	5G 5/1	5G Other	5GY 4-5/1	5Y 6/1	5Y 7/1						
EARLY (161) MONOCHROMES	6.2	21.7	8.7	5.0	0.0	0.6	2.5	3.1	0.0	3.7	19.3	5.0	1.9	1.2	0.0	0.0	0.0	21.1
MING (n=41) CELADONS	0.0	17.1	9.8	2.4	0.0	0.0	9.8	0.0	0.0	4.9	51.2	0.0	0.0	4.9	0.0	0.0	0.0	0.0
QING (n=14) MONOCHROMES	0.0	0.0	0.0	42.9	0.0	0.0	7.1	0.0	0.0	7.1	7.1	0.0	0.0	7.1	0.0	0.0	7.1	21.4
SAWANKHALOK (n=9)	0.0	0.0	0.0	0.0	0.0	11.1	0.0	22.2	0.0	33.3	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIETNAM (n=33)	0.0	12.1	15.2	0.0	0.0	0.0	0.0	3.0	0.0	0.0	9.1	0.0	3.0	3.0	9.1	6.1	0.0	39.4
EARLY (84) WHITEWARES	0.0	0.0	10.7	0.0	4.8	11.9	20.2	0.0	0.0	0.0	16.7	0.0	1.2	6.0	10.7	4.8	0.0	13.1
MING (n=13) WHITEWARES	0.0	0.0	0.0	0.0	0.0	23.1	7.7	0.0	0.0	0.0	15.4	0.0	0.0	0.0	7.7	38.5	0.0	7.7
BKH-II-2-2									X									
SBN-V-2-1																		X
SBN-V-12-1		X																
JLH-I-9-10						X												
JLH-I-9-11																		X
JLH-I-9-13		X																
JLH-I-9-14								X										
JLH-I-9-15		X																
JLH-I-10-2																		X
JLH-I-10-3																		X
JLH-I-11-1								X										

N.B. "BROWN" refers specifically to Munsell colours 7.5YR5/2, 7.5YR5/4, 7.5YR4/4 and 10YR5/3. Numerous brownish shades (Reddish Brown etc.) are included within the "OTHER" category which also includes non-gley Greys, Pink, Olives and Yellows

TABLE 7. INTERNAL GLAZE COLOUR PERCENTAGES - WHITEWARES AND MONOCHROMES

	-----"GLEYWARES"-----															WHITE	OTH- BROWN	ER
	----"CELADONS"----				BLUISH		-----GREENISH-----					GREYISH						
	Green/Brown		Other	5B	5BG	5G(<)	5G	Other	5GY	5GY	Other	5Y	5Y	5Y				
	A1-A3	A4	A5-A7	<7/1	7/1	6/1	5G	<7/1	7/1	5GY	4-5/	6/1	7/1					
EARLY (170)	5.3	22.4	8.8	5.3	0.0	0.0	3.5	2.9	3.5	0.0	4.7	14.1	4.7	1.8	0.6	0.0	0.6	21.8
MONOCHROMES																		
MING (n=43)	0.0	18.6	4.7	0.0	0.0	0.0	9.3	0.0	4.7	0.0	18.6	39.5	0.0	0.0	2.3	0.0	0.0	2.3
CELADONS																		
QING (n=14)	0.0	0.0	0.0	42.9	0.0	0.0	7.1	0.0	7.1	0.0	0.0	7.1	0.0	7.1	7.1	0.0	7.1	14.3
MONOCHROMES																		
SAWANKHALOK (n=6)	0.0	0.0	0.0	0.0	0.0	16.7	0.0	16.7	33.3	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0
VIETNAM (n=30)	0.0	10.0	16.7	0.0	0.0	0.0	0.0	3.3	3.3	0.0	3.3	3.3	0.0	0.0	6.7	13.3	0.0	40.0
EARLY (73)	0.0	0.0	12.3	0.0	4.1	21.9	8.2	0.0	0.0	5.5	8.2	0.0	0.0	0.0	6.8	19.2	0.0	13.7
WHITEWARES																		
MING (n=10)	0.0	0.0	0.0	0.0	0.0	30.0	10.0	0.0	0.0	10.0	10.0	0.0	0.0	0.0	0.0	30.0	0.0	10.0
WHITEWARES																		
SBN-V-2-1																		I
SBN-V-12-1		I																
SBN-I-11-1										I								
JLH-I-9-1		I																
JLH-I-9-10						I												
JLH-I-9-11																		I
JLH-I-9-12												I						
JLH-I-9-13		I																
JLH-I-9-14									I									
JLH-I-9-15		I																
JLH-I-10-2																		I
JLH-I-10-3																		I
JLH-I-11-1									I									
JLH-I-11-2									I									

TABLE 8. BODY COLOUR PERCENTAGES - WHITEWARES AND MONOCHROMES

	N 8/-	>N8/-, <N7/-	N 7/-	>N7/-, <N6/-	N 6/-	N 5/-	N 4/-	5YR 8/1	Other WHITE	5YR 7/1	Other 7/I	--5YR-5Y-- 6/1	5Y 5/1	4/1	PINK GREY	PINK PALE BROWN	VERY RED BROWN	RED BROWN	OTH- ER	
EARLY (172) MONOCHROMES	0.6	4.1	34.9	5.2	5.2	6.4	2.3	1.7	2.3	8.7	4.1	6.4	0.6	1.2	5.2	4.7	0.6	1.7	2.3	1.7
MING (n=39) CELADONS	0.0	33.3	48.7	0.0	2.6	5.1	0.0	2.6	0.0	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0
QING (n=13) MONOCHROMES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4	7.7	0.0	7.7	0.0	0.0	7.7	7.7	15.4	0.0	15.4	23.1
SAWANKHALOK (n=9)	0.0	0.0	44.4	0.0	22.2	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VIETNAM (n=34)	0.0	0.0	8.8	0.0	0.0	0.0	0.0	8.8	23.5	14.7	5.9	8.8	0.0	0.0	5.9	5.9	0.0	0.0	0.0	17.6
EARLY (83) WHITEWARE	21.7	25.3	6.0	0.0	0.0	0.0	0.0	15.7	8.4	15.7	1.2	0.0	0.0	0.0	1.2	1.2	0.0	0.0	0.0	3.6
MING (13) WHITEWARE	23.1	30.8	0.0	0.0	0.0	0.0	0.0	7.7	15.4	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	15.4
BKH-II-2-2									X, I											C
SBN-V-2-1															C	X, I				
SBN-V-12-1												X								
SBN-I-11-1	X																			
JLH-I-9-1																				X
JLH-I-9-10	X																			
JLH-I-9-11																				X
JLH-I-9-12	X																			
JLH-I-9-13				X																
JLH-I-9-14				X																
JLH-I-9-15					X															
JLH-I-10-2											X									
JLH-I-10-3				X																
JLH-I-10-12						X														
JLH-I-11-1				X																
JLH-I-11-2				I					X											

N.B. Other WHITE: Munsell whites not included in columns to the left. "RED BROWN" includes Dark Reddish Browns and Light Reddish Browns (for Early Monochromes) as well as Reddish Browns. "OTHER" includes various Greys, Browns and Yellows.

TABLE 9. GLAZE THICKNESSES & NUMBER OF APPLICATIONS (PERCENTAGES) - MONOCHROMES AND WHITEWARES

	-----EXTERNAL GLAZE-----								-----INTERNAL GLAZE-----							
	-----THICKNESS-----						NUMBER		-----THICKNESS-----					NUMBER		
	1	2	3	4	5	6	1	2-4	1	2	3	4	5	1	2-4	
EARLY (163-171)	4.3	25.8	42.9	9.8	14.7	2.5	93.9	6.1	1.2	29.2	48.5	5.8	15.2	94.7	5.3	
MONOCHROMES																
MING (n=41-44)	0.0	9.8	41.5	22.0	26.8	0.0	92.7	7.3	2.3	11.4	40.9	20.5	25.0	95.5	4.5	
CELADONS																
QING (n=14)	0.0	35.7	57.1	0.0	7.1	0.0	100.0	0.0	0.0	28.6	57.1	7.1	7.1	100.0	0.0	
MONOCHROMES																
SAWANKHALOK (n=6-9)	0.0	0.0	88.9	11.1	0.0	0.0	87.5	12.5	0.0	0.0	100.0	0.0	0.0	83.3	16.7	
VIETNAM																
(n=31-34)	5.9	52.9	35.3	0.0	5.9	0.0	100.0	0.0	0.0	58.1	41.9	0.0	0.0	100.0	0.0	
EARLY (n=74-85)	5.9	50.6	37.6	5.9	0.0	0.0	98.8	1.2	1.4	55.4	43.2	0.0	0.0	98.6	1.4	
WHITEWARES																
MING (n=10-13)	0.0	30.8	61.5	7.7	0.0	0.0	100.0	0.0	0.0	40.0	60.0	0.0	0.0	100.0	0.0	
WHITEWARES																
BKH-II-2-2		X					X									
SBN-V-2-1		X					X			I				I		
SBN-V-12-1		X					X			I				I		
SBN-I-11-1										I				I		
JLH-I-9-1										I				I		
JLH-I-9-10			X				X				I			I		
JLH-I-9-11		X					X			I				I		
JLH-I-9-12										I				I		
JLH-I-9-13			X				X				I			I		
JLH-I-9-14			X				X				I			I		
JLH-I-9-15			X				X				I			I		
JLH-I-10-2			X				X				I			I		
JLH-I-10-3			X				X				I			I		
JLH-I-11-1						X	X						I	I		
JLH-I-11-2							X						I	I		

TABLE 10. PERCENTAGES OF FURTHER BODY, AND SLIP CHARACTERISTICS - MONOCHROMES AND WHITEWARES

	-----HARDNESS-----					-----% INCLUSIONS-----						TRANSLUCENCY			SLIPPING	
	5	6	7	8	9	0	1	2-3	4-5	10-15	20+	No	Faint	Yes	Yes	No
EARLY (173-175) MONOCHROMES	6.3	1.7	40.0	40.0	12.0	0.6	25.4	22.5	25.4	20.8	5.2	100	0.0	0.0	24.1	75.9
MING CELADONS (n=43)	0.0	2.3	18.6	55.8	23.3	0.0	53.5	20.9	16.3	9.3	0.0	86.0	14.0	0.0	7.0	93.0
QING (n=14) MONOCHROMES	7.1	14.3	50.0	14.3	14.3	0.0	7.1	35.7	21.4	35.7	0.0	100	0.0	0.0	21.4	78.6
SAWANKHALOK (n=9)	0.0	0.0	33.3	66.6	0.0	0.0	0.0	0.0	55.6	44.4	0.0	100	0.0	0.0	0.0	100
VIETNAM (n=35)	2.9	8.6	60.0	22.9	5.7	5.7	14.3	14.3	40.0	25.7	0.0	100	0.0	0.0	48.6	51.4
EARLY (n=84-85) WHITEWARES	0.0	1.2	40.0	31.8	27.1	0.0	41.2	37.6	12.9	4.7	3.5	70.2	7.1	22.6	28.2	71.8
MING (n=12-13) WHITEWARES	0.0	0.0	23.1	53.8	23.1	23.1	53.8	15.4	0.0	7.7	0.0	50.0	16.7	33.3	16.7	83.3
BKH-II-2-2				X				X				X			I	
SBN-V-2-1			X					X				X				X
SBN-V-12-1			X					X				X				X
SBN-I-11-1					X		X					X				X
JLH-I-9-1			X							X		X				X
JLH-I-9-10				X				X						X		X
JLH-I-9-11		X							X			X				X
JLH-I-9-12					X				X				X			X
JLH-I-9-13				X					X			X				X
JLH-I-9-14				X				X				X				X
JLH-I-9-15				X					X			X				X
JLH-I-10-2				X			X					X				X
JLH-I-10-3			X					X				X				X
JLH-I-10-12			X					X				X				X

TABLE 11. PERCENTAGES OF BODY TYPES AND BASE CHARACTERISTICS - MONOCHROMES AND WHITEWARES

	China Porc- elain	Semi- Porc- elain	Proto- Porc- elain	Stone- ware	Earth- enware		Unglazed Base	Irregularly Glazed Base	Red Base	Ordinary Glazed Base	Glaze does not reach foot
EARLY (n=173) MONOCHROMES	0.0	1.7	9.8	83.8	4.6	(n=31)	58.1	9.7	0.0	32.3	(22)
MING (n=43) CELADONS	9.3	4.7	0.0	86.0	0.0	(n=12)	8.3	25.0	8.3	58.3	(1)
QING (n=14) MONOCHROMES	0.0	7.1	0.0	85.7	7.1	(n=4)	50.0	0.0	0.0	50.0	(1)
SAWANKHALOK (n=9)	0.0	0.0	0.0	100.0	0.0	(n=2)	50.0	0.0	50.0	0.0	(2)
VIETNAM (n=35)	0.0	0.0	25.7	74.3	0.0	(n=4)	100.0	0.0	0.0	0.0	(8)
EARLY (n=85) WHITEWARES	20.0	36.5	12.9	30.6	0.0	(n=11)	63.6	18.2	0.0	18.2	(11)
MING (n=13) WHITEWARES	46.2	38.5	0.0	15.4	0.0	(n=4)	25.0	25.0	0.0	50.0	(1)
BKH-II-2-2				X							?
SBN-V-2-1				X						X	-
SBN-V-12-1				X							?
SBN-I-11-1		X					X				?
JLH-I-9-1				X							X
JLH-I-9-10		X									?
JLH-I-9-11			X								?
JLH-I-9-12		X					X				?
JLH-I-9-13				X							-
JLH-I-9-14				X							?
JLH-I-9-15				X							?
JLH-I-10-2			X								?
JLH-I-10-3				X							?
JLH-I-10-12				X			X				?
JLH-I-11-1				X							?

N.B. Number of recorded bases shown separately from number of recorded body types. The last column shows the number of recorded cases where the external glaze stopped short of the foot - no attempt has been made to express these cases as a percentage of observable cases.

TABLE 12. PERCENTAGES OF EXTERNAL GLAZE COLOURS AND THICKNESSES - COARSE STONEWARES

	Green	(Very)	Dark	(Light)	(Very)	Brown/	Dark	(Light)	Dark	Black	EXTERNAL GLAZE THICKNESS						
		Dusky Red	Other Red	Red Brown	Red Brown	Dark Brown	Dark Brown	Strong Brown	Yellow Brown		Olive Brown	Grey Brown	Olive Grey	1	2	3(-4)	
COARSE BROWN (7-8)	0.0	25.0	0.0	12.5	12.5	25.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	12.5	28.6	57.1	14.3
COARSE RED (n=9)	0.0	0.0	11.1	22.2	11.1	0.0	22.2	0.0	33.3	0.0	0.0	0.0	0.0	0.0	11.1	55.5	33.3
BRITTLE (n=23-25)	0.0	4.3	0.0	17.4	4.3	34.8	13.0	4.3	4.3	4.3	0.0	0.0	4.3	8.7	28.0	24.0	48.0
GUANGDONG (n=27-33)	0.0	0.0	0.0	27.3	15.2	15.2	3.0	0.0	6.1	9.1	3.0	3.0	3.0	15.2	37.0	37.0	25.9
SAWANKHALOK (n=24-25)	4.2	0.0	4.2	16.7	8.3	25.0	4.2	0.0	4.2	0.0	8.3	0.0	4.2	20.8	12.0	52.0	36.0
WAVYLINE (1)	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
VIETNAM (2)	0.0	0.0	0.0	0.0	50.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
EARLY OTHER (n=7)	14.3	0.0	0.0	14.3	0.0	14.3	0.0	0.0	14.3	14.3	0.0	0.0	28.6	0.0	33.3	33.3	33.3
QING OTHER (n=6-7)	0.0	0.0	14.3	0.0	0.0	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	0.0	33.3	66.7
TOTAL (114-8)	1.7	2.5	2.5	17.8	9.3	22.0	8.5	0.8	6.8	4.2	2.5	0.8	5.9	14.4	28.1	37.7	34.2
BKH-II-2-2	X																X
SBN-V-11-1	X														X		
SBN-V-11-2							X								X		
SBN-I-10-1/2	X																X
JLH-I-9-2										X						X	
JLH-I-9-3											X						X
JLH-I-9-4													X				X
JLH-I-9-5						X										X	
JLH-I-10-4						X										X	
JLH-I-9-6										X						X	
JLH-I-9-8						X									X		
JLH-I-9-9									X						X		
JLH-I-10-5				X												X	
JLH-I-10-6				X												X	
JLH-I-10-7									X							X	
JLH-I-10-8								X								X	
JLH-I-10-9											X					X	
JLH-I-10-11					X									X			
JLH-I-17-1			X				X									X	

N.B. "Green" refers to Green-Brown A1 to A4 of Pottery Colour Chart, except for BKH-II-2-2 (5G5/1 of Munsell gley colour chart). Other colours as per Munsell (1975) soil colour charts; with both "Brown" and "Brown/Dark Brown" here included under "Brown/Dark Brown". Where two colour names or glaze thicknesses are included under the same column heading, brackets show the rare variant. TOTAL includes some undated unclassified specimens.

TABLE 13. PERCENTAGES OF BODY COLOURS (HOMOGENEOUS BODIES) - COARSE STONEWARES

	N7/-	N6/-	N5/-	N4/- -N3/-	Light Grey	Light Grey/ Grey	(Very) Dark Grey	Pink Grey	Red Grey	Dark Red Grey	Pink White	Other Very Pale	Yel- low	Red	Other		
COARSE BROWN (n=8)	0.0	0.0	0.0	25.0	12.5	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	25.0	0.0	
COARSE RED (n=11)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	9.1	18.2	0.0	0.0	63.6	0.0	
BRITTLE (n=24)	4.2	0.0	0.0	0.0	16.7	12.5	4.2	0.0	4.2	4.2	8.3	0.0	0.0	4.2	4.2	8.3	4.2
GUANGDONG (n=27)	0.0	7.4	7.4	0.0	14.8	0.0	7.4	3.7	3.7	3.7	3.7	11.1	0.0	7.4	0.0	0.0	3.7
SAWANKHALOK UNGLAZED (5)	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SAWANKHALOK GLAZED (n=24)	8.3	4.2	0.0	8.3	4.2	12.5	4.2	4.2	12.5	4.2	0.0	4.2	0.0	4.2	0.0	4.2	4.2
WAVYLINE (8)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	12.5	12.5
VIETNAM (1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAMBODIAN (3)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	33.3
MING OTHER(1)	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EARLY OTHER (n=13)	0.0	7.7	7.7	15.4	0.0	0.0	7.7	0.0	0.0	7.7	0.0	0.0	7.7	7.7	0.0	7.7	0.0
QING OTHER (n=8)	12.5	0.0	0.0	12.5	12.5	0.0	25.0	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	0.0	12.5
TOTAL (n=133)	3.8	3.0	2.3	5.3	9.8	5.3	5.3	2.3	3.0	3.0	4.5	5.3	3.0	4.5	0.8	12.0	4.5
SBN-I-10-1/2								X				X					
JLH-I-9-2					X												
JLH-I-9-3			X														
JLH-I-9-4							X										
JLH-I-9-5		X															
JLH-I-10-4		X															
JLH-I-9-9																X	
JLH-I-10-6			X														
JLH-I-10-8									X								
JLH-I-10-9	X																
JLH-I-17-1			X														

N.B. Sample sizes include striped jars (Tables 14 and 15) so percentages do not always add up to 100. "Light Grey", "Light Grey/Grey" and "Grey" are as named by the Munsell Soil Color Charts but with a chroma of 1 or more. "Other Very Pale" include Very Pale Brown and a brownish White. "Other" include Brown, Reddish Brown, Light Reddish Brown and Light Brownish Grey.

TABLE 14. COMBINATIONS OF BODY COLOURS - WALLED COARSE STONEWARE JARS

	Very Dark Black	Dark Grey	Dark Grey	Grey	G/ LG	Light Grey	Pink- ish Grey	Grey Brown	Very Pale Brown	Light Brown	Light Red Brown	Red Brown	Dark Red Brown	(Light) Pink Red	Yel- low Red	Dusky Red
C.BROWN			X										I			
BRITTLE			2X			2I										
BRITTLE				X										I		
BRITTLE						I			X							
GUANG						I			X							
GUANG				X					I							
GUANG								I						X		
G.SWANK			X						I							
G.SWANK						X,I										
WAVYLINE		X				I										
O.EARLY	X	I														
O.EARLY			X											I		
O.QING				I		X										
OTHER								I		X						
SBN-V-11-2				X					I							
JLH-9-6		I		X												
JLH-9-7				X										I		
JLH-9-8				X				I								
JLH-10-5				X							I					
JLH-10-7			X											I		
JHL-10-11							X			I						

N.B. Here and in Table 15: C.=Coarse; O.=Other; G.SWANK=Glazed Sawankhalok; GUANG=Guangdong; some body variations do not cross colour names and so are included under the same column.

TABLE 15. COMBINATIONS OF BODY COLOURS - CORED COARSE STONEWARE JARS

	Very Dark Black	Dark Grey	Dark Grey	G/ Light LG Grey	Pink- ish Grey	Very Pale Brown	Light Brown	Light Red Brown	Red Brown	Dark Red Brown	Pink (Light) Pale Red	Yel- low Red	Du- sky Red
C.BROWN									X,I				C
BRITTLE				X,I		C							
BRITTLE			I							C	X		
GUANG		C	X,I										
GUANG			X			I							C
GUANG				X			I						C
GUANG											X,I,C		
U.SWANK			X,I								C		
U.SWANK						X					I		C
U.SWANK		X					C		I				
U.SWANK				X,I,C									
G.SWANK				X,I,C									
G.SWANK				X,I		C							
G.SWANK		C	X,I										
WAVYLINE	X,I			C									
WAVYLINE				X,I						C			
WAVYLINE		X,I											C
WAVYLINE								X				I	C
CAMBODIA	X								I				C
O.EARLY				X,I				C					
O.EARLY	X							C			I		
OTHER				X							I		C
BKH-II-2-2			X,I									C	
SBN-V-11-1					X,I						C		
JLH-10-10									C	X,I			

N.B. For WAVYLINE, Dusky Red is actually Dark Reddish Grey. U.SWANK = unglazed Sawankhaotok.

TABLE 16. PERCENTAGES OF FURTHER BODY, AND SLIP CHARACTERISTICS - COARSE STONEWARES

	----SLIPPING----				--BODY--			-----HARDNESS-----						----% INCLUSIONS----				
	None	X	I	X & I	EW	SW	PP	2-4	5	6	7	8	9	1	2-3	4-5	10-15	20-30
C.BROWN (n=7-8)	100.0	0.0	0.0	0.0	28.6	71.4	0	14.3	0.0	28.6	42.9	14.3	0.0	0.0	0.0	0.0	28.6	71.4
COARSE RED (10)	30.0	60.0	10.0	0.0	50.0	50.0	0	10.0	50.0	20.0	20.0	0.0	0.0	0.0	0.0	30.0	40.0	30.0
BRITTLE (27-28)	85.7	7.1	3.6	3.6	55.5	44.4	0	11.1	40.7	18.5	14.8	7.4	7.4	0.0	11.1	48.1	33.3	7.4
GUANG (29-30)	55.2	17.2	10.3	17.2	23.3	76.7	0	10.0	16.7	10.0	46.7	10.0	6.7	10.	23.3	26.7	26.7	13.3
UNGLAZED SWANK (5)	100.0	0.0	0.0	0.0	20.0	80.0	0	0.0	20.0	20.0	40.0	20.0	0.0	0.0	20.0	20.0	40.0	20.0
G.SWANK (25-6)	76.0	12.0	12.0	0.0	7.7	92.3	0	0.0	12.0	8.0	36.0	44.0	0.0	0.0	7.7	23.1	30.8	38.5
WAVYLINE (n=7-8)	62.5	12.5	0.0	25.0	42.9	57.1	0	0.0	42.9	14.3	28.6	14.3	0.0	0.0	0.0	28.6	28.6	42.9
VIETNAM (n=1-2)	100	0.0	0.0	0.0	0.0	50	50	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	100	0.0	0.0
CAMBODIAN (n=3)	100	0.0	0.0	0.0	66.7	33.3	0	0.0	0.0	100	0.0	0.0	0.0	0.0	33.3	33.3	0.0	33.3
E. OTHER (13-15)	73.3	20.0	6.7	0.0	46.2	46.2	7.7	7.7	46.2	7.7	30.8	7.7	0.0	0.0	15.4	53.8	30.8	0.0
QING OTHER (n=7-8)	100	0.0	0.0	0.0	25.0	75.0	0	12.5	12.5	0.0	75.0	0.0	0.0	0.0	25.0	25.0	25.0	25.0
TOTAL (145-7)	75.2	13.1	6.5	5.2	34.0	64.6	1.4	6.9	26.9	15.2	34.5	13.8	2.8	2.1	13.1	31.7	31.0	22.1

TABLE 16. PERCENTAGES OF FURTHER BODY, AND SLIP CHARACTERISTICS - COARSE STONEWARES (CONT.)

	SLIPPING	Earth- enware	Stone- ware	-----HARDNESS-----						-----% INCLUSIONS-----				
				2-4	5	6	7	8	9	1	2-3	4-5	10-15	20-30
BKH-II-2-2	I		X					X			X			
SBN-V-11-1	X		X					X			X			
SBN-V-11-2	X & I	X			X							X		
SBN-I-10-1/2	None	X			X							X	X	
JLH-I-9-2	None		X				X					X		
JLH-I-9-3	X		X				X							X
JLH-I-9-4	None		X					X						X
JLH-I-9-5	None		X					X				X		
JLH-I-10-4	None		X				X					X		
JLH-I-9-6	None		X					X						X
JLH-I-9-7	None		X					X					X	
JLH-I-9-8	X		X					X			X			
JLH-I-9-9	X	X			X								X	
JLH-I-10-5	None		X					X					X	
JLH-I-10-6	None		X					X					X	
JLH-I-10-7	X		X				X				X			
JLH-I-10-8	None		X				X				X			
JLH-I-10-9	None		X				X						X	
JLH-I-10-10	None	X			X								X	
JLH-I-10-11	X	X			X						X			
JLH-I-17-1	X & I		X				X					X		

N.B. For BODY, EW = Earthenware, SW = Stoneware, PP = Proto-Porcelain. Other contractions as in Tables 14 and 15.

Appendix E

HINDUISTIC STATUES AND INSCRIPTIONS

E.1 Hinduistic Statues

In addition to the archaeological sites, other items recorded during the survey include statues of Hindu inspiration. Seven of these occur in the Pura Puseh at Les. Three are Ganesas; one is preserved in the second yard (Ganesa I), and other two (Ganesa II and III) are in the inner (third) yard. Ganesa I sits on a pedestal but has damage to both hands and the face. The statue is about 40 cm high and 20 cm wide. Ganesa II has four arms, but half of the body and the feet are missing. The right forward hand holds a broken tusk, and the left forward hand a bowl. The left rearward hand holds an axe, while the right holds a rosary. The standing part of the statue is about 26 cm high and 20 cm wide. Ganesa III is the most seriously damaged, with only part of the trunk surviving and no arms. This statue is also about 20 cm high and 22 cm wide.

Besides the three Ganesas, four personal statues, probably manifestations of deceased persons, are also preserved in the temple. According to Stutterheim (1929) the first appearance of this type of personal statue in Bali occurred during the 13th century AD.

The statues in the Pura Puseh at Les indicate that the village, which is already mentioned in inscriptions of the 12th century AD, might have served as a center of Hindu religion. However, the date of the statues is still a little uncertain, and more intensive research is required to determine their real significance.

Four statues are also preserved in the 5-story meru in the Pura Puseh of Tejakula. These consist of two Durgas, one Ganesa and an unidentified statue. Unfortunately, they cannot be described in detail because the villagers would not allow them to be removed from the building. Two, however, can be identified as statues of Durga Mahisasuramardini, the Durga who killed the *asura* (demon) which appeared from the head of a bull or a buffalo. Both are about 75 cm high and 35-40 cm wide. One of these Durga statues has 8 arms, but the objects in the forward hands are unrecognizable. The other three right hands hold, from top to bottom, a wheel, a club, and an unidentified object. The other three left hands hold, again from top to bottom, an axe, a noose of rope and a bow.

The second Durga statue stands next to the first, and has 10 arms. The two forward hands again hold unrecognizable items, but the four other right hands hold, from top to bottom, a trident, a club, a jar, and a spear. The four other left hands hold, again from top to bottom, an axe, a spear or arrow, a noose of rope and a trident. In India a Durga Mahisasuramardhini with eight hands usually holds a javelin, a sword, an arrow, a wheel, a noose, a shield, a bow and a conch shell. On the other hand, one with ten hands should hold a spear, an arrow, two javelins, a sword, two wheels, a moon, a shield and a skull cup (Gupte, 1972:56).

The Durgas in the Pura Puseh at Tejakula are therefore slightly different from the ideal described in the Indian sources. This may be due to local development, and a similar phenomenon can also be witnessed in the form of the Durga statue in Candi Singosari at Malang, in East Java (Bernet Kempers 1959:80). The Durga statue in Candi Singosari was depicted in a standing position with legs wide apart. This position is uncommon in Javanese Durgas but common in India. However, the artistic and technical style of the Durga in Candi Singosari is very different from that of contemporary Pala statues in India. The treatment of the garment is fairly ornate, whereas the garments of Indian Durgas are plain.

The Ganesa in the Pura Puseh at Tejakula is in a standing position. He raises his left hand, but holds nothing in it (*abhaya mudra*?). His right hand holds an unclear object. Standing Ganesas are very rare in Bali, and so far only nine have been reported (Oka Astawa 1988:49). In Indian iconography, Ganesa is usually depicted with 4,6,8,10 or 16 hands, and holds objects which include a noose, a broken tusk, an arrow, a shield, a battle axe, a mace or a club, and a spear (Gupte 1972:80-82).

The other statue in Tejakula is a male figure with two hands, the right holding a jar and the left an unclear object. This figure may represent Agastya. Besides these statues, several architectural fragments of carved sandstone are also preserved in the same meru.

The occurrence of Durga and Ganesa statues in the temples at Les and Tejakula suggests that Ciwaism was once dominant in northeastern Bali. As already noted, however, the dates of the statues and the foundation dates of the temples in which they are preserved remain uncertain.

E.2 Inscriptions

Six inscriptions dated between AD 922 and 1181 and consisting of a total of 20 rectangular copper or bronze plates are preserved in the villages of Sembiran and Julah. These inscriptions were first preserved in the village of Sembiran. However, in 1965 Goris and Poeger found that ten plates of the inscriptions were kept in the Pura Bale Agung of the village of Julah (Goris and Poeger: 1965). It is likely that the inscriptions were divided by the villagers of Julah and Sembiran after 1889, and as a consequence the plates of each inscription have become separated.

The four inscriptions dated AD 922, 975, 1016 and 1065 were written on a total of 12 plates Goris (1954) recorded and numbered these inscriptions as Sembiran AI, Sembiran AII, Sembiran AIII, and Sembiran AIV. Each plate is 37,5 cm long, 8,75 cm wide and between 1 and 1,5 cm thick (Brandes 1889: 20-21). The first plate of each inscription was inscribed only on one side, the others on both sides. Each plate contained 6 lines to a side.

The inscription dated Saka 873 or AD 951 (Sembiran B: Goris 1954) consists of three plates. The first plate was inscribed on both sides, each side with five lines. The second plate was inscribed only on one side with six lines, as was the third plate with seven lines. Each plate is 42,5 cm long and 10,5 cm wide.

This inscription was written badly with a lot of repetition. For instance, the sentence in the second line of the first plate (plate I.a) was repeated in each line below until the fifth line. The text was written in Old Balinese and does not mention a king's name, although some functionaries as well as the boundaries of the village of Julah are mentioned. It seems that the inscription was a confused copy of a possible palm leaf original.

The inscription dated Saka 1103 or AD 1181 (Sembiran C: Goris 1954) consists of 5 plates. Each plate is 39,5 cm long, 9,5 cm wide and between 1,5 and 2 cm thick. Except for the first plate all are inscribed on both sides in the Old Javanese language. Each side consists of six lines.

In terms of the languages used in these inscriptions, Sembiran AI (AD 922), Sembiran B (AD 951), Sembiran A II (AD 975) and Sembiran A III (AD 1016) are in Old Balinese, whereas Sembiran A IV (AD 1065) and Sembiran C (AD 1181) are in Old

Javanese. Five king's names are mentioned, namely Sang Ratu Cri Ugrasena (Sembiran AI), Sang Ratu Cri Janasadhu Warmmadewa (Sembiran AII), Sang Ratu Cri Sangajnadewi (Sembiran AIII), Paduka Haji Anak Wungsu (Sembiran AIV) and Paduka Haji Sri Maharaja Haji Jayapangus (Sembiran C)

Up to the present, only transcriptions of these inscriptions have been made without translation (Brandes 1889; Goris and Poeger 1965). In this section I will attempt to translate each of them, except for Sembiran B; as already mentioned, this appears to be an unauthorized inscription and it contains a lot of words which are difficult to translate.

Several abbreviations are used in this translation including;

cr = currency hnr = honorific pn = proper name
ftn = functionary ms = volume measurement pro = pronoun

The transcriptions of these inscriptions, taken from Goris and Poeger (1965) together with the literal word-for-word translations are as follow:

The inscription no 104 Sembiran AI. Side Ia was not inscribed.

Ib. 1. *Yumu pakatahu sarbwa, dinganga kumpi gowinda,*
You know (ftn), (ftn), (pn)
You have to know that the Sarbwa and the Dinganga is Kumpi Gowinda

manuratang ajna astra, pandyan, yajna, ada pnah ser
scribe order, (pn), (pn), (pn), exist (ftn)
the scribes are Astra, Pandyan and Yadna. The

pasar, kumpi ba(hugya)
market, (pn)
market officer is Kumpi Bahugyan

2. *n, me anak banwa di julah makahakuta, dhikara*
and people village place's name fort, (ftn)
and the villagers of Julah live in the fortified settlement. The Dhikara is

kriddhi, panundun pu cri, pratikaya prajna, turut
(pn), (ftn), (pn), (ftn) (pn), including
Kriddhi, the Panundun is Pu Sri, the Pratikaya is Prajna.

anak banwa, karaksayana, padma, ki(rata)
people village, (ft n), (pn), (pn),
The villagers are included. The Karaksayan are Padma, Kirata,

3. , *cri, pruk, sumambah aku midhih pamasamahyan*
(pn), (pn), pay respect to 1st pro ask to maintain
Sri and Pruk. They pay respect to me and ask me to maintain

kutana, me banwana aksina paraspara kanakanna,
fort and village observe condition people,
their fort and the village. The villagers help each other because

lagi tawan bunin, twa (he)
 continuously capture enemy, that the reason
 they are continuously captured by enemies. That is the reason for

4. *tu syuruhku ya. lipetangen anak parumahan di kutana,*
 my order 3rd pro, come back people live in fort
 my order to them. They have to come back to the fort.

marang santanan marumah ditu, simayangna hangga
 which descendant live there, freehold boundary
 So that their descendants can live there. The freehold of the fort and its
 boundaries are

air lutung karuh, hangga duri (twa)
 river's name west, boundary (proper)
 Air Lutung to the west, Duri Lwarlwar

5. *rlwar kalod, hangga air hyang kangin, hanggampuhan*
 name) south, boundary river's name east, boundary sea
 to the south, Air Hyang to the east and the sea to the

kadya, tani kabaketen mamatek papan, matkap bantilan
 north, negator tax manufacture plank, build hall
 north. They are not taxed by means of manufacturing planks, building a
 hall,

lancang, para(hu)
 canoe, ship
 building small or large canoes,

6. *mangrapuh mangharani, manutu, tikasan, di tambang,*
 manufacturing lime charcoal, (pounding rice ?), tax, at rope,
 manufacturing lime, charcoal, or pounding rice. They do not pay taxes for
 rope,

di buru, tapahaji, tani pamayarn
 at hunting ground, king's monastery, negator pay
 on the proceeds of hunting or to the ruler's monastery. They do not pay

pamli lancang pabharu,
 expense canoe renovation (?)
 the expenses of canoe or hall renovation.

pawaruga, me anada caksu
 tax of having hall and exist inspector
 If an inspector/official

- IIa. 1. *mamaren ka ditu, tani pasaputyana, twa*
 come to there, negator way of paying duty, that
 comes to (Julah), the villagers do not need to pay duty/service.

kabakatyanna wilang tandaga 20 tarub ma 12
 responsibility number tax(?) (cr) shelter (cr)
 Their responsibilities are to pay 20 tandaga (?), and the tax for a shelter is
 12 masaka.

blindarah ma 6 sambar karundung 2 tkapanna
 tax(?) (cr) ceremony (ms) pay
 The tax for blindarah (bloodprice ?) is 6 masaka. Their contribution for the
 sambar ceremony is 2 karundung.

kryampung pi 4
act childless (cr)
The tax for a childless married couple is 4 piling.

2. *bras ka(ru) 3 mulyan palbur ma 1 pi 2 di*
rice coconut bowl origin tax (cr)(cr) every
They provide 3 coconut bowls of rice, the tax for palbur (?) is 1 masaka
and 2 piling every

hakarudung panali ma 1 pi 2 tani kadan parchalana
(ms) tax of rope (cr) negator exist (?)
karudung. The tax for rope is 1 masaka and 2 piling. The parchalana (?)
is to be paid

prakara pamli sang ratu di magha ma 1 di ma
etcetera expense (3rd pro) at name of month (cr) at
and so forth. The expenses for the Sang Ratu every ninth day of Magha
are 1 masaka.

3. *hanawami, ma 1 pamlin nayaka di magha ma 1 di*
big 9th, (cr) expense (ftn) at month (cr) at
The expenses for the Nayaka every ninth day of Magha are
1 masaka.

mahanawami ma 1 pamli bhanda ma 4 talikur nayaka
big 9th day (cr) expense merchandise (cr) tax official
The expenses for merchandise are 4 masaka. The talikur (?) for the
Nayaka are

ma 1 arghayangna, ana kapa
(cr) price, exist cotton
1 masaka. They provide cotton

4. *s ya tula 2 bhang gunja 2 hartak gunja 20 lnga watu*
3rd pro (ms) thread (ms) mungbean (ms) palm sugar
2 tula, thread 2 gunja, mungbeans 29 gunja and palm sugar

gunja 20 di hakupang di gunjan panghurwan, tani
(ms) (cr) (ms) (?), negator
20 gunja, or alternately 1 kupang for every gunja.

blinyan bras lngis, cabya, tingkir
purchase rice oil, cabya candlenut
They do not need to purchase rice, oil, cabya and candlenut.

5. *anada pamli, pamahenda hulu sambah jalanangna,*
exist expense, exchange (ftn) act
If there is to be purchasing or buying, the Hulu Sambah will act,

tani blinyan ryaryya pangatawanangna di magha
negator purchase like the past contribution at name's of month
and they are not allowed to purchase by themselves. As in the past, their
contributions at the month of Magha are

kambing rukud 1 hartak raga 1 be su
 goat 1 mungbean (ms) (dried
 a goat, a basket of mungbeans, a basket of dried

6. *dang rimpi 1 (bwatangna) di nayaka, angken magha,*
 fish) basket 1 bring to (ftn), every month of magha
 fish. These have to be brought to the Nayaka every month of Magha,

hatmuang hatmuang tarhman katih 10 tajuk 10 papan
 every year post (ms) nail 10 plank
 every year. They have to provide 10 posts, 10 nails, a board/plank and

lambar 1 kulit lambar 1 tani dudukyan
 sheet 1 leather sheet 1 negator tax of
 a sheet of leather. They are not taxed on the breeding of

- Iib. 1. *sampi (besara me kambing), lagan leran ma 1 lagan*
 cattle mule and goat, tax road (cr) tax of
 cattles, mules and goats. The tax for roads is 1 masaka, and the tax for

sawung ku 1 teher tani pamyutan di nayakana,
 cockfighting (cr) and negator complaining to the official/leader
 cockfighting is 1 kupang. They are not allowed to complain to their
 Nayaka.

tujanjawa ku 1 tani paparcaksu
 tax (1cr) negator tax for inspectors
 The tax for Tujanjawa is 1 kupang without a supplementary tax for the
 inspector/official.

2. *han di upahan tlung mata di hakupang, tani kadan*
 the cost 3 (cr) every (cr), negator exist
 The cost is 3 mata for every kupang instead of

paptangna me tani kadan patalina, tani
 four (?) and negator exist tax of rope, negator
 four, and they are not taxed on rope or

paparcaksuhan, anada samana abanwa mar
 tax for inspectors, exist colleague village
 for inspectors. If their colleagues in the same village

3. *punya me mamatampihan punya patpat lalima*
 doing a favour and multiply favour 4 5
 do a favour or multiply their favours it is as much as (a 4 or 5 storeyed
 meru ?)

sumeruna, mas ku 2 tmwa nayaka ya panuligaran,
 storied building, gold (cr) to (ftn) that continue
 Two kupang of gold have to be given to the
 Nayaka continuously,

banwa ku 2 tambar pun randa ma 3
village (cr) contribution for ceremony that widow (cr)
two kupang for the village. The contribution provided by widows for the
tambar is 3 masaka.

4. *marang kinakana alihenna, tambar parladug ma 2*
all satisfy looking for, contribution tax (cr)
All are looking for a satisfactory tambar parladug (?) of 2 masaka.

parmasan pamukul ma 1 pi 2 turut sarunganna, me
tax for gamelan players (cr) including sheat and
The tax for gamelan players is 1 masaka and 2 piling, including covers,

sarb, sangkha, tani kadan
violin, conch shell, negator exist
violin and conch shell. There is no

5. *parcaksuna, pabharu, tani*
tax of caksu, tax, negator
tax for the Caksu or for phabaru (renovation ?). There is no

krangayan, me yanada
tax of childless and exist
tax on childless married couples. If a

samana habanwa binicara ditu,
colleague of the same village prosecution there,
colleague from the same village prosecutes,

mara ngalah pamayarn mas ma 2 tmwan hulu sambah ma
loser pay gold (cr) to (ftn) (cr)
the loser has to pay 2 masaka of gold. 1 masaka belongs to the Hulu
Sambah,

6. *1 caksu pi 2 banwa pi 4 ana uparata twanak*
inspector (cr) village (cr) exist died people
2 pirak for the Caksu and 4 masaka for the village. When villagers die,

marumah ditu angsa, buruk tanahna ma 4 di hadiri,
live there descendants grave (cr) every body
their descendants have to pay 4 masaka per person for a grave (?).

wwatangna di hulun sambah (hulu sambah katahwan di)
bring to (fnt) (fnt) know about
It has to be brought to the Hulu Sambah, and the Hulu Sambah knows

- IIIa. 1. *ya jhang tmwan hulu sambah ma 1 caksu pi 4*
3rd pro all income (fnt) (cr) inspector (4 cr)
about this. 1 masaka belongs to the Hulu Sambah, 4 pirak for the Caksu,
and

wanua pi 4 ana krangan mawalu ya suhunan na
village (cr) exist childless widow/widower rule/regulation
4 pirak for the village. If there is a widow/widower from a childless
married couple the Suhunan

tanggungan ulihangan humatur drbyana prakara, ma
tanggungan return arrange property etcetra,
tanggungan rule will be applied for the disposal of their properties.

2. ruhani dwang bhagi babini habhagi hanurangna, tani
man/husband 2 part women 1 part arrangement, negator
2/3 of their property belongs to the widower and 1/3 belong to the widow.
They do not pay

parangsan, ana krangan ampung ya, anak
tax (persuade) exist childless die 3rd pro, people
parangsang (?). When a childless married couple dies, the villagers

banwa tkapyan ya, miulyan ma 4 alapana marha-
village act 3rd pro, value /origin (cr) take for death
will look after them, and 4 masaka of their property has to be retained for
the expenses of a

3. ntu ya, sesan yalap marhantu
ceremony 3rd pro, the rest take for death ceremony,
death ceremony. The rest of their property,

ya, mas pirak kangsa bhajana, tambra bhajana
3rd pro gold silver bronze jar, copper jar
including gold, silver, bronze jars, copper jars,

hulun rbwang, karambo, sampi, huma parlak pa-
slave friend, buffalo, cattle, wet field dry field
slaves, buffaloes, cattles, wet fields, dry fields,

4. dang, mmal, bwatangna di nayaka, anada
grass, garden, bring to (ftn) exist
grass and gardens have to be presented to the Nayaka. If they have been

ceda mati tyarah bunin ya, tani
handicap die capture enemy 3rd pro, negator
handicapped, killed or captured by an enemy, they are not

patarubyan ya, tani pablinyian darahna, tani
shelter 3rd pro, negator price blood (tax), negator
taxed for shelter, blood price (?),

parangsan, ta-
persuade (tax), negator
parangsan (?), or

5. *ni karangyan, baluna katahwan di ya jhang,*
tax of childless, widow/widower know 3rd pro all
for childlessness. All of these rules have to be understood by the
widow/widower.

tathapi yanada kalulandang markalula, musirang ya
however, exist master to serve, flee 3rd pro
However, if someone with their slaves flees to

ditu, tani kasiddhan hulukayuna, pangulape
there negator provide (ftn) dazzling (?)
(Julah), and it can not be understood by the Hulu Kayu

6. *n pangustaustan ditu, pamwiten me ya*
the cause to become(?) there, permission and 3rd pro
why they fled, they have to be permitted to stay

di banwa katkana tinahan hulunna, ana nak, ya
in village arrive arrest servant, exist want 3rd pro
in (Julah). However, the servants have to be arrested. If they want

bayarn hutanna hamulana ba
pay debt original
to pay their debt, only the original has to be

- IIIb. 1. *yarnna, tani kadugan, me twanak banwa di julah*
pay, negator double(?), and people village at Julah
paid without kadugan (double ?). The villagers of Julah are

tani pabunyangen kalulananak, tuhun suruhanna mamrih
negator hide son of servant, but ask having
not allowed to hide the children of servants. However, they should ask

pakurasan, patrakasih,
(?), approval letter (?)
a pakurasan (?), an approval letter (?) of

2. *pasamayan, pamuhakyan, sakraman majengan di kuta,*
agreement, (?), act live in fort,
agreement, pamuhakyan (?), and they should know the regulations for
those who live in the fortified settlement.

ya patkapangna, yanada twanak palamswan marhuma,
3rd pro behavior, exist people outside wet field
If people from outside (Julah) have wet fields, or

mangrawi ditu, pamayarn
garden there, pay
gardens in the village territory of Julah they have to pay a

3. *pangrama ma l di hadiri, me*
tax for a new members of the village (1 cr) every body, and
tax (pangrama) of 1 masaka per person.

yanada taban karang ditu, parahu, lancang jukung,
 exist regulation there, ship, boat canoe,
 If there are stranded ships, boats, or canoes within Julah territory,

talaka anak banwa katahwan di ya kajadyan
 canoe, people village know 3rd pro to become
 which are known to the villagers, they have to be denoted as

wrddhi kinwa(na) ma
 welfare captives
 welfare. The captives

4. *katahu aku, pyanekangna bhaktina, di bhataru punta*
 know 1st pro, rise worship, to (proper
 must be reported to (Sang Ratu). Worship has to be offered to Bhataru
 Punta Hyang (Agastya ?).

hyang, cincin singhala, bantuk l tanda haji,
 name), ring Ceylon/Sinhala, form 1 symbol king,
 The offering is a ring of Sinhalese type with the king's stamp.

bharana ma 4 ya kramana tani kasi
 weight (4 cr) that conduct negator accomplishment
 Its weight is 4 masaka. It can not be changed by

5. *ddhan twa nayaka leran, tuhanjawa, tuhancadar, me*
 those (ftn), (ftn), (ftn), and
 the Nayaka Leran, Tuhan Jawa, Tuhan Cadar,

anak dwangca, krangan, turut sahayana, maka
 (?), childless, include servant, in order
 anak dwangsa (?), or childless people including their servants.

supratibaddha, sanggarugyanya
 to ensure, doubt regarding validity
 By offering this ring, it will ensure the validity

6. *, ajnan sang ratu cri ugrasena, syuhunang*
 order (proper name) receive on the head
 of Sang Ratu Sri Ugrasena's grant. It is received respectfully by

nayakan makarun kulangkaling, turun di panglapwan di
 (ftn) (pn), coming down at assembly at
 the Nayaka Makarun Kulangkaling. (The Sang Ratu's grant) is received at
 the assembly/ court of justice

singhamandawa, di wulan magha cukla pancami
 place's name, at month of Magha before the full moon fifth day
 at Singhamandawa on the fifth day before the full moon,

- IVa. 1. *(rggas) pasar bwijayamanggala, di caka 844 kilagina*
 during market Bwijayamanggala, at year 844 (?)
 during the market day of Bwijayamanggala in the Saka year 844.

di potthagin ajna //0//
 (?) order.
 At that time the Sang Ratu's order was made.

The inscription no 209 Sembiran AII.

- IVa. 1. *Punah di caka 897 bulan cetra krsna*
 Again Caka year 897 month Cetra after the full moon
 Again in the Saka year of 897, the month of Cetra (February-March)
- pancami*
 the 5th day
 on the 5th day after the full moon,
2. *rggas pasar bwijyamanggala, tatkalan sang ratu cri*
 on market Bwijyamanggala, when title/ honorific
 during the market day of Bwijyamanggala. At that time Sang Ratu Sri
- janasadhu warmmadewa, sambandha dang kryan ser*
 (proper name), reason honorific (ftn)
 Janasadhu Warmmadewa (was giving a grant/the inscription). The reason
 is that the market officer (Dang Kryan Ser
- pasar ida kumpi dara dyah damai, mupulang twanak ba*
 market honorific (pn), gathered that people
 pasar) Ida Kumpi Dara Dyah Damai gathered together the villagers of
3. *nwa di julah makasapasukuta, hatyun to linipetang*
 village at Julah around the fort, many that return
 Julah and those who live around the fort, being many of those who
 returned
- dug sang ratu sang lumah di bwah rangga, saha*
 during honorific entomb place's name, include
 during the reign of Sang Ratu, who was buried at Bwah Rangga.
- twa syuruhda ya kalipetan, maruma di julah, marang*
 that order 3rd pro return, live at Julah, all
 They were asked to come back to live where all their
- santa-*
 descendants
 descendants
4. *nan marumah ditu, yanugrahanda ya mabharin*
 live there, 3rd pro gift 3rd pro renew
 live. They are allowed to renew
- pandaksayanna, anugrahan sang ratu atitaprabhu, me*
 inscription, gift honorific previous king, and
 the inscription, which was a grant of the previous prabhu (king).
- pirpagehda ya tani kapanaruktan,*
 secure 3rd pro negator falsify
 The inscription has to be firmly established and it will not be changed,

5. *pangraksayanna*, *ulih datu kabudi kabudi*, *me caksu*
to be guard, by honorific future, and (ftn)
it has to be guarded by the future Datu, and Caksu,

paracaksuh halyun mangilala drbya haji, *parawulu-*
(ftn) all collector property king, (ftn)
paracaksu, all tax collectors, parawuluwulu

wulu saprakara, apan (r)yyuryyam
etc, because (?)
etcetera. Otherwise, (the contents of the inscription) will be

6. *da katurutan dharmmadayadya, pamasamahyan pandem*
following inheritance, complete grave
lost as an inheritance in the future. The responsibilities of the villagers of
Julah include maintaining the grave called Baleswara,

bapanda di dharmmakuta, makadanang di balecwara,
father at place's name, name at building's name,
of (Sang Ratu's) father at Dharmmakuta,

di banwa di bungkulan, saha twa birin sang
at village at place's name, include that gift honorefic
located at the village of Bungkulan. The grant of Sang

- IVb. 1. *ratu cri janasadhu warmmadewa, twanak banwa di*
honorific (pn), villagers at
Ratu Sri Janasadhu Warmmadewa to the villagers of

julah masu 10 dhikara siwanggada, panundun randhi,
jumlah (cr) (ftn) (pn), (ftn) (pn),
Julah includes 10 suwarna of gold. The Dhikara of Julah is Siwanggada,
the Panundun is Randhi.

hulu kayu di widatar trisa, karaksayana ba-
(ftn) at place's name (pn), (ftn) (pn)
The Hulu Kayu at Widatar is Trisa, the Karaksayan are Ba-

2. *nasuga, gaman, turut juru di kadhuran suwad*,
(pn), include (ftn) at place's name (pn),
nasuga and Gaman. The Juru at Kaduran are Suwad and

dharmma, hulu kayu di twaran tra(ng)gana, ka-
(pn), (ftn) at Place's name (pn),
Dharmma. The Hulu Kayu at Lwaran is Tranggana,

raksayanna danagana, nuhuk, palar, danghwa-
(ftn) (pn), (pn), (pn), honorific
the Karaksayan are Danagana, Nuhuk and Palar.

3. *n, banigrama lamatan kuta, tuha gusali mandhura,*
 guid (around?) fort, (ftn) (pn),
 The honorable merchants are around the fort: The smith leader is
 Mandhura
- astakula sujiwa, danghwan astakaya mahendra,*
 (ftn) (pn), (ftn) (pn),
 the Astakula is Sujiwa, the honorable Astakaya are Mahendra
- kestatade, pratikaya ke*
 (pn), (ftn), (pn)
 and Kestada, the Pratikaya is Ke-
4. *sawa, karaksayanna ganabhawa, subhama, turut juru*
 (ftn) (pn), (pn), include (ftn)
 sawa, the Karaksayan are Ganabhawa and Subhama, including four Jurus
- di kadhuran makapatang juru, paknayangna to mas*
 at place's name four (ftn), responsibility that gold
 at Kadhuran. The responsibility of the villagers of Julah is to pay
- paranakangna ma 2 ku 1 di hatahi*
 people (?) (cr) at payment
 paranakang (?), 2 masaka and 1 kupang of gold, which have to be paid
5. *l, hatmwang hatmwang, byayanangna di kartika*
 every year, expense at name of month
 every year as an expense during the month of Kartika (September-
 October).
- angken rah tirtha teher pakadan nasi balun lamak 10*
 every time holy water also provide rice(?) (ms)
 Every Rah Tirtha they also provide 10 lamak ("mats") of rice of balun (?)
 type.
- lyunang nasina gunja 6 di gunjan panghu*
 amount rice (ms) at (ms) (ftn)
 The amount of rice is 6 gunja for every.
6. *(rwan) di halamak, beyangna culung, dadih tangguli,*
 at (ms), meat pig, yogurt, plant,
 lamak (mat). They also provide rice includes pork, yogurt, tangguli
 (*Cassia fistula*) and
- hartak, siddhu hajengan, pirak daksina upah*
 mungbean, scale palm wine, silver offering fee
 mungbeans. (The villagers also provide) palm wine, silver coin for
 daksina (offerings)
- parjuluk ma 1 ku 1 me pamaka*
 spear (cr) and provide
 and the fee for spears is 1 masaka and 1 kupang. (They also provide)

- Va. 1. *kadan sara blin* *ku l rasuna, halya, blin* *ku l*
 (arrow?) purchase (cr) garlic, ginger, purchase (cr)
 for the purchase of arrows 1 kupang, garlic and ginger. 1 kupang has to be
- crahangna di da kulapati me da karana jataka ditu,*
 give at (ftn) and (ftn) there,
 given to the Kulapati and the Karana Jataka at Julah,
- angken karttika me rah tirtha ditu, ha*
 every name's of month and time holy water there, every
 every month of Kartika, and rah tirtha (?) every
2. *tmwang hatmwang, habhaban tkapyanna i lod pasiwwan,*
 year, cut to perform at sea bathing
 year. They also have to maintain the bathing place close to the sea,
- tambak, parigi, pager kambanga pangatawanna, dahan*
 fish pond, terrace, fence floating captive, direction
 the fish pond, terrace and the floating fence of the mooring (?). The length
- kalod kangin karuh, lantangnya haratu*
 south east west, length one hundred
 of the floating fence toward the south, east and west is one hundred and
3. *s dwang puluh pitu dpa, kunang yanada durbalan sang*
 two ten seven fathom, if exist disturbance
 twenty seven fathoms. If there are disturbances of
- hyang paryyangan, me pandem, pancuran, pasibwan,*
 temple, and grave, bathing place, idem,
 temples, graves, bathing places,
- prasada, jalan raya, denan lodan*
 shrine, main road, north south
 shrines and the main road north or south, the expenses
4. *pahurupangna banwa di julah, di indrapura,*
 reciprocity village at Julah, at Indrapura
 have to be shared by the villagers of Julah, Indrapura,
- buwundalm, hiliran, kabeyanna, amin siwidharmman*
 place's name, place's name expenditure (?) free hold
 Buwundalem and Hiliran. These villages have to maintain
- sanghyang paryyangan ditu, parbyayanya ya*
 honorific temple there, expenditure 3rd pro
 the temples/shrines at Julah. The expenditures have to
 the shrines at Julah. The expense for maintenance of the shrines has to be
5. *, raptanganya, watu sakasamahangna ulih to wanwa di*
 tighten stone complete by that village
 tightened. Stones are provided by the villagers of Julah.

julah yanada tarahan tumeken twa partapan di
 Julah if exist plunderer come that monastery at
 If a plunderer comes to the monastery at

dharmmakuta, kapwa ta ya kasamagrin
 place's name, all also 3rd pro together
 Dharmmakuta, the villagers must come together

6. *nurun tangga saha sanjata, tulungen to patapan di*
 come down with weapon, help that monastery at
 with their weapons to help the monastery at

dharmmakuta, apan ya prasiddha, ryyuryyang
 place's name, because 3rd pro perfect, end/final
 Dharmmakuta. Because they protected the monastery, finally,

sang ratu dharmmadaya ditu, kilagina
 honorific (?) there, establish (?)
 Sang Ratu give a grant (to the villagers of Julah). It is established

- Vb. 1. *di samohanda senapati, di panglapwan makasuprati-*
 at assembly (ftn), at court fix
 at the assembly of Senapati at the court. It is cofirmed that

baddha, senapati di wrsabha ida kumpi tuha masigi,
 (ftn), at place's name honorific (pn),
 the senapati at Wrsabha is Ida Kumpi Tuha Masigi,

da ser krangan tuha manta
 honorific (ftn) (pn)
 the honorable Ser Krangan is Tuha Mantada,

2. *da nayakan makarun ida wandami bhimatra, da*
 honorific (ftn) (pn), honorific
 the Nayakan Makarun is Ida Bhimantra, the

manuratang ajna, tuha wasuwandha, me tuha prawara,
 scribe order, (pn), and (pn)
 scribes are Tuha Wasuwandha and Tuha Prawara,

da caksu dikarana di wijayapura, tuha
 honorific (ftn) at place's name, (pn)
 the Caksu Dikarana at Wijayapura is Tuha

3. *nogata, da caksu di wijayakranta tuha rajana, da di*
 (pn) honorific (ftn) place's name (pn), honorific
 Nogata, the Caksu at Wijayakranta is Tuha Rajana,

karana di panglapuan di wrsabha, tuha dhana, da di
 (ftn) at court at place's name, (pn), honorific
 the Dikarana at the court at Wrsabha is Tuha Dhana,

karana *di panglapwan (di) pancakala* *tuha taran*
 (ftn) at court at place's name (pn)
 the Dikarana at the court at Pancakala is Tuha Taran,

4. *,da di karana di panglapwan di dandawaci tuha gama,*
 honorific (ftn) at assembly at place's name (pn),
 the Dikarana at the court at Dandawaci is Tuha Gama,

da di karana di panglapwan di pituha tuha bera, da
 honorific (ftn) at court at place's name (pn),
 the Dikarana at the court at Pituha is Tuha Bera,

panglapwan di wwit tuha lalita, syuratang da karana
 court at place's name (pn), clerk/scribe honorific (ftn)
 the Dikarana at the court at Wwit is Tuha Lalita. The scribe of the Karana

5. *wija(ya)pura banacri //0//*
 place's name (pn).
 at Wijayapura is Banacri.

The inscription no 351. Sembiran AIII

- Vb. 5. *Punah di caka 938 bulan acuji cukla sasti,*
 again at year 938 month acuji before the full moon 6th
 Again in the Saka year 938, the month of Asuji (September-October),
 the 6th day before the full moon,

rggas pasar bwijayakranta, takalan banwa di julah
 when market Bwijayakranta, when village at Julah
 during the market day of Bwijayakranta. At that time the village of Julah

makahalamatan kuta me makadhikara, sahaya lamatan
 around fort and territory, (ftn) around
 included the fort and its Adhikara (government). The sahaya at

kuta,
 fort,
 the fort are

6. *kayasta tuha santana, pratikaya tuha tambeh, prakula*
 (pn) (pn), (ftn) (pn), (ftn)
 Kayasta and Tuha santana, the Pratikaya is Tuha Tambeh, the Prakula is

jangga, astakula balitan, tuha gu
 (pn), (ftn) (pn), (ftn)
 Jangga, the Astakula is Balitan, the leader of the smiths is

- Via. 1. *sali ghalyak, karaksayanna banwa tuha basuta, duwel,*
 (pn), (ftn) (ftn) (pn), (pn),
 Ghalyak, the Karaksayan and Banwa Tuha of the village are Basuta and Duwel.

di widatar hulu kayu, rangkap tuha lilit, bupung,
 at place name (ftn), accompany (pn), (pn),
 The Hulu Kayu at Widatar are Tuha Lilit, Bupung and

plat, di nuran hulu-
 (pn), at place's name (ftn)
 Plat. The Hulu Kayu at Nuran are

2. *kayu, tinggar, me subhawan, manuratang naresa,*
 (pn), and (pn), clerk/writer (pn),
 Tinggar and Subhawan. The scribe is Naresa,

panundun jendra, me astragana, di lwaran hulu kayu,
 (ftn) (pn), and (pn), at place's name (ftn),
 the Panundun are Jendra and Astragana. The Hulu Kayu at Lwaran are

sukhada, sagun, me bhiksu
 (pn), (pn), and monk
 Sukhada, Sagun and the monk

3. *widyambara, makajalan samgat panghurwan uddhawa,*
 (pn), act/mediator (ftn) (pn),
 Widyambara. The mediator is the Samgat Panghurwan, Uddhawa.

manambah di sang ratu cri sangajnadewi, makahetu,
 pay respect to (pn), because,
 They pay respect to Sang Ratu Sri Sang Ajnadewi, because

makatahwang ramparaspara wana habanwa,
 report condition scatter village
 they report that the villagers are scattered,

4. *mati, me tyaban musuh, nguniweh lwas majengan di*
 die, and capture enemy, particularly go live at
 killed or captured by enemies. They have fled to

banwa johan, kwakas ta ya kurn 50 ghyani, mula
 village far, rest that 3rd pro family 50 now, origin
 other villages. There remain 50 families, but originally

kurn 300 kunang sangka ri tani pra
 family 300 because condition negator afford
 there were 300 families. Because of this they can not

5. *h misinin to drabayahajina sdangna paripurinna, tka di*
 fill that property king completely, include
 pay their taxes completely and also

halyun *buncang haji* *saprakara,* *ya ta mangjadyang*
 plenty corvee etc, that to be become
 all the corve'es, etcetera. This causes them

sakit kepwan di ya, *ya ta* *haituna ma*
 hurt become to 3rd pro, because that want pay
 suffering. Therefore, they want to pay

6. *nambah* *di sang ratu,* *mangidih anugraha* *titsyanambarta,*
 respect honorific, ask grant a drop of life
 respect to Sang Ratu, asking for a grant in order to

anandehan *sadrabyahajina,* *to kyangluhunna,* *kunang*
 reduce all property king, (?), therefore,
 reduce all taxes. Therefore,

pwan *kangenangen* *kasyasih*
 think pity
 the village of Julah and its fort is considered

- VIb. 1. *to banwa di julah* *makahalamatan kuta,* *me di bhayan*
 that village at Julah around fort, and in danger
 to be continuously in danger and

bisti jnganna, *hawalan turunan tarahan,* *tani burung,*
 dangerous with, againt enter plunderer, certainly
 to have a dangerous duty to fight against plunderers. They certainly will be

mati kahanang, *saha twa kitu*
 die capture, also that come down
 killed or captured (by enemies). That is the reason for

2. *runanugrahan* *sang ratu,* *to banwa di julah makahakuta,*
 grant 3rd pro, that village at julah around fort,
 the grant of Sang Ratu to the village of Julah and its fortified settlement.

an panngahyan *drabyahajina,* *ateher* *pabharinyan*
 half property king, and also renew
 Only half of these taxes have to be paid and also

pangraksayanna, *kunang lwir* *to*
 the inscription namely all kind that
 the inscription will be renewed. The taxes which are

3. *drabyahajina yandeh,* *sambar* *dwang* *karundung*
 property king reduce, (contribution?) two (ms)
 reduced include the sambar, to 2 karundung,

tkapana *me bhojana* *di dharmmakuta,* *lamak 10*
 responsibiity and meals at place's name, (ms)
 and they also provide 10 lamak of meals at Dharmmakuta,

pakadana *siddhu dwang puluna* *isina di hapulu gu*
 provide liquor two jar content in jar (ms)
 and 2 jars of spirituous liquor. Each jar has to contain one

4. *nja ma 1 ku 1 pamli danur ku 2 arghana 100*
 (cr) purchase coconut leaves (cr) price 100
 gunja. They also provide 1 masaka and 1 kupang. The price of
 coconut leaves is 2 kupang. The price of 100 leaves is 1 kupang -

lambar di hakupang, pamli twak ku 2 arghana
 sheet every (cr), purchase palm wine (cr) price
 The purchase of palm wine costs 2 kupang. the price of

hakadung di hakupang, tani
 (ms) every (cr) negator
 each kadung is 1 kupang. They do not

5. *blinyan bhasa, saprakara, me kasumbha, ulih sang*
 purchase spice, ect and dye in red, receive 3rd
 purchase spices etcetera and dye for Sang Ratu

ratu, me nayaka, pamahain tring katih 6 pakadanna
 pro and (ftn), payment bamboo stem 6 provide
 and the Nayaka. They have to provide 6 bamboos,

ptung katih 3 tmwan yajna, gantung dulur pacara
 bamboo stem 3 for ceremony, hang joint slave
 3 ptung bamboos for ceremonies. The bamboos have to be decorated and
 hung as a tribute by

6. *ka haji, di punya turuten tmwan wajantika, tani*
 king, at donation joint for (?), negator
 royal servants. They provide a donation for Wajantika (?). They do not
 pay

sisikan, kunang yanada samana habanwa ditu, mamayar
 tax, if exist colleague village there, pay
 sisikan (tax ?). If their colleagues at Julah pay for

doca rayadikit pamayarn ya luda
 sin big small payment 3rd pro tax
 big or small offences, they have to pay ludan (additional tax ?).

- VIIa. 1. *n, ndan pangtlwangen ya, habhagi bayarnna,*
 but divide into three 3rd pro, a part payment,
 However, the ludan (?) has to be divided into three, and only 1/3 of it has
 to be paid.

kunang hingan to kabakaten ludyen makantang mamayar
 as for limit that amount tax (?) pay
 The limit for ludan (?) is

- ma 2 bahuta, yan mamayar tujuh*
(cr) (?), if pay seven
2 masaka. If they pay seven
2. *pirak tigangatak hamas, hakupang satak, tani ludyen,*
silver 600 400, (cr) 200, negator tax,
silver coins, 600, 400 and 200 kupang, they are free from ludan (?).
- me tani dampulyan sampi, haturan, besara,*
and negator tax cattle, (?), mule
They are not taxed for having cows, haturan (?), mules,
- kambing culung, asu, manuk*
goat pig, dog, cock
goats, pigs, dogs, cocks,
3. *kdis, halyun yubuhna prakara, sahatwa anugrahan sang*
bird, all livestock etc, also that grant 3rd pro
birds, and livestock, etcetera. That is the grant of Sang Ratu
- ratu to di banwa di julah makadikara yathana*
at village at Julah territory (conjunction)
to the village of Julah and its government. Therefore, the grant
- kapagehen kalipeten paripur*
secure return perfect,
must be secured and perfect all the time.
4. *nna, kagih kramana usana kaligina di samohanda*
part villagers ancient (?) at assembly
The privilege of the villagers of Julah is confirmed at the assembly of
- senapati, ser nayaka, di panglapwan, makasuprati-*
(ftn), (ftn) (ftn), at court, to fix/confirm
Senapati, Ser and Nayaka at the court. It is confirmed,
- baddha, makadi mpungku sewa*
particularly priest Saiwa
particularly by the priests of Siva and
5. *sogata, samgat makrun dangacarya wimalananda, samgat*
Buddhist, (ftn) (pn), (ftn)
Buddha. The Samgat Makarun is Dangacarya Wimalananda, the Samgat
- juru wadwa, dangacaryya kesanten, samgat mangire-*
(pn), (ftn)
Juru Wadwa is Dangacarya Kesanta, the Samgat
- ngiren wandami krttartha, sa*
(pn),
Mangire-ngiren Wandami is Krttartha, the Samgat

6. *mgat prah pu taba, samgat tahan taku pu kasih,*
 (ftn) (pn), (ftn) (pn),
 Prah is Pu Taba, the Samgat Tahan Taku is Pu Kasih,

samgat prataya lali pu homa, samgat manuratangajna
 (ftn) (pn), (ftn) writer order
 the Samgat Prataya Lali is Pu Homa, the elder scribe is

di hulu jamang, samgat manuratanga
 senior (pn), (ftn) writer order
 Jamang,

- VIIb. 1. *jna di mgah lengka samgat caksu karana pura warsa,*
 in middle (pn) (ftn) (pn),
 the middle scribe is Lengkha, the Samgat Caksu Karana Pura is Warsa,

samgat caksu karana kranta rnek, samgat pituha
 (ftn) (pn), (ftn)
 the Samgat Caksu Karana Kranta is Rnek, the Samgat Pituha is

gunas, makadi da senapati dinganga
 (pn), particularly honorific (ftn)
 Gunas, particularly, the honourable Senapati Dinganga is

2. *pu prajna, me da senapati tunggalan dyah kayop, da*
 (pn), and honorific (ftn) (pn), honorific
 Pu Prajna, the honourable Senapati Tunggalan is Dyah Kayop,

senapati kuturan pu gawaksa, hyarp anak di karana
 (ftn) (pn), in front people at (ftn)
 the honourable Senapati Kuturan is Pu Gawaksa. The Dikarana at

wijayapura, sawodita.//0//
 place's name (pn).
 Wijayapura is Sawodita.

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- VIIb. 3. *muwah ing caka 987 bhadrawantan masa tithi sasti*
 again in the year 987 bhadrawantan month date 6th
 Again in the Saka year 987, the month of Badrawantan, (August-September), on the 6th day
- cuklapaksa, pa, pa, bu, wara*
 before the full moon, paniron, paing, wednesday, week
 before the full moon, Paniron (4th day of the 6 day week), Paing (2nd day of the 5 day week), Buda (4th day of the 7 day week),
- wariganing wariga, irika diwaca nikanang karamani*
 name of week, that time that village
 during the week of Wariganing Wariga. At that time the village of
- julah sadhikara,*
 julah unit territory/authority,
 Julah had these officials;
4. *dhikara bapa manija, juru gusali bapa tayamin,*
 (ftn) (pn), (ftn) (pn),
 the Dhikara is Bapa Manija, the leader of the smiths is Bapa Tayamin,
- banjar bapa suddhiman, panulisan bapa sujini,*
 (ftn) (pn), clerk (pn),
 the Banjar is Bapa Suddhiman, the scribe is Bapa Sujini,
- rama kabayan bapa ciksaja banjar i widatar*
 (ftn) (pn) (ftn) at place's name
 the Rama Kabayan is Bapa Ciksaja. The Banjar at Widatar is
5. *bapa manedel, panulisan bapa manghwat, rama kabayan*
 (pn), clerk (pn), (ftn)
 Bapa Manedel, the scribe is Bapa Manghwat, the Rama Kabayan is
- bapa agrati, i kaduran sahaya bapa paksaja,*
 (pn), at places name (ftn) (pn),
 Bapa Agrati. The Sahaya at Kaduran is Bapa Paksaja,
- panulisan bapa bhimaja, rama*
 clerk/scribe (pn), (ftn)
 the scribe is Bapa Bhimaja, the Rama
6. *kabayan bapa sahyaja, lawan pawlah makatlung juru,*
 (ftn) (pn), and a part three (ftn),
 Kabayan is Bapa Sahyaja, including the three Jurus of Julah.
- i pacuran, parujar bapa sambibu, i pasilm bapa*
 place's name, (ftn) (pn), place's name (pn)
 The Parujar at Pacuran is Bapa Sambibu, the Parujar at Pasilm is Bapa

sukhaman, i pasunggan bapa pu
 (pn), place's name (pn
 Sukhaman, the Parujar at Pasunggan is Bapa

- VIIIa. 1. *trangca, samangkana pratyekanya, papak prasama,*
 thus arrangement, persuade together,
 Putrangca. All of them make an arrangement to

mapulung rahi anambah i Ibu ni paduka haji,
 consult together pay respect to dust of shoe king,
 consult and pay respects to Paduka Haji

anak wungcunira kalih bhatari lumah i burwan, mawang
 (pn) of goddess entomb at place's name,
 Anak Wungsu, (the youngest son) of the princess who was buried at
 Burwan and

2. *bhatara dewata lumah ring banu wka, sambandhani*
 god buried at place's name, reason
 the prince who was buried at Banu Wka. The reason that

panambah nikanang karamani julah sadhikara i Ibu
 proposal that villager julah government to dust
 the villagers of Julah and its officials pay respect to

ni paduka haji, anghyang amintanugraha titisanamr
 of shoe king, aim ask grant essence of life
 Paduka Haji is to ask for a grant in order to

3. *tahyun tumambrakna pangraksayanya,*
 want to write on copper plate something to be kept
 write down on copper plates their inscription,

anugrahaniratita prabhu makanimita tan subaddha
 grant previous king because negator firmly
 which was a grant of the previous Prabhu (king). Because they do not

paripurna kahidapanya ta molahing ripta tka ring
 perfect mind that describe palm leave to
 think that what is described in the palm leaves will be well preserved

dlaha ning dlaha
 the future
 into the future.

4. *teher umratibaddhakna sarasani pangraksayanya*
 and confirm content something to kept
 They also want to confirm the original contents of the inscription (which
 has to be guarded),

mula i tan mulanya i sasuruhanya
 originally which negator originally that task
 and to confirm those tasks which are not their responsibilities.

sakweh rowang nikanang karamani julah wineh pasek
 all people that village julah give donation
 All the villagers of Julah are given a donation

rikana, lawan
 that time and also
 and also are

5. *anghyangahyun tumambrakna satingkah paduka haji*
 want to write on copper plate arrangement king
 permitted to write down on copper plates all the arrangements for Paduka
 Haji

ring sambar ikang sipat ma 5
 during contribution for ceremony that penalty (5cr)
 during the Sambar ceremony. The sipat (tax ?) included the

hopanali jaryyajaryyan aceleng ngamulya
 include tax of rope therefore tax (?) originally
 tax for rope of 5 masaka. The aceleng (?) as the same as the original one.

wnanga pagawaya li
 allow make crowbar,
 They are allowed to make crowbars and

6. *nggis, mwanng kris, tan sisiken, tan tahitikusen,*
 and kris, negator tax, negator tax,
 crises. They are free from sisiken (?) and tahitikusan (tax ?).

tan panahura pakupat, tuhun tanggapana ring
 negator pay tax, but duty at
 They do not pay pakupat (?). However, they still have duties

panambaran juga ikanang karaman sakra
 ceremony also that village traditionally
 during the Sambar ceremony, as in

- VIIIb. 1. *manya ring lagi, karananyan panambah i Ibu ni*
 in past, reason pay respect to dust of
 the past. That is the reason why they pay respects to

paduka haji makasopana sang senapati balm bunut
 shoe king intermediary (ftn)
 Paduka Haji. As a mediator is the Senapati Balm Bunut,

pu amrta, tan pisan pindwa aminta ti
 (pn), negator once twice ask attain
 Pu Amrta. Not only once but twice their request/purpose

2. *nkaken sapanghyanganganya, matangnyan tumulwi*
 all purpose 3rd pro, therefore, and then
 has been put. Therefore, the
- paduka haji makon malapkna tanda rakryan ring*
 king order gathering functionary at
 Paduka Haji makes an order to discuss the matter with the officials in the
- pakirakirani jro makabehan, karuhun*
 assembly all , particularly
 assembly, particularly
3. *mpungku caiwa sogata, umalocita sayathasambhawa ni*
 priest Saiwa Buddhist, consider possibility of
 the priests of Siva and Buddha, in order to consider the possibility of
- panambah nikanang karaman i julah sadhikara,*
 purpose that village of julah territory,
 granting the request of the villagers of Julah and its government.
- iningetinge(t) pwa yan tan sapira pangra*
 remember but if negator how many something
 The assembly consider the duties (of the villagers of Julah) to
4. *ksayanya ring kabalan tuhun humyangaken tumambrakna*
 to be kept at (?) however want to write on copper
 the Kabalan (?). However, written on copper plates
- panis paduka haji ring sambar patakannya i*
 requisite king during ceremony appear at
 will be the requirements of Paduka Haji during the Sambar ceremony.
 These will be described
- pangraksayanya, tka rikanang panumbas*
 something to be kept include that purchase of
 in the inscription, including the purchase of
5. *wlit, mula anugrahaniratitaprabhu, yathanya tan*
 tax, originally grant previous king, that negator
 wlit (?), which was a grant of the previous Prabhu and must never be
- purih purihana tka ring dlaha juga prayojananya,*
 exceed to the future also aim 3rd pro ,
 increased. Their aims also
- mwang pada tolihen ikanang kara*
 and same attention that village
 include care/attention between the villagers
6. *man lawan kabalan, an ikang ubhayahitawasana*
 and (?), that agreement
 and the Kabalan (?). That is an agreement/decision

tkapningagawayanugraha, yathanya tan pamuhara
 by those who making grand, therefore negator cause
 between those who are making the grant. The decision should not be

kadurwiwekan i muwahanya paripurnna
 poor judgement in change(?) perfect
 misjudged since it would affect the welfare

- IX.a. 1. *kadi kramanya ringanadi, kalapknanya tumulwi ta ya*
 as behavior in past, decision and then that 3rd pro
 of the villagers as in the past. The decision is taken and then

hinaturaken i lbu ni paduka haji an yogyaywana
 give to dust of king that truth
 it is brought to the Paduka Haji. The proposal

sapanambahnya, matangny(n dumawuh dharmanu)
 purpose, therefore fall good will
 or request of the villagers is true/reliable. Therefore, it is approved for

2. *raga paduka haji i rikanang karamani julah sa-*
 king to that village julah by the Paduka Haji the request of the
 the villagers of Julah and the

dhikara inubhaya sanmata sahinyangakenya patakna i
 territory approve all describe in
 Adhikara. All that was originally described in

pangraksayanya mula, pratyekanya ikang sipa
 something to be kept formerly, especially that penalty
 the former inscription is approved, especially the offence during

3. *ting sambar pinurk ma 5 kahop panalinya tkeng*
 contribution (?) (cr) include rope and also
 the Sambar ceremony which cost 5 masaka, including the tax on rope.

jaryyajaryyan, tan panusuna, aceleng amulya ma 4
 therefore(?), negator exceed, tax formerly (4 cr)
 Therefore, the tax will not be added to or increased. The aceleng (?) was 4
 masaka.

wnanga pagawaya linggis mwanng kris,
 allow make crowbar and keris,
 They are allowed to make crowbars and kris.

4. *tan sipaten, tan panahura pakupat, tuhun tanggapana*
 negator penalty, negator pay tax, however task
 There is no penalty and they do not pay pakupat. However, they are still in
 charge

i panambaranya juga ya, sakweh tinahilaknya ring
 at ceremony also 3rd pro, all payment to
 during the Sambar ceremony, and they pay all taxes to

caksu sambar apan mangkana pu
 (ftn) because that is originally
 Caksu Sambar. Because that was the original situation.

5. *rihnya, panumbas hatep sake sang senapati tunggalan,*
 payment roof for (ftn),
 They pay for the purchase of a roof for Sang Sang Senapati Tunggalan,

sangat kalasanten, mpungkwing hyang slat satak
 (ftn), priest/monk name of shrine 200
 Sangat Kalasanten, and for the priest/monk at Hyang Slat. They pay
 200 (?).

hingananya angken tahun angl
 limit every year exceed
 That is amount of payment that has to be paid every year.

6. *piha sargha mahajana, tan palakwana paksa ya,*
 value important man, negator treat half 3rd pro,
 It will be added to according to the status of the great man. They will not
 be forced to pay the following.

tan papacaksuha, tan sipaten, tan tahitikusen,
 negator tax of (ftn), negator penalty, negator tax,
 They are not taxed for the Caksu. There is no penalty or tahitikusen (?).

mangkana yan hana banyaga
 therefore if exist merchant
 Therefore, if there are seafaring merchants

- IX.b. 1. *sakeng sabrang jong, bahitra, cumunduk i manasa*
 from overseas ship boat met at place's name
 ships, boats met in Manasa,

awuka kunang hatpani katkananya, wnang ikanang
 damage that roof/hull come 3rd pro, so that
 and the roof of the dockyard is damaged when they arrive, so

karaman patrakasiha ana wlyana hatep mulya
 village help exist purchase roof origin
 the villagers have to help them. The purchase price of a roof originally was

2. *ma 1 angmpiha sargha mahajana, tan papacaksuha,*
 (1 cr) exceed value important man, negator tax (ftn),
 1 masaka. It will be added to according to the status of the great man. They
 will not be taxed for the Caksu.

tan kna paksa ya, ika ta yan pamawa sanghyan
 negator subject half 3rd pro, that is if carry hnr
 They will not be forced. It is their responsibility to keep

ajna haji tinumbuk telek paduka
 order king punish (?) king
 the Paduka Haji's inscription. They will be punished by Paduka Haji

3. *haji i tan pananggapa, tan pakanggeha pangraksa-*
 if negator duty, negator implement something
 if they do not care for and implement the inscription.

yanya, knaning hulunata, talitali babini blah
 to be kept, subject (?), rope women half
 They are taxed for hulunata (disobeying a rule?). The tax on rope and females is half

piling, rgep sa 3 saputhayu angken
 (cr), head family (3cr) one by one every
 a piling. The tax for every family is 3 saga every

4. *tahun, mangkana yan hana bhandagina salwiranya*
 year, thus if exist artist all kind
 year. If there are artists of any kind who

maranmak irikanang karamani julah sadhikara,
 come to that village julah territory,
 come to the village of Julah and its Adhikara,

yan pagending i haji ma 1 paweha i riya
 if singer of king (1cr) give to 3rd pro
 the court singer has to be given 1 masaka.

5. *agending ambaran ku 2 paweha i riya, amukul ku 1*
 singer around (2 cr) give to 3rd pro, gamelan player (cr)
 Other singers have to be given 2 kupang. The gamelan players
 have to be given 1 kupang.

paweha i riya, anulingi haji maranmak ku 1 paweha
 give to 3rd pro, flutist king come (cr) give
 The court flautist has to be given 1 kupang.

i riya, anuling ambaran
 to 3rd pro, flutist around
 Other flautists have

6. *sa 3 paweha i riya, atapukan pirus menmen*
 (cr) give to 3rd pro, mask dancer clown dramatist
 to be given 3 saga. The court masked dancer, clown and dramatist

i haji maranmak ku 2 paweha riya,
of king come (cr) give to 3rd pro,
have to be given 2 kupang. Other mask dancer,

yan atapukan
if mask dancer

pirus menmen ambaran
clown dramatist around
clowns and dramatists

- X.a. 1. *maranmak ku l paweha i riya, lawan yan hana waring*
 come (cr) give to 3rd pro, and if exist banyan
 have to be given 1 kupang. They are allowed to cut down banyan trees,

in, skar kuning, wungkudu, mudah,
 tree, kind of tree, tree produce red dye, tree (?),
 skar kuning(?), wungkudu (?), mudah (?),

wodhi, kamalagi, lumbang, yan hana wengi parahuning
 bodhi tree, tamarind, tree (?), if exist night ship
 bodhi trees, tamarinds and lumbang (?). If there is a ship of a

tarahan
 plunderer
 plunderer which comes in the night and

2. *tan katon yan tka, angebi tirisan kunang wnanga*
 negator see if come, overshadow coconut thus allow
 it is invisible when coming because it is blocked by coconut trees,

ya rumugakna ya, mangkana rowangnya sakaraman
 3rd pro smash 3rd pro, thus colleague village
 the trees should be destroyed. Therefore, the villagers are

tan wehen wadwawadwa i samgat julah
 negator allow complain to (ftn) julah
 not allowed to protest/complain against the Samgat Julah.

3. *tan wurung pinakawuluh panawing, lawan suruhanya*
 certainly as bamboo fence, and order
 They are certainly considered as protectors of the state and look after the

pager kambang ing kuta hanar wnanga surusuru pager-
 fence floating at fort new allow cactus fence
 floating fence at Kuta Hanar. They are allowed to use thorny plants for
 fences,

anya paratan hintyan angken tahun, mwanng tan
 tighten rope every year, and negator
 which have to be tightened by rope every year.

4. *hana wehen baryyabaryya cila, molahulah mangrapa-*
 exist allow wicked behavior change plunder
 Bad behavior, disturbing and plundering are not allowed

rapa ri thaninya tan panglapa salinaranganya
 to village negator take everything prohibit
 at the village. They are not allowed to take anything which is prohibited,

ngkana, kadyangganing sarwwaphala, mulaphala, maka
 there, for instance all kind fruit, tuber, include
 including all kind of fruits and tubers.

5. *ding wnanwnang tan panjinga ri jromah tan*
 domestic animal negator enter into house negator
 Domestic animals should not be brought into houses which are not

paneherakna drwyagrha pariskara, mangkana sakwehning
 known as property house decoration, that all about
 categorized as (pets?). That is all about

papangkapangkah angulwanangawetan sasangkananya,
 regulation west to east territory,
 the regulations from the west to the east of the territory.

kinona
 ask
 They are asked

6. *mera kunang salwiranya tan pangalapangduka*
 (?) and then all about negator catch and fight
 to look after everything. They are not allowed to catch and attack/abuse

kbo, sapi, wdus celeng yan tumurun i rikanang
 buffalo, cattle, goat pig if fall to that
 buffaloes, cows, goats or pigs which have fallen down on the

pacici i jumlah tan gawayakna salwirning amuhara
 seashore of jumlah negator make everything terrifying
 seashore of Julah. They are not allowed to terrify

tra-

- X.b. 1. *sa irikanang karaman, yapwan hana mangkana*
 feeling that village, if there is like that
 the villagers. If something like that happens,

kengetakna kawwanganya kawatekanya, sangkanya,
 remember descendants social group, origins,
 it has to be remembered by their descendants, as with their social group and
 their origins.

pजारakna i Ibu ni paduka haji, tan wurung
 report to dust of shoe king, certainly
 It must be reported to Paduka Haji. Certainly

(tibana danda sakara)
 fall penalty according
 they will be punished according to the

2. *maning ngajnalangghana, lawan i wnanwanyabengbenga*
 order disobedient, and allow 3rd pro block
 rule of disobedience. They are allowed to make fish ponds

i tasiknya kadi kramani rowangnya pacici
 at sea as village colleague coastal area
 along the seashore of the village, similar to their colleagues in the coastal regions.

yathanya paripurinna ri thaninya, tan hawuhawun,
 that is perfect at village, negator hesitation(?),
 That is expected to bring perfectness and happiness to the villagers.
 However, they do not hesitate

kunang yan
 but if
 if there are

3. *n katkanapadgata, kaparpekan musuh tan*
 misfortune, attack enemy negator
 misfortunes or attacks by enemies. They do not

pangantyatagen milwanututana kadi rowangnya pacici
 command go along follow as colleague coastal area
 need a command, but they have to follow their colleagues in the coastal areas

kabaih alngkepa ri sanjata sahawlah yan panututa
 all complete with weapon peddle if follow
 with their weapon and paddles in order to follow the

4. *na hawan parahu, tan kalaksepahiryyahiryyana,*
 way ship, negator watching what other people will do
 way of the ship. They are not allowed to waste time watching

lawan rowangnya sakaraman kunang yan hana pnu iwak
 and colleague village if exist turtle fish
 what their colleagues do. If there are turtles or big fishes

ageng kayaran manjing ibengbengnya
 big sail enter pond
 which enter their pond,

5. *sapurihnya mula ulahakanya, kunang pwa yathanya tan*
 privilege origin behavior, therefore, negator
 that was formerly their privilege. Therefore, it should

kolaholoha hlam tka ring dlaha ning dlaha tkapnira
 change now to the future by 3rd pro
 not be changed in the future by the

sanganagata prabhu, mwanng nayaka tkeng caksu
 future king, and leader include inspector
 future prabhu (king), the Nayaka, the Caksu and

6. *paracaksu salwiranya, sarasa sanghyang ajna haji*
all kind, content honorific order king
Paracaksu. These are the contents of this inscription,

prasasti anugraha paduka haji irikanang karamani
inscription grant king to the village
which is the grant of Paduka Haji to the village of

julah sadhikara tkeng pawlah makatlungjuru,
julah territory include part of three territory
Julah and its Adhikara and the three Jurus.

matangnyan
therefore
Therefore,

- XI.a. 1. *sinaphalaken pinanadahaken sapatha i bhatarata punta*
having a result eat curse to god 3rd pro
as a result, a curse is requested to Bhatarata Punta

hyang makapamurcita simsimas singhala bentuk
Hyang offering ring singhala/ceylon form
hyang. As an offering there is a ring of Sinhalese type,

tunggal bharanya ma 4 tanda haji pina
1 weight (4cr) stamp king as
weighing 4 masaka, with a sign or stamp of the Haji (king). It will be eaten

2. *ka panadah sapatha rasa nikanang sapatha, indah ta*
eat curse content that curse, hey
by the curse. The contents of the curse; Hey,

kita kamung hyang bhatarata punta hyang, hyang
all of you honorific (pn), hnr
all of you deified beings, including Bhatarata Punta Hyang, Hyang

ngagasti, maharsi, purwwa daksina, paccimottara,
(pn), great teacher, east south, west north,
Agasti (Agastya), the great priest, the east, south, west, north and

madhya,
middle,
middle

3. *urddhamadah rawi cacik, ksiti jala pawana hutacana*
zenith nadir sun moon, earth water wind fire
zeniths and nadirs, sun, moon, earth, water, wind, fire,

yajamanakaca dharmma, ahoratri
institutor of sacrifice religion, day night
sky as sacrificer, dharmma, day, night,

sandhyadwaya, yaksa picaca
 sunset sunshine, semi-divine being demon
 sunset, sunshine, semi-divine beings, demions,

pretasura ga
 king of ghost mystical bird of garuda
 kings of ghosts, mystical Garuda bird,

4. *ruda gandharba, graha kinnara*
 devas, eclipse combination of animal and human being
 semi-divine beings, eclipses, mystical beings,

mahoraba catwaring lokapala,
 great serpent four devas,
 great serpent, four devas as the guardiants of the four cardinal points,

yama baruna, kuwera, basawa, mwang
 (pn) (pn), (pn), (pn), and
 Yama, Baruna, Kuwera, Besawa and

putradewata, pancakucika nandicwara maha
 (pn), (pn) (pn) (pn)
 Putradewata, Pancakusika, Nandiswara, Mahakala,

5. *kala, sadwinayaka, nagaraja, durgadewi, caturacra,*
 (pn), (pn), (pn), (pn),
 Sadwinayaka, Nagaraja, Durgadewi, Caturasra,

anantasurendra, ananata hyang kalamrtyu, gana
 (pn), (pn), (pn)
 Anantasurendra, Ananta Hyang Kalamrtyu, Gana and

bhuta kita milu manarira, umasuking
 (pn) 2nd pro also embodiment, enter
 Bhuta. All of you embody and enter

6. *sarbwa pacarira, kita sakala saksi bhuta, tumon*
 all kinds body, you real witness (pn), see
 all kind of creatures. You are real witnesses. You can see

madoh lawan mapara ring rahineng wngi, atrngyoken
 far away and close during day night, listen
 from far and short distances in the night and day. You have to listen to

ikeng samaya sapatha sumpah
 this promise curse oath
 our promise, curse or oath

- XI.b. 1. *pamangmang mami ri kita, hyang kabaih, yawat*
 curse our/us to you, god all, if
 to all you deified beings. If

tikanang wwang duracara tan yatna rryanugraha
 that people against negator care to grant
 somebody behaves badly and does not care about the grant of

paduka haji, irikanang karamani julah saddhikara
 king, to that village julah territory
 Paduka Haji to the village of Julah and its Adhikara,

sa-
 include
 including

2. *pasuk parimandalanya kabaih, brahmana, ksatriya,*
 around boundary all, brahmin, nobleman
 its territories, whether brahmin, nobleman,

wecya, sudra, hadyan hulun matuha rarey, lakilaki,
 wecya, sudra, master slave old young, men,
 Wesya, Sudra, master, slave, old person, young person, man,

wadwan grhasta, wi-
 woman married, monk,
 woman, married couple, monk,

3. *ku, nayaka, caksu parasandiwisa, asingumulahulah*
 official, inspector expert (?), every one who change
 Nayaka, Caksu or expert. Those who change

anugraha paduka haji tka ring dlaha ning dlaha,
 grant king to the future,
 the grant of Paduka Haji from now into the future

tasmat kabwatakannya, patyanta
 therefore bring, kill/die
 will be killed

4. *ya kamung hyang, deyan tat patiya, tatanoliha ri*
 3rd pro 2nd pro hnr, if negator die 3rd pro, negator
 by all you deified beings. If they do not die, they will not be able to

wuntat, tat tinghala ri hiringan, tarung ring adgan,
 turn to behind, negator look from outside, attack while standing
 turn behind or to one side. They will be attacked while they are standing.

tampyal ri kiwan, uwahi ri tngena
 sliced at left, repeat at right
 They will be sliced from the left side and it will be repeated from the right side.

5. *n, tutuh tundunya, blah kapalanya, sbitaken*
 hit back, split head, tear
 Their back will be hit. Their head will be split. Their stomach will be torn.

wtengnya, rantan ususnya, wetwaken dalmannya dudut
 stomach, scatter intestines, pull internal pull
 Their intestines will be scattered. Their internal parts will be pulled out.

hatinya, pangan dagingnya, inum
 liver, eat flesh, drink
 Their liver will be pulled out. Their flesh will be eaten. Their blood will be drunk.

6. *rahnya, wkasaken pranantika, yan para ya ringalas*
 blood, finally kill, if go 3rdpro to forest
 Finally, kill them. If they go to the forest

panganening mong, patukning ula, puliraknaning
 eat tiger, bite snake, twist
 they will be attacked by tigers, they will be bitten by snakes, they will be twisted

dewamanyu, yan paraya ring tgal samber
 deva angry, if come 3rdpro to garden struck
 by Dewamanyu. If they come to the garden, they will be struck

- XIIa 1. *(ning glap), sempalning raksasa sarbwaroga rumanca-*
 lightning, tear demon all disease suffering
 by thunderbolts, they will be torn by demons. They will suffer from all kinds of diseases.

ya, arah ta kita hyang kucika, garga metri kurusya
 3rd pro, hey 2nd pro hnr (pn), (pn) (pn) (pn)
 Hey, all of you divine beings; Kusika, Garga, Metri, Kurusya and

patanjala, suwuk lor kidul
 (pn), guard north south
 Patanjala, the guardians of the north, south,

2. *kulwan wetan, bwangaken ringkasa, salambitaken ri*
 west east, throw at sky, throw to
 west and east. Throw them into the sky and throw them to

sanghyang kabaih, tibaken ring mahasamudra, kelm-
 deva all, fall to ocean, sink
 all the divine beings, throw them into the ocean, sink them

aken ring dawuhan, ala-
 at dam, take
 in the dam. They will be taken by

3. *pen sanghyang dalmer, dudutning tuwiran, senghapen-*
 (pn), pull (pn), attack
 Sanghyang Dalmer. They will be pulled out by sea monsters. They will be

ing wuhaya, bhrasta liputening phira, muliha ring
 crocodile, broken wrapped (pn), come back to
 attacked by crocodiles. They will be wrapped by phira (sea animals ?).
 They

narakaloka, klan de sang yamabala
 hell, boil by (pn)
 will come to hell. They will be boiled by the army of Yama.

4. *palun de sang kingkara, ping pitwa yan pangjanma,*
 beat by (pn), time seven if birth,
 They will be bitten by Sang Kingkara. They will be born seven times to

papa ta ya sangsara sajiwakala, sakelikning janma
 suffer 3rd pro suffer life time, hate people
 suffer in their lifetimes. They will be hated by other people.

tmahananya, awuka tan temwasama,
 become, suffer negator happiness,
 They will suffer and never be happy.

5. *mangkana tmahan nikanang wwang umulahulah sanghyang*
 that is become that people change hnr
 That is the fate of those who change the (content) of the inscription

ujar haji prasasti anugraha paduka haji irikanang
 order king inscription grant king to that
 which is the grant of Paduka Haji to

karamani julah saddhikara, tke sa
 village julah territory, include
 the village of Julah and its Adhikara, including

6. *parimandalanya kabaih, mangkana rasa nikanang sa-*
 territorial all, that is content that curse
 all its territories. These are the contents

patha, tinadah sake bhatara punta hyang, tlas
 eat to (pn), already
 of the curse which is requested from Bhatara Punta Hyang.

sinaksyaken ri sanmuka tanda rakryan (ring)
 witness at front 3rd pro at
 It has been witnessed/confirmed in the front of all officials

- XIIb. 1. *pakirakirani jro makabehan karuhun mpungku caiwaso-*
 assembly inside all particularly priest Saiwa
 in the assembly, particularly the priests of Siva and

gata, sira hana irikanang kala samangkana, sang
 Buddhist, who exist that time that is, hnr
 Buddha. Those present at that time were; the Sang

senapati balm bunut pu
(ftn) hnr
Senapati Balm Bunut who is Pu

2. *amarta, sang senapati dinganga pu mangurak, sang*
(pn), (ftn) (pn),
Amerta, the Sang Senapati Dinganga who is Pu Mangurak, the Sang

senapati pinatih pu manggala, sangat nayaka saksi
(ftn) (pn), (ftn)
Senapati Pinatih who is Pu Manggala, the Sang Nayaka Saksi who is

pu lmbu, sangat manuratangajna
(pn), (ftn) writer order
Pu Lmbu, the scribe

3. *ri mgah sadhya, sangat pasuk ganti jiwadhara,*
at middle (pn), (ftn) (pn),
of the centre who is Sadhya, the Samgat Pasuk Ganti who is Jiwadhara,

sangat manuratangajna ri wuntat bamangga, sangat
(ftn) writer order at last (pn), (hnr
the scribe of the end who is Bamangga, the Samgat

caksu karanapura suker, sangat a
(ftn) (pn), (hnr)
Caksu Karanapura who is Suker, the Samgat

4. *dhikaranapura singhaja, sangat caksu karanakranta*
(ftn) (pn), (ftn)
Adhikaranapura who is Singhaja, the Samgat Karanakranta who is

boja, sangat pituha widyaksara, karuhun mpungku
(pn), (ftn) (pn), particularly priest
Boja, the Samgat Pituha who is Widyaksara, the priest of

caiwasogata,
Siva Buddha,
Siva and Buddha,

5. *mpungku ring dharmmaryya wandami widyatma, sangat*
priest at (ftn) (pn), (hnr)
the monks at Dharmmaryya Wandami who is Widyatma, the Samgat

mangirengiren wandami ajiman, sireng kacaiwan,
(ftn) (pn), 3rd pro Saiwa,
Mangirengiren Wandami who is Ajiman. The priests of Siva

mpungkwing winor dangacaryya
priest at place's name hnr/great teacher
at Winor are Dangacaryya

6. karnnika, sangat juru wadwa dangacaryya
 (pn), (ftn) (hnr)
 Karnnika, the Sangat Juru Wadwa is dangacaryya

karnnikananda, tinulisakning lekha ring pakiraki-
 (pn), writer/clerk line at assembly
 Karnnikanda, the clerk/scribe of the assembly

ran bajrangca. //0//
 (pn).
 is Bajrangsa.

The inscription no 201. Sembiran B

- I.a. 1. *Caka 873 bulan posa krsna dwitiya rggas pasar
wwijayakranta tatkalan kyadandha pasangkatayandha
patra-)*
2. *tinin banigrama di julah masang kawratan padang ba-
nwa di julah blah padapada bapa sira yan, bubur
dangin padang manga*
3. *lod parkapasan titi daruh padang para me tri hena hamana lengget, rasa
truk gnar papa ni grama ni julah pratida*
4. *pat babinin banigrama di julah syanggarugin tri me henana*) lenget,
rasa truk gnar papa ni grama ni julah*
5. *di padang di banwa di julah bape bapana manuduh lod parkapasan
winigraman i julah parana*
- I.b. 1. *senapati di pelajungan*), bekas sunraha siddha ni parumahandha
matuturin dha senapati di sadatan, drbyana*
2. *hinuni, samah ya ta mayangan di lapu kinnuandha senapati jadi byayarin
sang grama bapa winigrama*
3. *nira pachaksuda nugrahan asyateja me anak wanuandha jadi lapu,
kadahulu aman ya di prati*
4. *kayandha naktanjakan, makanna masamah ya bakti ingettan ulih
senapati, sadar tana kinuandha pratika*
5. *yandha naktanjakan makannama iningettingeta yan ulih da sang senapati
me da pratikayandha naktanjakan*
- II. 1. *maknna matanaman tan umanangan di sa(ng) ratu kinuandha
(senapati) (pra)*
2. *tikayan, da nakkanjakan makanna mayunemann di sang ratu jadi kyadan
pya sang ratu nata mahli tra*
3. *mahenna hamana lengget rasa truk gnar*) pabala grama di julah
sumanggarugin padang da banwa di julah bla*
4. *h padpada bapa*) sira yan pirababya, dapat babinin banigrama i julah
nabiri surat jayapatra pa*
5. *raksayanna di pannahna manawa gunadosana kilagina di samohanda
senapati di panglapuan ..*
6. ... *(maka) supratibaddha dasatanta tuha tira ... banwa nayakan, makarun
ida kumpi tuha*

- III.
1. *ida manuratang ajna tuha nandhan tuha kesada, tuha pullang, da dikara di panglapuan di brsabha tuha ha*
 2. *rah da dikara di panglapuan hadi pancakala tuha gunanta da dikara di panglapuan di baranasi, tuha dara ba*
 3. *pa dikara di panglapuan da bapa kuhasa dikara di pa(ng)lapuan di tira tuha saddhana da dikara di panglapu(an) di su*
 4. *rih lamata tuha lampur ida manundun dikarana (wi)-jayapura mwan taruh karung, ma 4, patimur ma 3 mwan ta*
 5. *nin julah, kutur, tukad mamurpur, poh talur, tering wor, batu kamodi lijong, baringin, (air pu)*
 6. *hun, air balatuk, air rumusan, kutur, air tampiken, poh bacang, air hepu, beru, air poh tan*
 7. *duk, balimbing, rnek, bakar, candi, ikang tanin julahhan nika kabeh]*

The inscription no 621 Sembiran C

- I.b.
1. *i caka 1103 crawanamasa tithi nawami*
 at Saka year 1103 crawana month lunar day 9th
 The Saka year 1103, the month of Srawana (July-August), the 9th day

cuklapaksa, ma, pa, bu,
 before the full moon mawulu, paing, buda(wednesday)
 before the full moon, Mawulu(6th day of the 6 day week), Paing (2nd
 day of the 5 day week), Buda (4th day of the seven day week),

wara wayangwayang i rika diwaca
 week name pf week that time
 the week of Wayangwayang. At that time
 2. *ajna paduka cri maharaja haji jayapangus arkaja*
 order (title/honorific)(pn) descendant from sun
 the order of Paduka Haji Sri Maharaja Jayapangus (the descendent of the
 Sun)

cihna saharajapatni dwaya paduka bhatara cri
 sign together king's wife two (honorific)
 and his two wives, Paduka Bhatari Sri

para
 (pn)
 Parameswari

3. *mecwari indhuja lancana, paduka cri mahadewi*
 descendant from moon sign, (hnr) (pn)
 (descendant of the moon) and Paduka Sri Mahadewi
- cacangkaja ketana, umajar i parasenapati uming*
 descendant from moon sign, to speak to (ftn) fall
 (descendant of the moon), is given to all Senapatis.
4. *sor i tanda rakryan ri pakirakiran i jro makabehan,*
 down to (ftn) at assembly at inside all,
 The order of Paduka Haji is brought to the assembly,
- karuhun mpungku cewasogata, rsi*
 particularly priest Siva Buddhist, monk
 particularly to the priests of Siva and Buddha
5. *mahabrahmana, i pingsornyajna paduka cri maharaja,*
 great brahmnin, at fall 3rd pro order (hnr king)
 and the great brahmins. The reason for the order of Paduka Sri Maharaja
- ajaren sira kabeh, sembhandha mangrngo paduka cri*
 to inform 3rd pro all, reason heard (hnr)
 to them is that he heard about
6. *maharaja, ri katidopayan ikang karaman, epu kapgan*
 king, at having no idea that villagers, worry
 the villagers of Julah who were worrying about their problems without
- tan wri(ng)daya, alaholahaleh*
 negator knowing how to find way out lost action tired
 being able to solve them. These problems are boring to
- sawicara*
 discuss
 discuss.
- II.a. 1. *pinuripurihan denira sang admak akmitan*
 deceive by 3rd pro (hnr) receive keep
 They have had additional taxes imposed on them by the
- apigajih i karaman i julah kaduran*
 receiving a reward to villagers of julah kaduran
 tax collectors. The villages of Julah and Kaduran
- pikawitani desa*
 originally village
 originally were
2. *kawisesan dening julah sapanjing tani, nun mageyake*
 rule by julah authority, a part (?)
 ruled by Julah itself. This village now has

sarintnya, *satungkeb* *balidwipamandala,* *ha-*
body 3rd pro, whole island of Bali, exist
become a part of the state of Bali.

3. *na* *pwa kanitijnana* *paduka cri maharaja* *rumongo peh*
 right behavior (hnr) king hear essence
Paduka Sri Maharaja knows correct procedures and has heard the
essence of

ning *manawa kamandhaka,* *gunagrahi*
of name of book striving after virtue
the book of Manawa Kamandhaka. He is striving after virtue and

kumingking *ri*
to concern about of
is always concerned about

4. *kaswasthan* *ikang rat,* *rinaksanira,* *makadona ri*
safety that state, protect 3rd pro, aim of
the welfare of the state which he takes care of, as well as

pagehanika *sapthanagara* *swabhawaning kadi* *sira*
stability seven state nature of as 3rd pro
the stability of the state. It is the nature of

prabhu *cakrawr*
king supreme
the supreme

5. *tti rajadiraja,* *sekarajyarajalaskmi* *makadona ni*
king, whole royalty king's wife aim of
ruler/king with his wives to create the

pageha sapthanagara, *matangnyan* *tinatah paduka*
stability seven state, therefore, explain (hnr)
stability of the state. Therefore, Paduka

6. *cri maharaja,* *mangkana* *karaman i julah* *sapanjing*
king, thus villagers of julah authority
Sri Maharaja gives an explanation. The village of Julah

tani *ya ta karananya* *makmitana* *sanghyang raja*
village that reason keep hnr king's
will have and guard the king's

prasasti
inscription
inscription.

- II.b. 1. *agemagem* *makakemitan* *raksanya* *tugu karaman*
hold to be guard keep pillar village
The inscription has to be guarded and kept as evidence that the village

swatantra ri kawakanya *pisaningu tanakna* *pa-*
 autonomous of be embodied never negator to
 is an autonomous territory. It certainly will never

2. *rabyapara,* *karaman i julah*
 intrude upon another business villager of julah
 intrude upon another village's business. The village of Julah

padrwyahajinya *taruh karung ma 4* *saputthayu*
 property king's kinds of tax (cr) way of paying duty
 must pay 4 masaka for taruh karung (tax on boar fighting ?).

tan
 negator
 Apart from that they do not pay

3. *kna sakwehning padrwyahajyanya* *parawuluwulu*
 provide all kinds property king's person of inferior social status
 any kind of tax, including the tax of parawuluwulu (?)

mwang *makapitung bulu* *tkeng nayakan saksi, makadi*
 and seven social status and (ftm), especially
 and all seven taxes of bulu (?) to the Nayaka saksi, particularly

watu
 stone/seed
 the tax of watu

4. *n palbur* *i sambar,* *mwang tan* *kna*
 kinds of tax at ceremony, and negator provide
 palbur (?) during the Sambar ceremony. They are not taxed

tangkalik *ageng tangkalik alit,* *mangkana apan*
 tax of breeding big breeding small, thus because
 for breeding, whether big or small animals. This is because they were

tan *kna* *mulanya* *katmu tinmu* *ring karana*
 negator provide originally meet/find at cause
 not taxed originally, from the

purwwasthiti *ring lagi,* *tan* *kna*
 formerly from the past to present negator provide
 past to the present. They are not taxed for

pangleye palaris tan *kna* *pinta panumbas* *ri*
 kinds of taxes negator provide tax of purchase at
 pangleye (?) and palaris (?). They are not pinta panumbas (?) when

kalanya *patahil* *drwyahaji* *ri*
 time pay property king's at
 they pay all kind of taxes (king's property)

6. *magha mahanawami ri kartikantara purwwabyasa*
 month of magha big 9th at (month) repetition from the past
 on the 9th day of the month of Magha (January-February), and also
 during the month of Kartika (October-November). These are the
 responsibilities of the village from the past.

kalayaran, tan kna pawwat pacaru mwang byaya,
 (?), negator provide kinds of tax and expense
 The village does not provide pawwat (?) and pacaru (?) and related
 expenses.

tan kna
 negator provide
 It does not provide

- IIIa. 1. *ni sajisaji saprakara, ring parggapan manawura sa 12*
 of offering and so forth, at family pay (cr)
 offerings and so forth. Families have to pay a tax of 12 saga.

babini mwang kamasan blah ruwa angken maghamaha
 woman and gold half two every month of Magha big
 It has to be paid on the 9th day
 of the month of Magha.

2. *nawami, mangkana yan hana parawu turun kwehanya yan*
 9th, thus if exist ship come number if
 If canoes,

hana jong banawa salyuning parawu,
 exist canoe kinds of ship all number of ship,
 junks, boats or any kinds of ship (come to Julah)

samgat badwa haji
 (ftn) troop king (title ?)
 the samgat Badwa Haji

3. *di tengah juga wasesa magaci kabayan, gosti, ida*
 at middle also rule called(?) (ftn) (pn), (hnr)
 has authority to (inspect) these watercraft, and the Kabayan Gosti

mangawasa dinara, apan di tengah juga wasa isi
 rule (?) because at middle also rule contents
 has the right to rule people (?). In the middle (sea), (the Samgat Badwa
 Haji) has authority to inspect the contents (cargo) of

parawu di
 ship at
 these ships,

4. *patabah, dulangan, pasanggayabusan, i karaman i*
 (?), wooden tray, (?), of villagers of
 patabah (?), dulangan (?), pasanggayabusan (?) of the village of

julah sapanjing tani, badwaji di ingah juga wase
julah authority village troop king at middle also rule
 Julah and its territory. The Badwa Haji of the middle also has authority

5. *sa kunang (?) bebe(ng) lakuning parawu, makasaksi*
hold up/block way ship, as witness
 over broken down ships. As a witness

di ingah juga mangedum pangtlu
at middle also divide into three
 of the middle (of the sea) he divides into three the

6. *patatah pasanga habusan dwang bagi katah habagi*
(?) (?) (?) two part number a part
 patatah (?), pasanga (?) and habusan (?). Two third of these belong to
 Sangat Badwa Haji and one

patlu kahoman kabayan gosti, ida mangra-
third sacrifice (ftn) (pn), (hnr) guard
 third has to be sacrificed to the Kabayan Gosti. The Kabayan Gosti has
 authority

- IIIb. 1. *ksa desa di nagara, hapan mangingetin abhati*
village in state, because remember reflecting image of guest
to guard the village in the state. Because he is considered as a guest (?).
- mula juga badwaji di tngah mangingetin arikna*
formerly also (fn) at middle remember tax (?)
The Badwa Haji of the middle also remembers the
- mula i*
original of
original taxes of
2. *karaman i julah panjing tani, tan kna*
villager of julah authority village negator provide
the village of Julah, which does not provide the taxes for
- pakupat tan kna parmrm, mwang marnit,*
(tax) negator provide tax (?) and tax (?)
pakupat (?), parmrm (cloudyness ?) or marnit (twinkling ?)
- tan pangglar*
negator tax(?)
pangglar (?),
3. *turunturun bakatbakat mwang patimtim, tan kna*
tax(?) tax (?) and tax (?), negator provide
turunturun (?), bakatbakat (?) and patimtim (?). Julah does not provide
- papuncagiri, patalitali mwangpangempung, tan kna*
tax (?), tax of rope and tax (?), negator provide
papuncagiri (?), tax or rope, and pangempung (?). It does not provide
- sarwwawija*
all kinds of grain
any kind of grain
4. *ri mahabanten pawisuwa, prayaccita, tan*
at big offering of (?), purificatory ceremony negator
for the big offering of pawisuwa (?) and the purification ceremony. Julah
does not
- kna pajapajapa nguniweh wnanga ya*
provide tax of mantras(?) particularly allow 3rdpro
provide a tax of muttered prayers or recitation of mantras. The inhabitants
are allowed
- nambut gawe sakweh ni candala*
take job all kinds of out caste
to take all kinds of jobs out of their castes.
5. *karmma, mwang akekesa sapangalapnya satwa ring alas*
act, and keep hide whole catch animal at forest
They are allowed to hide animals and birds which are caught from the
forest

tkeng *wunyawunya saprakara,* *tan* *pamwita,*
include bird (?) and so forth, negator permission
without permission.

tan *kna* *palanting*
negator provide tax(?)
They do not provide palanting (?)

6. *mwang tan* *kna* *rot,* *mangkana* *yan hana* *rogan*
and negator provide tax, thus if exist infirmity
and a tax for rot (?). Thus, it is an infirmity

karaman *salah margga* *hyun makastri babini*
villagers unusual act want to marry woman
if a villager wants to marry a woman

brahmawangca *santana* *hu-*
brahmin descendant of
of Brahmana caste, or a descendant of an outstanding

- IVa. 1. *njeman* *jurukling,* *lawan yan*
out standing people (ftn) indian descendant and if
person such as a Juru Kling (descendant of an Indian ?). If

hana putra santana *kahulunan* *salwirani kahulunanya*
exist descendant slave all kinds of slave 3rdpro
there are descendants of slaves,

tkewadwa, *rakrya*
include troop, (ftn)
including army/troops, rakryan (officials),

2. *n ----- momah i taninya,* *tan* *tutudan* *tunggu*
live at village 3rd pro negator reduce wait
who live at the village of Julah, their

bwatt haji, *ring pakuwwan* *tan* *kna*
corvee at place's name negator provide
corve'e at Pakuwan is not reduced. They do not provide

buncanghaji *ageng*
corve'e (?) king big
buncang haji (?) big or

3. *admit, karan* *i julah* *pinaka pagar* *ida di*
small, because particle julah as fence (hnr) at
small. This is because the village of Julah serves as a fence or protector
of

nagara *apan di tangarani juga,* *pajuritna* *di julah,*
state because remind also, troops at julah,
the state. The troops at Julah are always alert.

mangkana *inanugraha*
 thus to be given
 This is the grant of

4. *nira paduka cri maharaja haji jayapangus* *yan hana*
 3rd pro(hnr majesty)(pn) if exist
 Paduka Sri Maharaja Haji Jayapangus. If there are

kahyang walyan momah i taninya tan alapen adamla
 (hnr) physician live at village negator take make
 physicians at Julah, they are not asked to provide a

wali i pujung
 ceremony at place's name
 ceremony/contribution at Pujung

5. *mwang i patahan, tan kna rot pabukabuddhi,*
 and place's name, negator provide tax service (?),
 and Patahan. They do not provide rot pabukabuddhi (a kind of tax ?),

tan kna pasiki, mwang pawija, ateher wnanga
 negator provide tax(?), and tax of grain and then allow
 pasiki (?) or pawija (taxes in grain ?). They are allowed

ya mijilakna sa-
 3rd pro make/provide
 to provide

6. *ra mareng tani salen tan alapen dening*
 medicine (?) to village other negator take by
 medicine to other villages. They are not taxed by

watek ser walyan, mwang hulu kayu i puja, tan
 (ftn) physician, and (ftn) at ceremony negator
 the Ser Walyan and the Hulu Kayu for ceremonies. They do not

kna lagani
 provide tax
 pay tax for

- IVb. 1. *hnu, tan sipaten lawan yan hana katyagan ri*
 road, negator penalty and if exist monastery
 roads. They are not penalised. If there is a monastery/ hermitage

taninya wnangaya tan pasaja
 village 3rd pro allow 3rd pro negator tax or
 in their village, they are allowed not to have pasaja (?) or

ekarapanta i matan parabya-
 levy particle negator business of other people
 ekarapanta (?). They do not intrude upon the business of

2. para deni watek kuturan, mangkana yan hana rowang-
by (ftn), thus if exist colleague
Watek Kuturan (officials). Thus, if their colleagues
- nya sakaraman anmu anakning wiku rsi, waluning*
3rd pro village find people monk priest widow
in Julah find a child of a monk, a priest or a widow of a
- wiku r*
monk
monk or
3. *si, tan kna tambangsani kalapitung wnanng wiku rsi*
priest negator provide tax (?) allow monk priest
priest, they do not provide tambangsani kalapitung (?). Monks and priests
are allowed
- momah ri tanin tan senggahenang asu belang,*
live at village negator consider as dog with spotted (beggar)
to live at Julah and are not considered as beggars.
- karaman i ju-*
village of Julah
The village of Julah
4. *lah tan kna pamli haji ring manumbul, mwang ring*
negator provide purchase king of basketry, and of
does not provide basketry or shrubs for the king.
- gulma, tan wadungana dening undahagi salwirani*
shrub, negator chop off by craftsman all kinds of
The shrubs should not be chopped by craftsmen.
- wadunganya, dadya ang*
chop allow to
They are allowed to
5. *rugaken sakweh ni kayu larangan makadi, kamiri,*
smash all kinds of tree forbidden such as candlenut
cut all kinds of forbidden trees such as candlenut,
- waringin, boddhi, sekar kuning yan*
banyan boddhi tree, kinds of tree if
banyan, bodhi, and sekar kuning (?), if
- sadosa ngeneba humah*
guilty block house
these trees interfere with houses

6. *tirisan mwang tan kna katempuhha de ---*
 coconut tree and negator provide target
 and coconut trees. They are not taxed by.....

ganaganan sahanahana krangan sahanahananing drwya
 amount of all exist childless all exist property
 ganagana (?). All taxes on childlessness and property

- Va. 1. *nya kapwa munggaha badwaji di tngah,*
 3rd pro however donate to troop king's in middle
 should be donated to the Badwa Haji of the middle,

tan hana drwyanya kadi wulu, apan di tngah
 negator exist property as (?), because in middle
 including wulu (?), because all

juga laku drwyanya kabeh, ateher
 also way property all, and then
 their property goes to the middle (state ?). And then,

2. *pinarimandhala hingan i taninya, hinganya wetan,*
 to fix whole area boundary of village, boundary east
 the boundaries of the village are established. The east boundaries of the
 the village are

tukad mamupur, air lamesung, air tabar, rangreng,
 river's name, river's name, river's name, (?),
 the river of Mamupur, Air Lamesung, Air Tabar and Rangreng.

hinganya ki-
 boundary south
 The southern (northern) boundary is

3. *dul, sagara, hinganya kulwan, cading, bakah, renek,*
 sea, boundary west, place's name (?), swamp,
 the sea. The western boundaries of the village are Cading, Bakah, swamp,

air cacaracas, hinganya lor, balibing, air nangka,
 river's name, boundary north, place's name river's name
 and Air Cacaracas. The northern (southern) boundaries are Balibing, Air

Nangka.

4. *po tanduk, beru, air repu, po bacang air tapiken,*
 (place's name), (?) river's name place's name river's name
 Po Tanduk, Beru, Air Repu, Po Bacang, Air Tapiken,

rangre, air runasan, air balanuk, air puhun, bari
 (?), river's name, river's name, river's name banyan tree
 Rangre, Air Runusan, Air Balatuk, Air Puhun, banyan tree.

5. *ngin, lijong, batu kamodi, tring ror, po taluh,*
 tree(?), place's name, bamboo ror, place's name

These are the boundaries of the four cardinal points of the village of Julah.
mangkana lmah ni parimandhala cinatur deca,
 thus area of border area four cardinal point
 This has been witnessed /confirmed in front of

tlas sinaksyaken ri sa-
 already witnessed at front
 the officials of the assembly, particularly by

6. *nmuka da rakryan i jro makabehan, karuhun mpungku*
 of hnr (ftn) all, particularly priest
 Sivaite and Buddhist monks, great priests.

sewasogata rsi maha brahmana i pingsor (nya)
 Siva Buddhist priest great brahmin of fall down
 The grant of Paduka Sri Maharaja has been laid down. The Senapati and

- Vb. 1. *ajna paduka cri maharaja, makadi parasenapati*
 order majesty king, particularly (ftn)
 the priests of Siva and Buddha are

mangkana (m)pungku sewa sogata, sang senapati balm bunut pu
 thus priest of Siva Buddhist, hnr (ftn)
 the Senapati Balm Bunut who is Pu

2. *anakas, sang senapati dinganga pu wudasina, sang*
 (pn), hnr (ftn) (pn), hnr
 Anakas, the Sang Senapati Dinganga who is Pu Wudasina, the Sang

senapati maniringin pu amuru
 (ftn) (pn)
 Senapati Maniringin who is Pu Amuru-

3. *lung, sang se(napa)ri kuturan pu nirjanma, sangat*
 hnr (ftn) (pn), hnr
 lung, the Sang Senapati Kuturan who is Pu Nirjanma, the

manuratang hajna i hulu (mada)tamwringreh, manurat-
 scribe order at front/first (pn), scribe
 senior scribe who is Madatamwringeh, the middle scribe who

ang hajna i tengah matadara
 order at middle (pn)
 is Matadara,

4. *sangat manuratang hajna i wuntat amaruda, sangat*
 hnr writer order at last (pn), hnr
 the last scribe who is Amaruda, the Sangat

caksu karanapura walaharsa, sire(ng) kacewan,
 (ftn) (pn), 3rd pro of Saiwa,
 Caksu Karanapura who is Walaharsa, the priests of Siva,

mpungkwi(ng) *hyang(pa)dang*
 priest place's name
 the priest at Hyang Padang who is

5. *dangacaryya agrecwara,* *mpungkwing pasaban* *dang*
 hnr (pn), priest place's name hnr
 Dangacaryya Agreswara, the priest at Pasaban who is Dang

acaryya amaradwaja, *mpungkwing binor* *dangacaryya*
 hnr (pn), priest at place's name hnr
 Acaryya Amaradwaja, the priest at Binor who is Dangacaryya

hlahla,
 (pn),
 Hlaha.

6. *mpungkwi(ng) makarun* *dangacaryya hadiwangsa* *sireng*
 priest at (ftn) hnr (pn), 3rd pro
 The priest of Makarun is Dangarcaryya Hadiwangsa.

kasogatan *mpungkwing kutrihanar* *dang upadyaya*
 of Buddhist priest at place's name hnr ftn
 The monk at Kutihanar is Dang Upadyaya

sarbwatharaja.
 (pn)
 Sarbwatharaja.

E.2 Geographical data from Inscriptions

The epigraphic sources name several villages in northeastern Bali in the late 9th century AD. According to the inscription of Bebetin AI, dated to AD 895, Banwa Bharu was a location where foreign traders came and sold their goods (Goris 1954:54-55). The site of Banwa Bharu has not yet been identified. The inscription of Sembiran AII, dated to AD 975, mentions other villages, apart from Julah, including Bungkulan, Buwundalem, Indrapura and Hiliran. Bungkulan still exists in Kecamatan Kubutambahan about 15 km west of Julah. Buwundalem should correlate with Bondalem, which is located 3 km east of Julah. The villages of Indrapura and Hiliran are still unlocated.

According to the same inscription the villagers of Julah had to maintain the grave of Baleswara in the village of Bungkulan, and the other three villages had to cooperate with Julah in the repair of shrines, graves, bathing places, and the main road. Part of the inscription states: Va.3. ...yanada durbalan sanghyang paryyangan, me pandem, pancuran, pasibwan, prasada, jalan raya, denan lodan 4.pahurupangna banwa di julah, di indrapura, hiliran, kabeyanna (Poeger 1965:4, Goris 1954:78). Translation:..." if damage occurs to shrines, graves, bathing places, prasada (shrines), or the northern (denan) and southern (lodian) main roads, the funding must be provided in turn by the villages of Julah, Indrapura and Hiliran".

These and other villages are mentioned again in the inscription of Kintamani E, dated to AD 1200, in relation to the cotton trade between Kintamani and several villages in northeastern Bali. These are Les, Paminggir, Hiliran, Buhundalem, Julah, Purwwasidhi, Indrapura, Bulihan and Manasa (Wardha 1983). Of these, Les, Buhundalem (Bondalem) and Julah still exist, and Bulihan should be the village of Bulian in Kecamatan Kubutambahan. Of the others listed, Paminggir and Hiliran may have been located between Les and Bondalem, possibly in the vicinity of the modern village of Tejakula. The villages of Purwwasidhi, Indrapura and Manasa still can not be identified.

It should be noted that a place called Manasa is also mentioned in the inscription of Sembiran A IV, dated to AD 1065. Part of the inscription states; IXa.6....mangkana yan hana banyaga, IXb.1sakeng sabrang jong, bahitra, cumunduk i manasa. Translation;" thus, if there were seafaring merchants, ships and small boats met in Manasa". It

thus seems that Manasa, like Julah, was another port on the northeastern coast of Bali. In the village of Sinabun near Singaraja there is a temple called Pura Manasa, but whether this is located on the ancient site of Manasa is still not clear. Based on the epigraphic data, therefore, at least three sites in northeastern Bali may have been ports, namely Banwa Bharu (Bebetin AI AD 896), Manasa (Sembiran AIV AD 1065) and probably Julah.

Two inscriptions dating from the early 11th century AD give some information on contemporary population numbers in villages in northeastern Bali. The inscription of Sembiran AIII, dated to AD 1016, states that Julah was then inhabited by 300 families (Goris 1954:95-96). However, because of a social disturbance at that time some of the villagers left Julah, so that only 50 families remained. These were unable to pay the required amount of tribute to the raja. The inscription of Sawan AI or Bila I, dated to AD 1025, also tells a similar story. The villagers of Bila were reduced from 50 to 10 families who could not pay the full tribute, so they had to ask the raja for a reduction (Goris 1954: 101-103).

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Abbreviation

BAR	<i>British Archaeological Reports. International Series.</i>
BIPPA	<i>Bulletin of the Indo Pacific Prehistory Association</i>
BKI	<i>Bijdragen Koninklijk Instituut voor Taal-Land en Volkenkunde</i>
IAR	<i>Indian Archaeology . A Review</i>
INI	<i>Inscripties van Nederlandsch-Indie. Uitgegeven door het Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen, 1940.</i>
JMBRAS	<i>Journal of the Malaysian Branch of the Royal Asiatic Society</i>
JSEAS	<i>Journal of South East Asian Studies</i>
TBG	<i>Tijdschrift voor Indisch Taal-Land en Volkenkunde. Uitgegeven door het Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen.</i>

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