

THE TIMBUL SITE, BALI, AND THE TRANSFORMATIONS PROJECT: MATERIAL REMAINS AND CONSIDERATIONS OF CHRONOLOGY AND TYPOLOGY

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ABSTRACT

The Timbul site, which a 2000 survey indicated had significant potential for the study of Bali's early states, was the focus of test excavations as part of the Transformations in the Landscapes of South-Central Bali: An Archaeological Investigation of Early Balinese States. This paper presents results of the analyses of the materials recovered from the 2004 excavations, their chronological information and an earthenware rim shape typology that is also tied to earthenware rim types from dated north coast sites. The excavated deposits, albeit limited, contribute further evidence of Bali's Early Metal period and rarely recovered settlement remains from possibly just prior to and during the early Classic period; these remains are discussed within the context of current archaeological knowledge of these periods.

INTRODUCTION

South-central Bali (Figure 1), particularly the area between the Pakerisan and Petanu rivers, is often considered to have been the center of the island's early states (Bernet Kempers 1991:114-115; Hobart et al. 1996:25). This area has yielded a high concentration of remains (e.g., bronze drums, carved stone sarcophagi) from the early complex societies of the mid/late-1st millennium BC to mid/late-1st millennium AD (Ardika 1987) and from the kingdoms of the Classic Period, particularly of the 11th to mid-14th century AD. Bali's early states formed during the intervening period, and based on the earliest known royal inscriptions, prior to the late 9th century AD. This intervening period is archaeologically poorly known, with very few statues and remains of monumental architecture pre-dating the first inscriptions.

Understanding the processes leading to early Balinese states, and of their subsequent transformations, is central to debates about the nature and the status of these polities: whether, for example, the nature of state political power arises from and exist only for ceremony (e.g., Geertz 1980) or derives from and for the control over the material resources and lives of its people (Wright 1998:173),

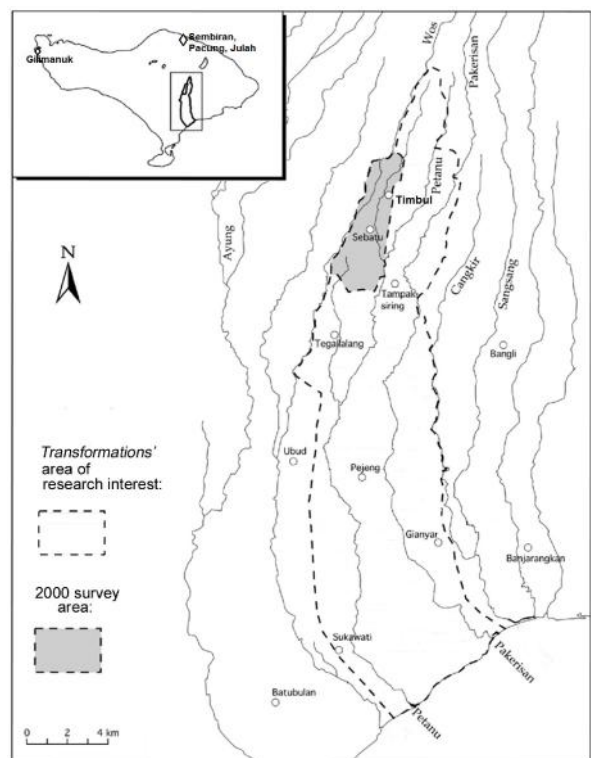


Figure 1 Location of the Timbul site

and whether any historically-known Balinese polity was a “state”. The existence of seemingly conflicting evidence may actually be more indicative of the cyclical nature of states, that is, re-occurring periods of consolidation, expansion and dissolution into non-state polities that nonetheless maintained aspects of “stateness” (Marcus 1998). The status of Balinese states may also be linked to how “the state” is defined and how archaeologists recognize, from a usually difficult archaeological record, the complex social, symbolic and material transformations important in their formation. As used here, “state” refers to a polity with at least a two class-endogamous social strata –

a professional ruling class and a commoner class – and a government that is both centralized and internally specialized (Feinman and Marcus 1998; Wright 1977, 1978). The crucial change is thus a political one that is both intimately connected to ideological change, including that which underlies stratification and descent, and entails a change in the autonomy of subject peoples to loyalty to a ruler (Marcus and Feinman 1998:6). The material implications of this conceptualization may include, for example, in an increase in settlement and administrative hierarchies, stratification connected with sacred or divine origins of the ruling class and standardized temples indicative of a state religion, full-time priests and greater territorial control (see e.g., Feinman and Marcus 1998).

The Balinese inscriptions of the 9th-10th centuries, currently the main source of information for the period (although remains of a Buddhist brick temple, related structures and *stupika* in Kalibukbuk, north Bali, may be contemporary to these inscriptions (Kertararhaja 2009; Suanika 1996), provide evidence consistent with this understanding of a state (see also Ardika 1987). The earliest known of these royal edicts (Sukawana A1 from AD 882), issued by an unnamed ruler, orders an official and several priests/monks to build a Buddhist monastery and adjoining hospice on the royal hunting grounds, which was to be maintained by levies from carpenters, weavers and livestock holders (Ardika 1987:46; Ardika and Beratha 1996:42-46; Hobart et al. 1996:73). The contents of the six other late 9th to early 10th century inscriptions include reference to different types of royal and village level officials; taxes, tax laws and tax exceptions; different types of settlements, some of which appear to have been associated with different noble secular officials having various rights and responsibilities; regulations of property; and coinage, a three day market cycle and a merchant guild of foreign traders (Ardika 1987, 2008; Beratha 1992; Hobart et al. 1996:26, 73-74; Setiawan 2008).

With this background, the *Transformations in the Landscapes of South-Central Bali: An Archaeological Investigation of Early Balinese States* project, undertaken with Drs John Schoenfelder and I Wayan Ardika, was initiated to investigate, through a program of survey and excavation, changes and continuities in aspects of the political, religious and economic landscapes of south-central Bali during the mid-late 1st millennium AD and into the second millennium AD. Preliminary fieldwork took place in 1998, followed by survey work in 2000 (see Bacus and Schoenfelder 2008; Bacus et al. 2000; Schoenfelder and Bacus 2006 for further details on the 2000 fieldseason for details). The results (e.g., presence of c. 104 whole and fragmentary statues, 19 architectural pieces including two possibly from tombs or shrines to glorify deceased rulers) suggested that the village of Timbul had significant potential for a study of early states and it was selected for the focus of the 2004 fieldseason. The exca-

vations aimed at beginning to understand the structure, community organization and chronology of the site; the last including radiometric dating of the deposits and the construction of one or more radiometrically-anchored artifact typologies to aid in future dating of other sites and in regional-scale analyses necessary to a study of state formation and transformation.

This paper presents results of the analyses of the materials recovered from the 2004 test excavations and their chronological information, with a particular focus on the initial construction of an earthenware rim typology. The paper begins with an overview of the 2004 excavations (see Bacus and Schoenfelder 2008 and Bacus et al. 2004 for details and preliminary results of the fieldwork) and discusses the dating of the deposits. Analysis of the small assemblage of non-earthenware artifacts – the Chinese materials and lithic artifacts – are next discussed. The paper then presents the morphological analyses of the earthenware pottery rim sherds and compares the resulting rim shape types to those from other dated sites on Bali. It concludes with a discussion of the excavated Timbul deposits in the context of current archaeological knowledge of the relevant periods on Bali.

OVERVIEW OF THE 2004 EXCAVATIONS AT THE TIMBUL SITE & CONSIDERATIONS OF CHRONOLOGY

The village of Timbul is located in Desa Dinas Pupuan, Kabupaten Gianyar, at c. 700 m above mean sea level (see Figure 1). It extends approximately 2.0 km north-south, with Desas Pupuan to its north and Calo to its south, and 1.5 km east-west. The Tukad Payang and Tukad Dedap rivers form its east and west boundaries, respectively. The 2004 fieldseason began with survey and coring work (see Bacus and Schoenfelder 2008 for details), the latter of which suggested buried cultural deposits in two areas near the Pura Puseh temple: core PPC3 yielded one earthenware sherd at c. 70 cm below surface (cmbs) from a slightly sandy clay layer that extended from c. 55 to 90 cmbs and core PPC10 had a distinctive dark layer of sandy clay, suggestive of a habitation deposit, from c. 125 to 165 cmbs.

One test excavation unit was thus located at the Pura Puseh locale and encompassed PPC3 (site designation TMB-04-PP; Figures 2 & 3). Two 1 x 1 m units of a larger 2 x 2 m unit were excavated and designated Test Pit (TP) #1 (the southeast quarter of the unit) and TP #3 (the northwest quarter); onset of the rainy season did not permit excavation of the entire 2 x 2 m unit. TP #1 was excavated until culturally sterile layers were encountered at the 165-170 cmbs level (and it was cored an additional 210 cm, to 390 cm, with no further cultural deposits detected). TP #3 was excavated to a depth of 200 cmbs; the 190-200 cmbs level yielded two earthenware sherds, although it is possible that their presence was due to the ex-

Period	Layer	Description	Artifacts (count)
late*	I	Fine-medium sandy clay, 10YR 3/3. Charcoal flecking. 0-29 (TP #1) & 0-27 cmbs (TP #3), (plow zone extends to c. 22 cmbs)	earthenware sherds (c. 744), glazed tradeware sherds (2), lithic artifacts (1), fire-cracked rocks (4), burnt/baked clay (1) (*note: some modern materials in plow zone & plastic in a post-hole of a farmer's temporary structure)
late?	IA	Clayey fine-medium sand, 10YR 3/4. Charcoal flecking. c. 29-47 & 27-42 cmbs	earthenware sherds (c. 48)
middle?	I below IA	47-70 & 42-78 cmbs	earthenware sherds (c. 699), fire-cracked rocks (2)
middle	Feature #2	Oval-shaped area (10+ cm x 21 cm) of (TP #3) charcoal-stained blackish soil, 74-80 cmbs	earthenware sherds (3)
early	IB	Fine-medium sandy clay, 10YR 3/3. Charcoal flecking. c. 70-110 & 78-120 cmbs. From c. 110 and 120 cmbs, resp., to 150 cmbs, IB increasingly mottled with layer II	earthenware sherds (c. 1366), lithic artifacts (2), fire-cracked rocks (5), burnt/baked clay (1)
early	Feature #1	Circular area (10 cm dia.) of grayish clay; (TP #1) possibly part of a posthole, 106-110 cmbs	earthenware sherds (2)
early?	II	Clay with some medium sand inclusions, 10YR 3/4. c. 150-170 (no artifacts below 165 cmbs) & 150-200 cmbs (cultural deposits may continue below 200 cmbs)	earthenware sherds (59)

Table 1: Description of Stratigraphic Layers, Features & Artifact Classes from TMB-04-PP Test Excavation



Figure 2: Location of test excavations (TMB-04-PP & TMB-04-RS) (Source: Google Earth, 2012)

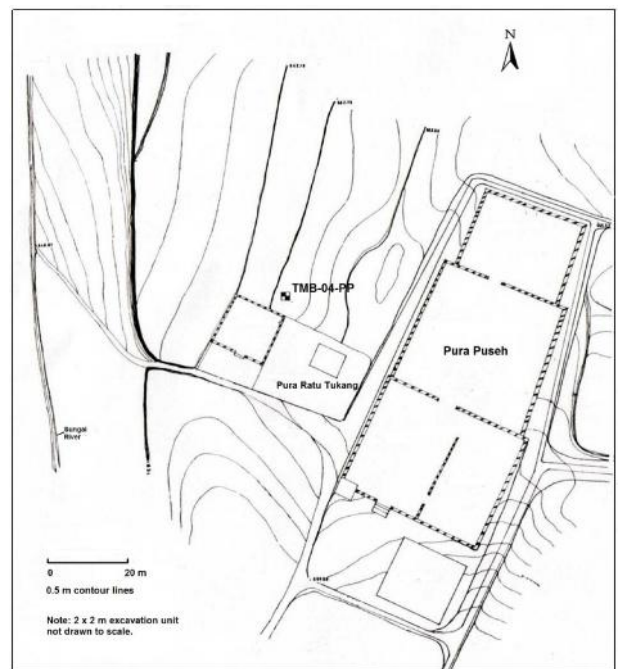


Figure 3: Map of Pura Puseh locale

tensive root and insect disturbances noted at this level. Table 1 briefly describes the stratigraphic layers, features and artifact classes (see Bacus and Schoenfelder 2008 for further details). Earthenware pottery dominated the excavated assemblage, of which less than one percent (20 of 2921 sherds) was decorated; only small quantities of several other classes of artifacts were recovered.

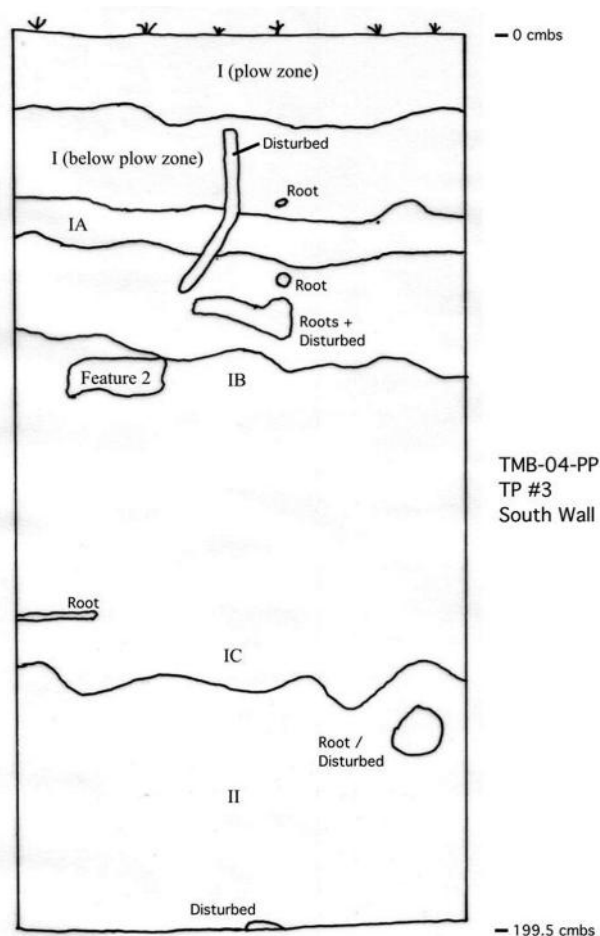


Figure 4: Profile of Pura Puseh unit

From Feature #2 (c. 74-80 cmbs; Figure 4), which contained one sherd decorated with incised parallel dashes and two plain earthenware sherds, one piece of carbonized material was submitted for AMS C14 dating. It yielded a date of 1370 ± 40 BP (Beta 224492), with a two-sigma calibrated date of AD 644-801 (Stuiver and Reimer 1993) using the Southern Hemisphere calibration dataset SHCal04 (McCormac et al. 2004). This date slightly differs from the IntCal04 2 sigma cal. AD 610-680 reported in Bacus and Schoenfelder 2008. Although it is only a single radiocarbon date, it does appear stratigraphically consistent with the dating of the material from the layers above and below Feature #2. From layer I (0-30 cmbs portion), two glazed tradeware sherds (see section below), dating to approximately the 15th-16th to 19th centuries, were recovered. From the layer into which the feature is cut, as well as below it, derive eight of the nine earthenware sherds that have the same types of decorative treatment – rectangular, triangular or diamond-shaped impressions, probably net impressed, or comb-incised (Figure 5)

– as found on sherds from the oldest deposits at one or more of the coastal sites of Sembiran, Pacung and Gilimanuk (see Figure 1 inset; Ardika 1991:Figs. 5.11, 5.13; Ardika 2008:149; Tim Jurusan Arkeologi 1998:Gambar 5.8, Foto 9; Soegondho 1985:Fig. 3, decoration patterns 1 and 2; Soegondho 1995:Photo 50). The other similarly decorated sherd is from the level immediately above the feature, which may suggest, for example, a longer period for this type of decoration than is known from the north coast sites or that the sherd was displaced.



Figure 5: Earthenware sherds from early period Pura Puseh that share decorative treatment with those from early period north coast Bali sites (top: comb-incised; bottom: net impressed)

At Sembiran and Pacung (which appear to have been part of an ancient harbor town for periods starting around the beginning of the 1st millennium AD), these types of decorated earthenwares derive from the same layers as Indian Rouletted Wares and other Indian wares (Ardika 1991:50; Tim Jurusan Arkeologi 1999:44); Rouletted Wares date to c. post-200 BC to AD 300 (Magee 2010). An age range of c. 200 BC to AD 200 is suggested for the early period at these sites (Ardika et al. 1997:195), although a range of c. AD 1 to 200 was initially suggested for the lower Sembiran deposits based on the chronological overlap between the Indian Rouletted Ware and the period of use of the Kharoshthi script that was found on a black-slipped sherd of probable Indian origin in these deposits (Ardika 1991; Ardika and Bellwood 1991).. Recent C14 determinations on human remains from the lower deposits at Pacung have yielded dates within this range: cal. BC 184-AD 51, BC 161-AD 52 and BC 167-AD 24 (2 sigma ranges; McCormac et al. 2004; Stuiver and Reimer 1993), which correspond to the uncorrected dates, respectively, of 2110 ± 40 from trench PCN III (Lansing et al. 2004, 2006),

Layer	Description	Artifacts (count)
I	Fine sandy clay, 10YR 3/3. Charcoal flecks & large pieces. c. 0-100 cmbs (TP #2) & c. 0-26.5 cmbs (TP #4) (but much of this layer in TP #2 is probably part of Feature #1 trash pit)	earthenware sherds (2052), glazed tradeware sherds (10), brick/baked clay (16), fired-clay object (1), coin (1), metal (3), slag (1), lithic artifacts (2), fire-cracked rock (1), carved pumice object (1), bone (3), tooth (1), glass (1), unidentified (1)
IB	Fine-medium sandy clay, 7.5YR 3/2, with 10YR 5/4 mottling. Small charcoal pieces. c. 14-100 cmbs & c. 0-35 cmbs	earthenware sherds (325), glazed tradeware sherds (2), coin (1)
	I & IB mixed in excavation of TP #2	earthenware sherds (1228), glazed tradeware sherds (7), coins (3), clay net weight? (1), lithic artifact (1), brick/baked clay (2), shell (1)
II	Similar to IB but with higher clay content, 10YR 3/4 (with some 10YR 2/2 mottling). Immediately below Feature #2, c. 32-50 cmbs(excavation stopped at 50 cmbs)	earthenware sherds (162), bone (2) [All from TP #2]
Feature 1	Late historic to modern (15th/16th to 19th/20th centuries) trash pit (TP #2 & #4, with max. dimension of 2.0 m N-S x 1.5 m E-W)*	earthenware sherds (631), glazed tradeware sherds (4), metal (1), brick/baked clay (6), bone (2), tooth (1), fire-cracked rock (1), glass (1)
	Feature 1 & non-feature mixed in excavation (TP #4)	earthenware sherds (613), glazed tradeware sherds (5), fired-clay object (1), brick/baked clay (3), coin (1), bone (1)
Feature 2	Hard, compact surface (c. 7 cm thick covering eastern portion (75 x 46 cm) of TP #4)	earthenware sherds (7)

* Initially, only an area of burnt soil and charcoal, from c. 52-78 cmbs, in TP #2, was designated Feature #1 but it was expanded to refer to the larger trash pit in which the burnt area was situated; Feature #1 probably includes much of Layer I in TP #2.

Table 2: Description of Stratigraphic Layers, Features and Artifact Classes from TMB-04-RS Test Excavation

and 2090±27 and 2103±27 from PCN IV (Suastika 2008: Table 3a, 3b – note: these tables also present two additional versions of each C14 determination, which are not used here). The dated sample from PCN III was associated with five Indian sherds, including an Arikamedu type 141 as well as glass beads and three burials (Ardika 2003). The impressed and comb-incised decorated earthenwares referred to above may thus also date to the range of c. 200 BC to AD 200. Several other types of decoration – small punctates (1), incised lines (1 with a single line and 1 with two parallel lines), two adjacent small notches/impressions on the lip of a rim (type IA1, see below) (1) and two sets of two black possibly painted parallel lines (1) – were also found on earthenware sherds associated with the chronologically diagnostic ones at Pura Puseh.

Based on the C14 date from Feature #2, the dates of the decorated earthenwares and the Asian tradewares, the excavated deposits at Pura Puseh have been preliminarily assigned, where possible, to one of the following three periods: “early” (c. 200 BC-AD 200 and possibly somewhat later), “middle” (7th-8th centuries AD) or “late” (c. 15th-16th to 19th centuries AD) (see Table 1). (The gaps between these periods may well be the result of the limited excavation and thus not indicative of hiatuses in the occupation of the Pura Puseh locale or of Timbul site in general.) It should be noted that decorated earthenwares

were also recovered from the middle and late periods. In addition to the one from Feature #2, the three other middle period decorated sherds include one each with a single incised line, a possible incised pattern and two parallel incised lines that are connected at the end by a perpendicular incised line. From the late period, one is red-slipped and one has an unrecorded design; none appear to be chronologically diagnostic.

The early period at Pura Puseh is not only contemporary with the early period at Sembiran and Pacung, but also with the site of Gilimanuk (based on two sigma calibrations of the radiocarbon dates presented in Bronson and Glover 1984) located near the western tip of Bali. Its late period is contemporary with that of Sembiran and Pacung's late period, which is broadly dated to the c. 9th-17th centuries based on two radiocarbon dates (770±180-BP; ANU 6543) from SBN I and 1010±110 BP (ANU 7218) from SBN VI (Ardika 1991:170) with 2 sigma calibrations of AD 900-1620 and AD 870-1280, respectively (McCormac et al. 2004; Stuiver and Reimer 1993), the presence of c. 14th-17th centuries glazed tradewares from the upper layers of SBN I and SBN V (Bulbeck 1991:197) and the six Sembiran/Julah royal inscriptions dating from AD 922 to 1181 (Ardika 1991:219). Test excavations were also conducted c. 140 m south of Pura Puseh, at the locale referred to as Rumah Sudana (site designation TMB-04-RS) (Figures 2 & 6). This locale was selected

after our colleague, I Nyoman Sumerta, discovered sherds from earthenware pottery and from vessels of an early Ming blue and white, a 15th century celadon and 14th-18th century stoneware, (identified by John Miksic in 2004) eroding from an area that had been graded by a bulldozer in 2001 to c. 1 to 4 m below its original surface level. The presence of the tradewares suggested the possibility of later period deposits that were not well-represented in the Pura Puseh test excavations. The area was thus selected for excavations to: (1) provide a longer chronological sequence of settlement deposits and enable the construction of a potentially lengthier earthenware-based chronology for Timbul and (2) uncover deposits potentially representative of contexts different from those at Pura Puseh.

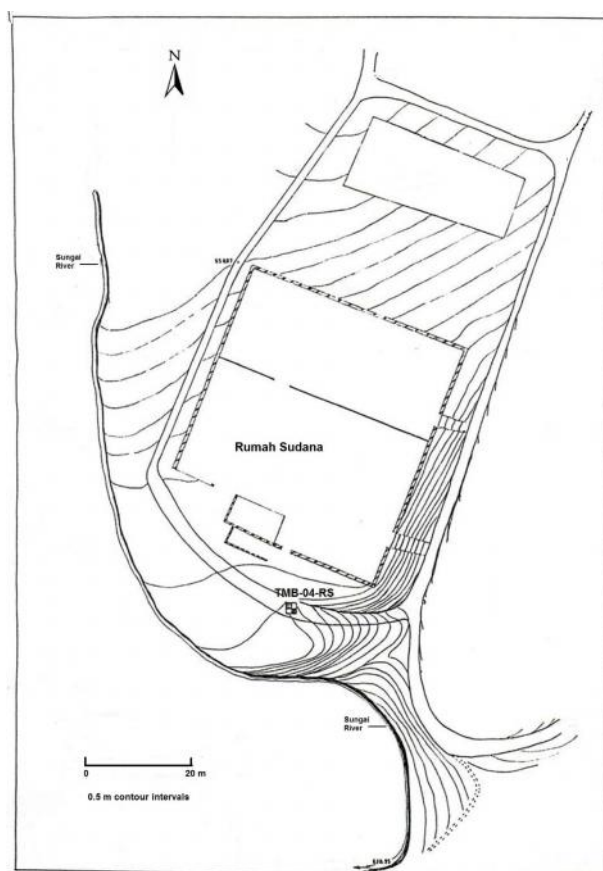


Figure 6: Map of Rumah Sudana locale

As at TMB-04-PP, two 1 x 1 m squares (the northwest quarter, TP #2, and the southeast quarter, TP #4) of a 2 x 2 m unit were excavated but ended due to the onset of heavy rains, at 100 cmbs and 50 cmbs, respectively, prior to reaching culturally sterile layers; coring suggested cultural deposits extended an additional 212 cmbs in TP #2. Table 2 briefly describes the stratigraphic layers and features. Layers I, IB and Features #1 (a trash pit) and #2 (a

c. 7 cm thick hard, compact surface) appear to primarily date to the c. 15th-16th to 19th centuries. This dating is based on the glazed Asian tradewares and coins (see below), and in the case of Feature #2, the similarity in the pastes of its earthenware sherds, the only artifacts it contained, to those from adjacent layers, which suggest the feature is contemporary with them. The upper levels though may extend into the 20th century, based on the presence of a possible 19th-20th century European glazed ceramic sherd and glass fragment in Feature #1. The Rumah Sudana deposits thus overlap with the late period deposits at Pura Puseh.

Table 2 also lists the artifact classes recovered, and as was the case at Pura Puseh, earthenware pottery dominated, represented primarily by body sherds; less than one percent were decorated (43 of the 5019 sherds). The types of decorations included incised lines (n=4); shallow incised lines forming a triangular pattern (n=1); wide, shallow lines or grooves (n=4); comb-incised curved lines (n=1); fabric? impression (n=1); red slip (n=9); and burnished patterns, primarily as parallel lines (n=24). The comb-incised decoration (from Layer IB) is the only one that appears similar to the types of decoration found at Pura Puseh and the north coast Bali sites, albeit from their early periods; its presence may indicate older deposits in the Rumah Sudana units' deeper unexcavated levels.

THE NON-EARTHENWARE POTTERY ARTIFACTS

Small quantities of several other classes of artifacts – glazed tradeware ceramics, lithic artifacts and coins – were also recovered, in addition to the earthenware pottery sherds that dominated the excavated remains, as listed in Tables 1 and 2. Several small metal fragments, a single piece of slag, several small bone fragments and tooth and a shell fragment, all from Rumah Sudana, were not part of the material on loan for analysis and are not discussed below.

The excavated glazed Asian tradeware sherds have been dated to approximately the 15th-16th to 19th centuries; the small size of most of the sherds did not allow more precise dating and identification (K.J. Chang, pers. comm., 2009, 2010). Two sherds were recovered from the Pura Puseh excavations: one from a possible celadon vessel and the other from a thick white-glazed vessel with an unglazed exterior, one from a base and one of a partial base with an unglazed stacking ring in the interior and an unglazed squarish foot-ring and ten brown glazed stoneware sherds, six of which appear to be from three different vessels. A rim sherd (straight with 19 cm diameter) from a probable European ceramic vessel, white with a decoration consisting of a light blue line running

TMB-04	Layer	Description (quantity)	Max. Dimensions/Mass	
PP	I	fire-cracked rocks? (2)	1.5 cm/0.4 g, 2.9 cm/5.6 g	
		split cobble (black chert) (1)	3.1 cm/11.3 g	
	IA	fire-cracked rocks? (2)	1.9 cm/1.9 g, 2.5 cm/4.0 g	
	IB	flake, medial or proximal fragment (basalt) (1)	2.0 cm/1.4 g	
		flake (basalt?) (1)	6.2 cm/28.1 g	
RS	I	fire-cracked rocks (3)	3.6 cm/35.4 g, 5.3 cm/29.5 g, 6.2 cm/33.6 g	
		fire-cracked rocks? (4)	3.0 cm/2.6 g, 4.0 cm/6.1 g, 4.8 cm/38.2 g, 5.2 cm/31.4 g	
		edge of retouched tool, poss. of a biface (chert?) (1)	1.1 cm/0.4 g	
		heat shatter fragment (chert?) (1)	1.7 cm/2.5 g	
	I/IB	fire-cracked rock (volcanic material?) (1)	3.0 cm/2.0 g	
		shaped pumice object (1)	5.5 cm/10.7 g	
		rectangular-shaped <i>paras</i> (sandstone?) block (1)	c. 30x15x18 cm/NAV	
		poss. fragment of a retouched flake (obsidian?) (1)	1.2 cm/0.6 g	
		Feature #1	fire-cracked rock (basalt?) (1)	4.8 cm/27.3 g

Table 3: Description of Lithic Artifacts from TMB-04-PP and TMB-04-RS Test Excavations

parallel to the rim and a clear glaze, dating to the c. 19th-20th centuries, was also recovered from Rumah Sudana.

The lithic artifacts are described in Table 3, some of which were partially described in Bacus and Schoenfelder (2008). Fire-cracked rocks comprised the majority at Pura Puseh, although there were also two flakes from the early period deposits and a split cobble from the late period. Lithic artifacts have also been recovered from a contemporary site, that of early period Pacung: a flake from PCN II (Tim Jurusan Arkeologi 1999:46-47, Gb. 5.24) and from one of its burials at PCN V (I W. Ardika pers. comm., 2012), 21 obsidian flakes and blades that had been placed near the individual's shoulder with an earthenware vessel at its feet (Suastika 2008:165). Interestingly, it appears flaked stone tools continued to be used in the late period, as evidenced at Rumah Sudana. A shaped pumice object, of unknown function, and a rectangular-shaped *paras* (sandstone?) block that was crumbling at one end and which may have been used in construction or as a paving stone, were also recovered from Rumah Sudana. The latter was close to the surface and may have been part of Feature #1 (trash pit) before it was defined in the excavation of subsequent levels.

Seven coins were recovered from Rumah Sudana, six of which were part of the sample on loan for analysis (the seventh, an almost complete coin from layer IB, was heavily corroded and unidentifiable and was not included in the sample), were useful for dating the excavated deposits. Layer I (TP #2) yielded one coin which appears to be Chinese based on its size and shape; however, the absence of markings on the fragment precluded dating it. Three coins from mixed Layers I/IB are from the Qing Dynasty, two of which date to AD 1736-1795 from the reign of Emperor Gao Zong (Hartill 2005:308-309); the corroded surface of the third coin did not allow for clear identification of the characters and markings indicating the reign, emperor and/or mint that issued it. One coin

derived from the excavated mix of Feature #1 and non-feature deposits (TP #4); although it is also a fragment, part of a character – for 'Boo' – suggests it dates to the Qing Dynasty (Hartill 2005:308-309).

Chinese coins, the earliest of which in Bali date to the Tang Dynasty (AD 618-907), were used as money up into the late 20th century and continue today as essential for religious offerings (DeMeulenaere 2005; Eiseman 1990:114). Referred to as *pis bolong* or *uang kepeng* in Indonesia, Chinese coins are associated with, and are a vehicle of, wealth; thus, when gifts are made to the gods in the form of offerings, these coins are included (Eiseman 1990:115-116). Their other historically-known and contemporary uses include, for example, in various types of ceremonies, such as burial and cremation rites; as the base for other types of offerings, such as placed in building foundations and in common small offerings and gifts to priests and temples; and as a source of protective powers, such as during the weaving of important ritual textiles (Eiseman 1990:116-117; Maxwell 2003:251). Individual Chinese coins apparently never had great value; large numbers of them were required for the uses noted above (Eiseman 1990:164). The several whole and fragmentary Chinese coins recovered from Rumah Sudana may have been used for such ritual and offertory purposes, although the specifics of such cannot be ascertained from their context within a trash deposit.

A previous publication (Bacus and Schoenfelder 2008) noted the recovery of a possible crucible fragment from Pura Puseh. Recent analyses of a polished cross-section of the item using reflected light optical microscopy and scanning electron microscopy with energy dispersive spectrometry, conducted by Dr Marcos Martín-Torres (2009), indicates that it is not such an artifact. Instead, it appears to be a fragment of a fine-grained and porous geological material through which iron-rich waters percolated and left a natural deposit of iron.

DEVELOPING AN EARTHENWARE RIM SHAPE TYPOLOGY

Morphological analysis of the Pura Puseh and Rumah Sudana earthenware rim sherds aimed at identifying variations in rim shape and assessing their temporal distribution in order to begin to establish an earthenware typology. The database for the analysis included 63 rim sherds – 38 from the early period, 14 from the middle period and 11 from the late period – from the Pura Puseh test excavations and 243 rim sherds from the Rumah Sudana test excavations. Rim sherds (with incomplete rims and lip sherds excluded) were selected since no complete vessels were recovered from the excavations and rim shape is often chronologically sensitive. Rim sherds were first checked for refits to one another; none were found among the Pura Puseh rims, but there were several refits among the Rumah Sudana rim sherds and are indicated in the tables discussed below.

Rim shape types were defined using a classification system from Dales (1986:29-30, 32-37) that was selected because of its explicitness and ability to be modified to encompass any rim shapes. It is based first on attributes concerning: (1) the nature of the rim attachment to the body wall, that is, either simple, where it is “an extension of the body wall that is not radically altered by thickening or by a sharp change in angle,” or complex, where the rim is built up and/or at a sharp angle to the body wall (Dales 1986:29); (2) the direction of any rim projections, either internal and/or external; and (3) rim width, either narrow or wide (i.e., less than or more than twice the thickness of the body wall, respectively). A fourth attribute, the shape of the projection, is used specifically when the rim has a ledge or channel shape. As used in this study, “rim” refers specifically to the extreme upper end of the vessel (and not to the entire part above the vessel’s throat, if present). The eight main types in this classification (Dales 1986:29) are:

Simple (type I):

The rim is an extension of the body wall and is neither radically thickened/thinned nor has a sharp change in angle.

Complex, External Projecting:

The rim is a built up external projection with a sharp angle to the body wall; differentiated into narrow (type II) or wide (type III).

Complex, Overturned (type IV):

The rim projects (internally or externally) at a sharp, acute angle to the body wall.

Complex, Internal Projecting:

The rim is a built up internal projection with a sharp angle to the body wall; differentiated into narrow (type V) or wide (type VI).

Complex, Ledge and Channel (type VII):

The rim is built up into either shape and projects internally or externally.

Complex, Bilateral Projecting (type VIII):

The rim is built up and projects in both directions. Distinctions within these main types are made using attributes such as rim orientation, i.e., everted, straight, inverted; and the projection’s shape, e.g., rounded, triangular, quadrangular, tilt, size and angle to the body wall, i.e., right, acute, or obtuse (Dales 1986:29). The Pura Puseh and Rumah Sudana earthenware rim sherds were classified using this system; the resulting rim shape types are described below.

Pura Puseh Rim Shape Types

The Pura Puseh rims were classified into 22 types within seven of the eight main rim shapes described above. Table 4 describes the types and lists their quantities by layer; Figure 7 illustrates examples of each rim shape type. Their distribution suggests that some of the rim shape types are chronologically diagnostic: eight of the 12 from the early period (IA3, IC1, IC2, IC3, ID1, ID2, VIIB2 and VIID2), four of the nine from the middle period (IB3, VB1, VD1 and VIIIA1 large) and six of the seven from the late period (ID2, IID1, VIID1, VIIIA1 small, VIIB1 and VIIB2). One type, IA2, is found in all three periods, which is not unexpected given its basic shape. Two types (IA1 and IA4) are represented by a few more rims in the early period but also occur in the middle period; two other types (IA5 and IIA1) occur in similarly limited numbers in both periods. Such distributions may indicate more chronological continuity between these two periods than is suggested by the current preliminary dating; that is, the early period may extend later in time than is indicated by cross-dating with the decorated earthenwares from the north coast Bali sites. Since many of the types are represented only by one rim sherd each, a larger dated sample is needed to establish a more secure rim shape typology.

Rumah Sudana Rim Shape Types

For Rumah Sudana, classification of its rims resulted in 49 types within the eight main rim shapes. It should be noted that there was no attempt to specify types exclusive to either Rumah Sudana or Pura Puseh within types I, VIII because of the basic, generally non-diagnostic shapes in the former and the great variability currently included

SHAPE TYPE	LAYER:	I (pz)	I	I below IA	I/IB	IB	IC
I - Simple	IA1 everted rim, tapered (n=10; rim dia. 16-25cm)				1	8	1
	IA2 everted rim, rounded (n=19; rim dia. 17-18cm)	4		2	3	10	
	IA3 everted rim, squared (n=2; rim dia. 34-42cm)					1	1
	IA4 very (< 45 degrees) everted rim, tapered (n=7; 11-17cm rim dia.)				2	5	
	IA5 very (<45 degrees) everted rim, rounded (n=5; rim dia. 17-20cm)			1	2	2	
	IB3 perpendicular rim, squared (n=1; rim dia. ?)			1			
	IC1? inverted rim, tapered (n=1; rim dia. 17cm)						1
	IC2 inverted rim, rounded (n=1; rim dia. 23cm)				1		
	IC3 inverted rim, squared (n=1; rim dia. 31cm)						1
	ID1 external projecting, everted, tapered (n=1; rim dia 13cm)						1
	ID2 external projecting, everted, rounded (n=1; rim dia. ?)		1				
	II - Complex, external projecting, narrow rim	IIA1 rounded (n=2; rim dia.14cm)				1	1
IID1 quadrangular (n=2; rim dia. 10-19cm)		2					
V - Complex, internal projecting, narrow	VB1 triangular (n=2; rim dia. 19-21cm)			2			
	VD1 quadrangular (n=1; rim dia. ?)			1			
VII - Complex (ledge or channel)	VIIB2 external thickened ledge, tapered (n=1)						1
	VIID1 internal squared ledge, rectangular (n=1)						1
	VIID2 internal concave ledge, thickened exterior juncture of rim & body, tapered (n=1; rim dia. 15cm)		1				
VIII - Complex, bilateral projecting	VIIIA1a (small & large) equal projection, tilted to exterior, convex (n=2; rim dia. 20- 30cm)	1		1 (large)			
	VIIIB1a (small & large) more external projection, tilted to exterior, convex (n=2; rim dia. 31cm)	2					

Table 4: Pura Puseh rim shape type descriptions (count and rim diameter range of measurable rims) and distribution by layer

in the latter and IIA1. The other identified types are specific to Pura Puseh or Rumah Sudana, e.g., VIIB1 is only found at Rumah Sudana while VIIB2 is only at Pura Puseh. Table 5 briefly describes each rim shape type. Most types are present in Layers I, IB and Feature 1 (note: Feature 2 did not yield any rims), which may be due in part to the mixing of some of these deposits during excavation as well as to their general contemporaneity, i.e., to the c. 15-16th to 19th/20th centuries. Only two types were exclusive to Feature 1 (IID3, VIA1), two to IB (IIIA1, VB2) and nine to Layer I (IB3, IIA2, IIA3, IIIA2, IIID1, IVB1, VIIB1, VIID7, VIIIC3a). Each of these types, with the exception of types IB3 and VIIB1, is represented by

only one rim. Figure 8 illustrates examples of each rim shape type.

Comparison to Earthenware Rim Shapes from other Balinese Sites

The Pura Puseh and Rumah Sudana rim shape types were compared to illustrated rim profiles in reports and publications from other excavated and dated sites in Bali, including Gilimanuk, Sembiran, Pacung and Batu Gambir (Ardika 1991, 1993; Hauser-Schaublin and Ardika 2008; Setiawan and Bawono 2008; Soegondho 1985; Tim Jurusan Arkeologi 1998, 1999). Similarities were found between several of the 22 Pura Puseh types and Sembiran and Pacung rim shapes:

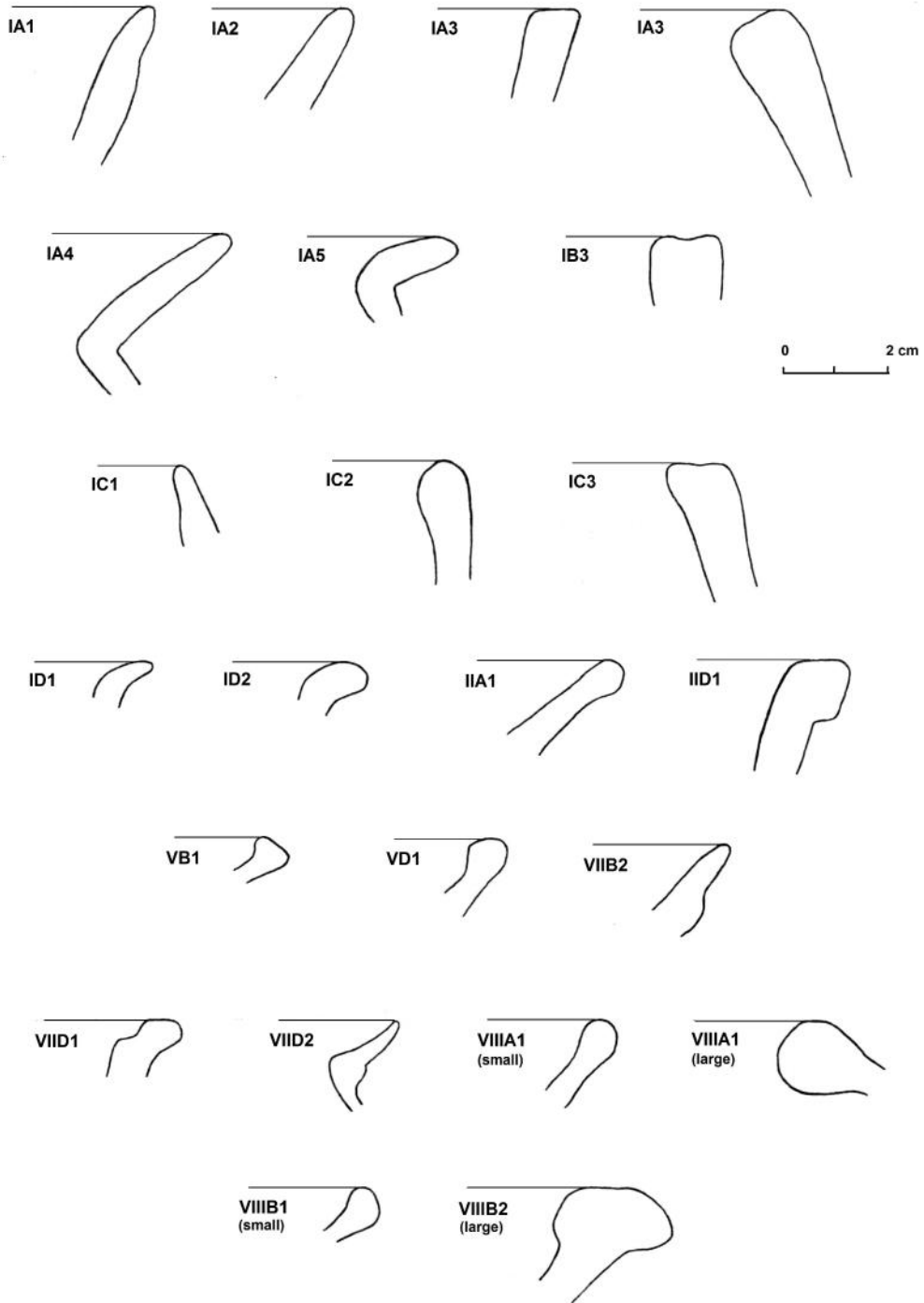


Figure 7: Pura Puseh rim shape types

SHAPE TYPE	
I Simple	<p>IA1 everted rim, tapered (n=8; rim dia. 14-24cm)</p> <p>IA2 everted rim, rounded (n=12; rim dia. 10-44cm)</p> <p>IA3 everted rim, squared (n=7; rim dia. 16-27cm)</p> <p>IA4 very (< 45 degrees) everted rim, tapered (n=5; rim dia. 21-33cm)</p> <p>IA5 very (<45 degrees) everted rim, rounded (n=14; rim dia. 9-31cm)</p> <p>IA6 very (<45 degrees) everted rim, squared (n=3 [2 sherds refit]; rim dia. 22-33cm)</p> <p>IB2 perpendicular rim, rounded (n=5 [3 prob. from same vessel]; rim dia. 6-10cm)</p> <p>IB3 perpendicular rim, squared (n=3; rim dia. 18-22cm)</p> <p>IC1 inverted rim, tapered (n=1; rim dia. 21cm)</p> <p>IC2 inverted rim, rounded (n=4 [2 prob. from same vessel]; rim dia. 27-51cm)</p> <p>ID1 external projecting, everted, tapered (n=6; rim dia. 21-25cm)</p> <p>ID2 external projecting, everted, rounded (n=7; rim dia. 20-27cm)</p>
II Complex, external projecting, narrow rim,	<p>IIA1 rounded (n=4; rim dia. 17-21cm)</p> <p>IIA2 rounded at very upper edge of lip (n=1; rim dia. 22cm)</p> <p>IIA3 oval (n=1; rim dia. 35cm)</p> <p>IID2 quadrangular (n=2; rim dia. 22-23cm)</p> <p>IID3 slightly upward angled quadrangle (n=1; rim dia. ?)</p>
III Complex, external projecting, wide	<p>IIIA1 round (n=1; rim dia. ?)</p> <p>IIIA2 oval (n=1; rim dia. 30cm)</p> <p>IIIB2 triangular (n=2; rim dia. 20-24cm)</p> <p>IIIB3 rounded triangle (n=1; rim dia. 28cm)</p> <p>IIID1 quadrangular (n=1; rim dia. 32cm)</p>
IV Complex, overturned	<p>IVB1 internal projecting, sharply thickened (n=1; rim dia. 44cm)</p>
V Complex, internal projecting, narrow	<p>VA1 gentle rounding of interior (n=23 [5 sherds refit to 1 rim]; rim dia. 11-34cm)</p> <p>VA2 marked angle delineating rounded interior (n=3; rim dia. 23-33cm)</p> <p>VA3 oval (n=4; rim dia. 27-55cm)</p> <p>VB2 triangular with flat lip (n=1; rim dia. 23cm)</p> <p>VB3 triangular, interior edge angled upward (n=11; rim dia. 21-32cm)</p> <p>VB4 marked triangular protrusion, interior edge angled upward (n=3; rim dia. 27-36cm)</p>
VI Complex, internal projecting, wide	<p>VIA1 rounded (n=1; rim dia. ?)</p>
VII Complex (ledge or channel)	<p>VII B1 external, concave ledge projecting horizontally from juncture of rim & body (n=4 [2 sherds refit]; rim dia. 23-29cm)</p> <p>VII B3 external thickened ledge, inverted rim, rounded (n=1; rim dia. 29cm)</p>

	VIIC1 channel/shallow groove in top of rim (n=6 [2 sherds refit]); rim dia. 23-32cm)
	VIID3 internal slightly concave ledge that forms right angle at interior juncture of rim & body, tapered (n=5; rim dia. 10-15cm)
	VIID4 internal concave ledge rim with no angle change to exterior, rounded (n=25 [5 sherds refit to 1 rim]; rim dia. 16-29cm)
	VIID5 internal slightly concave ledge, rim & body at obtuse angle, rounded (n=22 [6 sherds refit to 2 rims]; rim dia. 21-35cm)
	VIID6 internal concave ledge at right angle to body, rounded (n=4 [3 sherds refit to 1 rim]; rim dia. 21-29cm)
	VIID7 internal concave ledge, squared (n=1; rim dia. 20cm)
VIII Complex, bilateral	VIIIA1a (small & large) equal projection, tilted to exterior, convex (n=12; rim dia. 14-34cm)
	VIIIA2a (small) equal projection, horizontal, convex (n=2; rim dia. 22-25cm)
	VIIIB1a (small & large) more external projection, tilted to exterior, convex (n=3; rim dia. 20-23cm)
	VIIIB1b (small) more external projection, tilted to exterior, flat (n=2; rim dia. 25-28cm)
	VIIIB2a (small & large) more external projection, horizontal, convex (n=6; rim dia. 27-52cm)
	VIIIB2b (large) more external projection, horizontal, flat (n=1; rim dia. 19cm)
	VIIIB3a (small) more external projection, tilted to interior, convex (n=2; rim dia. 27cm)
	VIIIC1a (small) more internal projection, tilted to exterior, convex (n=5 [2 sherds refit]; rim dia. 24-33cm)
	VIIIC1b (small) more internal projection, tilted to exterior, flat (n=2; rim dia. 22-26cm)
	VIIIC2b (small) more internal projection, horizontal, flat (n=2; rim dia. 30-33cm)
	VIIIC3a (large) more internal projection, internal tilt, convex (n=1; rim dia. 35cm)

Table 5: Rumah Sudana rim shape type descriptions (count and rim diameter range of measurable rims)

IA3 to early period Sembiran rim 2.4 (from SBN VII 36) (Ardika 1991:Fig. 5.4),

IA4 to early period Sembiran rim 2.1 (from SBN VI 35) (Ardika 1991:Fig. 5.4),

VIID2 to early period Sembiran rim 2.9 from (from SBN VI and VII) (Ardika 1991:Fig. 5.4),

VIIIA1(large) to early period Sembiran rim 2.7 (from SBN VI and VII) (Ardika 1991:Fig. 5.4),

VIIIB2 to lip type 11, particularly those from the late period at Pacung (PCN I 23) and Sembiran (SBN V 12) (Ardika 1991:Fig. 5.3)

The similarities between three of the early Pura Puseh rim shape types and early period Sembiran rim shapes (with the exception of VIIIA1 which is not an early type) and between the one late type and a late period lip type at Sembiran and Pacung provide additional support for the dating of the Pura Puseh deposits as contemporary, at least partially, with the two periods uncovered at the excavated north coast sites. One of the IA4 rims and the one VIIIA1(large) rim may date, however, to the middle period, which suggests either a longer time span for these types and/or greater continuity between the early and middle period excavated deposits at Timbul.

In addition, these similarities, particularly to those Sembiran and Pacung rims that derive from reconstructed vessels, provide information on some of the vessel shapes present at Pura Puseh. Thus, type IA4 and the possible middle period type VIIIA1 may derive from simple restricted vessels of globular shape, VIID2 from a dependent restricted vessel with carinated contours and IA3 from either one of these two types of restricted vessels (see Ardika 1991:82-84, Figs 5.3-5.4). These shapes are generally referred to in the literature (e.g., Soegondho 1995) as “pots” that are used in cooking or serving food. Vessels with composite contours, such as found among some pots, shallow bowls and *kendi*, are also known at Pura Puseh from the presence of 15 carinated sherds (5 from each period), as is a flat-bottomed vessel from a definite base sherd from the middle period. Bowls and plates were also probably among the earthenware vessel shapes at Pura Puseh as suggested by the everted and inverted rims that appear to derive restricted and unrestricted vessels.

For the Rumah Sudana rim shape types, similarities were found to three rim/lip shapes from the late period at Sembiran and Pacung, i.e., the upper layers of PCN I, which are contemporary with the late period, c. 9th-17th

centuries, upper layers at Sembiran (Ardika 1991:75) and at least the top three layers, a-c, and possibly the upper spits of layer d from PCN II and all of the PCN III deposits based on the distribution of the Asian tradewares) to three of their early period rims:

IC1 to rim category 1.3 from early period Sembiran (Ardika 1991:90, Fig. 5.3) and to a profile of a *langsung terbuka* rim from early period Pacung (PCN II) (I W. Ardika pers. comm., 2012; Tim Jurusan 1999:Gb5.6c),

IID1 to rim profiles of plain bowls from late period Pacung (PCN III) (Tim Jurusan 1999:Gb5.12a-b), IID2 to the profile of a *langsung terbuka* rim from early period Pacung (PCN II) (I W. Ardika pers. comm., 2012; Tim Jurusan 1999:Gb5.6a),

IIIB2 to lip type 11 (specifically, the third PCN I 22 rim in Ardika 1991:Fig. 5.3) from late period Pacung (see also Tim Jurusan 1999:Gb5.13b),

VB2 to rim category 1.4 from early period Sembiran (SBN VI) (Ardika 1991:Fig. 5.3),

VIA1 to an indirect rim from late period Pacung (PCN III) (Tim Jurusan 1999:Gb5.18a)

These similarities in rim shape provide further evidence that the excavated deposits at Rumah Sudana are contemporary with at least part of the broadly-dated late period at Sembiran and Pacung. Although three Rumah Sudana rim shape types are also similar to early period rims from Sembiran, in regards to VB2, it is undecorated unlike the Sembiran rim; it is possible that the similarities may instead relate to vessel shape/function instead of to their contemporaneity, or alternatively, may indicate that the late period trash pit at Rumah Sudana disturbed early period deposits resulting in the inclusion of some early earthenware types among the excavated remains.

Information on the vessel shapes present at Rumah Sudana can also be discerned from the several rim shape types that are similar to Sembiran and Pacung rims that derive from reconstructed vessels. Bowls, including simple shallow bowls, are suggested by the rims similar to types IC1, IID1, IID2, IIIB2 and VB2; and simple restricted vessels of globular shape ("pots") are suggested by the rim similar to type VIA1. In addition, a single spout fragment from Rumah Sudana indicates the presence of vessels similar to the flasks or bottles (such as *kendi*) recovered from Sembiran; although these forms were only from its early period deposits, spouted vessels are found among the traditionally-recorded earthenware assemblages and also are used today. Similarly, a possible foot-ring sherd suggests the use of footed vessels, which have also been recovered from Sembiran and Gilimanuk, but only from the early period (Ardika 1991:Fig. 5.8; Soegondho 1995:Photo 37). Carinated sherds attest to vessels with composite contours at Rumah Sudana, and the presence of plates and non-carinated bowls are suggested by the everted, straight and inverted rims from unrestricted vessels.

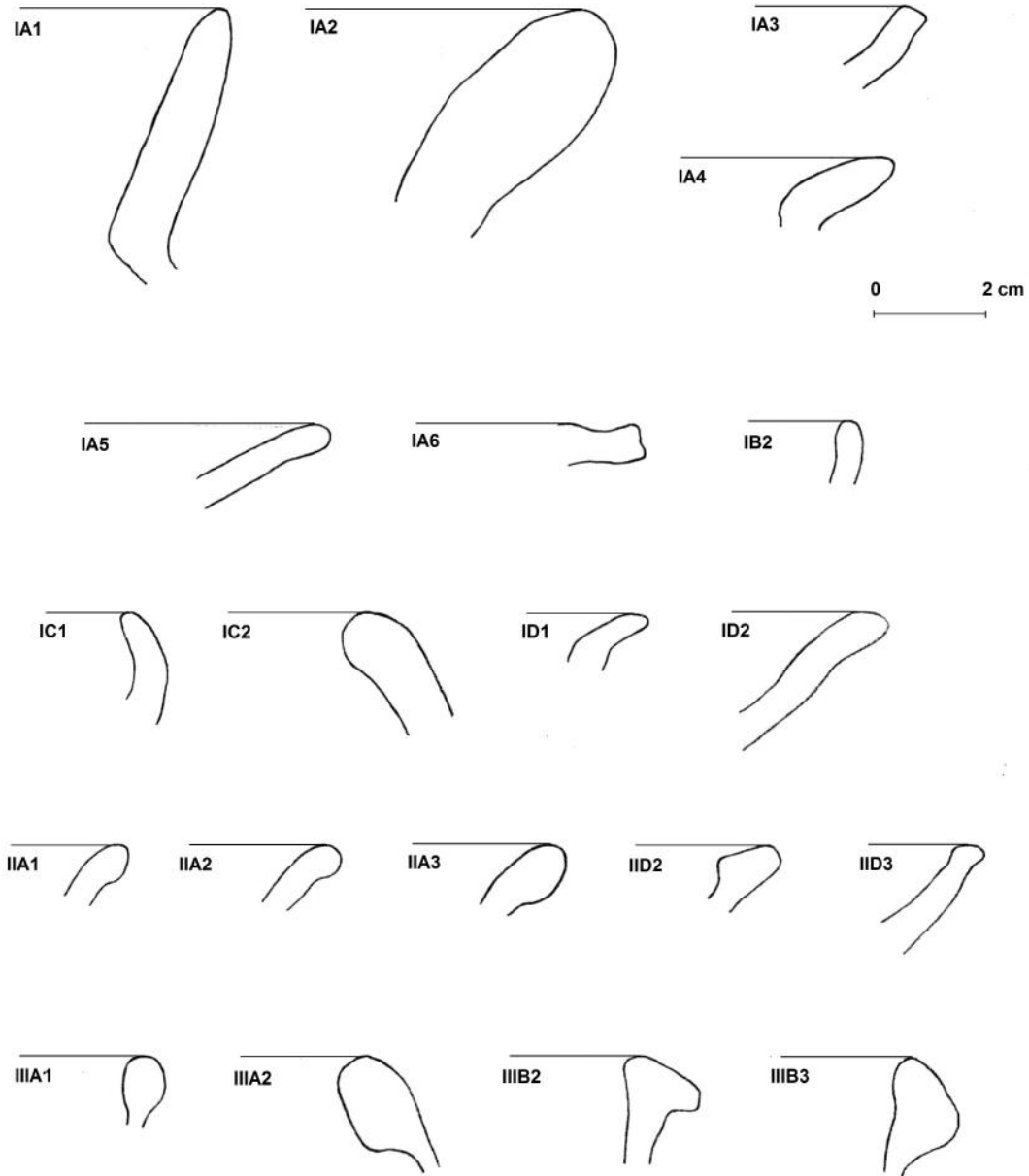
CONCLUDING REMARKS

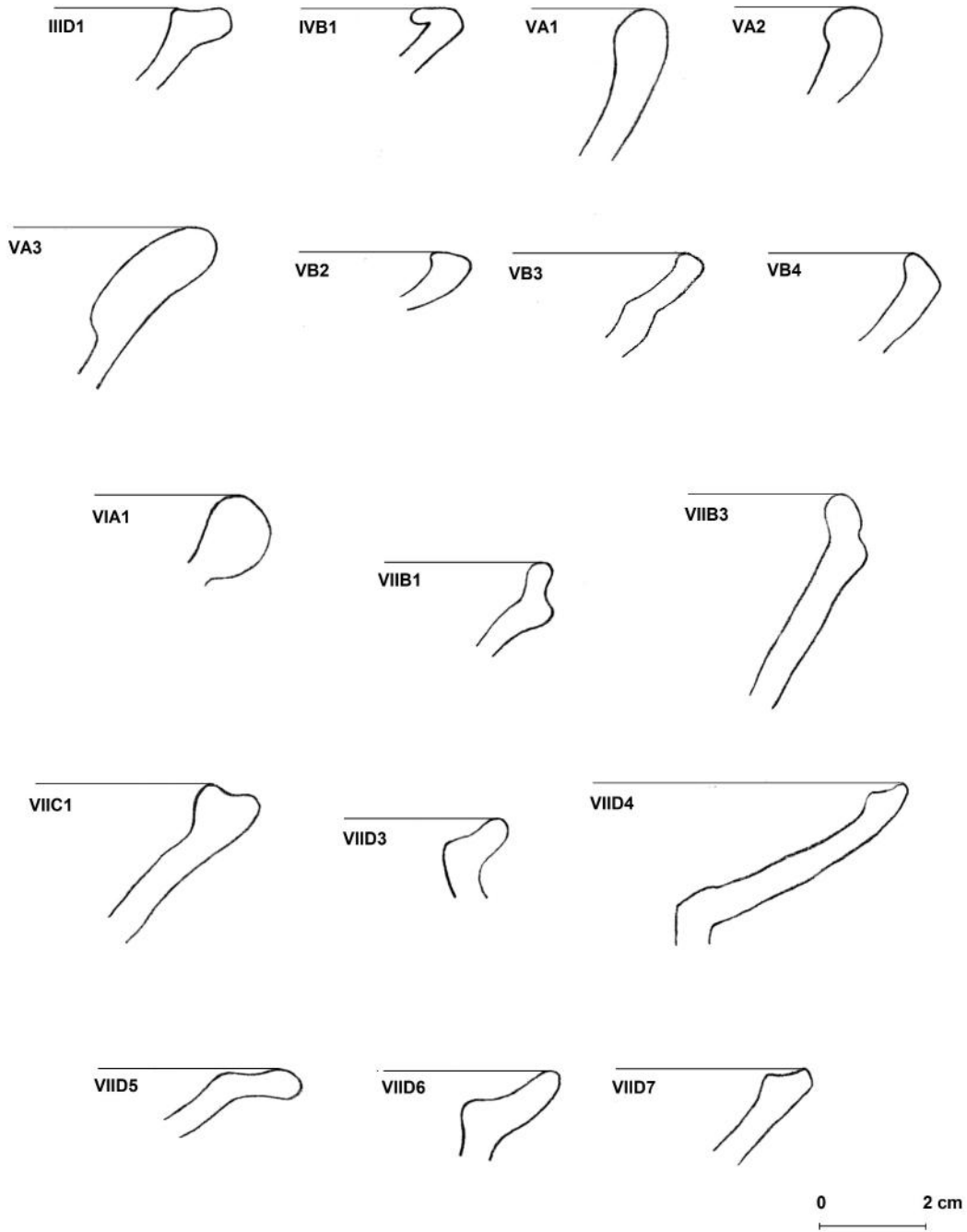
Prior to the *Transformations* project, Timbul's archaeological past was known from several stone-carved sarcophagi, approximately dating to the late 1st millennium BC-early centuries AD, and whole and fragmentary statues, including ten dated to the 13th-14th centuries AD (Oka 1986; Widiani 1987). The excavations at the Pura Puseh and Rumah Sudana locales have contributed evidence for three periods of occupation at Timbul, and through an analysis of the earthenware rim sherds, enabled the construction of a radiometrically-anchored rim shape typology that can be tied to dated earthenware rim shapes from sites on the north coast of Bali. This earthenware typology will hopefully aid future researchers in dating of surface collections and regional-scale analyses. Given the stage reached by the project, which, at this time, is no longer continuing, it is not possible to offer much in the way of new interpretations, let alone conclusions, regarding Bali's early states; thus, this paper concludes with a brief discussion of the excavated evidence from the first two periods in regards to current archaeological knowledge of contemporary sites on Bali.

The early period habitation remains at Pura Puseh are contemporary with the previously recorded sarcophagi that belong to Bali's Early Metal Period (c. late 1st millennium BC-early centuries AD). This period is best known from the excavated sites of Sembiran, Pacung and Gilimanuk, and indications of some similarities in the vessel shapes composing their earthenware assemblages and those recovered from Pura Puseh (i.e., globular and carinated pots, and possibly, shallow bowls, plates, jars and *kendi*) suggest that similar domestic activities – cooking, serving, storage and consumption of food/liquids – were engaged in at these sites.

Numerous stone-carved sarcophagi and rarer bronze drum burials, uncovered primarily from an area running through the north-central and south-central part of the island (with another cluster in the west), also characterize this period and have yielded grave goods such as bronze jewelry and axes, iron objects, glass, carnelian and other stone beads and, to date, one Han- or Xin-style bronze mirror (e.g., I W. Ardika 1987, pers. comm., 2009; Soejono 1977). Differentiation in various aspects of mortuary treatment have been used to argue for the presence of ranked societies or chiefdoms during this period (Ardika 1987); the presence of several sarcophagi at Timbul suggests that high ranking individuals were associated with this site.

The presence of such foreign goods attest to the participation of these polities – at least those located along the north and west coasts of Bali – in long-distance exchange networks, which is further supported by the remains of a possible Indian trader that date to this Early Metal Period (i.e., the cal. BC 184-AD 51 date referred to above). Their participation in intra-archipelago networks is also sug-





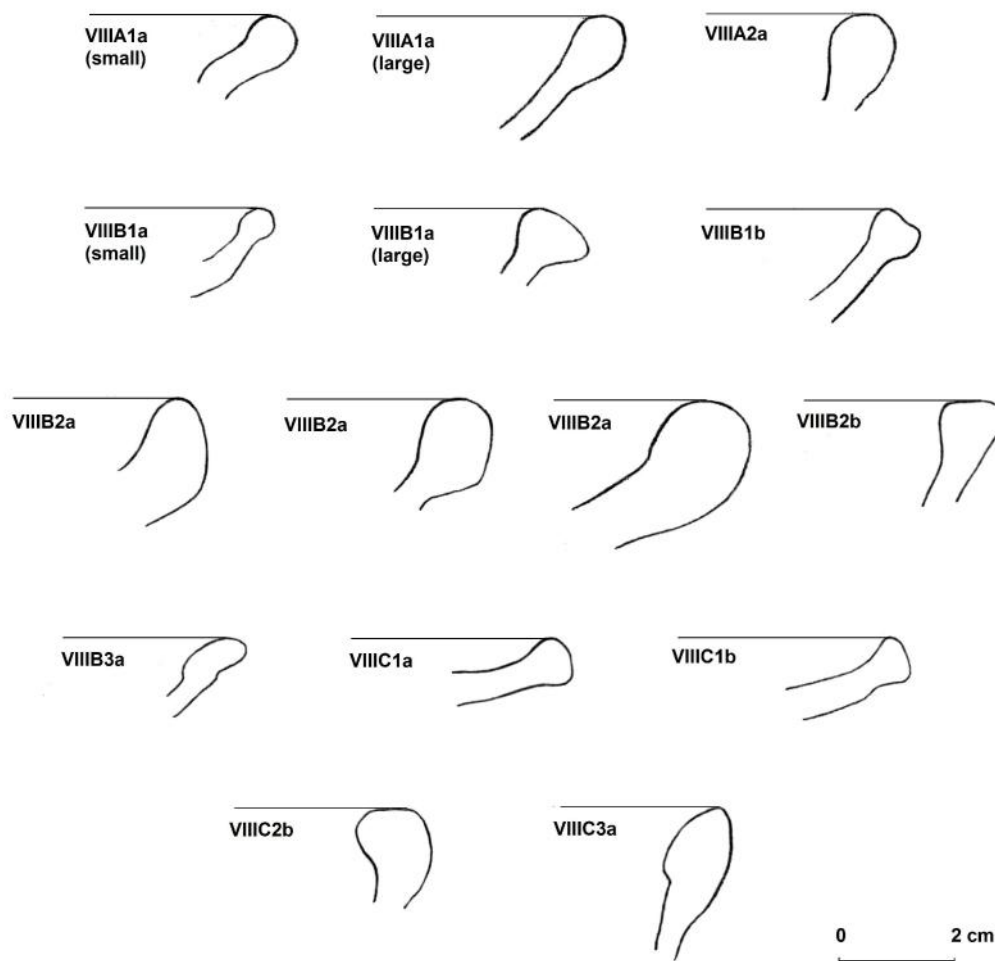


Figure 8: Rumah Sudana rim shape types

gested by the evidence for bronze production (e.g., fragments of molds used in casting bronze drums; Ardika 1991), which would have required the importation of tin and copper (both unavailable on the island) and similarities in burial treatment, such as the use of gold foil eye covers on an extended burial at Gilimanuk and a sarcophagus burial in western Bali, a practice also seen in burials of the Buni culture in northwest Java and at a site in Sarawak and one in the Philippines (Ardika 1987:17).

Interactions among Bali's polities of this period are attested to by the presence of various non-local items (e.g., glass and carnelian beads and the presence of copper and tin as evidenced by bronze artifacts and bronze drum casting mold fragments) in the hinterland and of non-local tuffaceous rock but from elsewhere on the island at Gilimanuk in the form of sarcophagi fragments (Bellwood 1985:281). The presence of earthenware pottery at Timbul with some of the same types of decorations and rim shape forms as found at the north coast sites may attest to their

respective residents' involvement in exchange activities and/or participation in the production of region-wide ceramic styles.

The middle period (7th-8th century AD) remains provide further evidence of Timbul's relevance to the study of the formation of Bali's earliest state, as known from its late 9th century royal edicts. The Timbul excavations provide Early Classic (c. 8th-10th centuries AD) habitation remains in the form of earthenware sherds probably from pots, bowls and/or plates including some with carinations and a small charcoal-stained feature containing several earthenware sherds. Habitation remains attributable to this period have not previously been recovered on Bali (Ardika 1996a:70). There is also an indication of continuity with the previous period (i.e., in the earthenware rim shapes). In conjunction with evidence for Timbul's use in subsequent periods – possibly in the 9th-10th centuries, in the late 12th century and in the 13th-14th centuries AD as indicated, respectively, by a miniature *candi* recorded

during the 2000 temple survey (Bacus et al. 2000), the mention of Timbul (as *Tibul*) in the Mantring C inscription, which was issued by the early 12th century ruler Jayapangus and whose inscriptions have been recovered from across Bali (Schoenfelder et al. in prep; I.G.M. Suarbhawa, pers. comm., 2004), and statues (Bacus et al. 2008; Oka 1986; Widiani 1987) – suggests occupation through the Early to Late Classic periods, which ends at the start of the 16th century, of early states and that Timbul was a site of continual ritual significance, specifically, within the temple-surveyed Sebatu area. Timbul's relationship to Pejeng (15 km to the north), the known royal center of some of Bali's early states, has not yet been ascertained.

The only other currently recorded remains on Bali that may be contemporary with the middle period at Timbul are the hundreds of small clay votive tablets and *stupika* (small clay models of stupa) with images or short Buddhist texts inscribed on them that have been found in Pejeng. These are dated to the 8th-9th century AD based on similarities to a Buddhist text on Candi Kalasan in Central Java and the use of a pre-10th century type of script (Ardika 1987:51; Miksic 1997:34). There are also several Sanskrit inscriptions in Nagari script that may be from the 8th century (Ardika 1987: 51).

Lastly, it is worth noting that the late period materials recovered from the test excavations, although not representing the period of focus of the *Transformations* project, are also relevant to the study of Balinese states. More extensive archaeological assemblages from this period would facilitate, for example, the study of the nature and dynamics of the household and village levels of late pre-colonial states, as well as those of the subsequent colonial period. Such topics, while not yet a focus of research on the island, would contribute to the overall understanding of the transformation of Bali's states.

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