

POTTERY ANATOMY: REVIEW AND SELECTION OF BASIC NOMENCLATURE AS A STEP TOWARD A SEARCHABLE RIM FORM DATABASE FOR THE SAKON NAKHON BASIN

Joyce C. White and William Henderson

Ban Chiang Project, University of Pennsylvania Museum, 3260 South Street, Philadelphia, PA 19104-6324, USA

ABSTRACT

While studies of rims are not new to the prehistoric archaeology of Thailand, integration of data across studies is at an early stage. The effort to implement a computer database to facilitate integration of rim forms from the Sakon Nakhon Basin of northeast Thailand revealed that a contributing obstacle is a lack of standardized approach and terminology for the anatomy of rims and whole vessels. In this paper we review several fundamental nomenclature systems for vessel and rim parts in the context of vessels and rims from the Sakon Nakhon Basin, the region occupied by the Ban Chiang cultural tradition. Terms are selected, modified, and defined or redefined to suit the descriptive needs of ceramic assemblages in this region. In addition to the discussion and rationale, a working glossary of terms is given. The systemisation of the terminology and criteria for classifying rims is being used to code rim form data in a searchable rim database.

BACKGROUND

Archaeologists rely on the entity called "the regional ceramic sequence" for many aspects of their space/time framework. Regional sequences are usually developed from ceramic analyses of several sites in a region whose combined chronology covers all ceramic-using periods. Replicability is an underlying requirement for using regional ceramic sequences, as others besides the creators should come up with the same conclusions as how to classify or code individual sherds if the classification system is to be useful (Orton *et al.* 1993:152).

Despite the number of excavations of pottery-using sites in the Sakon Nakhon Basin of northeast Thailand producing large quantities of pottery sherds (Figure 1), no compre-

hensive regional ceramic sequence has ever been compiled. Instead ceramic sequences have been developed for individual sites or projects with minimal effort to combine them into a regional sequence. The lack of a regional sequence handicaps such basic activities as cross-dating, level sherd analysis and field survey in the Sakon Nakhon Basin.

Ceramic sequences based on rim sherds from other parts of Thailand, including other parts of the northeast, also have tended to be project or site-specific. Rim studies from the Khorat Basin of northeast Thailand include work by Bayard (unpublished 1977) on Non Nok Tha and Wilen (1989) on Non Pa Kluay, both in the Phu Wiang area of the northwest corner of the Khorat Basin; by Rutnin (1979) for Non Chai in the upper Chi; by Chantaratiyakarn (1984) for Ban Chiang Hian and other sites about 60 km downstream from Non Chai in the middle Chi drainage; and by Higham (1977) for sites 80 km further downstream in the Roi Et portion of the Chi drainage. Although Chantaratiyakarn makes an effort to integrate rim forms for the middle Chi, defined in earlier studies by Rutnin for upstream and by Higham for downstream, only a few previously defined forms are identified in her particular research area. She describes a characteristic experience among archaeologists working in Thailand when she states (1984:590) "During the site survey of the Middle Chi area, it became clear that prehistoric pottery was quite different to that already described from Non Chai or the Roi Et sites ...". Nevertheless, compiling and integrating ceramic sequences within a defined region, such as a drainage system, that incorporate data from nearby sites even if they have distinctive stylistic traditions, is important for the progress of archaeology in Thailand.

As one step toward developing a regional ceramic sequence for the Sakon Nakhon Basin, Henderson has been attempting to integrate ceramic rim data from several

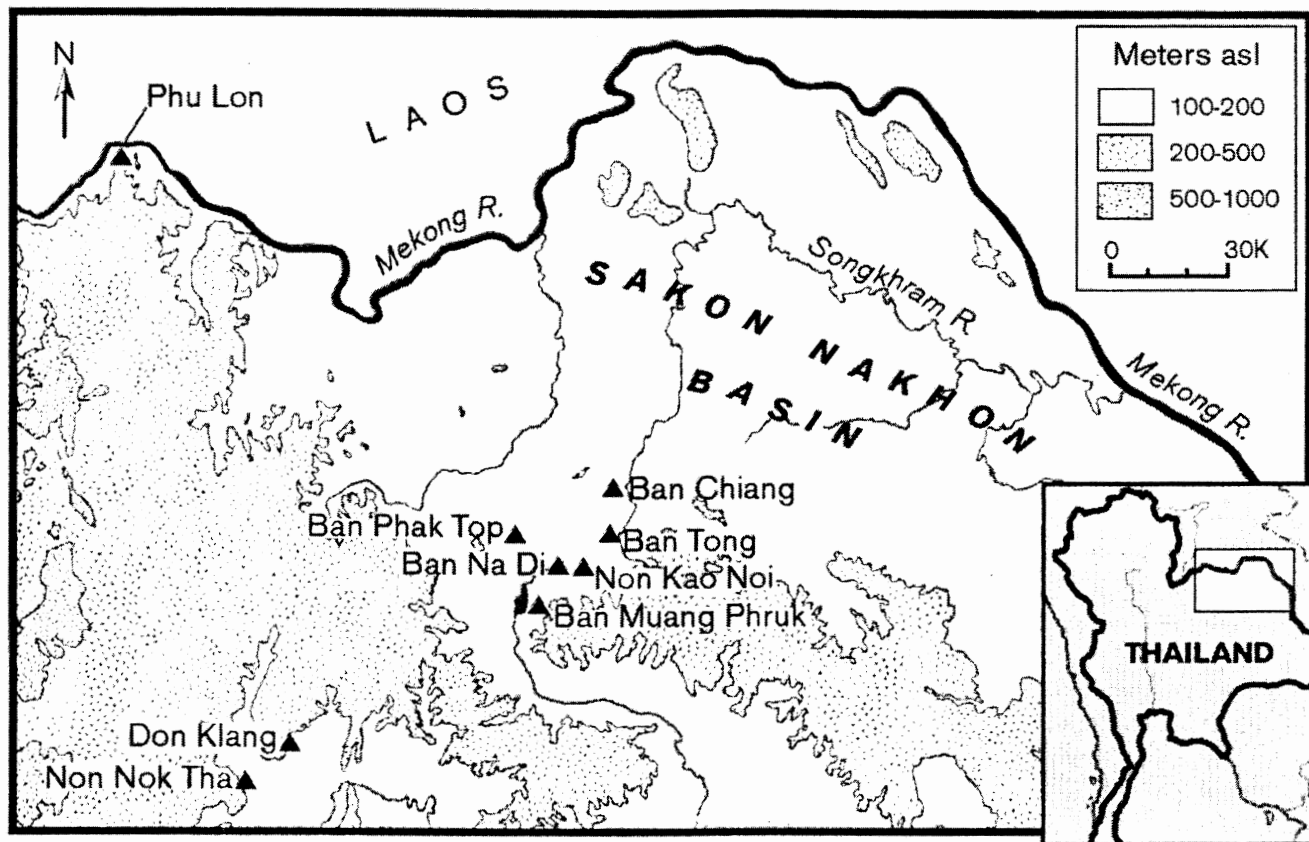


Figure 1: Map of selected prehistoric sites in northeast Thailand.

excavations and studies, as listed below. There are a number of challenges to integration of these data, such as the sheer number of rims, the varying criteria used for classifying each data set, and site-to-site variability in ceramic forms. Henderson decided to focus on the aspect that all the data sets have in common, namely rim forms. He is examining 1150 drawings of rims and 498 vessels from both published and unpublished studies of sites excavated in the Sakon Nakhon Basin. Ultimately, his goal is to use this large body of data to create a searchable database of rim profiles. A compilation and systematic ordering of these ceramic rim forms should be a useful step toward that fundamental archaeological need – the “regional ceramic sequence”.

However, in trying to develop a systematic ordering of rim shapes that could be input into a computer database, we encountered the basic issue of defining what constitutes a rim? Where does the rim begin and the vessel body end? What criteria should be used in defining groups of similar rims? In the process of trying to delineate groupings of similar rims, we encountered a great deal of confusion in the literature concerning names and criteria for defining rim (as well as other vessel) parts. Moreover we found this confusion hampers systematic description and categori-

sation of rim forms and hence inter-observer concurrence on what constitutes a grouping. A systematic approach to rim form criteria is key to designing and using a computerized database.

The main objective of this article is to sort through fundamental aspects of subdividing vessels and rims into parts and to propose nomenclature for the basic anatomy of pottery vessels and rims from Sakon Nakhon prehistoric sites. We are not prepared at this time to propose a comprehensive typology of rim forms for the region. We employ the term “anatomy” (following Rice 1987:212) to refer to “artificially separating the different parts of an animal or plant [or in our case pottery vessels] in order to ascertain their position, relations, structure, and function” (Webster’s Unabridged 1996). We include basic vessel anatomy because, whenever possible, rims are most usefully viewed in the context of total vessel morphology, for a variety of reasons. Rims can have important functional and/or stylistic relationships to the whole vessel. Whenever possible, it is useful to infer vessel morphology from a rim sherd. At the very least, rims have a formal relationship to the original vessel that is important to defining the rim’s basal boundary.

We are finding that the clarification of anatomical terms is a necessary step preceding a discussion of rim or vessel typology – the definition of characteristic forms. While we hope that the proposed anatomical nomenclature will prove useful beyond the Sakon Nakhon Basin, we focus on terminology for this specified region in part because we have found no single generic system to be an apt fit for the morphological range common in our research region, a problem for which we propose an explanation below. Therefore our point of departure is regional ceramic assemblages and studies thereof, not an idealized notion of how parts of ceramic vessels might be distinguished.

The discussion below proceeds as follows. First, the rim and vessel data sets providing reference forms for the project are briefly described. Second, a general terminology for vessel anatomy is discussed, as a necessary groundwork for defining the rim as a vessel part and defining how rims articulate with other portions of the vessel. Third, terminology for basic description of rim anatomy is offered. Fourth, the status of applying the anatomical approach to coding for the rim form database is discussed. At the end of the article is a working glossary of terms.

VESSEL AND RIM FORM DATA USED IN THE STUDY

To develop the anatomical terminology, we began with our reference set of forms from four sources of formal variation in prehistoric ceramics from six Sakon Nakhon Basin sites. The reference sets utilised are as follows:

1. The one published data source, *Prehistoric Investigations in Northeast Thailand* (Higham and Kijngam 1984), contains: (a) a rim typology derived from level sherds excavated primarily from Ban Na Di (BND) but also from the sites of Ban Muang Phruk and Non Kao Noi by Metha Wichakana (1984), and drawings of 403 rims grouped into 261 types; and (b) illustrations of 127 whole or reconstructed vessels (including lids) from Ban Na Di and six vessels from Non Kao Noi.
2. The second data source is unpublished and on file with the Ban Chiang Project at the University of Pennsylvania Museum. It comprises sketches and coded data on 82 rim forms defined by William Schauffler from level sherds excavated in 1975 from the sites of Ban Tong and Ban Phak Top (Schauffler n.d.).
3. The third data source is an examination by Rakshanok Tosuphan (1986) of rims from the 1975 excavation of Ban Chiang square D5. Tosuphan illustrated 135 rim shapes in her senior thesis at Silpakorn University.
4. The fourth source of vessel and rim forms, also from the Ban Chiang files, comprises drawings of 372 whole/reconstructed vessels that have rims, which were excavated from the BC and BCES excavation locales at

Ban Chiang (363 vessels), Ban Tong (7 vessels), and Ban Phak Top (2 vessels).¹

Some limitations of the data

The Sakon Nakhon Basin rim data sets vary in their quality, consistency, and detail. Different criteria were used for classification in the different rim studies. For example, the Ban Na Di rims were classified taking four attributes into consideration: rim form, decoration, vessel size, and clay fabric. However, none of the other data sets integrated clay fabric or decoration as defining criteria. Schauffler coded these attributes as separate variables with the intention of querying for correlations among them. His unpublished data do not reveal rigid correlations, but the study must be considered preliminary. The only common element available from the four data sources is morphology of rim profiles. Although in a fully defined typology it will be desirable to include other criteria, at this stage we seek to integrate the various data sources only on the basis of rim morphology, and associated vessel morphology as available.

Another aspect of concern is the as-yet-to-be-defined relationship between pottery from burials and pottery from non-burial contexts. Whole vessels are likely to come from burial contexts, yet rims studied in level and surface contexts may derive primarily from habitation debris. Were different forms recovered from these different archaeological contexts? A full and formal study of this issue has yet to be undertaken. In the present article, non-burial reconstructed ceramics are included in the Henderson database. For example, of the 372 excavated vessels with rims from Ban Chiang, Ban Tong, and Ban Phak Top incorporated into the Henderson rim database, 86 (23%) were excavated outside of burial contexts. The present study's underlying assumption, which is partly based on White's experience with prehistoric northeast Thailand ceramics over the past 26 years, is that there is considerable commonality of forms between ceramics found in burial and non-burial contexts. Thus we think it is valid to examine the morphology of pottery from both contexts together, at the stage and general level we are undertaking in this study.

PROBLEMS IN DEVELOPING SYSTEMS FOR MORPHOLOGICAL DESCRIPTION

Before discussing a terminological system for vessel anatomy, it is important to ask why is such a discussion even necessary? Can't an existing generic terminological system be adopted without "reinventing the wheel"? Terminological systems used in other studies of prehistoric ceramics from Thailand usually mention systems such as Shepard's (1956) approach to whole vessels and Bronson's (1976) rim study for Chansen in the Chao Phraya valley of

central Thailand (e.g., Wichakhana 1984), but the studies then tend to outline directly a to-some-degree idiosyncratic typology and terminology specifically for the project's vessels and/or rims. The terminological sources are rarely fully explicated. While this serves immediate needs for a site sequence, the typology tends to be "in the head" of the typologist and hard for others to replicate.

With an aim to improve replicability, we deemed a return to basics was appropriate. A review of several fundamental references on ceramic morphology, including the works of Shepard (1956), Bronson (1976, considered fundamental to Thailand based on frequency of being referenced), Joukowsky (1980) and Rice (1987) revealed that no one approach or terminological system in whole was a "best fit" or even adequate for our ceramic assemblages. In our efforts to define a morphological descriptive system, several observations emerged with regard to the difficulties we experienced.

1. The same terms are being used by different scholars (and sometimes the same scholar) to mean different things;
2. numerous terms are being used by different scholars for the same attribute;
3. variation in vessel morphology can sometimes be continuous, thus rendering the effort to define discrete parts of vessels and rims at times inappropriate;
4. prevalent manufacturing technology impacts the range of characteristic ceramic forms manufactured within potting traditions; and,
5. regionally attuned morphological systems are therefore desirable as any individual generic system may be over-elaborate for some aspects of a region's ceramic variability, and underdeveloped for other aspects.

The relationship of vessel anatomy to ceramic technology and potting tradition

Not only style and function, but also vessel formation technology influence the range of characteristic forms in a region. We think that appreciation of vessel formation technology can appropriately impact the anatomical nomenclature utilized in a region. In our experience, no existing terminological system can be "all things to all ceramic typologists" nor to our regional typologies partly because of regional variation in formation technology. The paddle and anvil vessel formation techniques that prevailed during the prehistoric time period in the Sakon Nakhon Basin resulted in a range of characteristic vessel shapes that are quite different from a region where, for example, wheel-thrown pottery techniques dominated the potting tradition.

Some tendency toward continuous morphological variability may be anticipated from studies showing that several coexisting hand-building techniques were used to form Sakon Nakhon Basin prehistoric pots (Glanzman and

Fleming 1985; White *et al.* 1991; Vincent 1988:133). Vessels were probably made in household contexts that tend toward low levels of standardization. As one product of hand-building in decentralized production contexts, morphological attributes may not form discrete mutually exclusive groupings and instead can cluster in numerous different ways depending on the analytical objectives. Formal analysis of such polythetic forms produced with manufacturing processes that allow multiple avenues to produce similar forms does not lend itself to creation of all-encompassing typologies.

Generic systems of terminology for vessel parts, such as Shepard's (1956), we find have cultural and technological biases presumably reflecting the author's experience with specific ceramic assemblages. Each system elaborates some variables that may not be particularly useful in specific assemblages (such as Shepard's "independent versus dependent restricted vessels"), while glossing over other variables that need elaboration in order to describe those same assemblages adequately. That one system can be simultaneously inadequate and over-developed results in cumbersome applications to particular groups of ceramics analogous to forcing data to fit a theoretical model. Therefore, useful morphological systems are inherently to some degree regional, as any individual system will ultimately derive from the ceramic assemblages with which the creator of the system is familiar.

Lack of acknowledgement that regional technologies can influence and even restrict formal ranges of vessels may have contributed to some of the confusion in the ceramic literature, such as when different ceramicists define the same term differently, presumably to fit their context, but without acknowledging the modification of meaning. Examples of terms that have multiple and sometimes discordant meanings in the literature include "everted," "orifice," "lip" and "unrestricted".

We have taken the approach of "picking and choosing" from several existing terminological systems, as well as adapting, combining and, if necessary for clarity, modifying morphological terms and concepts for the purpose of developing an overall system of vessel anatomical description useful for prehistoric ceramic assemblages in the Sakon Nakhon Basin. A few new terms are introduced. While most of the proposed nomenclature is not "new", the discussion that follows strives to make clear choices in terminology and to give the rationale for why one term is chosen over another, or why a proposed usage for a term might be restricted or expanded in comparison with another scholar's usage. While a laborious discussion, the effort, we hope, will move regional archaeologists to "talking the same language" and ultimately striving for replicability among ceramic analysts within our region in discussions of

vessel and rim morphology. While we hope the system or at least the discussion is useful for a wider region in Southeast Asia and even beyond, this is not our primary objective.

TERMINOLOGY FOR VESSEL PARTS

To be able to describe a rim systematically, including its potential relationship to a vessel, present or not, it is necessary to begin with basic terms for vessel parts. The following discussion concerns only symmetrical vessels whose profile has a uniform relationship to a central “vertical axis of revolution” (Shepard 1956:228) (i.e., not the square or animal-shaped vessels that occasionally occur in prehistoric sites in Thailand, although some morphological distinctions discussed below may prove to be useful for these special vessel forms).

Our review of the Shepard (1956), Bronson (1976), Joukowsky (1980) and Rice (1987) systems in the context of our reference assemblages resulted in a sense that sometimes a term or approach from one for defining a vessel part fit better than another, i.e., the term “worked” in the sense that we each could use it and mean the same thing. Another ceramicist’s concept might work for another vessel part. In selecting and adapting from several different systems concepts and terms that seemed useful in the context of our reference assemblages, we have focused on those that can be objectively applied. For example, vessels can be broken down into horizontal units whose lower and upper termini can, in most cases, be objectively determined via Shepard’s (1956:226) four types of “characteristic points”, namely:

1. endpoints (at the base and lip);
2. points of vertical tangency;
3. points of inflection; and
4. corner points.

However, several terms for vessel parts that have ambiguous boundaries we still find useful in selected contexts, and these are retained in our basic anatomical vocabulary.

Basic vessel parts

In Sakon Nakhon Basin prehistoric assemblages, there are two basic vessel parts, namely the *body* (following Bronson 1976; Joukowsky 1980:345; and Rice 1987:212) and the *rim* (following Joukowsky 1980:351). The body is usefully conceived of as the part of the vessel that acts as a container. “The rim is the outer edge of the vessel, to which the neck or body is attached” (Joukowsky 1980:351).

Although Rice and Joukowsky consider the base an essential vessel component, the predominance of round-bottomed pots in Sakon Nakhon Basin prehistoric assemblages, a common by product of the paddle-and-anvil technique when used without the wheel, renders impossible

distinguishing this portion systematically or meaningfully as discrete from the lower body in a high proportion of vessels. We use the term *base* in a more restricted sense as discussed below.

Upper and lower bodies

We find Rice’s and Bronson’s division of a vessel’s body into a *lower body* and an *upper body* useful (Figure 2). The lower body’s vessel wall moves upward and outward from a base or, in the case of round-bottomed vessels, the point of contact of the vertical axis of revolution (VAR) with the basal horizontal plane. An upper body is a distinct vessel portion above the lower body, the wall of which moves upward from the body’s maximum diameter (the juncture of the lower and upper body, to be termed the vessel’s *equator*) and toward the vessel’s VAR. In a slight departure from Rice (1987:212), we employ the phrase *lower body* (and not just *body*) for complete vessels that lack an upper body and hence are unrestricted (discussed below). Therefore, all vessels have minimally by definition a lower body and a rim. A footless bowl is an example of an unrestricted vessel whose only vessel parts are a lower body and rim (Figure 2a).

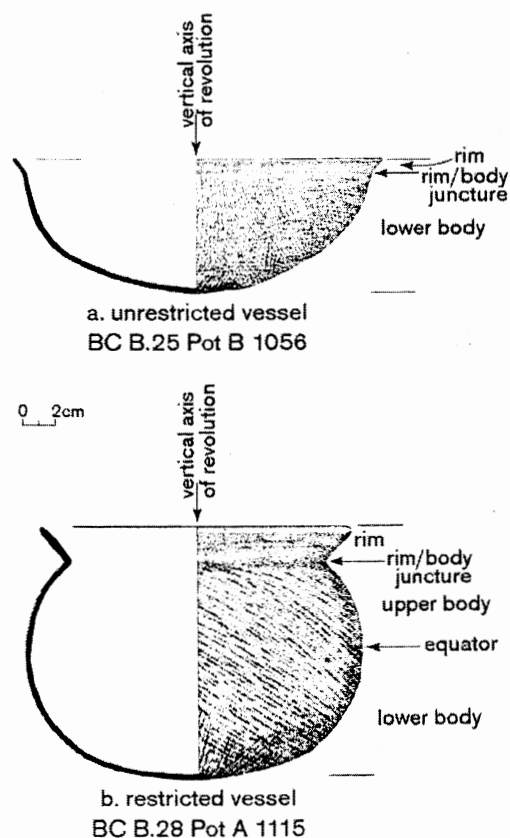


Figure 2: Basic vessel parts.

Optional vessel parts

Other vessel parts that may or may not be present on any individual vessel include *base*, *neck*, and *handle*. The presence of a base in our assemblage is defined by the deliberate effort to create a horizontal surface for the vessel to rest on a horizontal plane. It requires the presence of a “base endpoint” (after Shepard 1956:226). Usually in our assemblages this involves adding a clay element such as a ring to the basal portion of the lower body, which commonly is round-bottomed. *Foot* is a useful term for this type of base. Sometimes the configuration of a round-bottomed lower body is modified to create a horizontal surface without adding a clay element, such as by flattening, which usually provides a definable base endpoint (Figure 3).

While we agree with Shepard (1956:230) that “it is better to keep the word ‘neck’ as a loose term” than to consider it a regular vessel part, we prefer restricted usage. We use the term neck primarily if there is a corner point (following Shepard 1956:226) differentiating a relatively tall and vertical cylindrical vessel part above an upper body, from which an articulated rim (defined below) can be distinguished (Figure 4).

Handles are rare among Sakon Nakhon Basin prehistoric ceramics and therefore are not discussed further.

Other vessel terms

Orifice

The term *orifice* in the literature is employed in confusing and contradictory ways. Neither Bronson nor Joukowsky use the term, although Bronson uses “mouth” in some analogous contexts. The basic contradiction is built into Shepard’s (1956) discussions of the term. On some pages orifice is equated with a vessel’s superior endpoint, which can be extrapolated to mean lip (Shepard 1956:226, 227). In other portions of her discussion vessel accessibility is the underlying rationale for the concept (1956:228). Rice defined orifice, which she considered an “essential component”, as the vessel’s “mouth opening” and uses the term to refer not to a point along the wall profile but to a “zone” (Rice 1987:212, 214).

The conflict is in defining orifice as a fixed location along a vessel wall irrespective of this point’s relationship to vessel function, as opposed to the position or zone along a vessel wall configuration that governs accessibility to that vessel. The distinction is particularly significant for a vessel that has an upper body but whose diameter at the lip is wider

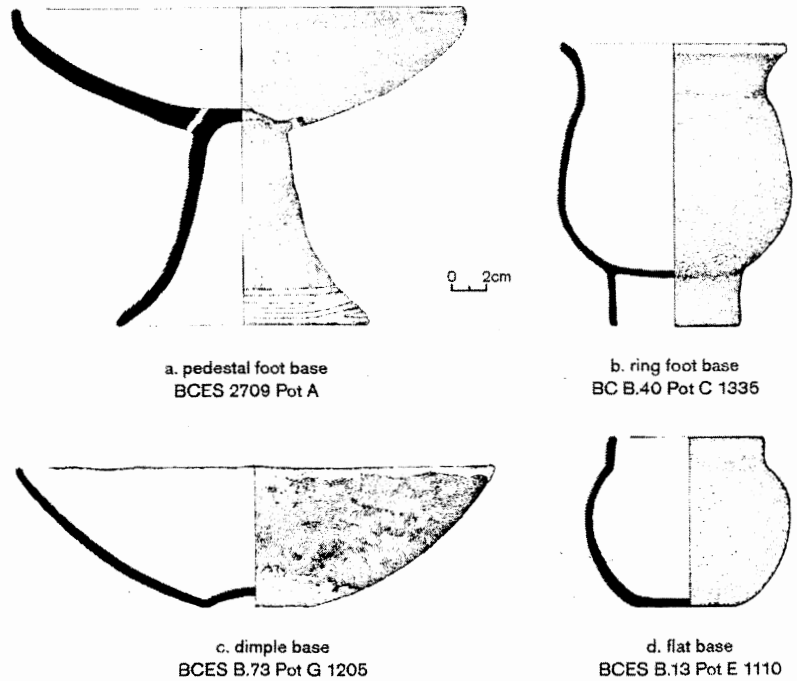


Figure 3: Selected bases from Sakon Nakhon Basin vessels.

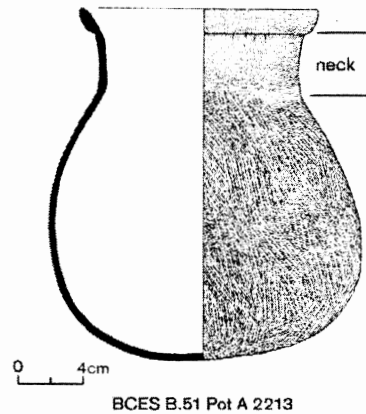


Figure 4: Vessel with neck, a distinct cylindrical element between the upper body and rim.

than at the vessel’s equator (e.g., Figure 5a). We prefer functional accessibility as the most meaningful basis for using the term orifice and propose for a definition “the position along any rim which has the narrowest interior diameter”. For some vessels the orifice might coincide with the lip; for other vessels the orifice might coincide with the junction of the rim and body (Figure 5).

Restricted and unrestricted vessels

Restricted and unrestricted are terms that also have become confused in the literature but that we find useful to maintain in the descriptive terminological system for Sakon Nakhon

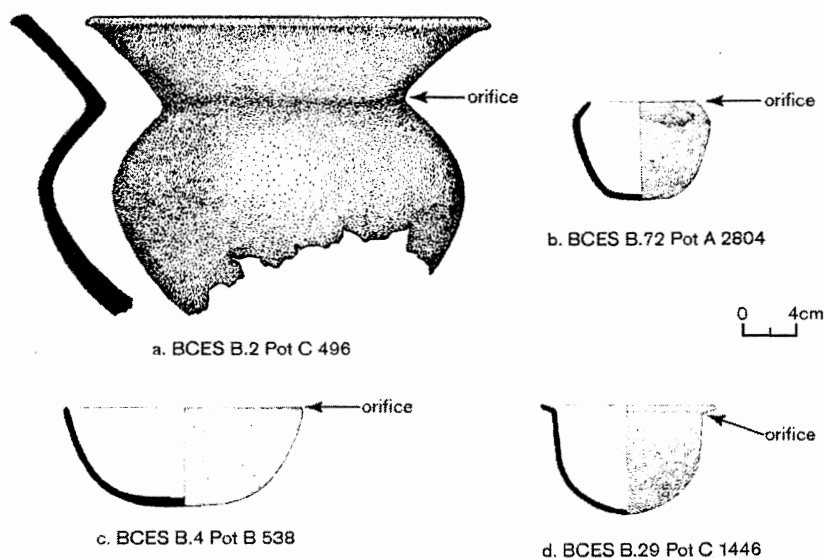


Figure 5: Orifices of (a) and (d) are at the rim/body juncture. Orifices of (b) and (c) are at the lip.

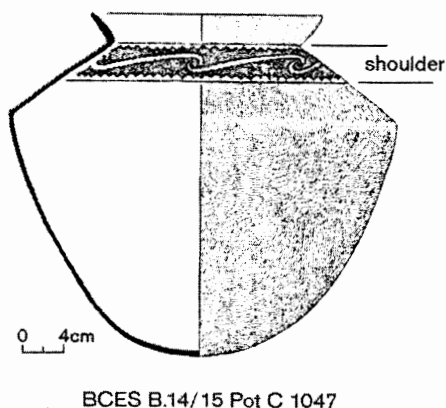


Figure 6: Vessel with shoulder used for design field.

Basin ceramics. The source of the confusion is in the misapplication of the terms to rims and the imprecisely used concept of orifice (e.g., Shepard 1956:228; Rice 1987:212, 214). Shepard's (1956:228) specification that the concepts of restricted and unrestricted have implications for the structure and function of vessels clarifies her intent. The contour of the vessel wall, which has functional implications for the vessel as a container, is the key attribute she sought to discriminate in restricted versus unrestricted vessels.

The unrestricted vessel is suited for all purposes that require the use of the hands inside the vessel and also for display or drying of contents. Restriction of the vessel wall aids in retaining the contents and renders the vessel more useful for storage. (Shepard 1956:228)

Later, she states that, *disregarding rim modifications,*

... the unrestricted vessel has an open orifice marked by an end-point tangent that is vertical or inclined outward, and *at no point in the contour is there a constriction marked by a corner or inflection point.* (Shepard 1956:230 [emphasis added])

We argue that the terms restricted and unrestricted are appropriate, meaningful, and useful when applied to the vessel body. Why use the terms at all when there exists misunderstanding? Ultimately, restricted and unrestricted are useful shorthands for "vessel with upper and lower bodies" (e.g., Figure 2b) and "vessel with lower body only" (e.g., Figure 2a) respectively. Because of the potential for morphological continua and the handmade variability in some of the vessels, there are cases that are difficult to place clearly in one or the other categories, but these are exceptions.

The anatomical terminology for vessels discussed above is merely a first step toward regularizing and elaborating morphological terms to be employed for Sakon Nakhon Basin ceramics. The above discussion emphasizes terms for vessel parts that can be defined based on objectively determined termini. The discussion does not exhaust the list of useful anatomical terms, however. For example, *shoulder* is useful in describing the position of many design fields (Figure 6). We define shoulder as the zone below the rim/body juncture (also termed the *throat*) of a restricted vessel; the lower terminus is not fixed but lies above the vessel's equator (*cf.* Shepard 1956:241).

RIM ANATOMY

Rim morphology is important both because rim shapes can have distinctive stylistic and functional sources, and also because rim sherds often have more attributes to employ in assessing the chronology and culture of a site from surface or general deposits in comparison to body sherds. Many scholars in other parts of the world have expended great effort in categorizing the various parts and shape configurations of rims. Because rims are traditionally the focus of much attention in ceramic studies, and because Henderson is compiling existing rim form data in the Sakon Nakhon Basin, a systematic approach to rim descriptions and morphology should be helpful in our general objective of developing a regional ceramic sequence.

As with vessel shape, no generic approach has been *in toto* helpful, and we ran into many differences among

ceramicists in their use of terms and emphases, even on the definition of rim itself. Rice (1987) avoids detailed discussion of rim morphology. Shepard (1956:245) provides more extended discussion but focuses on conceptual rather than terminological issues. However, in order to implement the database we find it a practical need to have a system to describe and order rim variation, based on terms for repeated features that allow shorthand descriptions of variation in morphology.

Although Bronson's (1976) system for rim anatomy is commonly cited in the literature on prehistoric ceramics in Thailand, we find many terms and approaches of Joukowsky (1980) to have several advantages in our effort to develop concepts and terminology for variation in rim morphology. The framework we advocate below can be considered a "modified Joukowsky system". We strive to develop a system that can be applied to rim parts, rim sherds that lack information on the rest of the vessel body, as well as rims on intact vessels.

Articulation

The first useful concept is that of articulation, in that a rim (the portion of the vessel that includes the superior endpoint) may be unarticulated or articulated. A vessel whose vessel wall simply ends at the lip endpoint (Shepard 1956:226) with no change in direction or thickness to define a rim/body juncture has an unarticulated rim (i.e., the vessel lacks a characteristic point between the body and lip endpoint, see Figure 5c). We prefer the term *direct rim* for this class of rims.² A rim "expressed in a distinct fashion" (Joukowsky 1980:351) by a change in direction of the vessel profile from the vessel's body or neck and/or changes in wall thickness is an *articulated rim*.

We recognize three basic genres of articulation:

- a. *directional articulation*, which ranges from corner changes in vessel wall direction (e.g., Figures 2a, 2b, 3d, 5a, 5b, 5d, 6 and see also Figure 8a) to inflected changes in vessel wall direction (e.g., Figures 3a, 3b, 7a and see also Figure 8b);
- b. *thickness articulation* in which the base of the rim is defined by changes in vessel wall thickness (usually thickening but sometimes thinning, Figure 7b); and
- c. *multiple articulation* which includes a combination of changes in direction and thickness at the point of articulation (Figure 7c).

In the real world of rim morphological continua, examples are found that are difficult to assign to direct versus articulated rim categories, or to one of the three articulated rim categories. However, the conceptual breakdown does provide a rational approach to grouping rims at an initial level.

Complexity of articulated rims: Simple and elaborated rims

For the group of articulated rims whose morphology comprises one inflected or corner directional change at the point of articulation, whose interior and exterior rim wall surfaces are essentially parallel (equidistant) entailing no obvious change in thickness, and that have no additional changes in direction, we propose the term "simple articulated rim" or *simple rim* for short (e.g., Figure 2a, 2b, 3a, 3d, 7a). Lip morphology is not considered, as explained below. All other articulated rims will be considered *elaborated rims* (Figures 7b, 7c).³ Elaborated rims may be expressed by changes in thickness, more than one change in direction, or combinations of these attributes.

Stance

Joukowsky's (1980:351) term *stance* is useful, but we employ it in a more restrictive manner.⁴ We use stance to refer solely to the bearing of the rim from the point of articulation to the rim top with respect to the vessel's VAR. We use three basic stances of a rim *everted* (bearing away from the axis, Figures 2a, 2b, 3b, 3c, 5a, 5d, 6), *vertical* (bearing parallel to the axis, Figures 3a, 3d) and *inverted* (bearing toward the axis, Figure 5b). Of course, the reality is characterized by a continuum from inverted to everted.

Rim parts

Like vessels, rims are usefully subdivided into constituent parts, or more commonly constituent surfaces, for descriptive purposes. And like vessels, no single discussion of rim parts is fully adequate to our needs, although Bronson's (1976) and Joukowsky's (1980) approaches each have strengths and weaknesses.

Rim versus rim edge

One of the distinctions between Bronson's and Joukowsky's systems is that the portion of the vessel which Bronson calls the "rim", Joukowsky calls the "rim edge". The difference reflects Joukowsky's reliance on the point of rim articulation as the base of the rim, whereas Bronson does not define the rim from its rim/body juncture, but rather leaves the basal rim terminus undefined. Joukowsky treats the configuration of the rim edge separately from the rim as a whole. We find the Joukowsky concept of rim edge useful, as it is often an area of stylistic or functional rim elaboration in our reference assemblages (although in some cases the rim and rim edge may essentially coincide). She terms variation in the rim edge as "rim edge treatment". One reason we find the distinction useful is because sometimes the same rim edge treatments may be used on rims with different kinds of articulation. We will, in concert with Joukowsky,

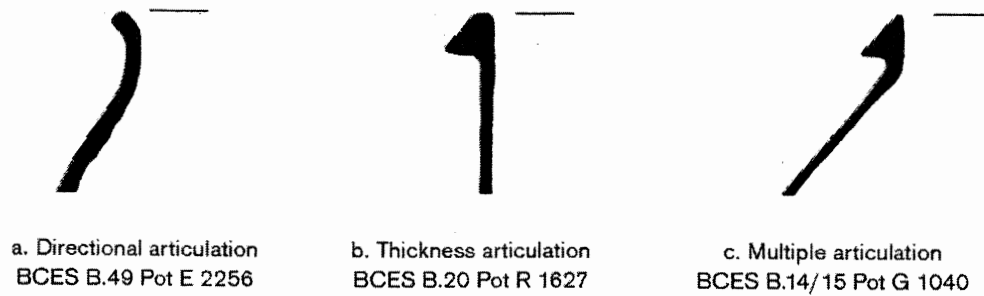


Figure 7: Three basic categories of rim articulation. Rim/body juncture is defined by (a) change in direction of vessel wall; (b) change in thickness only; (c) combination of changes in thickness and direction of vessel wall.

distinguish the rim edge, that portion of the rim closest to the vessel endpoint, from the rim as a whole, noting, however, that the base of the rim edge is a subjective not a fixed terminus along the rim wall (Figure 8b).

Rim surfaces

Although Bronson and Joukowsky have different subdivisions and terminology, they both distinguish distinct surfaces along a rim. The Bronson approach (1976:106) assigns a set of seven terms to potential surfaces that a rim might have, depending on its configuration relative to the lip or vessel endpoint. The simpler Joukowsky (1980) approach discusses rim edges in terms of three essential surfaces (interior, top and exterior, which she labeled i, ii and iii), plus subsidiary external configurations (termed iv). The key to Joukowsky's approach is its orientation of rim surfaces to a rim top, not with respect to the lip or vessel endpoint, as Bronson prefers. The rim interior is the rim surface toward the vessel's VAR, with respect to the rim top. The rim exterior is the rim surface on the side away from the vessel's VAR, with respect to the rim top.

We use a modified Joukowsky (1980:353, figure 14-43) approach for discussing not just the rim edge, but also for the rim as a whole. However, we redefine slightly and rename Joukowsky's three main surfaces. Rather than using lower case roman numerals we propose the following terms for the three basic surfaces *interior rim face*, *rim top* and *exterior rim face* (Figure 8a). The rim top is the surface of the rim of the complete vessel that, if the vessel were inverted on to a horizontal plane, would be in contact with that plane. Thus, the rim top unambiguously separates the exterior and interior rim faces. The rim wall from the rim top to the exterior point of articulation is the exterior rim face. The rim wall from the rim top to the interior point of articulation is the interior rim face. Being able to discuss separately the interior and exterior rim faces is particularly helpful when the rim profiles have complex non-parallel configurations.

Joukowsky's interior/exterior surface distinction can also be applied separately to the rim edge, as in *rim edge interior*

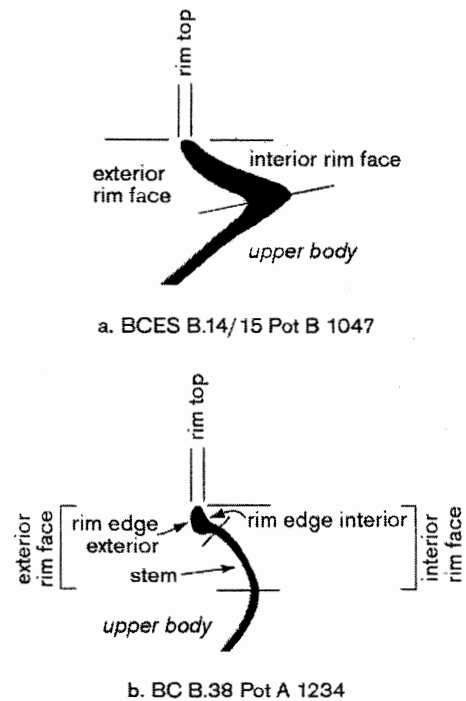


Figure 8: (a) Three basic surfaces of rims; (b) compound elaborated rim showing stem and distinct rim edge treatment.

and *rim edge exterior* (Figure 8b). This distinction facilitates discussion of the configuration and contours of the interior and exterior rim edges separately from each other, as well as separately from the contours of the rim faces, if necessary. In cases of complex rim configurations, these distinctions are useful.

Lip

Lip is another term that is differentially used in the literature.⁵ Our usage follows Shepard's view (1956:247) that usually "The form of the lip is a minor variation", often a product of the final pass of fingers or tool in a particular posture and hence rarely of stylistic import.

Another limitation with application of the term lip to rims is that while it is easily identified as the terminus or endpoint of the vessel wall in simple rims, it can be difficult to identify in cases where the rim edge treatment is complex and involves thickened configurations, or where the lip does not coincide with rim top. Bronson's recognition (1976:106) of seven potential rim edge surfaces – namely inlip, lip, outlip, face, top, bottom and throat – applicable depending on the rim configuration – is an attempt to deal with endpoints of complex and thickened rim forms. We have not found the Bronson system easy to apply consistently to complex rim edge configurations, so that two independent assessors of a rim arrive at the same description. Hence, in many cases, Joukowsky's concept of rim top is useful for its lack of ambiguity in contrast to the term "lip". However, keeping "lip" in our terminological repertoire to refer to the vessel wall endpoint is useful in many, if not all, cases of rim description, even if there are examples where the term seems inadequate.

Anatomy of elaborated rims: a few preliminary comments

A full discussion of elaborated rims, that is articulated rims that have modifications in thickness and/or multiple changes in direction, will be undertaken in a future publication. The majority of rims in the Henderson database fall into this general category. Some of the variables and some terminology pertinent to elaborated rims are suggested here, however.

We anticipate that elaborated rims might initially be subdivided into three groups: rims that are expressed primarily by changes in thickness (Figure 7b), rims that are expressed by both changes in thickness and/or changes in direction from the point of articulation (Figure 7c), and rims that have changes in thickness and/or direction above directional articular changes in profile. These latter we are tentatively calling *compound rims*, in that they have two or more distinct parts (Figure 8b).

A fairly common genre of compound rim is one in which there is a directional articulation at the rim/body juncture above which the interior and exterior rim faces are initially parallel leading up to a distinctive rim edge treatment that often involves thickening or "building up" of the edge (Figure 8b). The rim edge treatment in these cases appears often to be stylized and can be chronologically sensitive. To distinguish the distinctive, usually thickened rim edge treatment from the parallel rim faces between the rim edge treatment and point of articulation, we propose the term *stem* for the latter rim part (Figure 8b).

Terminology for variation in elaborated rims is still being worked out. The illustrations and terms for rim edges and

configurations used by Bronson (1976:105), Joukowsky (1980:351) and Shepard (1956:246) provide useful starting points, but we anticipate many modifications and additions. Variation is so great that we may have to have a numbered system, with names for particularly clear-cut shapes. In any case, our point of departure will be the variability evident in the Henderson database, not a generic, idealized, or pre-conceived set of rim shapes.

Summary

We have defined some basic anatomical vocabulary and concepts to be used in descriptions of Sakon Nakhon Basin rims. The three essential parts of all rims are rim top, interior rim face, and exterior rim face. Other key terms defined above are articulation, stance, direct rims, simple (articulated) rims, elaborated rims, lip, rim edge, rim edge interior, rim edge exterior and rim edge treatment. This discussion and set of terms set the stage for delineation of rim form variation found in our assemblages.

The configuration of rim and rim edge interior and exterior faces now enters the discussion. Attributes to consider include curvature, flattening, direction changes, thickness changes including both thickening and thinning, position and shape of thickness changes (Shepard 1956:246), and combinations of these attributes. Furthermore, the relationship of rim configurations to vessel anatomy and shapes, such as restricted and unrestricted forms, can be systematically considered.

APPLICATION OF RIM ANATOMY TO CLASSIFYING RIM FORMS

The anatomical discussion above facilitates the systematic organization of rim forms in several ways, including providing a vocabulary, ways to view rims, and a means to structure decision-making in creating groups. We are in the process of systematizing the structure with regard to the rim form database (Figure 9). The structure of the decision tree seeks to place simpler rim shapes that have fewer observable traits on the left, and progressively more complex forms, which have more observable formal attributes, on the right. In the discussion that follows, we review the development of the system with regard to direct and simple rims. Elaborated rims, because of their number and complexity, will be the subject of a subsequent publication.

Direct rims

The first observation to make in examining a rim is whether or not it is articulated (has a determinable junction with the vessel body on the basis of change in thickness and/or wall direction). If the rim is unarticulated, i.e., if it is a direct rim, then additional observations on its form are few. The main

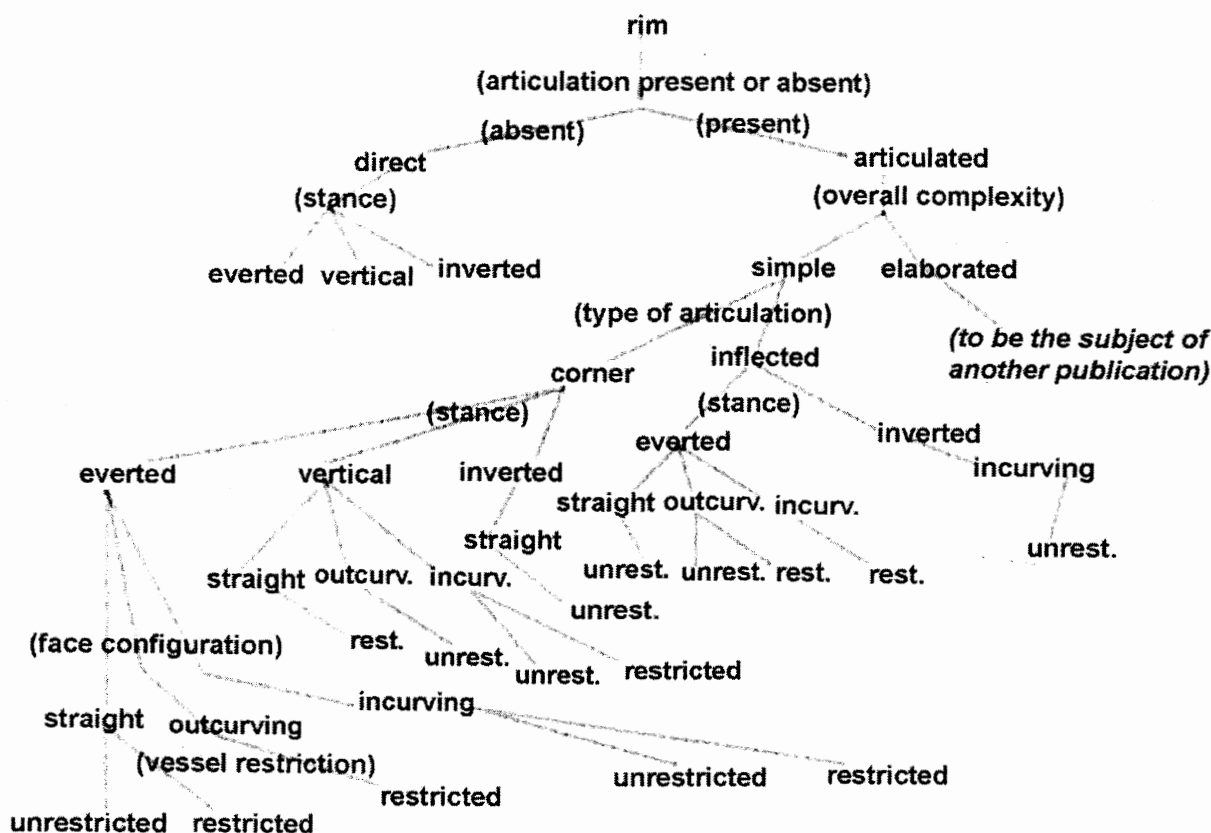


Figure 9: Decision tree for determining rim class for direct and simple rims. Eighteen classes have so far been identified in prehistoric Sakon Nakhon Basin rims.

formal variation of direct rims concerns stance: everted, vertical, or inverted. Therefore, we have defined three classes of direct rims: direct everted (Figure 10a), direct vertical (Figure 10b), and direct inverted (Figure 10c). The coding of rims into these three classes is fairly straightforward. Additional discrimination aiming to group rims with a family resemblance and toward defining formal “types” would incorporate scale, diameters, decoration, fabric and other attributes. Currently, lip configuration does not appear to be a significant variable, but future work may reveal otherwise.

Articulated rims: simple rims

If a rim has a definable juncture with the vessel body, it is an articulated rim. Simple rims are articulated rims that have only a change of direction at the point of articulation (Figure 10d-r). The rim interior and exterior faces are essentially parallel (equidistant), having no significant changes in thickness, and there is no distinctive rim edge treatment. The point of articulation in simple rims can be of two basic varieties of directional change, which are more accurately

conceived of as ends of a continuum: *corner articulations* (basal terminus defined by Shepard’s “corner point”), and *inflected articulations* (basal terminus defined by Shepard’s “point of vertical tangency”).

Simple rims with corner articulations

Among simple rims in the Henderson database with corner articulations, three variants to the curvature of the parallel rim faces are observed: straight (Figure 10d, 10e), outcurving (faces are convex with respect to central VAR, Figure 10f), and incurving (faces are concave with respect to central VAR, similar to “cupped” in Wichakana 1984:227, Figure 10g, h). These may be joined with restricted or unrestricted vessels and with everted, vertical, and inverted rims. Ten of a possible 18 hypothetical combinations have been observed, as given in the summary of classes below.

Simple rims with inflected articulations

Among simple rims in the Henderson database with inflected articulations, five classes have been identified. Four of the classes are everted and one is inverted.

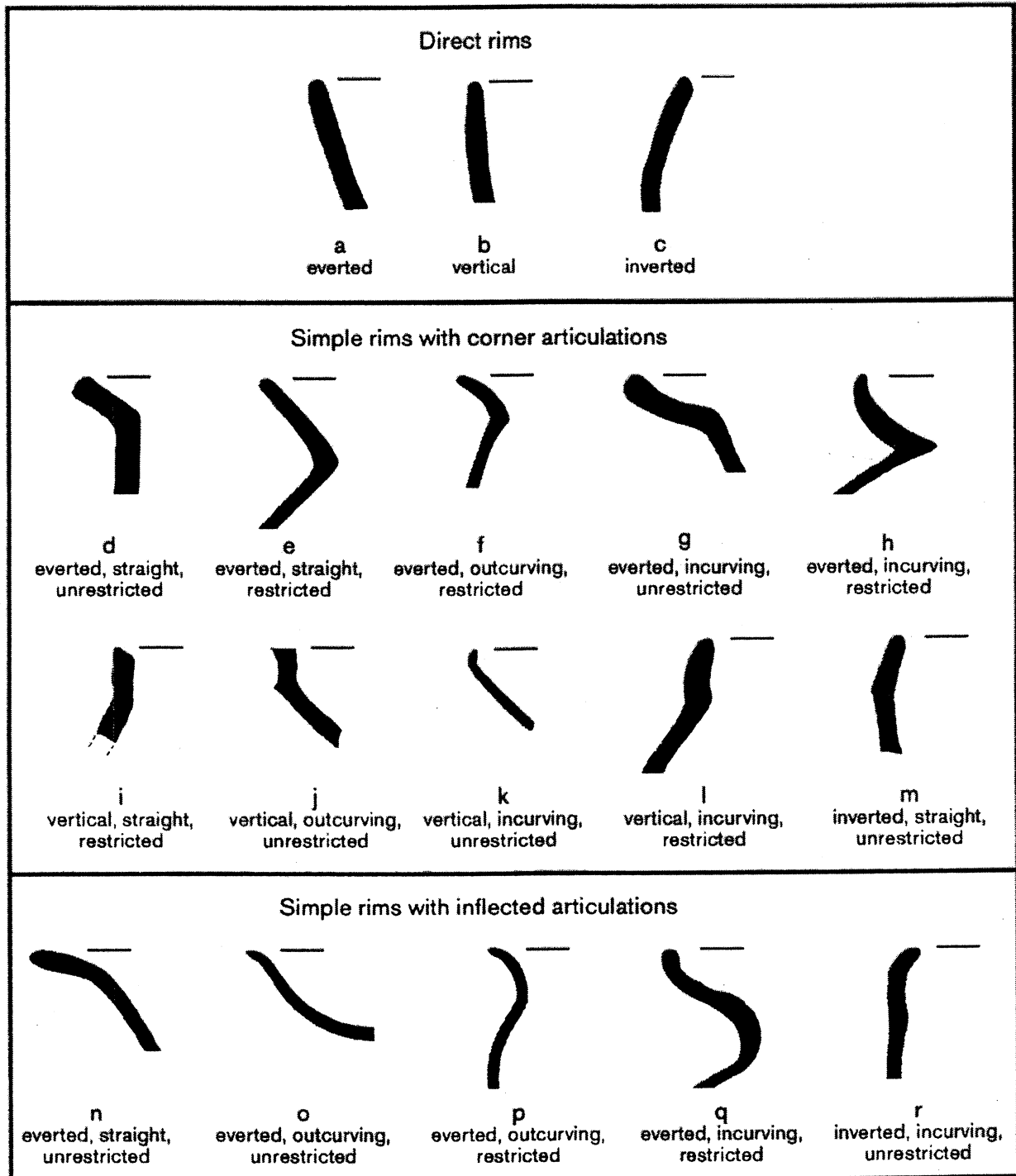


Figure 10: Examples of each rim class for direct and simple rims.

SUMMARY OF CLASSES OF DIRECT AND SIMPLE RIMS

Below is delineated the range of possible classes logically possible with the system we are proposing. Following each class is the identifier for an example in the Henderson database and the letter for the image of that vessel's rim in Figure 10. Classes for which no example has been identified are put in italics and square brackets. Eighteen out of a hypothetical total of 39 classes of simple and direct rims have been identified.

Direct Rims

Direct rims have no change in thickness or direction to differentiate the rim from the vessel body, i.e., no articulation or specific point of transition from the vessel wall. We subdivide direct rims into three classes:

Direct everted, BCES B.4 Pot B 538, Figure 10a

Direct vertical, BCES B.72 Pot C 2804, Figure 10b

Direct inverted, BCES B.52 Pot D 2211, Figure 10c

Note that by definition, direct everted and direct vertical are on unrestricted vessels, and direct inverted is on a restricted vessel.

Simple Rims

Simple rims are rims that are articulated only through a change in wall direction; interior and exterior rim faces are essentially parallel. Directional articulation can range from corner to inflected. Within each type of articulation, eighteen permutations of stance, face configuration, and vessel restriction are hypothetically possible, but not all variants have been identified in our reference data.

Simple rims with corner articulations:

everted straight rims on unrestricted vessels,

BC B.44 Pot B 1339, Figure 10d

everted straight rims on restricted vessels,

BCES B.29 Pot A 1679, Figure 10e

[everted outcurving on unrestricted]

everted outcurving on restricted vessels,

BND Pot 62, Figure 10f

everted incurving on unrestricted vessels,

BCES B.7 Pot D 2637, Figure 10g

everted incurving on restricted vessels,

BCES B.71/73 Pot M 1901, Figure 10h

[vertical straight on unrestricted vessels]

vertical straight on restricted vessels,

Tosupan R 100, Figure 10i

vertical outcurving on unrestricted,

Schauffler rim 66, Figure 10j

[vertical outcurving on restricted]

vertical incurving on unrestricted vessels,

BND Pot 122, Figure 10k

vertical incurving on restricted vessels,

BCES B.13 Pot E 1110, Figure 10l

inverted straight on unrestricted vessels,

BCES B.49 Pot C 2251, Figure 10m

[inverted straight on restricted vessels]

[inverted outcurving on unrestricted vessels]

[inverted outcurving on restricted vessels]

[inverted incurving on unrestricted vessels]

[inverted incurving on restricted vessels]

Simple rims with inflected articulations:

everted straight rims on unrestricted vessels,

BCES B.2 Pot E 523, Figure 10n

[everted straight rims on restricted vessels]

everted outcurving on unrestricted,

BND Pot 127, Figure 10o

everted outcurving on restricted vessels,

BND Pot 2, Figure 10p

[everted incurving on unrestricted vessels]

everted incurving on restricted vessels,

BCES B.7 Pot A 813, Figure 10q

[vertical straight on unrestricted vessels]

[vertical straight on restricted vessels]

[vertical outcurving on unrestricted]

[vertical outcurving on restricted]

[vertical incurving on unrestricted vessels]

[vertical incurving on restricted vessels]

[inverted straight on unrestricted vessels]

[inverted straight on restricted vessels]

[inverted outcurving on unrestricted vessels]

[inverted outcurving on restricted vessels]

inverted incurving on unrestricted vessels,

BCES B.8 Pot B 857, Figure 10r

[inverted incurving on restricted vessels]

SUMMARY AND CONCLUSIONS

A basic anatomical system of subdivision and nomenclature for vessels and rims is proposed. We expect that this system, being based on objective and empirical criteria, will facilitate the coding of rims in a searchable rim database and subsequently its use by others. The system has the potential to expand to include forms that are not yet observed or described in the reference ceramic assemblages. While developing this system, it became clear to us that this formal approach will be very useful in defining groups of rims that have family resemblances within classes. The frequency and distribution of rim forms and families across space and time will be determinable once the system is fully implemented. Therefore, we believe we are progressing toward the larger goal, that of defining a regional ceramic sequence for the Sakon Nakhon Basin.

WORKING GLOSSARY OF TERMS FOR DESCRIBING
BASIC VESSEL AND RIM ANATOMY

articulation: presence/absence of a definable juncture between the vessel body and the rim: articulated vs. unarticulated or direct.

articulated rims: a rim "expressed in a distinct fashion" (Joukowsky 1980:351) by a change in direction of the vessel profile from the vessel's body or neck (directional articulation) and/or changes in wall thickness.

base: optional vessel part comprising a surface for the vessel to rest on a horizontal plane.

body: essential vessel part that functions as the container.

compound rims: rims with two or more distinct portions, commonly including a stem and distinctive rim edge treatment at the superior portion of the rim.

corner articulation: rim is distinguishable from the body or neck by a well-defined, sharp change of direction of both the exterior and interior rim faces from the vessel wall.

direct rim: rim with no definable juncture with the body; vessel wall simply ends at a lip with no change in direction or thickness to define the base of a rim relative to the vessel body.

directional articulation: rim/body juncture is identified by a change in bearing of the vessel wall, ranging from corner to inflected.

elaborated rims: articulated rims that may have changes in thickness, more than one change in direction, and/or combinations of changes in thickness and direction.

equator: the position of the maximum horizontal body diameter on a restricted vessel.

everted stance: term for rims with bearing away from vertical axis of revolution.

exterior rim face: the surface of the rim from the point of exterior articulation to the rim top.

foot: bases formed by a discrete ring-like element added to a vessel's lower body to provide a surface on which the vessel can rest on a horizontal surface.

handle: optional part appended to the vessel of a size, shape, and position to facilitate lifting.

incurving rim: curvature of interior rim face is concave and exterior rim face is convex with respect to the vertical axis of revolution.

inflected articulation: rim is distinguishable from the body by a curving change of direction. A vertical straight edge is usually needed to accurately delineate the point of inflection.

interior rim face: the surface of the rim from the point of interior articulation to the rim top.

inverted stance: bearing of the rim is oriented inward toward the vertical axis of revolution relative to the articulation.

lip: superior vessel endpoint.

neck: optional vessel part for a cylindrical element between the upper body and rim.

lower body: essential vessel portion that extends upward and away from the basal central vertical axis of revolution.

multiple articulation: transition to the rim from the body is characterized by changes in both direction and thickness at the point of articulation.

orifice: the position along any rim that has the narrowest interior diameter.

outcurving rim: curvature of interior rim face is convex and exterior rim face is concave with respect to the vertical axis of revolution.

restricted vessel: vessels with an upper body.

rim: essential part of the complete vessel that includes the outer edge of the vessel, to which the neck or body is attached.

rim edge: uppermost portion of the rim (sometimes coinciding with the entire rim), which is sometimes an area of stylistic or functional modification. Basal terminus is not fixed but is subjective.

rim edge exterior: exterior surface of the rim edge.

rim edge interior: interior surface of the rim edge.

rim edge treatment: the shape and formal modifications made along the rim edge.

rim top: the uppermost horizontal surface of the complete vessel.

shoulder: outer vessel surface on a restricted vessel with an upper boundary at the rim/body juncture or throat and an unfixed lower boundary above the vessel equator.

simple rims: articulated rims with one change in wall direction at the rim/body juncture and no changes in wall thickness or additional changes in direction. Rim faces are equidistant (parallel) and may be straight, outcurving, or incurving.

stance: the bearing of the rim from its articulation (if present) to its rim top with respect to the vertical axis of revolution.

stem: the lower portion of many compound rims comprised of parallel rim faces above the point of articulation and beneath a distinctive rim edge treatment.

straight rim: rim faces are parallel and flat.

thickness articulation: the rim is distinguished from the body primarily by changes in vessel wall thickness (usually thickening but sometimes thinning).

throat: the rim/body juncture of restricted vessels.

unrestricted vessel: vessels with a lower body only.

upper body: optional vessel body part above the lower body that moves upward from the vessel equator and toward the vertical axis of revolution.

vertical axis of revolution (VAR): the central vertical axis in the middle of a symmetrical vessel

vertical stance: bearing of the rim is parallel to the vertical axis of revolution.

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NOTES

1. Eighty-one reconstructed partial vessels from these sites did not include the rim portion of the vessel and thus are excluded from Henderson's rim-focused study. Also excluded are the 70 pots and 10 lids Schaffler excavated from Don Klang, which lies outside of the Sakon Nakhon Basin and whose ceramics are related to the Phu Wiang ceramic tradition defined by Bayard at Non Nok Tha.
2. Direct rim is also used by Shepard (1956:245) and Rice (1987:213), although Joukowsky (1980:351) used the term "plain rim".
3. The simple/elaborated distinction for rims has not been formally adopted in other ceramic studies. However, Shepard (1956:245) used the word "elaborated" in several places in her discussion of rim variation in line with our usage. Bronson's (1976:105) "built-up" rims would be included in our concept of elaborated rims.
4. Joukowsky (1980:351-353) combined rim orientation with rim shape to arrive at eight basic stances – "vertical, flaring, incurving, everted, inverted, T-shaped, pendant and horizontal" in contrast to our recognition of only three stances. Our use of everted and inverted follows Bronson's generalized use and does not require any specific type of articulation, whereas Joukowsky uses everted and inverted only with rims with corner articulations.
5. Rice in some portions of her discussion (e.g., 1987:241) applies the term lip more or less comparably to Joukowsky's "rim edge", i.e., ascribing modifications of it to stylistic and functional values. We prefer to follow Shepard's more traditional and restricted usage of lip for the endpoint of the vessel wall and use Joukowsky's phrases "rim edge" and "rim edge treatment" to discuss intentional functional and stylistic modifications close to the rim top.

REFERENCES

- Bayard, D.T. n.d. Pottery Code. Unpublished mss on file, Ban Chiang Project, University of Pennsylvania Museum, Philadelphia.
- Bayard, D.T. 1977. Phu Wiang pottery and the prehistory of northeastern Thailand. *Modern Quaternary Research in Southeast Asia* 3:57-102.
- Bronson, B. 1976. Excavations at Chansen and the Cultural Chronology of Protohistoric Central Thailand. PhD dissertation, Department of Anthropology, University of Pennsylvania, Philadelphia.
- Chantaratiyakarn, P. 1984. The pottery from Ban Chiang Hian and related sites. In C.F.W. Higham and A. Kijngam (eds), *Prehistoric Investigations in Northeastern Thailand, Part II*, pp. 590-621. Oxford: BAR International Series 231(ii).
- Glanzman, W.D. and S.J. Fleming. 1985. Ceramic technology at prehistoric Ban Chiang, Thailand: fabrication methods. *MASCA Journal* 3(4):114-21.
- Higham, C.F.W. 1977. The prehistory of the southern Khorat Plateau, northeast Thailand, with particular reference to Roi Et Province. *Modern Quaternary Research in Southeast Asia* 3:103-41.
- Higham, C.F.W. and A. Kijngam (eds). 1984. *Prehistoric Investigations in Northeast Thailand: Excavations at Ban Na Di, Non Kao Noi, Ban Muang Phruk, Ban Chiang Hian, Non Noi, Ban Kho Noi and Site Surveys in the Upper Songkhram and Middle Chi Valley, Part I-III*. Oxford: BAR International Series 231.
- Joukowsky, M. 1980. *A Complete Manual of Field Archaeology: Tools and Techniques of Field Work for Archaeologists*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- Orton, C., P. Tyers and A. Vince. 1993. *Pottery in Archaeology*. Cambridge: Cambridge University Press, *Cambridge Manuals in Archaeology*.
- Rice, P.M. 1987. *Pottery Analysis: A Sourcebook*. Chicago: University of Chicago Press.
- Rutnin, S. 1979. A Pottery Sequence from Non Chai, Northeast Thailand. MA dissertation, Department of Anthropology, University of Otago, Dunedin.
- Schaffler, W. n.d. Rim Sherds. In Ban Chiang Project, Artifact Coding Instructions. Unpublished mss on file, Ban Chiang Project, University of Pennsylvania Museum, Philadelphia.
- Shepard, A.O. 1956. *Ceramics for the Archaeologist*. Washington, DC: Carnegie Institute of Washington.
- Tosuphan, R. 1986. Typological Study of Pottery from Square D5 of the 1975 Excavation at Ban Chiang, Nong Han, Udon Thani. BA dissertation, Department of Archaeology, Silpakorn University, Bangkok.
- Vincent, B.A. 1988. *Prehistoric Ceramics of Northeastern Thailand, With Special Reference to Ban Na Di*. Oxford: BAR International Series 461.
- Webster's Unabridged. 1996. *Webster's Third New International Dictionary, Unabridged*. Springfield, MA: Merriam-Webster. ProQuest Information and Learning Company. University of Pennsylvania Library, December 13, 2002, <http://www.infolearning.com/>.
- White, J.C., W.W. Vernon, S.J. Fleming, W.D. Glanzman, R.G.V. Hancock and A. Pelcin. 1991. Preliminary cultural implications from initial studies of the ceramic technology at Ban Chiang. *BIPPA* 11:188-203.
- Wichakana, M. 1984. The rims from Ban Na Di and related sites. In C.F.W. Higham and A. Kijngam (eds), *Prehistoric Investigations in Northeastern Thailand, Part I*, pp. 223-90. Oxford: BAR International Series 231(i).
- Wilén, R.N. 1989. *Excavations at Non Pa Kluay, Northeast Thailand*. Oxford: BAR International Series 517.

