APPENDIX B. TRADEWARES DESCRIPTION AND DATING

B.1 Introduction

The revision of greater Gowa's history advanced in this thesis relies heavily on SSPHAP's method of drawing very precise chronological implications from the high-fired ceramics identified at site exposures (Chapters 6 to 12). This appendix will explain the procedures by which the identifications were made, describe the tradeware classes, and apply seriation theory to illustrate their relative chronology. Conversion of the relative chronology into an absolute chronology depends primarily on a review of the literature on tradewares, although the available radiocarbon dates (Tables 13-4 and 13-5) support the scheme. Finally, the great majority of the collected specimens have been deposited with Suaka's museum in Ujung Pandang, so SSPHAP's identifications are amenable to investigation by other ceramic experts.[1]

During SSPHAP's fieldwork a grand total of 42,980 tradeware pieces were identified and provenanced by site and zone - 5351 during the Soppeng survey (Kallupa et al., 1989) and 37,629 during the Gowa survey. These pieces are generally represented by single sherds although a small proportion are represented by two or more matching sherds, and a still smaller proportion are complete vessels. 40,156 or 93.4% were given identifications in the field and of these, 3905 or 9.1% were collected for follow-up study in the laboratory. 6.6% of the grand total were either collected but not identified at the sites or already present within Suaka's museum collections.[2] In all, identifications made under laboratory conditions are available for 6754 pieces, 15.7% of the grand

[1] I brought back a small proportion to Canberra for further examination. 87 of these were later sent to the Research Centre for Southeast Asian Ceramics in Adelaide for physical and chemical analysis. The remainder will be returned to Suaka, along with a hard copy of the computer files listing the collected tradewares, after completion of this thesis.
[2] The vast majority of this 6.6% was collected either at the very outset of the survey, whilst I was still formulating an appropriate survey strategy, or during SSPHAP's last two completed surveys at Benteng Tallok and along the Paknakkukang-Barombong coastal wall.

total (Table B-41). Identifications made in the field are used for the remainder.

B.2 Background to SSPHAP's Classificatory System

The tradewares which commonly occur in Indonesian archaeological contexts consist of high-fired ceramics produced in China, Japan, mainland Southeast Asia and Europe. Classifying the tradewares by country of origin and period assumes, as it were, all the manufacturing sites have been located, their products securely dated, and appropriate classes erected on the basis of defining visual or chemical characteristics. But the advances which have been made along these lines (e.g. Palmgren et al., 1963; Guy, 1989) prefigure more than bridge the vast lacunae in the ideal database. Moreover the ideal database, were it attainable, would not necessarily advance far beyond the skills of practising ceramic experts in terms of accurate and precise tradeware identifications. There is not and may never be a scientifically rigorous, "correct" classificatory system; systems must be assessed on softer critera such as utility and appropriateness.

The systematic scholarly study of Oriental ceramics has had a long history (e.g. Hobson, 1915) in which to build a general framework on unshakeable foundations. Nonetheless the mainstream literature betrays its antiquarian bias through an emphasis on highest quality wares and a penchant for "understanding" culture by its finest artefacts. The minority interest in commonplace wares, sherdage collections and general trade patterns can be largely attributed to the scholars who, in the middle decades of this century, pioneered the study of high-fired ceramics found in Southeast Asia. Important as this step was, it did tend to involve a merely partial understanding of the international ceramics literature which was itself of only oblique relevance.[3] On top of that, different systems took root under the various

[3] For instance, as noted by Fox (1979:186-187), the most impressive Chinese celadons found in island Southeast Asia have usually been ascribed automatically to the Song dynasty, whereas the majority are Yuan or even early Ming.

colonial administrations and have projected their shadow into the corresponding national archaeological bodies following independence.[4] In Indonesia's case the standards were set by de Flines who classified primarily by Chinese dynasty or non-Chinese place of manufacture. Regrettably most Indonesian archaeological reports dispense with the supplementary information which de Flines used to give on the type of ware involved - information of great relevance in documenting the likely reliability of the identifications.[5]

Although South Sulawesi is one of the world's great ceramics troves, a permanent archaeological presence was established only in 1973, well after most of the richest sites had been plundered. Two of the functions of Suaka Peninggalan Sejarah dan Purbakala Sulawesi Selatan (Suaka) have been the documentation of privately held collections and the inspection of antiques registered for legal export, including the right to request donations and the power to appropriate antiques under certain circumstances (Hadimuljono and Macknight, 1983). The two officers mainly responsible for this work, Hadimuljono and Karaeng Demmanari, studied tradewares under the tutelage of co-operative antique dealers (Demmanari, pers. comm.). While dealers have undoubtedly played a major part in shaping the systems used elsewhere in Southeast Asia, their influence in South Sulawesi appears to have been particularly pronounced.

The foregoing explains much about the system in use in South Sulawesi, when I began fieldwork there, as already applied to 14,611 tradewares recorded by Suaka up to 1977 (Hadimuljono and Macknight, 1983). On the one hand it followed the standard Indonesian practice of classifying by Chinese dynasty or non-Chinese place of manufacture. On the other hand the influence of antique dealers is apparent in the preponderance of "Song" wares[6] and the construction of

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[4] For example, the quite sophisticated systems developed in Sarawak for certain groups of wares (Zainie and Harrisson, 1967; Moore, 1968, 1970) have not been applied beyond Malaysia and Brunei.

[5] Not surprisingly, one of the tasks which the SEAMO Project in Archaeology and Fine Arts (SPAFA) has set itself is to standardise the classification and reporting of high-fired ceramics.

[6] More than ten times the number of wares classified as Yuan.

three idiosyncratic categories. One of these, "Korean", had already been reinterpreted as Vietnamese before I arrived, while the "Siam" category was soon recast as Qing-period monochromes during fieldwork (B.3.7). The well represented "Swatow" category merited deliberation because it signalled a welcome relief from the usual tyranny of the imperial dynasties in the classification of Chinese tradewares. What was unusual in South Sulawesi was the relegation of nondescript monochromes to the "Swatow" class, and the recognition of "Ming Swatow" and "Qing Swatow" as related classes.[7] Of course local ceramic experts also entertained a complex subsidiary nomenclature, e.g. Wanli, Qianlong, even *Qing dapur* (Kitchen Qing) by the time I left; there is after all a lot of interest in ceramics in South Sulawesi.

Nonetheless the system which SSPHAP took to the field was essentially an elaboration on that published in Hadimuljono and Macknight (1983). I was fortunate to have Karaeng Demmanari as a linchpin in SSPHAP's survey team and the bulk of the tradeware identification naturally fell on his shoulders. That meant Demmanari's standards had to be understood by the other team members, myself especially.

I tackled this issue as part of my broader campaign to compile a statistically useful database on the characters shown by sherds from high-fired ceramics. Despite the voluminous literature on Oriental ceramics and the various attempts to pigeonhole the salient characters of particular classes, precise quantified data are virtually non-existent. Where one might want to know the Munsell colours of the bodies of Vietnamese wares, for instance, one reads that 'The body is ... pale beige or grey-white' (Guy, 1986:105) or of a '... hard gray, beige or cream ... [or] putty coloured, pale beige, or gray paste' (Frasché, 1976:97). Even Harrisson's quite unique attempt to compile a system for martavans based on the sherds' characteristics employs descriptive terms which are impressionistic and so not always repeatable by other observers (Harrisson, 1986:35-43).

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[7] These last classes are not cited in Hadimuljono and Macknight (1983) and may have been derived since 1979, either from the "Swatow" or from the "Ming" and "Qing" classes.

Hence I used my "rest days" during fieldwork to build up the missing arsenal of observations from approximately 2000 specimens selected from the collections. A section of the wall was broken off at a point which did not carry decorations or other diagnostic features. This fresh cross-section and the interior and exterior surfaces of the sherd were examined macroscopically and with a 30X hand lens.[8] The sherd was described in terms of its weight, thickness of vessel parts, translucency, slipping, type of wall fracture, decorations (including the shadows of now lost overglaze enamels), wheel lines and spur marks or other evidence of manufacture, well-known diagnostic characters such as chocolate bases or dirty feet, and rim diameter or foot diameter using a plastic diameter template. Cross-sections and faces were drawn where these assisted the documentation, and many of the sherds were photographed. Munsell colour values were recorded of the body, not only at the fresh cross-section but also on the weathered walls and on any unglazed surfaces. Glaze and decoration colours were also recorded by the closest Munsell value, or by the closest colour on the *Pottery Colour Chart*[9] in cases of the richer celadon glazes and the more earthy decoration colours. As regards the better oxidised cobalt decorations, however, I described them using the sorts of impressionistic classes found in the ceramics literature ("silvery blue", "Mohammedan blue" etc.), since at the time I had neither a complete colour chart nor knowledge of the ISCC-NBS names for blues (see Agoston, 1987). I also examined the fresh cross-section microscopically to describe body texture, percentage of the body made up by inclusions, form and colour of the inclusions, body porosity, thickness of the glaze and number of glaze applications. Body hardness was determined by an adapted Moh's scale scratch test on the fresh cross-section, while glaze bubbles, crackling and irregularities were determined by macroscopic and microscopic inspection of the

[8] The 30X level of magnification was recommended by Dick Richards, Curator of Antiques at Adelaide Museum.
[9] Published by The Study Group for Romano-British Pottery, n.d. I thank Peter Bellwood who loaned me his copy of what proved to be a valuable supplementary standard.

glazed surfaces. Using the above observations I also typed the glaze according to transparency, reflectance and colour saturation, and classified the body into broad fabrication types. Comparisons were then made with specimens and descriptions published in the literature.

Originally I had hoped to codify the observations into a format whereby distances could be calculated between the sherds for the purposes of clustering them into a mathematically based typology. However, my early forays soon brought out methodological problems[10] which could have been surmounted only by engulfing the time available for preparing the thesis. Still the time spent scrutinising my notebooks allowed me to standardise the identifications I had made during the period of observation and to pick out the sets of observations which appeared both reliable and useful (B.3). In particular it increased my general confidence in the main body of SSPHAP's identifications in a laboratory setting, carried out in Ujung Pandang after I had already spent a lot of time documenting sherds in detail.

Between June and August of 1987 Karaeng Demmanari and myself classified all the collected tradeware sherds which I had not yet studied in detail. We exposed a fresh cross-section of the wall and examined the section and the faces both macroscopically and with a 30X hand lens. We discussed possibilities, referring to the literature at hand and SSPHAP's other tradeware specimens, until we agreed on the most likely identification. Karaeng Demmanari had had enormous experience in classifying tradewares previously and rapidly absorbed the new information available from a microscopic perspective. We tried to make our laboratory identifications as discrete as possible, e.g. a plain white sherd similar in body and glaze to specimens which we had identified as Kangxi blue-and-white would accordingly be identified as "Kangxi white". The main methodological

[10] e.g., variability in my criteria as my observations became more sophisticated during the process, variability related to different parts (e.g. bases and rims) of the same vessel, variability as it related to different vessels (e.g. tempayan and cups) within the same type of ware, and difficulties in using very different types of data to arrive at a single measure of distance.

justification for driving the identifications to their most discrete level possible is that classes can be pooled if so desired, but a class treated as undifferentiated can never be split up. Since returning to Australia I have reclassified a small proportion of these specimens as prompted by recently available information and allowed by my documentation of the specimens in question. Nonetheless the core of the identifications made under laboratory conditions, by which the reliability of the identifications made in the field can be tested, resides in the work co-executed by Demmanari and myself in Ujung Pandang.

B.3 Description of SSPHAP's Tradeware Classes

B.3.1 Introductory points

The data compiled and analysed in this appendix have been entered into three Reflex PC files (Borland/Analytica, 1987). Hard copies will be deposited with Suaka after completion of this thesis, and either PC disc or hard copies are available from me on request. The specimens are identified by site, zone, and specimen number within the zone (5.5.3).[11] The files also give those identification made in the field on the specimens. This section reports the descriptive data made under laboratory conditions.

In the laboratory work Demmanari and I strove after a chronology of far finer grain than would be possible in any system to be applied in the field. Obviously, to bring all of SSPHAP's identifications together, the main headings must be those which were applied in the field, or at the very least to be found among the tradeware classes regularly collected during fieldwork (B.5.1). 31 main classes can be recognised, most of them represented by photographed specimens in the main text (Chapters 6 to 11). This section describes these main classes, not only in terms of their overall characters

[11] A slight exception involves the complete collections made at Benteng Tallok, Paknakkukang and Barombong, where the specimens which received the same identification in the same zone were simply gathered together into the same sample bag and not individually numbered.

but also as constituted by the finer categories recognised during laboratory work.[12]

One set of descriptions comprises the identifications of tradeware category, vessel form and distinguishing characters made by Demmanari and me. The second set is the discrete observations (excluding those I had already winnowed out as unreliable or unmanageable before compiling the database) which I made on a selection of the pieces. In the tables which follow, traits are usually presented as percentage frequencies for the finer categories, but as raw frequencies (in brackets) and as percentage frequencies for the 31 main classes.

Particular conventions adopted in the tables should be spelled out as a prelude to the descriptions. (i) As the observed colours frequently fell between the Munsell (1975) shades, especially as regards the white to light grey spectrum in which fine determinations can be mandatory, I frequently recorded the colours as whiter than (<) or darker than (>) the closest Munsell reading. (ii) Glaze colours usually fell within or near the range of Munsell's (1975) "Colour Chart for Gley". The notations can usually be identified in my tables by the letters G (greenish) and B (bluish). There is however a potential source of confusion in that notations at the yellow end of the scale occur also in the "Soil Colour Charts" where they describe a different colour. To sidestep any confusion, I will use "y" when gley colours are involved and "Y" when soil colours are involved. (iii) Glaze colours spelled out fully are from the *Pottery Colour Chart*. (iv) Glaze thickness are ranked as "1" for vestigial glazes; "2" for glazes applied as a thin even sliver; "3" for glazes clearly visible as a macroscopic band in cross-section; "4" when the glaze becomes thick in places, e.g. at an inflexion; "5" for moderately thick glazes; and "6" for very thick glazes. (v) Body hardness follows the Moh scale up to "6". However, "7" signifies harder than iron but

[12] A fine-grained description is desirable for a number of reasons, e.g. as part of the description of the main classes, as an aid to their dating, and because SSPHAP's standardised chronological histograms which use the fine classes (B.4) take whichever is the finest chronological determination which can be sustained.

softer than quartz, "8" signifies quartz hardness, and "9" signifies harder than quartz. (vi) Translucency was determined by shining a small torch with a concentrated light through the sherd's wall. "Y" means clearly translucent, "F" means faintly translucent, and "N" means opaque. (vii) Body type is categorised into five main ideal types. "China porcelains" (CP) are white, hard, free of inclusions and translucent. "Semi-porcelains" (SP) approach china porcelains, but appear sugary with glassy splinters when viewed at 30X. "Stonewares" (SW) are hard and opaque, but otherwise variable. "Proto-porcelains" (PP) are a type of homogeneous stoneware which appears chalky at 30X. "Earthenwares" (EW) are soft (hardness less than 7), porous, opaque, and usually rich in inclusions.

B.3.2 Early whitewares (Chinese)

119 early whitewares were recognised in the laboratory, and as a group compare well with the A.1 and A.2 categories of Zainie and Harrisson (1967).[13] "*Qingbai*" is the best known category (e.g. Addis, 1968c) and the one which dominates SSPHAP's early whitewares (Table B-1). One example included here apparently combined a spot of iron decoration beneath the *qingbai* glaze (cf. Wiesner, n.d.). The other well represented category comprises early tradewares from Dehua (Locsin, 1968b). A residue of similar pieces could not be assigned to these categories but could be comfortably placed among Lam's (1985) Guangdong whitewares.

My criteria for identifying early whitewares came from detailed study of the whitewares in the few assemblages free of the usually dominant strains of blue-and-white wares. As these whitewares could be confidently dated pre-Ming, the range of characters they showed could be used to identify early whitewares mixed among predominantly blue-and-white assemblages. However, the logic broke down with one particular category of early whitewares. The "Shufu" early whitewares are distinguished from their *Qingbai* counterparts

[13] I am grateful to Peter Bellwood for lending me his photographs of key examples, on display in the Sarawak Museum, of the categories of Zainie and Harrisson.

by a thicker and more opaque glaze (Addis, 1968b; Medley, 1974:16; Guy, 1986:73), but so are Ming whitewares (Dick Richards, pers. comm.; cf. Medley, 1974:20). Hence I have come to shift the burden of proof with these specimens and reclassify as Ming all but eight of the pieces I had first identified as "Shufu"; bowls with an unglazed stacking ring in the centre (Bulbeck, in press: Figure 2-d) are a good example.

TABLE B-1. COMPOSITION OF SSPHAP'S EARLY WHITEWARES

	Qingbai	Dehua	Guangdong	Shufu	Total
Bowls	34	5	2	5	46
Small bowls	7	0	0	0	7
Cups	2	0	0	0	2
Plates	13	1	1	3	18
"Open"	3	0	1	0	4
Boxes	8	25	0	0	33
Kendis	2	0	1	0	3
Vases	4	0	0	0	4
Jars	2	0	0	0	2
Total	75	31	5	8	119

B.3.3 Early monochromes (Chinese)

At the finer end of its range SSPHAP's category of early monochromes overlaps with early whitewares. To sort out the (literally) grey area, the pale-glazed pieces which did not conform to a recognised whiteware category were generally consigned to the monochromes. At the coarser end SSPHAP's early monochromes overlap with the older "coarse stonewares" (B.3.5). Here, borderline cases were placed among the early monochromes via a combination of finer body, less earthy glazes and smaller, open vessel form - e.g. the bowls but not the jars of Adhyatman's (1983) "early olivegreen wares", and the smaller and more olive-glazed examples of Grau-Abaya's "brownwares" (see also Sorsby Ltd, 1974:44). In all 291 early monochromes were identified in the laboratory, roughly corresponding as a group to the B.1, C.1 and C.2 categories of Zainie and Harrisson (1967).

Demmanari and I usually classified the glaze colours as "celadon" or *abu-abu* (grey). The word "celadon" has come into abuse for its apparent etymological impropriety (Willetts,

TABLE B-2. EARLY WHITEWARE GLAZE CHARACTERS (PERCENTAGES)

	Exterior Glaze						Interior Glaze					
Colour	*Qingbai*	Dehua	Guangdong	Shufu	Total		*Qingbai*	Dehua	Guangdong	Shufu	Total	
N8/-	1.8	0	0	0	1.2	(1)	1.9	15.4	0	0	4.1	(3)
> N8/-	0	5.3	0	0	1.2	(1)	0	0	0	0	0	
Green/Brown A5	0	5.3	0	0	1.2	(1)	0	7.7	0	0	1.4	(1)
Green/Brown A6	3.6	0	0	60.0	6.0	(5)	1.9	0	0	60.0	5.5	(4)
Green/Brown A7	5.5	0	0	0	3.6	(3)	7.7	0	0	0	5.5	(4)
< 5B 7/1	7.3	0	0	0	4.8	(4)	5.8	0	0	0	4.1	(3)
5BG 6/1	1.8	0	0	0	1.2	(1)	0	0	0	0	0	
5BG 7/1	5.5	0	0	0	3.6	(3)	3.8	0	0	0	2.7	(2)
< 5BG 7/1	10.9	0	0	0	7.1	(6)	13.5	0	0	0	9.6	(7)
5G 7/1	16.4	10.5	20.0	0	14.3	(12)	13.5	0	0	0	9.6	(7)
< 5G 7/1	9.1	0	0	0	6.0	(5)	11.5	0	0	0	8.2	(6)
5Gy 7/1	12.7	5.3	0	40.0	11.9	(10)	7.7	0	0	40.0	8.2	(6)
< 5Gy 7/1	5.5	5.3	0	0	4.8	(4)	7.7	0	0	0	5.5	(4)
5y 6/1	1.8	0	0	0	1.2	(1)	0	0	0	0	0	
5y 7/1	5.5	5.3	20.0	0	6.0	(5)	7.7	0	33.3	0	6.8	(5)
5Y 8/1	1.8	5.3	0	0	2.4	(2)	1.9	15.4	0	0	4.1	(3)
<5Y 7/1	0	5.3	0	0	1.2	(1)	1.9	0	0	0	1.4	(1)
5Y 7/1	0	10.5	0	0	2.4	(2)	0	7.7	0	0	1.4	(1)
5Y 7/2	1.8	5.3	0	0	2.4	(2)	1.9	0	0	0	1.4	(1)
5Y 7/3	0	5.3	0	0	1.2	(1)	0	0	0	0	0	
5Y 6/2	0	0	0	0	0		0	7.7	0	0	1.4	(1)
5Y 6/3	0	5.3	0	0	1.2	(1)	0	7.7	0	0	1.4	(1)
10YR 8/1	0	5.3	0	0	1.2	(1)	0	7.7	33.3	0	2.7	(2)
10YR 8/2	0	5.3	0	0	1.2	(1)	0	7.7	0	0	1.4	(1)
10YR 7/2	1.8	0	0	0	1.2	(1)	1.9	0	0	0	1.4	(1)
7.5YR 8/2	0	5.3	0	0	1.2	(1)	0	7.7	0	0	1.4	(1)
5YR 8/1	1.8	10.5	20.0	0	4.8	(4)	1.9	15.4	33.3	0	5.5	(4)
5YR 8/2	0	0	40.0	0	2.4	(2)	0	0	0	0	0	
YR5 7/1	3.6	0	0	0	2.4	(2)	5.8	0	0	0	4.1	(3)
YR5 7/2	1.8	0	0	0	1.2	(1)	1.9	0	0	0	1.4	(1)
Total	(55)	(19)	(5)	(5)	(84)		(52)	(13)	(3)	(5)	(73)	
Glaze Thickness												
1	5.4	10.5	0	0	5.9	(5)	1.9	0	0	0	1.4	(1)
2	53.6	47.4	40.0	40.0	50.6	(43)	57.7	57.1	33.3	40.0	55.4	(41)
3	35.7	31.6	60.0	60.0	37.6	(32)	40.4	42.9	66.7	60.0	43.2	(32)
4	5.4	10.5	0	0	5.9	(5)	0	0	0	0	0	
Total	(56)	(19)	(5)	(5)	(85)		(52)	(14)	(3)	(5)	(74)	

Glaze Number: one Shufu piece showed two glaze layers interiorly and exteriorly (20%); otherwise single glaze layers only.

TABLE B-3. EARLY WHITEWARE BODY CHARACTERS (PERCENTAGES)

Colour at Fresh Cross-section

	Qingbai	Dehua	Guangdong	Shufu	Total
N8/-	17.9	36.8	0	20.0	21.2 (18)
> N8/-	21.4	5.3	0	0	15.3 (13)
< N7/-	8.9	5.3	20.0	20.0	0.4 (8)
N7/-	5.4	0	0	40.0	5.9 (5)
5YR 8/1	16.1	0	40.0	0	12.9 (11)
> 5YR8/1	17.9	0	20.0	0	2.4 (2)
< 5YR7/1	1.8	0	0	0	1.2 (1)
5YR 7/1	12.5	15.8	20.0	20.0	14.1 (12)
5YR 8/2	5.4	0	0	0	3.5 (3)
5YR 7/2	1.8	0	0	0	1.2 (1)
5YR 7/3	0	5.3	0	0	1.2 (1)
7.5YR8/2	0	10.5	0	0	2.4 (2)
7.5YR7/2	1.8	0	0	0	1.2 (1)
7.5YR 6/2	1.8	0	0	0	1.2 (1)
10YR 8/1	1.8	5.3	0	0	2.4 (2)
10YR 7/1	0	5.3	0	0	1.2 (1)
10YR 7/2	1.8	0	0	0	1.2 (1)
2.5YR8/2	0	5.3	0	0	1.2 (1)
5Y 8/1	0	5.3	0	0	1.2 (1)
Total	(56)	(19)	(5)	(5)	(85)

Translucency

	Qingbai	Dehua	Guangdong	Shufu	Total
Y	19.6	38.9	0	20.0	22.6 (19)
F	8.9	0	0	20.0	7.1 (6)
N	71.4	61.1	100.0	60.0	70.2 (59)
	(56)	(18)	(5)	(5)	(84)

Hardness

6	0	0	20.0	0	1.2 (1)
7	42.9	36.8	60.0	0	40.0 (34)
8	33.9	26.3	0	60.0	31.8 (27)
9	23.2	36.8	20.0	40.0	27.1 (23)
	(56)	(19)	(5)	(5)	(85)

% of Body Inclusions

1	37.5	52.6	40.0	40.0	41.1 (35)
3	41.1	26.3	20.0	60.0	37.6 (32)
5	12.5	10.5	40.0	0	12.9 (11)
10	5.4	5.3	0	0	4.7 (4)
20	1.8	0	0	0	1.2 (1)
30	0	5.3	0	0	1.2 (1)
40	1.8	0	0	0	1.2 (1)
	(56)	(19)	(5)	(5)	(85)

Body Type

CP	5.4	26.3	0	20.0	10.6 (9)
Almost CP	10.7	5.3	0	20.0	9.4 (8)
SP	46.4	10.5	40.0	20.0	36.5 (31)
PP	7.1	31.6	20.0	0	12.9 (11)
SW	30.3	26.3	40.0	40.0	30.6 (26)
Total	(56)	(19)	(5)	(5)	(85)

Slipping

	Qingbai (56)	Dehua (19)	Guangdong (5)	Shufu (5)	Total (85)
Unslipped	73.2	73.7	20.0	100.0	71.8 (61)
Slipped only on exterior face	1.8	0	40.0	0	3.5 (3)
Slipped only on interior face	7.1	5.3	40.0	0	8.2 (7)
Slipped on both faces	17.9	21.1	0	0	16.5 (14)

Basal Glazing Characters

	Qingbai (12)	Dehua (1)	Guangdong (1)	Shufu (1)	Total (15)
Glazed base and foot	16.7	0	0	0	13.3 (2)
Glaze-splashed base	8.3	100.0	0	0	13.3 (2)
Unglazed base and foot	41.7	0	100.0	100.0	46.7 (7)
Glaze does not reach non-extant foot	33.3	0	0	0	26.7 (4)

1979) and "greenwares" is often the preferred term now (e.g. Guy, 1986). However, "celadon" is widely understood to indicate only thicker, richer glazes which are furthermore generally browner than the specifically excluded green lead glazes. In my opinion, etymological niceties do not provide adequate grounds to jettison a useful term for a misleading one, and hence I retain the original term. *Abu-abu* can then be translated as "subceladons", excluding a few examples which can be better typed as olivegreenwares (cf. Adhyatman, 1983) and olivewares (Table B-4).

In the laboratory a distinction was made between apparent Song examples (41) and c. Yuan examples (250), but the pieces are hard enough to identify as "early" without needing to say how early (Footnote 3). In particular, the production of similar sorts of monochromes clearly continued into the Ming dynasty (e.g. Palmgren et al., 1963). To identify the pre-Ming examples, I relied on the range of variability shown among the specimens in clearly pre-Ming assemblages, and classified as "early" any others which could not be clearly distinguished. Hence SSPHAP's "early monochromes" in part constitute a default classification which accordingly is somewhat broader than if the burden of proof had been placed on making a positive identification.[14]

TABLE B-4. COMPOSITION OF SSPHAP'S EARLY MONOCHROMES

	Celadons	Sub-celadons	Olive-wares	Olivegreen wares	Total
Plates	113	17	5	0	135
Conical forms	10	7	5	0	22
Bowls	60	24	10	2	96
Shallow bowls	4	0	0	0	4
Small bowls	4	3	0	0	7
"Open"	3	0	1	0	4
Boxes	3	0	0	0	3
Jarlets	5	1	0	0	6
Vases	2	0	0	0	2
Jars/*Tempayan*	9	1	2	0	12
Total	213	53	23	2	291

[14] Note that the class "early monochromes", as understood here, is narrower than I have used it elsewhere (Bulbeck, in press) where it included early whitewares, earlier examples of Vietnamese monochromes, and "Yuan-like Ming celadons" (B.3.8).

TABLE B-5. EARLY MONOCHROME GLAZE CHARACTERS (PERCENTAGES)

Colour	Exterior Glaze					Interior Glaze				
	Celadon	Sub-celadon	Olive	Olive-green	Total	Celadon	Sub-celadon	Olive	Olive-green	Total
Green/Brown A1	0	0	0	0	0	0.9	0	0	0	0.6 (1)
Green/Brown A2	3.7	0	0	0	2.5 (4)	3.5	0	0	0	2.3 (4)
Green/Brown A3	4.6	0	0	100.0	3.7 (6)	3.5	0	0	0	2.3 (4)
Green/Brown A4	31.2	2.9	0	0	21.7 (35)	31.3	5.4	0	0	22.2 (38)
Green/Brown A5	10.1	2.9	0	0	7.5 (12)	11.3	2.7	0	0	8.2 (14)
Green/Brown A6	0.9	0	0	0	0.6 (1)	0.9	0	0	0	0.6 (1)
Green/Brown A7	0.9	0	0	0	0.6 (1)	0.9	0	0	0	0.6 (1)
Brown/Green A5	0.9	0	0	0	0.6 (1)	0	0	0	0	0
Blue/Green A3	0.9	0	0	0	0.6 (1)	1.7	0	0	0	1.2 (2)
Blue/Green A4	0.9	0	0	0	0.6 (1)	0.9	0	0	0	0.6 (1)
Blue/Green A5	0.9	0	0	0	0.6 (1)	0	0	0	0	0
Blue/Green A6	4.6	0	0	0	3.1 (5)	5.2	0	0	0	3.5 (6)
5BG 6/1	0.9	0	0	0	0.6 (1)	0	0	0	0	0
5G 4/2	0.9	0	0	0	0.6 (1)	0.9	0	0	0	0.6 (1)
5G 4/1	0.9	0	0	0	0.6 (1)	0	0	0	0	0
5G 5/1	0	0	0	0	0	0.9	0	0	0	0.6 (1)
5G 6/2	3.7	0	0	0	2.5 (4)	3.5	0	0	0	2.3 (4)
5G 6/1	3.7	2.9	0	0	3.1 (5)	3.5	2.7	0	0	2.9 (5)
5G 7/1	3.7	0	0	0	2.5 (4)	4.3	2.7	0	0	3.5 (6)
5Gy 4/1	0.9	0	0	0	0.6 (1)	0	0	0	0	0
5Gy 5/1	3.7	2.9	0	0	3.1 (5)	2.6	2.7	0	0	2.3 (4)
5Gy 6/1	13.8	8.6	0	0	11.2 (18)	14.8	8.1	0	0	11.7 (20)
5Gy 7/1	5.5	0	6.3	0	4.3 (7)	7.0	0	0	0	4.7 (8)
5y 4/1	0	5.7	0	0	1.2 (2)	0	5.4	0	0	1.2 (2)
5y 5/1	0.9	14.3	0	0	3.7 (6)	0.9	13.5	0	0	3.5 (6)
5y 6/1	0	8.6	0	0	1.9 (3)	0	8.1	0	0	1.8 (3)
5y 7/1	0.9	2.9	0	0	1.2 (2)	0	2.7	0	0	0.6 (1)
5Y 4/4	0	0	6.3	0	0.6 (1)	0	0	5.6	0	0.6 (1)
5Y 4/3	0	0	0	0	0	0	0	5.6	0	0.6 (1)
5Y 5/4	0	0	6.3	0	0.6 (1)	0	0	11.1	0	1.2 (2)
5Y 5/3	0	0	12.5	0	1.2 (2)	0.9	0	16.7	100.0	2.9 (5)
5Y 5/2	0	0	0	0	0	0	0	11.1	0	1.2 (2)
5Y 6/4	0	0	6.3	0	0.6 (1)	0	0	5.6	0	0.6 (1)
5Y 6/3	0	0	0	0	0	0	2.7	5.6	0	1.2 (2)
5Y 6/2	0	0	31.3	0	3.1 (5)	0	0	16.7	0	1.8 (3)
5Y 7/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5Y 7/1	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5Y 8/3	0	0	0	0	0	0	2.7	0	0	0.6 (1)
2.5Y 4/3	0	0	6.3	0	0.6 (1)	0	0	0	0	0
2.5Y 5/4	0	0	6.3	0	0.6 (1)	0	0	0	0	0
2.5Y 6/2	0	2.9	6.3	0	1.2 (2)	0	2.7	5.6	0	1.2 (2)
2.5Y 7/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
2.5Y 8/2	0	0	0	0	0	0.9	0	0	0	0.6 (1)

TABLE B-5. EARLY MONOCHROME GLAZE CHARACTERS (CONT.)

Colour	Celadon	Sub-celadon	Olive	Olive-green	Total	Celadon	Sub-celadon	Olive	Olive-green	Total
10YR 5/4	0	0	6.3	0	0.6 (1)	0	2.7	0	0	0.6 (1)
10YR 5/3	0	0	0	0	0	0	2.7	0	0	0.6 (1)
10YR 6/3	0	5.7	0	0	1.2 (2)	0	2.7	0	0	0.6 (1)
10YR 6/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
10YR 7/4	0	5.7	0	0	1.2 (2)	0	5.4	0	0	1.2 (2)
10YR 7/3	0	0	0	0	0	0	2.7	0	0	0.6 (1)
10YR 7/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
10YR 8/3	0	2.9	0	0	0.6 (1)	0	0	0	0	0
7.5YR 7/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5YR 3/4	0.9	0	0	0	0.6 (1)	0	0	0	0	0
5YR 5/6	0.9	0	0	0	0.6 (1)	0	0	0	0	0
5YR 5/4	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5YR 5/3	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5YR 6/2	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
5YR 7/1	0	2.9	0	0	0.6 (1)	0	2.7	0	0	0.6 (1)
Total	(109)	(35)	(16)	(1)	(161)	(115)	(37)	(18)	(1)	(171)
Glaze Thickness										
1	2.7	23.5	0	0	4.3 (7)	0.9	2.7	0	0	1.2 (2)
2	17.3	34.3	58.8	100.0	25.8 (42)	21.7	40.5	50.0	100.0	29.2 (50)
3	42.7	45.7	41.2	0	42.9 (70)	48.7	48.6	50.0	0	48.5 (83)
4	13.6	2.9	0	0	9.8 (16)	7.8	2.7	0	0	5.8 (10)
5	20.0	5.7	0	0	14.7 (24)	20.9	5.4	0	0	15.2 (26)
6	3.6	0	0	0	2.5 (4)	0	0	0	0	0
Total	(110)	(35)	(17)	(1)	(163)	(115)	(37)	(18)	(1)	(171)
Glaze Number										
1 layer	91.9	97.1	100.0	100.0	93.9 (154)	93.0	97.3	100.0	100.0	94.7(162)
2 layers	7.2	2.9	0	0	5.5 (9)	6.1	2.7	0	0	4.7 (8)
4 layers	0.9	0	0	0	0.6 (1)	0.9	0	0	0	0.6 (1)
Total	(111)	(35)	(17)	(1)	(164)	(115)	(37)	(18)	(1)	(171)

Slipping	Celadon (118)	Subcel. (37)	Olive (18)	Olivegreen (1)	Total (174)
Unslipped	75.4	83.8	66.7	0	75.9 (132)
Slipped only on exterior face	0.8	2.7	0	0	1.1 (2)
Slipped only on interior face	5.1	5.4	11.1	0	5.7 (10)
Slipped on both faces	18.6	8.1	22.2	100.0	17.2 (30)

Basal Glazing Characters	Celadon (29)	Subceladon (8)	Oliveware (2)	Total (39)
Glazed base	27.6	12.5	50.0	25.6 (10)
Glaze-splashed base and foot	6.9	12.5	0	7.7 (3)
Unglazed base, glaze-splashed foot	6.9	0	0	5.1 (2)
Unglazed base, foot not extant	6.9	0	0	5.1 (2)
Unglazed base and foot	27.6	62.5	50.0	35.9 (13)
Glaze does not reach non-extant foot	24.1	12.5	0	20.5 (8)

TABLE B-6. EARLY MONOCHROME BODY CHARACTERS (PERCENTAGES)

Main Colour at Fresh Cross-section

	Celadon	Sub-celadon	Olive	Olive-green	Total
N4/-	2.6	2.6	0	0	2.3 (4)
N5/-	7.8	2.6	5.6	0	6.4 (11)
N6/-	5.2	5.3	5.6	0	5.2 (9)
< N6/-	5.2	5.3	5.6	0	5.2 (9)
N7/-	42.6	26.3	0	100.0	34.9 (60)
< N7/-	3.5	2.6	5.6	0	3.5 (6)
> N8/-	0.9	5.3	0	0	1.7 (3)
N8/-	0.9	0	0	0	0.6 (1)
2.5YR 4/8	1.7	0	0	0	1.2 (2)
2.5YR 6/6	0	0	5.6	0	0.6 (1)
2.5YR 5/4	0.9	0	0	0	0.6 (1)
5YR 3/2	0.9	0	0	0	0.6 (1)
5YR 5/6	0.9	0	0	0	0.6 (1)
5YR 6/4	0.9	2.6	0	0	1.2 (2)
5YR 7/4	0.9	0	0	0	0.6 (1)
5YR 8/4	0	0	5.6	0	0.6 (1)
5YR 7/3	1.7	2.6	5.6	0	2.3 (4)
5YR 8/3	0	2.6	0	0	0.6 (1)
5YR 6/2	0.9	0	5.6	0	1.2 (2)
5YR 7/2	2.6	5.3	0	0	2.9 (5)
5YR 8/2	0.9	5.3	0	0	1.7 (3)
5YR 4/1	0.9	0	0	0	0.6 (1)
5YR 5/1	0.9	0	0	0	0.6 (1)
5YR 6/1	1.7	5.3	5.6	0	2.9 (5)
< 5YR 6/1	0.9	0	0	0	0.6 (1)
5YR 7/1	7.8	2.6	16.7	0	7.6 (13)
< 5YR 7/1	0.9	2.6	0	0	1.2 (2)
5YR 8/1	0.9	2.6	5.6	0	1.7 (3)
7.5YR 7/4	0	0	5.6	0	0.6 (1)
7.5YR 8/4	0.9	0	0	0	0.6 (1)
7.5YR 7/2	0	0	5.6	0	0.6 (1)
7.5YR 8/2	0	2.6	0	0	0.6 (1)
7.5YR 4/1	0.9	0	0	0	0.6 (1)
7.5YR 6/1	1.7	0	0	0	1.2 (2)
7.5YR 7/1	0	0	5.6	0	0.6 (1)
10YR 4/3	0	0	5.6	0	0.6 (1)
10YR 3/1	0.9	0	0	0	0.6 (1)
10YR 8/3	0	2.6	0	0	0.6 (1)
10YR 6/2	0.9	0	0	0	0.6 (1)
10YR 6/1	1.7	0	0	0	1.2 (2)
< 10YR6/1	0	2.6	0	0	0.6 (1)
10YR 7/1	0.9	10.5	5.6	0	3.5 (6)
	(115)	(38)	(18)	(1)	(172)

Translucency

	Celadon	Sub-celadon	Olive	Olive-green	Total
N	100.0	100.0	100.0	100.0	100.0
	(116)	(38)	(18)	(1)	(173)

Hardness

5	4.2	7.9	16.7	0	6.3 (11)
6	0.8	0	11.1	0	1.7 (3)
7	36.4	52.6	38.9	0	40.0 (70)
8	46.6	23.7	27.8	100.0	40.0 (70)
9	11.9	15.8	5.6	0	12.0 (21)
	(118)	(38)	(18)	(1)	(175)

% of Body Inclusions

0	0.8	0	0	0	0.6 (1)
1	30.5	16.2	11.8	0	25.4 (44)
2-3	20.3	29.7	23.5	0	22.5 (39)
5	22.9	29.7	29.4	100.0	25.4 (44)
10	15.3	13.5	23.5	0	15.6 (27)
15	5.9	5.4	0	0	5.2 (7)
20	1.7	5.4	5.9	0	2.9 (5)
25	0.8	0	5.9	0	1.2 (2)
30	0.8	0	0	0	0.6 (1)
40	0.8	0	0	0	0.6 (1)
	(118)	(37)	(17)	(1)	(173)

Body Type

SP	2.5	0	0	0	1.7 (3)
PP	5.1	21.1	16.7	0	9.7 (17)
SW	89.0	73.7	72.2	100.0	83.8 (147)
EW	3.4	5.3	11.1	0	4.6 (8)
	(118)	(38)	(18)	(1)	(175)

N.B. Nine variably coloured bodies were observed: (celadons) core N5/-, walls N4/-; core 5YR 5/2, walls N4/-; core N7/-, walls 5YR 6/4; core 7.5YR 6/2, walls 5YR 4/1; outer wall N5/-, inner wall 2.5YR 5/2; outer wall 2.5YR 4/8, inner wall 5YR 7/1; outer wall 10YR 3/1, inner wall 7.5YR6/2; (subceladon) outer wall N6/-, inner wall 10R 8/3; (oliveware) outer wall 2.5YR 6/6, inner wall 5YR 7/2. A central stacking ring was observed on 2 celadons and 1 subceladon.

B.3.4 Early Chinese polychromes (four classes)

Some early tradeware assemblages in the Philippines contain a distinctive class of usually miniature wares with blue cobalt decorations under a *qingbai* glaze, closely matched by a rarer variant with underglaze decorations in copper red (Addis, 1968d, 1968e; Sorsby Ltd, 1974). I have not found any evidence that these wares reached South Sulawesi in any number. The decorations found on the standard Ming BW wares, which China exported in bulk from the late 15th century onwards (e.g. Joseph, 1979; Carswell, 1985), also characterise the oldest detectable blue-and-white presence among SSPHAP's pieces. However, I date a small proportion to the late 14th and early 15th centuries on the basis of apparently older characters such as unglazed bases, "heaped and piled" cobalt decorations, a *qingbai* glaze, and the occasional archaic motif (cf. Medley, 1974; Macintosh, 1977). Three pieces also appeared to have underglaze copper decorations. These "early BW wares" (Table B-7) do not constitute a well defined class and any particular identification might be in error, although there is little doubt that some BW wares from China would have been reaching South Sulawesi by c.1400.

As with the early BW wares, "early overglaze-decorated wares" were identifed as pieces exhibiting apparently older characters than usually found on their Swatow and Ming counterparts. These older traits include unusual decorations with a Yuan echo to them, richer glazes like those usually found on early monochromes, and slipping beneath the glaze. As might be expected if the pieces' considerable antiquity is correctly inferred, the enamel decorations were rarely preserved. Rather, they were usually represented by shadows which flashed on the glaze surface when the sherd was viewed at different angles. When enamel decorations remained they were most often red but also occasionally black or green. The 17 pieces identified (Tables B-8 and B-9) conform reasonably well with the descriptions given by Medley (1974:107) and Mao (1979) of enamel-decorated wares from the Yuan dynasty.

TABLE B-7. SSPHAP'S SAMPLE OF EARLY BLUE-AND-WHITE WARES

	1. Yuan BW	2. Yuan BW with underglaze red	3. Yuan underglaze red	4. Yuan/early 15th century BW	5. Early 15th century BW	Total
Plates	0	1	1	2	6	10
Bowls	2	0	1	2	5	10
Boxes	0	0	0	1	2	3
Jarlets	0	0	0	0	1	1
Jars	0	0	0	0	1	1
Total	2	1	2	5	15	25

	Exterior Glaze						Interior Glaze					
Colour	1.	2.	3.	4.	5.	Total	1.	2.	3.	4.	5.	Total
5BG 7/1	0	0	0	1	1	2 (10.0%)	0	0	0	1	2	3 (14.3%)
< 5BG 7/1	1	0	0	0	1	2 (10.0%)	1	0	0	0	1	2 (9.5%)
5G 7/1	0	0	1	0	3	4 (20.0%)	0	0	1	0	4	5 (23.8%)
< 5G 7/1	0	0	0	1	2	3 (15.0%)	0	0	0	1	2	3 (14.3%)
5Gy 7/1	0	0	0	0	2	2 (10.0%)	0	0	0	0	2	2 (9.5%)
10YR 8/1	0	0	0	0	2	2 (10.0%)	0	0	0	0	1	1 (4.8%)
7.5YR 8/2	0	0	1	1	0	2 (10.0%)	0	0	1	1	0	2 (9.5%)
10YR 8/3	0	0	0	1	0	1 (5.0%)	0	0	0	1	0	1 (4.8%)
10YR 7/2	0	0	0	1	0	1 (5.0%)	0	0	0	1	0	1 (4.8%)
10YR 7/41	0	1	0	0	0	1 (5.0%)	0	0	0	0	0	0
7.5YR 7/41	0	0	0	0	0	0	0	1	0	0	0	1 (4.8%)
Glaze T.												
2	1	0	1	4	1	7 (35.0%)	1	0	1	4	2	8 (38.1%)
3	0	1	1	1	8	11 (55.0%)	0	1	1	1	8	11 (52.4%)
5	0	0	0	0	2	2 (10.0%)	0	0	0	0	2	2 (9.5%)
Glaze No.												
1	1	1	2	4	11	19 (95.0%)	1	1	2	4	12	20 (95.2%)
2	0	0	0	1	0	1 (5.0%)	0	0	0	1	0	1 (4.8%)
Total	(1)	(1)	(2)	(5)	(11)	(20)	(1)	(1)	(2)	(5)	(12)	(21)

	Main Colour at Fresh Cross-section							Translucency					
N8/-	1	0	1	0	2	4 (25.0%)	Y	0	0	0	0	0	1 (5.3%)
> N8/-	0	0	0	0	1	1 (5.0%)	F	0	0	1	0	0	1 (5.3%)
< N7/-	0	0	0	2	0	2 (10.0%)	N	0	1	1	5	10	17 (89.5%)
N7/-	0	1	0	0	2	3 (15.0%)							
5YR 8/1	0	0	0	0	2	2 (10.0%)		(0)	(1)	(2)	(5)	(10)	(19)
10YR 8/1	0	0	0	1	0	1 (5.0%)							
10YR 8/2	0	0	0	0	1	1 (5.0%)							
< 5YR 7/1	0	0	0	0	1	1 (5.0%)							
5YR 7/1	0	0	1	0	0	2 (10.0%)							
10YR 7/1	0	0	0	0	1	1 (5.0%)							
5YR 7/2	0	0	0	1	0	1 (5.0%)							
5YR 7/4	0	0	0	0	1	1 (5.0%)							
5YR 5/1	0	0	0	1	0	1 (5.0%)							
	(1)	(1)	(2)	(5)	(11)	(20)							

	Hardness							% of Body Inclusions					
							1	1	0	1	0	5	7 (35.0%)
							3	0	0	1	2	5	8 (40.0%)
							5	0	0	0	2	0	2 (10.0%)
							10	0	1	0	0	1	2 (10.0%)
							25	0	0	0	1	0	1 (5.0%)
								(1)	(1)	(2)	(5)	(11)	(20)

	Body Type												
Almost CP	0	0	0	0	1	1 (4.8%)	5	0	0	0	1	0	1 (5.0%)
SP	1	0	1	0	7	9 (42.9%)							
PP	0	0	0	1	1	2 (9.5%)							
SW	0	1	1	4	3	9 (42.9%)							
	(1)	(1)	(2)	(5)	(12)	(21)		(1)	(1)	(2)	(5)	(11)	(20)

Basal Glazing Characters	1. Yuan BW	4. Yuan/early 15th century BW	5. Early 15th century BW	Total (9)
Glazed base and foot	0	1	2	3 (33.3%)
Unglazed base and foot	1	3	2	6 (66.7%)

N.B. Slipping absent. The early 15th century BW 5YR 7/4 on its outer wall was N 7/- on its inner wall.

TABLE B-8. EARLY OVERGLAZE, JIZHOU AND SANCAI: BODIES

	Early Overglaze 13th-14th centuries	Early Overglaze 14th-15th centuries	Early Overglaze Total	Jizhou	Sancai 13th-14th centuries	Sancai 15th century	Sancai "Looked latish"	Sancai Total
Tempayan	0	0	0	7	0	9	0	8
Jars	0	0	0	0	0	1	0	1
Vases	0	0	0	0	0	1	1	2
Jarlets	0	0	0	0	1	0	0	1
Boxes	1	0	1	0	0	1	0	1
Bowls	6	2	8	0	0	1	0	1
Plates	6	2	8	0	0	0	0	0
Not determined	0	0	0	0	1	0	0	2
Total	13	4	17	7	2	13	1	16

Main Colour at Fresh Cross-section

	Early Overglaze 13th-14th centuries	Early Overglaze 14th-15th centuries	Early Overglaze Total	Jizhou	Sancai
> N8/-	1	1	2 (14%)	0	0
< N7/-	1	0	1 (7%)	0	0
N7/-	1	0	1 (7%)	0	0
N6/-	0	1	1 (7%)	0	1 (11%)
N5/-	0	0	0	0	1 (11%)
5YR 8/1	1	0	1 (7%)	0	0
7.5YR 8/1	0	1	1 (7%)	0	0
7.5YR 8/2	0	0	0	2 (50%)	1 (11%)
5YR 8/3	0	0	0	0	1 (11%)
10YR 8/3	1	0	1 (7%)	0	0
5YR 8/4	1	0	1 (7%)	0	0
7.5YR 8/4	0	0	0	0	1 (11%)
5YR 7/1	0	1	1 (7%)	1 (25%)	0
5YR 7/2	0	0	0	1 (25%)	0
5YR 7/3	0	0	0	0	1 (11%)
5YR 7/4	1	0	1 (7%)	0	2 (22%)
10YR 7/1	1	0	1 (7%)	0	0
5YR 6/2	1	0	1 (7%)	0	0
5YR 5/2	0	0	0	0	1 (11%)
2.5YR 5/4	1	0	1 (7%)	0	0
	(10)	(4)	(14)	(4)	(9)

Hardness

	Early Overglaze 13th-14th centuries	Early Overglaze 14th-15th centuries	Early Overglaze Total	Jizhou	Sancai
5	2	0	2 (14%)	1 (25%)	3 (38%)
6	1	0	1 (7%)	2 (50%)	0
7	4	2	6 (43%)	1 (25%)	4 (50%)
8	2	2	4 (29%)	0	1 (13%)
9	1	0	1 (7%)	0	0

% of Body Inclusions

	Early Overglaze 13th-14th centuries	Early Overglaze 14th-15th centuries	Early Overglaze Total	Jizhou	Sancai
1	1	0	1 (7%)	0	0
3	6	3	9 (64%)	2 (50%)	1 (13%)
5	2	1	3 (21%)	0	1 (13%)
15	1	0	1 (7%)	2 (30%)	5 (63%)
30	0	0	0	0	1 (13%)
	(10)	(4)	(14)	(4)	(8)

Body Type

	Early Overglaze 13th-14th centuries	Early Overglaze 14th-15th centuries	Early Overglaze Total	Jizhou	Sancai
SP	1	0	1 (7%)	0	0
PP	1	1	2 (14%)	0	0
SW	6	3	9 (64%)	4	6 (67%)
EW	2	0	2 (14%)	0	3 (33%)
	(10)	(4)	(14)	(4)	(9)

Slipping	Early overglaze 13th-14th c's	Early overglaze 14th-15th c's	Early overglaze Total (14)	Jizhou (4)	Sancai (9)
Unslipped	5	3	8 (57%)	0	4 (44%)
Slipped only on exterior face	0	0	0	1 (25%)	3 (33%)
Slipped only on interior face	2	0	2 (14%)	0	0
Slipped on both faces	3	1	4 (29%)	3 (75%)	2 (22%)

N.B. One of the Sancai specimens, and the early overglaze-decorated specimen, coloured 5YR 7/4 on the outer wall were respectively coloured 2.5YR 6/6 and 5YR 7/1 on the inner wall.

TABLE B-9. EARLY OVERGLAZE, JIZHOU AND SANCAI: GLAZES

	Exterior Glaze					Interior Glaze				
	--- Early Overglaze ---					--- Early Overglaze ---				
Colour	13th-14th centuries	14th-15th centuries	Total	Jizhou	Sancai	13th-14th centuries	14th-15th centuries	Total	Jizhou	Sancai
10YR 8/2	0	0	0	1 (25%)	0	0	0	0	0	1 (17%)
10YR 8/3	0	0	0	1 (25%)	0	0	0	0	0	0
10YR 8/4	0	0	0	1 (25%)	0	0	0	0	0	0
10YR 7/2	1	0	1 (8%)	0	0	1	0	1 (7%)	0	0
10YR 7/3	0	0	0	0	0	1	0	1 (7%)	0	0
5Y 6/3	1	0	1 (8%)	0	0	1	0	1 (7%)	0	0
5Y 5/3	0	0	0	0	1 (6%)	0	0	0	0	0
5YR 6/2	0	0	0	0	1 (6%)	0	0	0	0	0
5YR 6/3	0	0	0	0	1 (6%)	0	0	0	0	0
10YR 7/6	0	0	0	0	1 (6%)	0	0	0	0	0
7.5YR 6/6	0	0	0	0	1 (6%)	0	0	0	0	0
7.5YR 7/8	0	0	0	0	2 (11%)	0	0	0	0	0
5YR 6/8	0	0	0	0	1 (6%)	0	0	0	0	0
5YR 5/6	0	0	0	0	1 (6%)	0	0	0	0	1 (17%)
5YR 3/2	0	0	0	0	0	0	0	0	0	1 (17%)
Yellow/Brown A4	0	0	0	0	1 (6%)	0	0	0	0	1 (17%)
5y 6/1	1	0	1 (8%)	0	0	1	0	1 (7%)	0	0
5Gy 7/1	3	0	3 (23%)	1 (25%)	0	2	0	2 (14%)	1	0
5Gy 6/1	0	2	2 (15%)	0	0	0	1	1 (7%)	0	0
5G 7/1	1	1	2 (15%)	0	0	2	1	3 (21%)	0	0
5G 6/2	0	0	0	0	1 (6%)	0	0	0	0	1 (17%)
5BG 5/1	0	0	0	0	1 (6%)	0	0	0	0	0
Green/Brown A6	1	1	2 (15%)	0	0	1	1	2 (14%)	0	0
Green/Brown A4	0	0	0	0	0	1	0	1 (7%)	0	0
Green/Brown A2	1	0	1 (8%)	0	0	0	0	0	0	0
Brown/Green A7	0	0	0	0	0	1	0	1 (7%)	0	0
Brown/Green A6	0	0	0	0	1 (6%)	0	0	0	0	0
Brown/Green A5	0	0	0	0	1 (6%)	0	0	0	0	1 (17%)
Brown/Green A4	0	0	0	0	2 (11%)	0	0	0	0	0
Green A3	0	0	0	0	1 (6%)	0	0	0	0	0
Total	(9)	(4)	(13)	(4)	(18)	(10)	(4)	(14)	(1)	(6)
Glaze Thickness										
1	0	0	0	1 (25%)	0	0	0	0	0	2 (40%)
2	1	0	1 (8%)	2 (50%)	8 (89%)	1	0	1 (7%)	0	3 (60%)
3	5	3	8 (62%)	1 (25%)	1 (11%)	6	2	8 (57%)	1	0
4	1	0	1 (8%)	0	0	0	0	0	0	0
5	2	1	3 (23%)	0	0	3	2	5 (36%)	0	0
Glaze Number										
1 layer	8	2	10 (77%)	4	9	9	2	11 (79%)	1	5
2 layers	1	2	3 (23%)	0	0	1	2	3 (21%)	0	0
Total	(9)	(4)	(13)	(4)	(9)	(10)	(4)	(14)	(1)	(5)

Basal Glazing Characters	Early overglaze 13th-14th c's	14th-15th c's	Total (3)	Sancai (2)
Glazed base	1	0	1 (33%)	0
Glaze-splashed base	1	0	1 (33%)	0
Unglazed base	1	0	1 (33%)	2 (100%)

N.B. Only the Sancai pieces attributed a 15th century were studied in detail. The number of recorded glaze colours exceeds the number of glazes studied, as the name "three-coloured" wares might suggest.

While some Jizhou pieces may be present in the class just described, the best known Jizhou wares have black underglaze decorations painted in iron oxides. Wirgin (1970:89ff.) and Medley (1974:103 ff.) describe the range of examples collected from China, while examples from archaeological sites in the Philippines ("Chi-chou wares") and Sarawak are described by Locsin (1968a) and Zainie and Harrisson (1967) respectively. These sources show that a reasonable variety of the tremendous range of forms made in China were exported to island Southeast Asia, but only *tempayan* (large jars) were represented among the seven pieces recorded by SSPHAP (Tables B-8 and B-9).[15] The Sukothai wares produced in Thailand often have strongly reminiscent decorations, but close scrutiny of the body allows an unequivocal identification.[16]

The so-called "Sancai" or three-coloured wares included lead in the glaze which allowed the potters to achieve striking colour combinations such as the renowned "eggs and spinach effect". They have been produced in China from the 1st millennium AD (Medley, 1981) through to the Qing dynasty (e.g. Harrisson, 1986), but current opinion holds that the majority exported to island Southeast Asia were Ming period wares (e.g. Guy, 1986:102-103). Correspondingly, the 16 pieces identified by Demmanari and myself were tentatively given a wide chronological distribution with a 15th century mode (Tables B-8 and B-9).

B.3.5 Coarse stonewares

Following advice from Campbell Macknight that sherds from large jars (*tempayan*) would resist accurate dating, I allowed a column specifically for coarse stonewares when I designed SSPHAP's site recording forms. During the fieldwork, more often than not their frequency was simply counted and the sherds replaced, but the specimens which were collected led to an attempted classification of 400 under laboratory

[15] Another example of a piece from a Jizhou iron-decorated *tempayan* is kept at the site museum of the Watanglamuru royal Islamic cemetery, Bone.

[16] Prior to SSPHAP's fieldwork, Jizhou iron-decorated pieces were not recognised in South Sulawesi but rather were included with the Sukothai class.

conditions. The primary references available to Demmanari and me in Ujung Pandang were Adhyatman and Ridho (1984) and Guy (1986), plus the warning by Richards et al. (1984) that large Sawankhalok storage jars had not yet been reported from Southeast Asian export sites. We assumed a Chinese source unless the piece could be clearly identified as something else, or was so perplexing that any suggestion of its origins appeared to be speculative. We also assigned dates which usually spanned two centuries, and characterised the type of glaze (although without reference to the Munsell colour chart).

After I returned to Canberra, Campbell Macknight acquainted me with Harrisson's (1986) major study on *tempayan*. Essentially the book adumbrates two classificatory systems which only partially overlap. One system is based on sherds from Brunei's 16th century capital, Kota Batu, in which Harrisson avoids giving the full time range of the described categories.[17] The second system describes a chronological framework based on complete specimens generally devoid of any archaeological context. I have compared the complete jars figured by Harrisson with the identical jars or close counterparts in Adhyatman and Ridho (1984), and found that the two sources provide very comparable dates, although Harrisson's catalogue is much ampler. The point of interest, however, is Harrisson's system based on sherds. Considering SSPHAP's coarse stonewares which I had documented in sufficient detail to allow direct comparison with Harrisson's criteria, I have matched them to her categories whenever the descriptions fitted. But as Harrisson's categories (other than Sawankhalok) are undated I have usually had to retain the chronological identifications given in Ujung Pandang.

The re-analysis indicated that the work in Ujung Pandang had been myopic towards large Sawankhalok jars which, as Harrisson documents at Kota Batu, was probably the major Ming period *tempayan* transported in Southeast Asian waters. A second problem in SSPHAP'S identifications is revealed after removal of the Sawankhalok pieces from the re-analysed

[17] With the partial exception of the Sawankhalok sherds most of which had been produced at a known kiln site of known chronology.

sample. Considering only the pieces dated between the 14th-15th and the 16th-17th centuries, we see that they are outnumbered by more recent as well as by older pieces, even in the group of categories recognised by Harrisson at Kota Batu (Table B-10b). Hence the reliability of SSPHAP's general identifications of coarse stonewares appears in doubt, both in terms of place of manufacture and chronological determination, for want of Harrisson's crucial study.

Table B-10a shows the relationship between vessel form and coarse stoneware category, using a corrected classification where available but otherwise following the Ujung Pandang classifications. At over 75% of all cases *tempayan* clearly dominate, and the great majority of other pieces represent smaller closed vessels. However, a small proportion consists of vessel forms generally assigned to other classes, which raises the question of how coarse should a stoneware be to qualify. With the *tempayan* and jars I included them here unless there were clear signs of a preferable identification elsewhere, e.g. a Sancai or celadon (not subceladon) glaze, or underglaze decorations. But sherds from small stoneware vessels were placed among the coarse stonewares only if they bore not a trace of glaze (which obviously prevents any classification based on glaze colour) or if the glazes fell among the strong reds, browns and blacks which usually characterise *tempayan*.

The identifications which could be corrected into Harrisson's categories are probably quite reliable, while the few pieces identified as Vietnamese or Cambodian would at least belong to the tips of their respective icebergs. But the remaining identifications of even the pieces studied in detail are not reliable and so are pooled in the description (Tables B-11 and B-12). The coarse stonewares evince an extraordinary range of glaze and body colours, not only as a class but also within individual categories, and hence the recorded Munsell colours are merged under the Munsell colour names for the sake of some manageability.

TABLE B-10. COMPOSITION OF SSPHAP'S COARSE STONEWARES

TABLE B-10A. VESSELS	*Tempayan*	Jars	Vases	Bottles	Kendis	Teapots	Flower pots	Jarlets	Boxes	Bowls	Basins	Cups	Total
Coarse Red	9	2	0	0	0	0	0	0	0	0	0	0	11
Brittleware	21	5	0	0	0	0	0	1	0	1	0	0	28
Guangdong	26	6	0	1	0	0	0	0	0	0	0	0	33
Miscellaneous pre-Ming	1	18*	2	0	0	0	1	1	0	0	0	0	1
Miscellaneous Ming	196	4	1	0	0	0	0	0	1	0	0	0	234
Miscellaneous Qing	1	9	2	0	0	2	0	1	0	1	0	0	1
Miscellaneous Chinese	11	4	0	0	1	0	0	0	0	1	0	0	22
Sawankhalok	24	11	0	0	0	0	0	0	1	0	0	1	37
Sawank. unglazed	2	5	0	0	0	0	0	0	0	0	0	0	7
Coarse Brown	7	0	0	0	0	0	0	0	0	0	1	0	8
Wavyline	8	0	0	0	0	0	0	0	0	0	0	0	8
Vietnamese	1	2	0	0	0	0	0	1	0	0	0	0	4
Cambodian	0	2	1	0	0	0	0	0	0	0	0	0	3
Unidentified	2	3	0	0	0	0	0	0	0	0	0	0	5
Total	307	71	6	1	1	2	1	4	2	3	1	1	400

* Include one spouted jar.

TABLE B-10B. CENTURIES	10th-12th	12th-13th	13th-14th	14th	14th-15th	15th-16th	16th	16th-17th	17th	17th-18th	18th	18th-19th	Not dated	Total
Coarse Brown	0	1	2	0	0	0	0	1	0	0	0	0	4	8
Coarse Red	0	0	4	0	0	1	0	2	0	0	0	0	4	11
Brittleware	0	1	4	0	2	3	1	2	1	2	3	0	9	28
Guangdong	3	4	7	1	2	4	0	2	1	4	1	0	4	33
Wavyline	0	0	1	0	0	1	0	1	0	0	0	0	5	8
Brownwares	1	2	2	0	0	0	0	0	0	0	0	2	3	10
Oliveware	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Redware	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Greywares	0	0	1	0	0	0	0	0	0	0	0	0	1	2
Blackwares	0	0	0	0	1	0	0	0	0	1	0	1	2	5
Unglazed	0	1	1	0	0	0	0	0	0	0	0	1	2	5
Vietnamese	0	0	1	0	1	1	0	0	0	0	0	0	1	4
Total	4	9	23	1	6	10	1	8	2	9	4	4	35	116

TABLE B-11. COARSE STONEWARES EXTERIOR GLAZE CHARACTERS (PERCENTAGES)

Colour	Coarse Brown	Coarse Red	Brittleware	Guangdong	Wavyline	Sawankhalok	Vietnam	Other	Total
Green/Brown A1	0	0	0	0	0	0	0	5.6	1 (0.8%)
Green/Brown A3	0	0	0	0	0	4.2	0	0	1 (0.8%)
Very Dusky Red	12.5	0	4.3	0	0	0	0	0	2 (1.7%)
Dusky Red	12.5	0	0	0	0	0	0	0	1 (0.8%)
Light Red	0	11.1	0	0	0	0	0	0	1 (0.8%)
Yellowish Red	0	0	0	0	0	4.2	0	5.6	2 (1.7%)
Dark Reddish Brown	12.5	22.2	17.4	27.3	0	16.7	0	5.6	21 (17.8%)
Reddish Brown	12.5	11.1	4.3	12.1	0	8.3	50.0	0	10 (9.3%)
Light Reddish Brown	0	0	0	3.0	0	0	0	0	1 (0.8%)

TABLE B-11. COARSE STONEWARES EXTERIOR GLAZE CHARACTERS (CONT.)

Colour	Coarse Brown	Coarse Red	Brittle-ware	Guang-dong	Wavy-line	Sawank-halok	Vietnam	Other	Total
Very Dark Brown	12.5	0	17.4	3.0	0	4.2	0	5.6	8 (6.8%)
Dark Brown	12.5	0	17.4	12.1	0	20.8	0	22.2	18 (15.3%)
Brown/Dark Brown	0	22.2	13.0	3.0	0	0	50.0	5.6	8 (6.8%)
Brown	0	0	0	0	100.0	4.2	0	0	2 (1.7%)
Strong Brown	0	0	4.3	0	0	0	0	0	1 (0.8%)
Dark Yellow Brown	0	33.3	4.3	6.1	0	4.2	0	5.6	8 (6.8%)
Olive Brown	0	0	4.3	9.1	0	0	0	5.6	5 (4.2%)
Very Dark Grey Brown	0	0	0	0	0	8.3	0	0	2 (1.7%)
Dark Greyish Brown	0	0	0	3.0	0	0	0	0	1 (1.7%)
Olive	0	0	0	3.0	0	0	0	0	1 (0.8%)
Dark Reddish Grey	0	0	0	0	0	0	0	5.6	1 (0.8%)
Reddish Grey	12.5	0	0	0	0	0	0	0	1 (0.8%)
Light Brownish Grey	0	0	0	0	0	0	0	5.6	1 (0.8%)
Light Grey	0	0	0	3.0	0	4.2	0	0	2 (1.7%)
Very Dark Grey	0	0	4.3	0	0	0	0	5.6	2 (1.7%)
Black	12.5	0	8.7	15.2	0	20.8	0	22.2	17 (14.4%)
Total	(8)	(9)	(23)	(33)	(1)	(24)	(2)	(18)	(118)
Thickness									
1	28.6	11.1	28.0	37.0	100.0	12.0	100.0	33.3	32 (28.1%)
2	57.1	55.5	24.0	37.0	0	52.0	0	27.8	43 (37.7%)
3	14.3	33.3	48.0	18.5	0	36.0	0	27.8	35 (30.7%)
4	0	0	0	7.4	0	0	0	11.1	4 (3.5%)
	(7)	(9)	(25)	(27)	(1)	(25)	(2)	(18)	(114)

TABLE B-12. COARSE STONEWARE BODY CHARACTERS (PERCENTAGES)

Colours	Coarse Brown	Coarse Red	Brittle-ware	Guang-dong	Wavy-line	Sawank-halok	Unglazed Sawankhalok	Viet-nam	Cambo-dian	Other	Total
N7/-	0	0	4.2	0	0	8.3	20.0	0	0	3.6	5 (3.8%)
N6/-	0	0	0	7.4	0	4.2	0	0	0	3.6	4 (3.0%)
N5/-	0	0	0	7.4	0	0	0	0	0	3.6	3 (2.3%)
N4/-	25.0	0	0	0	0	8.3	0	0	0	7.1	6 (4.5%)
N3/-	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Light Grey	12.5	0	16.7	14.8	0	4.2	0	0	0	7.1	13 (9.8%)
Light Grey/Grey	0	0	12.5	0	0	12.5	0	0	0	3.6	7 (5.3%)
Grey	0	0	4.2	7.4	0	4.2	0	0	0	10.7	7 (5.3%)
Dark Grey	0	0	0	0	0	4.2	0	0	0	0	1 (0.8%)
Very Dark Grey	12.5	0	0	3.7	0	0	0	0	0	0	2 (1.5%)
Pinkish Grey	0	0	4.2	3.7	0	12.5	0	100.0	0	0	6 (4.5%)
Light Brown Grey	0	0	4.2	0	0	0	0	0	0	0	1 (0.8%)
Reddish Grey	0	0	4.2	3.7	0	4.2	0	0	0	3.6	4 (3.0%)
Dark Red Grey	0	9.1	8.3	3.7	0	0	0	0	0	7.1	6 (4.5%)
(Off-)White	0	0	0	0	0	4.2	0	0	0	0	1 (0.9%)
Pinkish White	0	18.2	0	0	0	0	0	0	0	7.1	4 (3.0%)
Pink	0	9.1	0	11.1	12.5	4.2	0	0	0	3.6	7 (5.3%)
Very Pale Brown	0	0	4.2	7.4	0	0	0	0	0	7.1	5 (3.8%)
Yellow	0	0	4.2	0	0	0	0	0	0	0	1 (0.8%)
Light Red Brown	0	0	0	0	0	4.2	0	0	0	3.6	2 (1.5%)
Reddish Brown	0	0	0	0	12.5	0	0	0	33.3	0	2 (1.5%)
Brown	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)

TABLE B-12. COARSE STONEWARE BODY CHARACTERS (CONT.)

Colours	Coarse Brown	Coarse Red	Brittle-ware	Guang-dong	Wavy-line	Sawank-halok	Unglazed Sawankhalok	Viet-nam	Cambo-dian	Other	Total
Light Red	0	9.1	0	0	0	0	0	0	0	0	1 (0.8%)
Pale Red	0	9.1	0	0	0	0	0	0	0	3.6	2 (1.5%)
Weak Red	25.0	9.1	4.2	0	12.5	0	0	0	33.3	0	6 (4.5%)
Red	0	18.2	4.2	0	0	0	0	0	0	0	3 (2.3%)
Dark Red	0	9.1	0	0	0	0	0	0	0	0	1 (0.8%)
Dusky Red	0	9.1	0	0	0	4.2	0	0	0	3.6	3 (2.3%)
2 shades of Light Grey/Grey X & I	0	0	0	0	0	4.2	0	0	0	0	1 (0.8%)
Light Grey/Grey X, Grey I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Very Pale Brown X, Light Grey/Grey I	0	0	4.2	3.7	0	0	0	0	0	0	2 (1.5%)
Pink X, Pinkish Grey I	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Light Brown X, Pinkish Grey I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Grey X, Very Pale Brown I	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Grey X, Pink I	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Dark Grey X, Pink I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Dark Grey X, Pinkish Grey I	0	0	0	0	0	4.2	0	0	0	0	1 (0.8%)
Dark Grey X, Reddish Brown I	12.5	0	0	0	0	0	0	0	0	0	1 (0.8%)
Dark Grey X, Light Grey/Grey I	0	0	8.3	0	0	0	0	0	0	0	2 (1.5%)
Very Dark Grey X, Grey I	0	0	0	0	12.5	0	0	0	0	0	1 (0.8%)
Black X, Very Dark Grey I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Core & Walls 2 shades of Light Grey/Grey	0	0	0	0	0	4.2	20.0	0	0	0	2 (1.5%)
Walls Light Grey/Grey, Core Pinkish Grey	0	0	4.2	0	0	4.2	0	0	0	0	2 (1.5%)
Walls Grey, Core Light Grey/Grey	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Walls Grey, Core Pink	0	0	0	0	0	0	20.0	0	0	0	1 (0.8%)
Walls Light Grey/Grey, Core Light Reddish Brown	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Walls Light Grey/Grey, Core Dark Reddish Brown	0	0	0	0	12.5	0	0	0	0	0	1 (0.8%)
Walls Light Red, Core Red	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Walls Red Brown, Core Dusky Red	12.5	0	0	0	0	0	0	0	0	0	1 (0.8%)
Walls Very Dark Grey, Core Light Grey/Grey	0	0	0	0	12.5	0	0	0	0	0	1 (0.8%)
Walls Grey, Core Dark Grey	0	0	0	0	0	4.2	0	0	0	0	1 (0.8%)
Walls Dark Grey, Core Dark Reddish Grey	0	0	0	0	12.5	0	0	0	0	0	1 (0.8%)

TABLE B-12. COARSE STONEWARE BODY CHARACTERS (CONT.)

Colours	Coarse Brown	Coarse Red	Brittle-ware	Guang-dong	Wavy-line	Sawank-halok	Unglazed Sawankhalok	Viet-nam	Cambo-dian	Other	Total
Light Grey/Grey X, Core Pink, Light Brown I	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Light Grey/Grey X, Core Red, Pink I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Greyish Brown X, Core Yellowish Red, Pink I	0	0	0	0	0	0	20.0	0	0	0	1 (0.8%)
Dark Grey X, Core Pinkish Grey, Light Brown I	0	0	0	0	0	0	20.0	0	0	0	1 (0.8%)
Grey X, Core Yellow Red, Very Pale Brown I	0	0	0	3.7	0	0	0	0	0	0	1 (0.8%)
Pink X, Core Dark Red Brown, Grey I	0	0	4.2	0	0	0	0	0	0	0	1 (0.8%)
Light Red Brown X, Core Dark Red Grey, Red I	0	0	0	0	12.5	0	0	0	0	0	1 (0.8%)
Very Dark Grey X, Core Light Red Brown, Pink I	0	0	0	0	0	0	0	0	0	3.6	1 (0.8%)
Black X, Core Dusky Red, Red Brown I	0	0	0	0	0	0	0	0	33.3	0	1 (0.8%)
Total	(8)	(11)	(24)	(27)	(8)	(24)	(5)	(1)	(3)	(28)	(133)
Hardness											
2	14.3	0	0	0	0	0	0	0	0	0	1 (0.7%)
3	0	0	3.7	0	0	0	0	0	0	0	1 (0.7%)
4	0	10.0	7.4	10.0	0	0	0	0	0	6.9	8 (5.5%)
5	0	50.0	40.7	16.7	42.9	12.0	20.0	0	0	37.9	39 (26.9%)
6	28.6	20.0	18.5	10.0	14.3	8.0	20.0	0	100.0	10.3	22 (15.2%)
7	42.9	20.0	14.8	46.7	28.6	36.0	40.0	100.0	0	41.4	50 (34.5%)
8	14.3	0	7.4	10.0	14.3	44.0	20.0	0	0	3.4	20 (13.8%)
9	0	0	7.4	6.7	0	0	0	0	0	0	4 (2.8%)
% Inclusions											
1	0	0	0	10.0	0	0	0	0	0	0	3 (2.1%)
2-3	0	0	11.1	23.3	0	7.7	20.0	0	33.3	17.2	19 (13.1%)
4-5	0	30.0	48.1	26.7	28.6	23.1	20.0	100.0	33.3	37.9	46 (31.7%)
10-15	28.6	40.0	33.3	26.7	28.6	30.8	40.0	0	0	34.5	45 (31.0%)
20-30	71.4	30.0	7.4	13.3	42.9	38.5	20.0	0	33.3	10.3	32 (22.1%)
Total	(7)	(10)	(27)	(30)	(7)	(25-26)	(5)	(1-2)	(3)	(29)	(145)
Body Type											
PP	0	0	0	0	0	0	0	50.0	0	3.3	2 (1.4%)
SW	71.4	50.0	44.4	76.7	57.1	92.3	80.0	50.0	33.3	53.3	95 (64.6%)
EW	26.4	50.0	55.5	23.3	42.9	7.7	20.0	0	66.7	43.3	50 (34.0%)
Total	(7)	(10)	(27)	(30)	(7)	(26)	(5)	(2)	(3)	(30)	(147)
Slipping											
None	100.0	30.0	85.7	55.2	62.5	76.0	100.0	100.0	100.0	89.3	109 (75.2%)
X	0	60.0	7.1	17.2	12.5	12.0	0	0	0	7.1	19 (13.1%)
I	0	10.0	3.6	10.3	0	12.0	0	0	0	3.6	9 (6.2%)
X and I	0	0	3.6	17.2	25.0	0	0	0	0	0	8 (5.5%)
Total	(8)	(10)	(28)	(29)	(8)	(25)	(5)	(1)	(3)	(28)	(145)

B.3.6 Ming celadons (including Yuan-like Ming celadons)

These two classes include celadons which we dated between the 14th and the 16th centuries, including pieces we called "*Qingbai* celadons". The celadons dated to the 14th or the 14th-15th centuries, the "Yuan-like Ming celadons", resembled the celadons of the early monochrome class in overall appearance, but also exhibited certain features usually regarded as "late". These features include fully glazed base, thinner or more watery glaze, a tendency to a more porcellanous body, conspicuous brown or yellow miscolorations of the glaze, and a tendency to crowded and "artificial" decorations (Gompertz, 1980:164,182; Zainie and Harrisson, 1967:70; Sorsby Ltd, 1974:14; Lu Yaw, 1979). We dated the celadons with a whitish porcellanous body and a uniform, depthless glaze to the 15th and 16th centuries.[18] The middle ground of variation between the latter pieces and the "*Qingbai*" early whitewares was reserved for the "*Qingbai* celadons". These were distinguished by their incised, moulded or gouged decorations which lacked the vigour of their *Qingbai* whiteware counterparts, and their greener glaze which lacked the greasy sheen of the classical *Qingbai* glaze. I have decided to treat the *Qingbai* celadons as nothing more than one variant of the Ming celadons, in view of the general similarities and the absence of *Qingbai* celadons from

TABLE B-13. SSPHAP'S MING (INC. YUAN-LIKE) CELADONS

	--- Yuan-like ---		---- Ming celadon ----			--- *Qingbai* celadon ---			
	"14th century"	"14th-15th centuries"	15th century	15th-16th centuries	16th century	15th century	15th-16th centuries	16th century	Total
Plates	8	29	13	10	13	17	1	1	92
Bowls	0	10	2	2	3	5	0	0	22
"Open"	0	1	0	0	1	0	0	0	2
Boxes	0	0	1	0	0	1	0	0	2
Jarlets	0	0	1	0	1	0	0	0	2
Vases	0	0	2	0	2	0	0	0	4
Jars/*Tempayan*	3	2	0	1	1	0	0	0	7
Total	11	42	19	13	21	23	1	1	131

[18] It is possible that some Japanese celadons (cf. Kallupa et al., 1989:Plates) have been mixed in here as well.

TABLE B-13. SSPHAP'S MING (INC. YUAN-LIKE) CELADONS (CONT.)

	---- Yuan-like ----			------- Ming celadons -------				
Exterior Glaze Colour	"14th century"	"14th-15th centuries"	Total	15th century	15th-16th centuries	16th century	*Qingbai*	Total
Blue/Green A3	0	5.3	1 (4.0%)	0	0	0	0	0
Green/Brown A4	50.0	21.1	7 (28.0%)	0	0	0	0	0
Green/Brown A5	16.7	5.3	2 (8.0%)	0	0	0	0	0
Green/Brown A6	0	5.3	1 (4.0%)	0	0	0	12.5	1 (6.3%)
5G 6/2	0	10.5	2 (8.0%)	0	0	0	0	0
5G 7/1	0	0	0	0	0	0	50.0	4 (25.0%)
5Gy 5/2	16.7	0	1 (4.0%)	0	0	0	0	0
5Gy 5/1	0	15.8	3 (12.0%)	0	0	33.3	0	1 (6.3%)
5Gy 6/1	16.7	26.3	6 (24.0%)	33.3	0	66.7	0	3 (18.8%)
5Gy 7/1	0	5.3	1 (4.0%)	33.3	100.0	0	25.0	5 (31.3%)
< 5Gy 7/1	0	0	0	0	0	0	12.5	1 (6.3%)
5y 7/1	0	5.3	1 (4.0%)	33.3	0	0	0	1 (6.3%)
X Glaze Thickness								
2	0	5.3	1 (4.0%)	33.3	0	0	25.0	3 (18.8%)
3	33.3	42.1	10 (40.0%)	66.7	50.0	33.3	37.5	7 (43.8%)
4	50.0	10.5	6 (24.0%)	0	0	33.3	25.0	3 (18.8%)
5	16.7	36.8	8 (32.0%)	0	50.0	33.3	12.5	3 (18.8%)
X Glaze Number								
1 layer	83.3	94.7	23 (92.0%)	100.0	100.0	100.0	87.5	15 (93.8%)
2 layers	16.7	5.3	2 (8.0%)	0	0	0	12.5	1 (6.3%)
Total	(6)	(19)	(25)	(3)	(2)	(3)	(8)	(16)
I Glaze Colour								
Green/Brown A4	42.9	25.0	8 (29.6%)	0	0	0	0	0
Green/Brown A5	0	5.0	1 (3.7%)	0	0	0	0	0
Green/Brown A6	0	0	0	0	0	0	12.5	1 (6.3%)
5G 6/2	0	10.0	2 (7.4%)	0	0	0	0	0
5G 7/1	0	0	0	0	0	0	50.0	4 (25.0%)
5Gy 5/1	0	10.0	2 (7.4%)	0	0	0	0	0
5Gy 6/1	57.1	35.0	11 (40.7%)	33.3	0	66.7	12.5	4 (25.0%)
5Gy 7/1	0	10.0	2 (7.4%)	33.3	100.0	33.3	25.0	6 (37.5%)
5y 7/1	0	0	0	33.3	0	0	0	1 (6.3%)
5Y 5/3	0	5.0	1 (3.7%)	0	0	0	0	0
I Glaze Thickness								
1	12.5	0	1 (3.6%)	0	0	0	0	0
2	12.5	5.0	2 (7.1%)	0	0	33.3	25.0	3 (18.8%)
3	50.0	40.0	12 (42.9%)	66.7	50.0	33.3	25.0	6 (37.5%)
4	12.5	25.0	6 (21.4%)	33.3	0	0	25.0	3 (18.8%)
5	12.5	30.0	7 (25.0%)	0	50.0	33.3	25.0	4 (25.0%)
I Glaze Number								
1 layer	100.0	95.0	27 (96.4%)	100.0	100.0	100.0	87.5	15 (93.8%)
2 layers	0	5.0	1 (5.6%)	0	0	0	12.5	1 (6.3%)
Total	(7-8)	(20)	(27-28)	(3)	(2)	(3)	(8)	(16)

TABLE B-13. SSPHAP'S MING (INC. YUAN-LIKE) CELADONS (CONT.)

	---- Yuan-like ----			------- Ming celadons -------				
Interior Body Colour	"14th century"	"14th-15th centuries"	Total	15th century	15th-16th centuries	16th century	*Qingbai*	Total
N5/-	0	11.8	2 (8.7%)	0	0	0	0	0
N6/-	0	5.9	1 (4.3%)	0	0	0	0	0
N7/-	83.3	41.2	12 (52.2%)	33.3	50.0	100.0	25.0	7 (43.8%)
< N7/-	0	29.4	5 (21.7%)	33.3	50.0	0	25.0	4 (25.0%)
> N8/-	0	5.9	1 (4.3%)	33.3	0	0	25.0	3 (18.8%)
5YR 5/4	0	5.9	1 (4.3%)	0	0	0	0	0
5YR 7/1	16.7	0	1 (4.3%)	0	0	0	12.5	1 (6.3%)
5YR 8/1	0	0	0	0	0	0	12.5	1 (6.3%)
Total	(6)	(17)	(23)	(3)	(2)	(3)	(8)	(16)
Translucency								
Faint (F)	0	0	0	33.3	0	100.0	25.0	6 (37.5%)
No (N)	100.0	100.0	27 (100%)	66.7	100.0	0	75.0	10 (62.5%)
Hardness								
6	0	5.0	1 (3.7%)	0	0	0	0	0
7	0	25.0	5 (18.5%)	0	50.0	0	25.0	3 (18.8%)
8	85.7	45.0	15 (55.6%)	33.3	50.0	100.0	50.0	9 (56.3%)
9	14.3	25.0	6 (22.2%)	66.7	0	0	25.0	4 (25.0%)
% Inclusions								
1	57.1	55.0	15 (55.6%)	66.7	0	33.3	62.5	8 (50.0%)
3	42.9	15.0	6 (22.2%)	0	50.0	0	25.0	3 (18.8%)
5	0	20.0	4 (14.8%)	0	0	66.7	12.5	3 (18.8%)
10	0	10.0	2 (7.4%)	33.3	0	0	0	1 (6.3%)
15	0	0	0	0	50.0	0	0	1 (6.3%)
Body Type								
Almost China P.	0	5.0	1 (3.7%)	0	0	33.3	25.0	3 (18.8%)
Semi-porcelain	0	0	0	0	50.0	0	25.0	3 (18.8%)
Stoneware	100.0	95.0	26 (96.3%)	100.0	50.0	66.7	50.0	10 (62.5%)
Slipping								
None	100.0	90.0	25 (92.6%)	100.0	100.0	100.0	87.5	15 (93.8%)
X and I	0	10.0	2 (7.4%)	0	0	0	12.5	1 (6.3%)
Total	(7)	(20)	(27)	(3)	(2)	(3)	(8)	(16)

	------- Yuan-like -------						
Basal Glazing Characters	"14th c."	"14th-15th c."	Total (8)	15th c.	16th c.	*Qing-bai*	Total (4)
Ordinarily glazed base	3	3	6 (66.7%)	0	1	0	1 (25.0%)
Red-glazed base	0	0	0	1	0	0	1 (25.0%)
Glaze-splashed base	1	0	1 (33.3%)	0	0	2	2 (50.0%)
Unglazed base	0	1	1 (33.3%)	0	0	0	0
Glaze does not reach to foot	0	1	1 (33.3%)	0	0	0	0

N.B. One celadon dated "14th century" had an unglazed central stacking ring, but the three *Qingbai* celadons with the relevant part extant lacked the stacking ring.

SSPHAP's clearly pre-Ming assemblages.[19]

The composition of the Ming celadon classes shows a dominance of plates to an even greater extent than with the early monochromes. So few pieces had a subceladon (*abu-abu*) glaze that I have not bothered to distinguish them from the celadons (Table B-13).

B.3.7 Qing monochromes

This class, which broadly equates with the local "Siam" class (Hadimuljono and Macknight, 1983), includes the monochromes which Demmanari and I dated to between the 17th and 20th centuries. The majority were from stoneware bowls with a strong green glaze which we dated to the 18th-19th centuries. The class also includes early Qing celadons which exceeded even the Ming celadons in transparency of the glaze (cf. Gompertz, 1980:202); apparent Qing-period imitations of earlier Chinese wares, which we usually attributed to the Qianlong reign when the Chinese potters were responding to a wave of antiquarianism (Macintosh, 1977:83; Medley, 1980:258);[20] and some fine brownwares (Table B-14). This last group constitutes the closest approximations we found to the wide range of exquisite Qing monochromes with subtle or bright glazes described by Tam (1977) and Medley (1980:250-259). I did not record many of the pieces in detail because their dates fall later than SSPHAP's period of main interest, and the pieces which were recorded (Table B-17) may not be particularly representative of the class.

B.3.8 Wares blue or white

12 pieces were identified as bluewares in the laboratory (Table B-15). A few are possibly doubtful inclusions, either because the piece is small or, in one case (T.30.1.48),

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[19] Note that in an earlier report I treated both the "14th century celadons" and the *Qingbai* celadons as early or pre-Ming Chinese wares (Bulbeck, in press). Review of the pieces, and especially the results of seriation (Bulbeck, 1989), have convinced me to treat them as Ming.

[20] A good example is provided by the greyish green wares with heavily crackled glaze, locally called *pecah seribu* (*a thousand pieces*).

because the obverse contained blue-and-white decorations. In terms of the ISCC-NBS colour names (Agoston, 1987), the observed colours would have ranged between light blues, vivid blues and violets. The three pieces observed in detail are described in Table B-18. The Gowa survey did not come upon any evidence of blueware antiques looted from the pre-Islamic burial grounds, but three bowls with very dark blue glazes, which appeared to be of Qing antiquity, are held in the *kabupaten* head office of the Department of Education in Soppeng.

As regards the whitewares, we felt confident in dating them prior to the Qing dynasty only if the glaze had a conspicuous richness about it, or if an archaic feature such as an unglazed base was present, or if the vessel form fell in particular categories. Those considered Ming whitewares tended to be, as it were, rejects from the early whiteware class - pieces with an opaque but otherwise *qingbai*-like glaze, or pieces which looked like early whitewares but failed to match any recognised category. The 36 recognised Wanli whitewares tended to consist of small open forms - cups, bowls with slender graceful profiles, and plates with foliated edges - further characterised by an icey, pink or cream glaze (see Photo 10-24 and Table B-16). Descriptive characters of the Ming whitewares and single Wanli whiteware studied in detail are given in Table B-18.

B.3.9 Ming blue-and-white and *Ming merah* (Ming red)

The Ming blue-and-white class is here taken to cover a well-defined group of Chinese BW wares which excludes older looking pieces (those we dated to the early 15th century or earlier), Wanli and later pieces, and members of the Swatow family (B.3.11). The class includes a small number of pieces whose decorations combined red overglaze enamels with the underglaze cobalt blue (Table B-19). The range of decorations overlaps with the repertoire found on the high-quality, "imperial" Ming BW wares, as described particularly well by Macintosh (1977), but centres on a group of standard motifs which would appear to have been the specialisation of the Chinese provincial kilns. The wares produced in these kilns,

which occur in numerous Southeast Asian sites as a distinct late 15th to 16th century horizon, are treated by Addis (1968a), Sorsby Ltd (1974), McElney (1979) and Guy (1986:94-97). A particularly common example in South Sulawesi involves bowls whose exterior cavetto is covered with a lattice of hexagonal diapers enclosing dots inside the hexagons.[21] For the purposes of initial seriation (B.4) I treat these "Ming BW hexagonal wares" as a separate class because the identification is unequivocal as long as part of the cavetto is extant. Nonetheless the "hexagonal wares" evince very similar characters to the other Ming BW pieces, including the tendency to a porcellanous body but the rarity of true porcelains (Table B-19).

Demmanari and I dated the Ming BW pieces to the 16th century except for a small number whose specific motifs or fabrication techniques indicated a slightly earlier date, according to the sources just cited. Plates and bowls vied for equal prominence among the SSPHAP's sample of Ming BW wares, with *balubu* (the porcellanous equivalent to *tempayan*) and jars constituting the majority of the remainder (Table B-19). The types of wares recorded during laboratory study of the assemblages specifically associated with greater Gowa's palaces (G.1.107-108, G.3.3, U.25.1) differed markedly from the general ruck. For instance, the palatial assemblages contained the majority of the recorded *balubu* but not one of the "hexagonal wares".

Related to the Ming BW class is the class called *Ming merah* in South Sulawesi ("Ming red"), which differs in having enamel overglaze decorations usually restricted to a few standard floral motifs. An alternative label is provided by adapting the terminology used for the earlier class of Qing overglaze-decorated wares and calling the class, or at least those pieces whose extant decorations include green enamels, Ming *famille verte*. Only 27 pieces were identified in the laboratory, and these proved to be either plates or bowls, the majority lacking green enamels (Table B-20). The single piece I recorded in detail (Photo 10-24; Table B-21) has some

[21] An example is figured in Carswell (1985).

TABLE B-14. COMPOSITION OF SSPHAP'S QING MONOCHROMES

	17th		Kangxi	17-18th		--- 18th ---				Qianlong		18-19th			19th	19-20	20th	Qing	
	C	S	P	C	S	C	S	B	P	C	S	C	S	P	S	C	P	C	Sum
Bowls	7	3	3	17	1	2	0	0	1	1	10	150	5	1	2	4	1	1	209
Plates	0	1	0	1	1	0	2	0	0	1	1	2	1	0	2	0	0	1	13
Cups	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Boxes	0	0	1	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5
Bottle	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Vases	0	0	0	2	0	0	0	0	0	1	6	2	0	0	0	0	0	0	11
Jars	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
Tempayan	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	9	4	4	23	2	2	3	1	1	3	18	156	6	1	4	4	1	2	244

N.B. In the column headings, the numbers refer to the century or centuries to which the pieces were dated; C stands for celadons, S for subceladons, B for the brown-glazed stoneware, and P for brown-glazed porcelains.

TABLE B-15. COMPOSITION OF SSPHAP'S BLUEWARES

	16th century	16th-17th centuries	17th century	17th-18th centuries	18th century	Total
Bowls	0	0	1#	1^	2	4
Plates	0	0	0	1	0	1
Boxes	0	0	0	1	1	2
Jars	1	1*	0	0	0	2
Vases	2	0	1	0	0	3
Totals	3	1	2	3	3	12

* Navy blue exterior glaze (2 layers, "5" thickness).
\# Deep purplish exterior glaze (1 layer, "3" thickness).
^ Pale azure exterior glaze (1 layer, "3" thickness).

TABLE B-16. COMPOSITION OF SSPHAP'S MING/WANLI WHITEWARES

	---------- Ming Whitewares ----------						---- Wanli Whitewares ----		
	Dehua 14th-15th centuries	Other 14th-15th centuries	15th century	16th century	Other	Total	Dehua 16th-17th centuries	Other	Total
Bowls	0	1	3	3	3	11	0	19	19
Plates	0	0	0	3	2	4	0	9	9
Cups	0	0	0	0	0	0	0	4	4
"Open"	0	1	0	0	0	1	0	0	0
Boxes	0	0	1	1	1	3	1	1	2
Jarlets	0	0	0	0	0	0	0	1	1
Vases	0	0	0	0	2	2	0	0	0
Kendis	2	0	0	0	0	2	0	0	0
Jars	1	0	0	0	0	1	0	0	0
Figurette (human head)	0	0	0	0	0	0	1	0	1
Total	3	2	4	7	8	25	2	34	36

TABLE B-17. SSPHAP'S SAMPLE OF QING MONOCHROMES

	Exterior Glaze				Interior Glaze			
Colour	Celadons	Subceladons	Brownware	Total	Celadons	Subceladons	Brownware	Total
Blue/Green A4	1	0	0	1 (7.1%)	1	0	0	1 (7.1%)
Blue/Green A5	2	0	0	2 (14.3%)	2	0	0	2 (14.3%)
Blue/Green A6	3	0	0	3 (21.4%)	3	0	0	3 (21.4%)
5G 6/2	1	0	0	1 (7.1%)	1	0	0	1 (7.1%)
5G 7/1	0	1	0	1 (7.1%)	0	1	0	1 (7.1%)
5Gy 4/1	1	0	0	1 (7.1%)	1	0	0	1 (7.1%)
5y 6/1	0	0	0	0	0	1	0	1 (7.1%)
5y 7/1	0	1	0	1 (7.1%)	0	1	0	1 (7.1%)
5Y 7/2	0	1	0	1 (7.1%)	0	1	0	1 (7.1%)
5YR 5/1	0	1	0	1 (7.1%)	0	1	0	1 (7.1%)
5YR 6/1	0	1	0	1 (7.1%)	0	0	0	0
7.5YR 5/4	0	0	1	1 (7.1%)	0	0	0	0
7.5YR 4/4	0	0	0	0	0	0	1	1 (7.1%)
Glaze Thickness								
2	4	0	1	5 (35.7%)	4	0	0	4 (28.6%)
3	3	5	0	8 (57.1%)	3	5	0	8 (57.1%)
4	0	0	0	0	0	0	1	1 (7.1%)
5	1	0	0	1 (7.1%)	1	0	0	1 (7.1%)
Body Colour					**Hardness**			
10YR 8/2	0	2	0	2 (14.3%)	5	0	0	1 (7.1%)
10YR 8/3	1	0	0	1 (7.1%)	6	1	1	0 2 (14.3%)
5YR 8/4	1	0	0	1 (7.1%)	7	4	3	0 7 (50.0%)
5YR 7/1	1	1	0	2 (14.3%)	8	2	0	0 2 (14.3%)
10YR 7/2	1	0	0	1 (7.1%)	9	1	1	0 2 (14.3%)
7.5YR 7/2	1	0	0	1 (7.1%)				
10YR 7/3	1	0	0	1 (7.1%)	**% Incs**			
5YR 6/1	1	0	0	1 (7.1%)				
5YR 6/2	1	0	0	1 (7.1%)	1	1	0	0 1 (7.1%)
10YR 6/3	0	0	1	1 (7.1%)	3	1	4	0 5 (35.7%)
2.5YR 5/6	0	1	0	1 (7.1%)	5	1	1	1 3 (21.4%)
2.5YR 5/8	0	1	0	1 (7.1%)	10	3	0	0 3 (21.4%)
					15	2	0	0 2 (14.3%)
Body Type					**Slip**			
Semi-porcelain	0	1	0	1 (7.1%)				
Stoneware	8	4	0	12 (85.7%)	None	5	5	1 11 (78.6%)
Earthenware	0	0	1	1 (7.1%)	X & I	3	0	0 3 (21.4%)
	(8)	(5)	(1)	(14)		(8)	(5)	(1) (14)

Basal Glazing Characters	Celadons (2)	Subceladons (4)	Brownware (1)	Total (7)
Glazed base	2	2	0	4 (57.1%)
Unglazed base	0	2	0	2 (28.6%)
Glaze stops short of non-extant foot	0	0	1	1 (14.3%)

N.B. The celadons include specimens dated between the 17th and the 18th centuries, and the subceladons specimens dated between the 17th and the 19th centuries. All specimens had only a single layer of glaze and an opaque body. Unglazed central stacking rings were present on one of the two celadons, and on all five subceladons, which preserved the relevant area.

TABLE B-18. SSPHAP'S SAMPLE OF BLUE OR WHITE WARES

	Exterior Glaze					Interior Glaze				
	--- Ming Whitewares ---					--- Ming Whitewares ---				
Colour	Blue-wares	14th-15th centuries	15th/16th centuries	Total	Wanli White	Blue-wares	14th-15th centuries	15th/16th centuries	Total	Wanli White
< 5BG 7/1	0	0	3	3 (23.1%)	0	0	0	3	3 (30.0%)	0
5G 7/1	0	0	1	1 (7.7%)	0	0	1	0	1 (10.0%)	0
< 5G 7/1	0	0	0	0	0	1	0	0	0	0
5Gy 7/1	0	0	1	1 (7.7%)	0	0	1	0	1 (10.0%)	0
< 5Gy 7/1	0	0	1	1 (7.7%)	0	1	0	1	1 (10.0%)	0
5y 7/1	0	0	0	0	1	0	0	0	0	1
N8/-	0	1	0	1 (7.7%)	0	0	2	0	2 (20.0%)	0
5YR 8/2	0	0	1	1 (7.7%)	0	0	0	1	1 (10.0%)	0
7.5YR 8/2	0	3	0	3 (23.1%)	0	0	0	0	0	0
10YR 8/2	0	1	0	1 (7.7%)	0	0	0	0	0	0
N7/-	0	0	0	0	0	0	0	1	1 (10.0%)	0
5YR 7/2	0	1	0	1 (7.7%)	0	0	0	0	0	0
Glaze Thick.										
2	0	3	1	4 (30.8%)	1	0	2	2	4 (40.0%)	1
3	2	3	5	8 (61.5%)	0	2	2	4	6 (60.0%)	0
4	0	0	1	1 (7.7%)	0	0	0	0	0	0
5	1	0	0	0	0	0	0	0	0	0
	(3)	(6)	(7)	(13)	(1)	(2)	(4)	(6)	(10)	(1)
Body Colour										
N8/-	2	1	2	3 (23.1%)	1					
> N8/-	0	0	2	2 (15.4%)	0					
< N7/-	0	0	2	2 (15.4%)	0					
N7/-	1	0	0	0	0					
5YR 8/1	0	1	0	1 (7.7%)	0					
10YR 8/1	0	1	0	1 (7.7%)	0					
5YR 8/2	0	0	1	1 (7.7%)	0					
5YR 7/4	0	1	0	1 (7.7%)	0					
5YR 7/6	1	2	0	2 (15.4%)	0					
	(3)	(6)	(7)	(13)	(1)					
Translucency										
Y	2	0	4	4 (33.3%)	1					
F	0	0	2	2 (16.7%)	0					
N	1	5	1	6 (50.0%)	0					
Slipping										
None	2	4	6	10 (83.3%)	1					
Exterior	0	0	1	1 (8.3%)	0					
Interior	1	0	0	0	0					
X and I	0	1	0	1 (8.3%)	0					
	(3)	(5)	(7)	(12)	(1)					

Hardness					
"7"	0	1	2	3 (23.1%)	0
"8"	1	3	4	7 (53.8%)	1
"9"	2	2	1	3 (23.1%)	0

% of Body Inclusions					
"0"	0	1	2	3 (23.1%)	0
"1"	1	4	3	7 (53.8%)	1
"3"	2	1	1	2 (15.4%)	0
"15"	0	0	1	1 (7.7%)	0

Body Type					
CP	2	0	5	5 (38.5%)	1
Near CP	1	0	1	1 (7.7%)	0
SP	0	4	1	5 (38.5%)	0
SW	0	2	0	2 (15.4%)	0
	(3)	(6)	(7)	(13)	(1)

Basal Glazing Characters Ming White	14th-15th centuries	15th-16th centuries	Total
Regularly glazed base	0	2 (50.0%)	2 (40%)
Irregularly glazed base	0	1 (25.0%)	1 (20%)
Unglazed base	0	1 (25.0%)	1 (20%)
Glaze does not reach non-extant foot	1 (100%)	0	1 (20%)
Unglazed central stacking ring present	1 (100%)	3 (100%)	4 (100%)

N.B. Only one glaze layer present in all cases except for one blue glaze (Table B-15).

TABLE B-19. SSPHAP'S MING BW (INC. HEXAGONAL) WARES

	15th century	Late 15th century	Late 15th-early 16th century	15th-16th centuries	"Ming BW/Red BW"	16th century	16th century	Total	Hexagonal Ming BW
Plates	0	3	5	0	10	292	0	310	0
Bowls	2	7	2	3	11	233	2	260	75
Dishes	0	0	0	0	0	2	0	2	0
Cups	0	0	0	1	0	0	0	1	0
"Open"	0	0	0	0	0	2	0	2	0
Boxes	0	1	1	1	0	12	1	16	0
Jarlets	0	0	0	0	0	3	0	3	0
Vases	0	0	0	0	0	8	0	8	0
Jars	0	0	0	0	0	42	0	42	0
Balubu	0	0	2	0	0	97	2	101	0
Total	2	11	10	5	21	691	5	745	75

N.B. Jars and *balubu* include 50 pieces from Tallok's royal cemetery (U.25.1), identified only as Jars/*balubu*, divided up according the the recorded frequencies of the jars and *balubu* at other sites.

X Glaze Colour	Late 15th century	Late 15th-early 16th century	15th-16th centuries	BW/Red 16th century	16th century	Total	Hexagonal Ming BW
< 5B 7/1	0	0	0	0	1.3	1 (1.1%)	0
5BG 7/1	100.0	11.1	0	0	8.7	9 (9.9%)	1 (8.3%)
5G 7/1	0	33.3	25.0	0	13.2	14 (15.4%)	4 (33.3%)
< 5G 7/1	0	0	0	100.0	11.8	10 (11.0%)	1 (8.3%)
5Gy 6/1	0	11.1	0	0	0	1 (1.1%)	0
5Gy 7/1	0	11.1	25.0	0	27.6	23 (25.3%)	2 (16.7%)
< 5Gy 7/1	0	11.1	25.0	0	18.4	16 (17.6%)	2 (16.7%)
5y 6/1	0	0	0	0	1.3	1 (1.1%)	0
5y 7/1	0	0	0	0	1.3	1 (1.1%)	0
< 5y 7/1	0	11.1	0	0	3.9	4 (4.4%)	0
N8/-	0	0	0	0	5.3	4 (4.4%)	0
> N8/-	0	0	0	0	1.3	1 (1.1%)	0
< N7/-	0	0	0	0	0	0	1 (8.3%)
10YR 8/1	0	11.1	0	0	2.6	3 (3.3%)	0
7.5YR 8/2	0	0	0	0	1.3	1 (1.1%)	0
5Y 8/2	0	0	0	0	0	0	1 (8.3%)
5Y 7/1	0	0	25.0	0	1.3	1 (1.1%)	0
5Y 7/2	0	0	0	0	1.3	1 (1.1%)	0
X Glaze Thickness							
2	0	0	25.0	0	5.3	5 (5.5%)	0
3	100.0	77.8	75.0	100.0	78.9	72 (79.1%)	11 (91.7%)
4	0	0	0	0	7.9	6 (6.6%)	0
5	0	22.2	0	0	7.9	8 (8.8%)	1 (8.3%)
Slipping							
None	100.0	88.9	100.0	100.0	100.0	90 (98.9%)	12 (100%)
X and I	0	11.1	0	0	0	1 (1.1%)	0
	(1)	(9)	(4)	(1)	(76)	(91)	(12)

TABLE B-19. SSPHAP'S MING BW (INC. HEXAGONAL) WARES (CONT.)

I Glaze Colour	Late 15th century	Late 15th-early 16th century	15th-16th centuries	BW/Red 16th century	16th century	Total	Hexagonal Ming BW
5BG 7/1	100.0	0	0	0	6.8	6 (6.7%)	1 (9.1%)
< 5BG 7/1	0	0	0	0	1.4	1 (1.1%)	0
5G 7/1	0	44.4	25.0	100.0	13.5	16 (18.0%)	3 (27.3%)
< 5G 7/1	0	0	0	0	10.8	8 (9.0%)	1 (9.1%)
5Gy 6/1	0	11.1	0	0	1.4	2 (2.2%)	0
5Gy 7/1	0	11.1	25.0	0	25.7	21 (23.6%)	2 (18.2%)
< 5Gy 7/1	0	11.1	25.0	0	20.3	17 (19.1%)	2 (18.2%)
5y 7/1	0	0	0	0	1.4	1 (1.1%)	0
< 5y 7/1	0	11.1	0	0	5.4	5 (5.6%)	0
N8/-	0	0	0	0	5.4	4 (4.5%)	0
> N8/-	0	0	0	0	1.4	1 (1.1%)	0
< N7/-	0	0	0	0	0	0	1 (9.1%)
10YR 8/1	0	11.1	0	0	2.7	3 (3.4%)	0
< 5Y 8/2	0	0	0	0	0	0	1 (9.1%)
10YR 7/1	0	0	0	0	1.4	1 (1.1%)	0
5Y 7/1	0	0	25.0	0	0	1 (1.1%)	0
5Y 7/2	0	0	0	0	1.4	1 (1.1%)	0
10YR 6/3	0	0	0	0	1.4	1 (1.1%)	0
	(1)	(9)	(4)	(1)	(74)	(89)	(11)
I Glaze Thick.							Ming BW
1	0	0	25.0	0	0	1 (1.1%)	0
2	0	0	0	0	17.6	13 (14.6%)	0
3	100.0	77.8	75.0	100.0	68.9	64 (71.9%)	11 (100%)
4	0	0	0	0	6.8	5 (5.6%)	
5	0	22.2	0	0	6.8	6 (6.7%)	0
	(1)	(9)	(4)	(1)	(74)	(89)	(11)
Body Type							
China Porcelain	0	12.5	20.0	0	20.5	18 (19.4%)	1 (8.3%)
Almost CP	0	25.0	0	100.0	10.3	11 (11.8%)	1 (8.3%)
Semi-porcelain	100.0	37.5	40.0	0	41.0	37 (40.0%)	6 (50.0%)
Protoporcelain	0	12.5	0	0	1.3	2 (2.2%)	3 (25.0%)
Stoneware	0	12.5	40.0	0	26.9	25 (26.9%)	1 (8.3%)
	(1)	(8)	(5)	(1)	(78)	(93)	(12)
Translucency							Hexagonal
Not translucent	-	100.0	80.0	0	79.6	53 (80.3%)	6 (60.0%)
Faintly	-	0	0	0	11.1	6 (9.1%)	3 (30.0%)
Translucent (Y)	-	0	20.0	100.0	9.3	7 (10.6%)	1 (10.0%)
	(0)	(6)	(5)	(1)	(54)	(66)	(10)

TABLE B-19. SSPHAP'S MING BW (INC. HEXAGONAL) WARES (CONT.)

Body Colour							
N8/-	100.0	12.5	0	0	14.1	13 (14.1%)	1 (8.3%)
> N8/-	0	25.0	0	0	17.9	16 (17.4%)	1 (8.3%)
< N7/-	0	25.0	25.0	0	14.1	14 (15.2%)	2 (16.7%)
N7/-	0	0	0	0	16.7	13 (14.1%)	0
> N7/-	0	0	0	0	1.3	1 (1.1%)	0
5YR 8/1	0	12.5	0	0	11.5	10 (10.9%)	2 (16.7%)
10YR 8/1	0	0	0	0	1.3	1 (1.1%)	0
5YR 8/2	0	0	25.0	0	1.3	2 (2.2%)	3 (25.0%)
7.5YR 8/2	0	12.5	0	0	0	1 (1.1%)	0
10YR 8/3	0	0	0	0	1.3	1 (1.1%)	0
5YR 7/1	0	12.5	25.0	100.0	11.5	12 (13.0%)	2 (16.7%)
10YR 7/1	0	0	0	0	2.6	2 (2.2%)	0
5Y 7/1	0	0	0	0	1.3	1 (1.1%)	0
5YR 7/2	0	0	0	0	1.3	1 (1.1%)	1 (8.3%)
5YR 6/1	0	0	0	0	2.6	2 (2.2%)	0
10YR 6/1	0	0	0	0	1.3	1 (1.1%)	0
5YR 6/2	0	0	25.0	0	0	1 (1.1%)	0
	(1)	(8)	(4)	(1)	(78)	(92)	(12)
Hardness							
5	0	0	0	0	1.3	1 (1.1%)	0
7	0	50.0	40.0	100.0	21.8	24 (25.8%)	6 (50.0%)
8	100.0	37.5	60.0	0	59.0	53 (57.0%)	6 (50.0%)
9	0	12.5	0	0	17.9	15 (16.1%)	0
% Inclusions							
0	0	0	20.0	0	6.4	6 (6.5%)	1 (8.3%)
1	0	50.0	20.0	0	61.5	53 (57.0%)	7 (58.3%)
3	100.0	25.0	0	100.0	20.5	20 (21.5%)	1 (8.3%)
5	0	12.5	40.0	0	7.7	9 (9.7%)	1 (8.3%)
10-15	0	12.5	20.0	0	2.6	4 (4.3%)	1 (8.3%)
30	0	0	0	0	1.3	1 (1.1%)	0
40	0	0	0	0	0	0	1 (8.3%)
	(1)	(8)	(5)	(1)	(78)	(93)	(12)

Basal Glazing Characters	Late 15th century (5)	Late 15th-early 16th century (2)	16th century (34)	Total (41)	Hexagonal Ming BW (3)
Regularly glazed base	4 (80%)	2 (100%)	33 (97.1%)	39 (95.1%)	3 (100%)
Dirty base	0	0	1 (2.9%)	1 (2.4%)	0
Unglazed base	1 (20%)	0	0	1 (2.4%)	0

N.B. One piece dated to the late 15th-early 16th century had two layers of glaze on both faces, but all other observed glazes had only one layer.

TABLE B-20. MING *MERAH*, WANLI BW AND LATE MING BW WARES

	Overglaze *Famille verte*	Over-glaze Red	Total Ming *Merah*	Wanli BW	Wanli BW/ overglaze *F.verte*	Wanli Red/ *F.verte*	Total Wanli BW	Late Ming BW	Late BW/ red	Late Ming Red/ *F. verte*	Total Late Ming BW
Plates	6	13	19	50	0	1	51	133	1	9	143
Bowls	1	7	8	153	1	1	155	203	0	1	204
Small bowls	0	0	0	15	0	0	15	5	0	0	5
Cups	0	0	0	25	0	1	26	2	0	1*	3
Ashtray	0	0	0	1	0	0	1	0	0	0	0
"Open"	0	0	0	0	0	0	0	2	0	0	2
Boxes	0	0	0	19	0	0	19	12	0	2	14
Jarlets	0	0	0	2	0	0	2	7	0	1	8
Vases	0	0	0	10	0	0	10	13	0	0	13
Jars	0	0	0	8	0	1	9	12	0	0	12
Balubu	0	0	0	2	0	0	2	11	0	0	11
Figure (duck)	0	0	0	0	0	0	0	1	0	0	1
Total	7	20	27	285	1	4	290	401	1	14	416

* Identified as a stem-cup.

TABLE B-21. MING RED AND LATER BW TRAITS (PERCENTAGES)

	Exterior Glaze								Interior Glaze							
Colour	Wanli BW	Wanli *Merah*	Total Wanli BW		Late Ming BW	Late Ming Red	Total Late Ming BW		Ming *F. verte*	Wanli BW	Wanli *Merah*	Total Wanli BW		Late Ming BW	Late Ming Red	Total Late Ming BW	
5B 7/1	3.8	0	1	(3.6)	2.2	0	1	(2.2)	0	0	0	0		2.2	0	1	(2.2)
<5B 7/1	0	0		0	0	0		0	0	0	0	0		0	0		0
5BG 7/1	0	0		0	4.4	0	2	(4.3)	0	0	0	0		4.4	0	2	(4.3)
<5BG7/1	3.8	0	1	(3.6)	6.7	0	3	(6.5)	0	4.2	0	1	(3.8)	6.7	0	3	(6.5)
5G 7/1	11.5	50	4	(14.3)	26.7	0	12	(26.1)	1	16.7	0	4	(15.4)	31.1	0	14	(30.4)
<5G 7/1	23.1	0	6	(21.4)	11.1	100	6	(13.0)	0	20.8	0	5	(19.2)	6.7	100	4	(8.7)
5Gy 6/1	0	0		0	2.2	0	1	(2.2)	0	0	0		0	2.2	0	1	(2.2)
5Gy 7/1	15.4	0	4	(14.3)	8.9	0	4	(8.7)	0	16.7	50	5	(19.2)	11.1	0	5	(10.9)
<5Gy7/1	11.5	50	4	(14.3)	15.6	0	7	(15.2)	0	8.3	50	3	(11.5)	17.8	0	8	(17.4)
5y 7/1	7.7	0	2	(7.1)	4.4	0	2	(4.4)	0	12.5	0	3	(11.5)	2.2	0	1	(2.2)
<5y 7/1	15.4	0	4	(14.3)	2.2	0	1	(2.2)	0	8.3	0	2	(7.7)	2.2	0	1	(2.2)
N8/-	7.7	0	2	(7.1)	8.9	0	4	(8.7)	0	12.5	0	3	(11.5)	6.7	0	3	(6.5)
> N8/-	0	0		0	2.2	0	1	(2.2)	0	0	0		0	2.2	0	1	(2.2)
< N7/-	0	0		0	2.2	0	1	(2.2)	0	0	0		0	2.2	0	1	(2.2)
5Y 7/1	0	0		0	2.2	0	1	(2.2)	0	0	0		0	2.2	0	1	(2.2)
Thickness																	
1	0	0		0	0	0		0	0	4.2	0	1	(3.8)	0	0		0
2	15.4	50	5	(17.9)	8.0	100	5	(10.9)	1	20.8	50	6	(23.1)	6.7	100	4	(8.7)
3	73.1	50	20	(71.4)	80.0	0	36	(78.3)	0	66.7	50	17	(65.4)	86.7	0	39	(84.8)
4	7.7	0	2	(7.1)	4.4	0	2	(4.3)	0	4.2	0	1	(3.8)	2.2	0	1	(2.2)
5	3.8	0	1	(3.6)	4.4	0	2	(4.3)	0	4.2	0	1	(3.8)	2.2	0	1	(2.2)
6	0	0		0	2.2	0	1	(2.2)	0	0	0		0	2.2	0	1	(2.2)
Number																	
1 layer	100	100	28	(100)	97.8	100	45	(97.8)	1	100	100	26	(100)	97.8	100	45	(97.8)
2 layers	0	0		0	0	0		0	0	0	0		0	2.2	0	1	(2.2)
3 layers	0	0		0	2.2	0	1	(2.2)	0	0	0		0	0	0		0
	(26)	(2)		(28)	(45)	(1)		(46)	(1)	(24)	(2)		(26)	(45)	(1)		(46)

TABLE B-21. MING RED AND LATER BW TRAITS (CONT.)

Body Colour	Ming *F. verte* (1)	Wanli BW	Wanli *F. verte*/Red	Total Wanli BW (28)	Late Ming BW	Late Ming Red	Total Late Ming BW (46)
N8/-	0	38.5	0	10 (35.7%)	24.4	0	11 (23.9%)
> N8/-	0	23.1	50.0	7 (25.0%)	26.7	0	12 (26.1%)
< N7/-	0	15.4	50.0	5 (17.9%)	13.3	0	6 (13.0%)
N7/-	0	3.8	0	1 (3.6%)	22.2	0	10 (21.7%)
5YR 8/1	0	7.7	0	2 (7.1%)	2.2	0	1 (2.2%)
5YR 7/1	0	7.7	0	2 (7.1%)	4.4	100.0	3 (6.5%)
5YR 8/2	0	0	0	0	2.2	0	1 (2.2%)
7.5YR 8/2	0	0	0	0	2.2	0	1 (2.2%)
10YR 8/2	0	3.8	0	1 (3.6%)	2.2	0	1 (2.2%)
5YR 8/3	100.0	0	0	0	0	0	0
Hardness							
7	100.0	11.5	50.0	4 (14.3%)	31.1	0	14 (30.4%)
8	0	61.5	50.0	17 (60.7%)	48.9	0	22 (47.8%)
9	0	26.9	0	7 (25.0%)	20.0	100.0	10 (21.7%)
% Inclusions							
0	0	42.3	0	11 (39.3%)	4.4	0	2 (4.3%)
1	0	26.9	100.0	9 (32.1%)	64.4	100.0	30 (65.2%)
2-3	0	19.2	0	6 (17.9%)	22.2	0	10 (21.7%)
5	100.0	7.7	0	2 (7.1%)	4.4	0	2 (4.3%)
10	0	3.8	0	1 (3.6%)	2.2	0	1 (2.2%)
20	0	0	0	0	2.2	0	1 (2.2%)
Body Type							
China Porcelain	0	46.2	50.0	13 (46.4%)	33.3	0	15 (32.6%)
Almost CP	0	3.8	0	1 (3.6%)	11.1	0	5 (10.9%)
Semi-porcelain	0	42.3	50.0	12 (42.9%)	24.4	0	11 (23.9%)
Stoneware	100.0	7.7	0	2 (7.1%)	31.1	100.0	15 (32.6%)
Slipping							
No	0	100.0	100.0	28 (100.0%)	100.0	100.0	46 (100.0%)
Interior face	100.0	0	0	0	0	0	0

Translucency	Ming *F. verte* (1)	Wanli BW (None *Merah*) (15)	Late Ming BW	Late Ming Red	Total Late Ming BW (40)
Not translucent	100.0	4 (26.7%)	64.1	100.0	26 (65.0%)
Faintly translucent	0	1 (6.7%)	17.9	0	7 (17.5%)
Clearly translucent (Y)	0	10 (66.7%)	17.9	0	7 (17.5%)

Basal glazing Characters	Ming *F. verte* (1)	Wanli BW (6)	Late Ming BW (23)
Fully glazed base	0	100.0	22 (95.7%)
Unglazed base	100.0	0	1 (4.3%)

Swatow-like characters and may not be fully representative of the *Ming merah* class.

B.3.10 Wanli blue-and-white and late Ming BW

Demmanari and I identified Wanli blue-and-white wares mainly through their delicacy which included a soft clear glaze, whitish porcelain to porcellanous body (Table B-21), and silvery blue decorations executed with care (Macintosh, 1977:60). The dominant vessel form was bowls, notably examples with slender graceful cavettos, while smaller vessels such as cups and small bowls were also prominent. One piece combined red enamels with the underglaze decorations, and four pieces were decorated only with red or famille verte enamels (Table B-20).22

As understood by McElney (1979) *Kraak porselein*, which was given its name by the Dutch to commemorate their seizure of a Portuguese carrack laden with the wares in 1603, is almost synonymous with SSPHAP's Wanli class. McElney draws attention to the delicate potting and silvery blue decorations. He further outlines a chronology between 1550 and 1640 based on precisely the decorative repertoire Demmanari and I associated with Wanli - e.g. animals and humans depicted as central emblems, animals and subtle floral motifs in vertical panels (e.g. Photos 10-24 and 10-25), and the "eight precious things". On the other hand, Medley (1980:225-229) asserts that Kraak wares were exported to Southeast Asia and thence to Europe throughout the 17th century, while Kwan and Martin (1985:131) extend the temporal range of Kraak to the early 18th century. The repertoire Medley describes includes open vessels with complex landscapes, which we would have classified as Swatow (B.3.11), and she notes a specifically 17th century tendency towards "moth-eaten" or flaky glaze along the rims, which would also have struck us as a Swatow characteristic. In addition SSPHAP's Wanli class includes some large closed vessels (Table B-20) which would not be matched among the range of Kraak forms described in the

[22] These overglaze-decorated Wanli wares were too rare to constitute their own class and so are pooled into the Wanli BW class.

literature, probably because *Kraak porselein* refers primarily to the export wares marketed to meet European tastes.

By the latter stages of fieldwork recording sites, and certainly in the laboratory, SSPHAP followed the lead of Medley (1980:230-232) in recognising a "Transitional (Ming-Qing) BW" class. In practice Demmanari and I also used it as a pigeonhole for pieces combining Ming with early Qing traits. The pieces were not always clearly distinct from Wanli (cf. Medley, 1980:229), and we tended to prefer the "Transitional" classification in the absence of the Wanli specialisations, e.g. tendencies to a stronger or more irregular glaze, coarser body (Table B-21), larger vessel form (Table B-20) or decorations in stronger blues. I renamed the class "late Ming blue-and-white" after seriation appeared to demonstrate its contemporaneity with Wanli wares (Bulbeck, 1989). The class includes one piece with overglaze red decorations complementing the underglaze blue, and 14 pieces decorated only with overglaze enamels, usually red (Table B-20).

B.3.11 The Swatow family

Swatow, a major South China port close to the presumed kilns, has given its name to a variable group of wares produced mainly for the Japanese and Southeast Asian markets between the 16th and 17th centuries (Medley, 1980:234-236). The primary reference on Swatow catalogues five main groups: BW pieces painted in a "Simple" style and monochromes, both produced mainly during the middle 16th century decades; and BW pieces and enamelled polychromes decorated in a "Complex" style, as well as slip-decorated wares, produced mainly during the reign of Wanli (Harrisson, 1979).

Except for the slip-decorated wares, all of Harrisson's main groups were recorded among SSPHAP's assemblages. Furthermore, "Swatow" in South Sulawesi also covers miscellaneous monochromes which cannot be readily classified elsewhere, and Qing period vessels whose decorations hearken after the Swatow style. A three-stage chronology of "Ming Swatow", "Swatow" and "Qing Swatow" has become entrenched in the local classificatory system. Recognising the importance

of these abundantly represented classes for my chronological determinations, I embarked on a sustained project to systematise the variation among these wares. After studying hundreds of pieces in detail I developed a brief way of codifying the body, glaze and decorative style, which I then also applied during the laboratory work carried out jointly with Karaeng Demmanari (detailed below).

Body Type

1. Usual Qing porcelain, such as that found in modern Chinese wares. The body was dead white, clearly translucent, and very low in impurities.

2. "Soft paste" bodies. Here I had attempted to recognise an innovation of the Kangxi reign described by Macintosh (1977:74). Indeed, it seemed that wares which we identified as Kangxi often had a body subtly different from the usual Qing porcelain in being harder, less translucent, and of slightly coarser crystallisation. Possibly I was recognising an older type of Qing porcelain body, but its relation to the rare "soft paste" body would be oblique at best.

3. "Semiporcelain"-type bodies, showing both porcelain and stoneware characteristics, plus a sugary appearance when viewed at 30X.

4. Usual Swatow stoneware bodies. These bodies tended to be hard and well-fired, comparatively free of impurities and white to light grey in colour (Table B-26).

5. Poorer Swatow stoneware bodies. These tended to be low on Moh's hardness scale, lower fired, fuller of inclusions and more earthy in colour. Occasionally they qualified as earthenwares (Table B-25).

Glaze Type

A. Nearly perfect Qing-type glazes. Colourless glazes with virtually no traces of macroscopic defects, nor muffling of the decorations owing to microscopic defects.

B. Imperfect Qing-type glazes. Distinguished from the "A" glazes by slight muffling of the decorations owing to sheeny specks and other microscopic defects within the glaze. These

glazes also occasionally contained inclusions or other macroscopic defects.

C. Usual Swatow-type glaze. In microscopic view these glazes looked full of bubbles and showed numerous sheeny specks and other defects. Macroscopically they corresponded to the greyer Munsell light gley colours, appeared flakey at the edges of the sherd and often had pronounced crackling.

D. Poor Swatow-type glazes. Microscopically they were crowded with bubbles and defects. Macroscopically they tended to be heavily crackled, slightly earthy in colour, and covered with small holes where glaze bubbles had exploded at the glaze surface. Usually the glaze was in the process of flaking off the sherd.

E. Oily Swatow-type glazes. These were distinguished from the "D" and poorer "C" types by their pronounced brownish tinge, and a greasey consistency when viewed at 30X.

F. Ghostly Swatow-type glazes. Here the defects within the glaze were so pronounced that the decorations were heavily muffled and only irregularly visible.

G. Celadon Swatow-type glaze. Particularly rich and lustrous by Swatow standards, these glazes usually corresponded to the greener Munsell light gley colours. They were more characteristic of enamelled wares, where the glaze provided a pleasant backdrop to the decorations, than on the BW wares when the glaze would have obscured the motifs.

Decorative Type

I. Very fine decorations with clean tones and fine outlines; similar in theme to miniature versions of the Swatow motifs.

II. Devolved Swatow-type decorations. One group of these fell along the path of devolution, driven by repeated copying over the generations, which can be traced through wares 3201-3241 of the 1760s "Geldermalsen" cargo (van der Waal and Sheaf, 1986) to the *Fu* and related plates within Willetts' (1981) "Kitchen Ch'ing" wares. The other group consisted of cases where a single Swatow rim motif was repeated as a lattice decoration. The most common example, which I call roundelwares and which Macknight (1976:Figure 29[b]) calls

"Kellor" decoration, concerns bowls and plates whose interior face is covered with roundels similar to the classical Swatow roundels.

III. "Classical" Swatow decorations, corresponding to the "Complex" style described by Harrisson (1979).

IV. 16th century Ming-type decorations. Here I exclude the standardised Ming motifs such as conch shells, double *vajra* and hexagons, and instead refer to a medley of landscape and figurative motifs which can be found on similarly potted wares. Any particular motif occurred rarely but collectively they constituted a common decorative substratum. Classification of pieces bearing these designs depended on whether the body and glaze conformed to Ming BW or to Swatow standards.

V. Decorations corresponding to Harrisson's (1979) "Simple" style. Emphasis is on large motifs, often a single emblem in the centre such as a flower. Decorations tended to be poorly oxidised and muddy greyish blue owing to the weak dilutions of cobalt applied as thick lines and broad sheets. Harrisson and Shariffuddin (1969:Plate 18) show some of the examples excavated at Sungai Lumut in Brunei,[23] while a 16th century shipwreck excavated in the Philippines also contained numerous specimens (Goddio, 1988).

VI. Pieces which are either undecorated or carry extant decorations too miniscule or generalised to indicate membership in any of types "I" to "V".

As shown by cross-tabulation, the frequencies of body, glaze and decorative types systematically vary across the Qing Swatow, Swatow and Ming Swatow classes as identified by Demmanari and myself (Table B-22). The patterns of co-variation are particularly clear by the cross-tabulation of body, glaze and decorative types shown in Table B-23. To read the table, imagine that the five two-way comparisons are stacked on top of each other in three-dimensional space, starting at body type "2" at the top and ending at body type "5". One could then see that vast majority of the observed combinations of characters fall along an axis from

[23] The excavators dated the site to the 15th century, but the figured examples clearly span the 14th to 16th centuries.

top-top-left to bottom-bottom-right. Most of the Qing Swatow pieces - identified by their porcellanous body, Qing-type glaze and devolved Swatow decorations - sit at the top-top-left; the Swatow pieces tend to occupy the centre of the cube; and at the bottom-bottom-right come the Ming Swatow pieces with their coarse bodies and glazes and 16th century decorative styles. By this analysis the three Swatow classes represent nodes along a continuum, which would legitimise the practice in South Sulawesi of treating them as related.

I have also drawn lines in Table B-23 to section off the cells dominated by the Qing Swatow, Swatow and Ming Swatow classes. In cases where equal numbers of two classes are present, the cell is attributed to the class less well represented in the total sample (i.e., not Swatow). More

TABLE B-22. PERCENTAGES OF THE BODY, GLAZE AND DECORATIVE TYPES AMONG THE SWATOW CLASSES IDENTIFIED IN UJUNG PANDANG

Body Type	Number	Qing Swatow	Swatow	Ming Swatow
"2"	139	96.4%	3.6%	0%
"1"	29	89.7%	10.3%	0%
"3"	207	24.6%	72.0%	3.4%
"4"	581	1.5%	82.6%	15.8%
"5"	419	0%	8.1%	91.9%
Glaze Type				
"A"	33	97.0%	3.0%	0%
"B"	257	54.1%	45.1%	0.8%
"C"	484	8.1%	76.9%	15.1%
"G"	110	8.2%	74.5%	17.3%
"F"	45	2.2%	44.4%	53.3%
"D"	289	0%	18.7%	81.3%
"E"	157	0%	16.6%	83.4%
Decorative Type				
"I"	56	91.1%	7.1%	1.8%
"II"	159	70.4%	22.6%	0%
"III"	602	7.5%	69.9%	22.6%
"VI"	208	4.8%	53.4%	41.8%
"IV"	250	0.8%	33.2%	66.0%
"V"	100	0%	5.0%	95.0%
Total pieces	(1375)	(220)	(671)	(484)

TABLE B-23. LOCATION OF THE IDENTIFICATIONS IN TABLE B-22 BY COMBINATIONS OF BODY, GLAZE AND DECORATIVE TYPES

	"I"	"II"	"III"	"VI"	"IV"	"V"
"2A"	9QS	7QS	4QS			
"2B"	21QS	45QS	14QS;3S	2QS	2QS	
"2C"		15QS	12QS			
"2G"		1QS	2QS			
"2F"		2S		(Swatow)		
"2E						
"2D"						

	"I"	"II"	"III"	"VI"	"IV"	"V"
"1A"	4QS	1QS		1QS		
"1B"	8QS;1S	8QS	3QS;1S			
"1C"	1QS;1S					
"1G"	(Qing Swatow)					
"1F"				(Swatow)		
"1E"						
"1D"						

	"I"	"II"	"III"	"VI"	"IV"	"V"
"3A"	4QS		1QS	1QS		
"3B"	2QS	22QS;4S	3QS;24S	2QS;1S		1S
"3C"	1QS	7QS;7S	2QS;55S;2MS	14S	7S	1S
"3G"	(Qing Swatow)		3QS;3S	1QS;5S	1S	
"3F"			3S	1QS;2S	1S	
"3E"		1S	3S	1S	2S;1MS	1MS
"3D"	(Swatow)		6S;1MS	2S	5S;2MS	

	"I"	"II"	"III"	"VI"	"IV"	"V"
"4A"			1S			
"4B"	1QS;1S	4QS;19S	1QS;40S	1QS;8S	9S;1MS	
"4C"	1S	1QS;9S	186S;8MS	30S	40S;7MS	8MS
"4G"			39S	1QS;33S;2MS	1MS	
"4F"	(Swatow)		7S	1S	1S	1MS
"4E"		1S	8S;1MS	4S;1MS	2S	1S;3MS
"4D"		1S	19S;5MS	4S;11MS	15S;16MS	27MS

	"I"	"II"	"III"	"VI"	"IV"	"V"
"5A"						(Ming
"5B"		1S	2S	1S	1MS	Swatow)
"5C"		2S	15S;21MS	4S;4MS	19MS	4MS
"5G"			1S;7MS	8MS	1MS	
"5F"	(Swatow)		2S;10MS	1S;6MS	4MS	3MS
"5E"			1S;34MS	33MS	24MS	2S;33MS
"5D"	1MS		2S;47MS	31MS	79MS	15MS

N.B. QS stands for Qing Swatow pieces, S for Swatow pieces and MS for Ming Swatow pieces.

precisely, two cells which would scrape in as Qing Swatow by this procedure ("3BVI" and "3GIII"), but which protrude into a space of cells otherwise dominated by Swatow, are treated as Swatow cells because we are dealing with a continuum in variation.[24] After the three dimensions of variation are carved up into Qing Swatow, Swatow and Ming Swatow spaces, we see that less than ten percent of the pieces as identified by Demmanari and myself occur in the wrong space. Clearly our laboratory identifications were by and large consistent, and the minor inconsistencies reflect the point that the three classes fall along a single range of continuous variation. To enhance the degree of consistency I have reclassified the pieces falling in the wrong space according to Table B-23, which involves 9.1% of the original Qing Swatow pieces becoming Swatow, 9.8% of the original Swatow pieces becoming Ming Swatow, and 6.6% of the original Ming Swatow pieces becoming Swatow.[25] These figures exclude the pieces whose body, glaze and decorative type I did not note, and hence whose original classification made by Demmanari and myself is simply retained.[26]

Table B-24 shows the composition of the three Swatow classes by decorative style, or glaze type when no decorations were extant, and by vessel form. The Ming Swatow and Swatow classes show remarkably comparable proportions of vessel forms, apart from the declining frequency of *balubu* in the Swatow class.[27] There is however a clear trend towards greater use of overglaze enamels with the Swatow class, in line with Harrisson's (1979) notes on chronological changes. The Qing Swatow wares differ from the Swatow class by a clear shift towards smaller vessels, including the loss of *balubu*;

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[24] The choice of where to draw the lines through the empty spaces of unfilled cells is of course largely arbitrary.
[25] In my PC tradewares file, these pieces are tagged by showing the original classification in brackets after the reclassification.
[26] Involving 42 Qing Swatow pieces, 180 Swatow pieces and 276 Ming Swatow pieces, most of them from the site museum collection at Tallok's royal graveyard (U.25.1).
[27] As with the Ming BW wares, the majority of the Ming Swatow and Swatow *balubu* were also recorded within assemblages associated with Makassar palaces.

TABLE B-24. COMPOSITION OF THE SWATOW FAMILY CLASSES

Ming Swatow	Plates	Bowls	Small Bowls	Dishes	"Open"	Boxes	Jar-lets	Vases	Jars	*Balubu*	Total
Blue-and-white	465	100	2	3	1	8	8	3	15	84	689
BW/enamelled	2	0	0	0	0	0	0	0	0	0	2
Overglaze enamels	31	5	0	0	1	1	0	1	0	0	39
Subceladons	1	1	0	0	0	0	0	0	1	0	3
Whitewares	1	0	0	0	0	0	0	0	0	0	1
Plain	17	5	0	1	1	1	0	0	1	0	26
Total Ming Swatow	517	111	2	4	3	10	8	4	17	84	760

Swatow	Plates	Bowls	Small Bowls	Dishes	"Open"	Boxes	Jar-lets	Vases	Jars	*Balubu*	Total
Blue-and-white	485	126	4	2	3	9	3	2	16	28	678
BW/enamelled	2	1	0	0	0	0	0	0	0	0	3
Overglaze enamels	75	21	2	0	1	6	0	2	2	0	109
Celadons	5	1	0	0	0	0	0	0	0	0	6
Subceladons	12	7	0	0	0	0	2	0	0	0	21
Whitewares	4	6	0	0	0	0	0	0	0	0	10
Plain	15	6	1	0	0	0	0	0	2	0	24
Total Swatow	598	168	7	2	4	15	5	4	20	28	851

Qing Swatow	Plates	Bowls	Small Bowls	Cups	Boxes	Jar-lets	Vases	Jars	Spoons	Total
Blue-and-white	113	83	8	1	7	3	4	3	1	223
BW/enamelled	3	1	1	0	0	1	0	0	0	6
Overglaze enamels	14	12	1	0	3	0	4	0	0	34
Total Qing Swatow	130	96	10	1	10	4	8	3	1	263

N.B. Qing Swatow pieces lacking traces of decoration would have been classified with the "Qing white" pieces.

TABLE B-25. CHARACTERS OF MING SWATOW WARES (PERCENTAGES)

Basal glazing Traits	Ming Swatow BW (36)	Ming Swatow *Merah* (2)	Plain Ming Swatow (3)	Total (41)
Ordinarily glazed base	61.1%	50.0%	0%	23 (56.1%)
Red-glazed base	2.8%	0%	0%	1 (2.4%)
Glaze-splashed base	11.1%	50.0%	0%	5 (12.2%)
Dirty glazed base	11.1%	0%	0%	4 (9.8%)
Unglazed base	13.9%	0%	100.0%	8 (19.5%)

TABLE B-25. CHARACTERS OF MING SWATOW WARES (CONT.)

	Exterior Glaze						Exterior Glaze					
Colour	Ming Swatow BW	Ming Swatow BW/Merah	Ming Swatow Merah	Plain Ming Swatow	Total Ming Swatow		Ming Swatow BW	Ming Swatow BW/Merah	Ming Swatow Merah	Plain Ming Swatow	Total Ming Swatow	
Green/Brown A5	0	0	0	9.1	1	(0.7%)	0	0	0	7.7	1	(0.7%)
Green/Brown A6	0	0	0	0		0	0	0	0	7.7	1	(0.7%)
5BG 6/1	0.8	0	0	0	1	(0.7%)	0	0	0	0		0
5BG 7/1	0.8	0	0	0	1	(0.7%)	1.6	0	0	0	2	(1.4%)
5G 6/1	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
5G 7/1	3.3	0	0	0	4	(2.9%)	4.0	0	0	0	5	(3.5%)
< 5G 7/1	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
5Gy 5/1	0	0	0	0		0	0.8	0	0	0	1	(0.7%)
5Gy 6/1	1.6	0	16.7	18.2	5	(3.6%)	2.4	0	16.7	15.4	6	(4.2%)
5Gy 7/1	28.7	100.0	0	45.5	41	(29.3%)	26.6	100.0	0	38.5	39	(27.1%)
< 5Gy 7/1	11.5	0	0	0	14	(10.0%)	11.3	0	0	0	14	(9.7%)
5y 7/1	9.8	0	50.0	0	15	(10.7%)	10.5	0	50.0	7.7	17	(11.8%)
< 5y 7/1	13.1	0	16.7	0	17	(12.1%)	12.9	0	16.7	7.7	18	(12.5%)
> N8/-	3.3	0	0	9.1	5	(3.6%)	1.6	0	0	0	2	(1.4%)
5Y 8/1	0.8	0	0	0	1	(0.7%)	1.6	0	0	0	2	(1.4%)
2.5Y 8/2	0.8	0	0	0	1	(0.7%)	1.6	0	0	0	2	(1.4%)
5Y 8/2	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
> 5Y 8/2	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
10YR 8/3	1.6	0	0	0	2	(1.4%)	1.6	0	0	0	2	(1.4%)
5Y 7/1	3.3	0	0	9.1	5	(3.6%)	4.0	0	0	7.7	6	(4.2%)
10Y 7/1	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
< 10YR 7/2	0.8	0	0	0	1	(0.7%)	1.6	0	0	0	2	(1.4%)
10YR 7/2	1.6	0	0	0	2	(1.4%)	2.4	0	0	0	3	(2.1%)
5Y 7/2	5.7	0	0	0	7	(5.0%)	4.0	0	0	0	5	(3.5%)
2.5Y 7/2	0	0	16.7	0	1	(0.7%)	0	0	16.7	0	1	(0.7%)
10YR 7/3	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
< 5Y 6/1	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
5Y 6/1	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
5Y 6/2	1.6	0	0	0	2	(1.4%)	2.4	0	0	0	3	(2.1%)
2.5Y 6/2	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
10YR 6/2	0.8	0	0	0	1	(0.7%)	0	0	0	0		0
5Y 6/3	0.8	0	0	0	1	(0.7%)	0.8	0	0	0	1	(0.7%)
10YR 6/3	0	0	0	9.1	1	(0.7%)	0	0	0	7.7	1	(0.7%)
R10 6/2	0.8	0	0	0	1	(0.7%)	0	0	0	0		0
5YR 6/4	0.8	0	0	0	1	(0.7%)	0	0	0	0		0
5YR 7/6	0	0	0	0		0	0.8	0	0	0	1	(0.7%)
Thickness												
1	1.6	0	0	0	2	(1.4%)	0	0	0	7.7	1	(0.7%)
2	6.6	0	0	0	8	(5.7%)	8.1	0	0	0	10	(6.9%)
3	57.4	0	16.7	45.5	76	(54.3%)	56.5	0	33.3	61.5	80	(55.6%)
4	4.9	0	16.7	18.2	9	(6.4%)	4.0	0	0	7.7	6	(4.2%)
5	29.5	100.0	66.7	36.4	45	(32.1%)	31.5	100.0	66.7	23.1	47	(32.6%)
Number												
1 layer	78.7	0	66.7	81.8	109	(77.9%)	80.6	0	66.7	84.6	115	(79.9%)
2 layers	18.0	100.0	33.3	18.2	27	(19.3%)	17.7	100.0	33.3	15.4	27	(18.8%)
3 layers	2.5	0	0	0	3	(2.1%)	1.6	0	0	0	2	(1.4%)
4 layers	0.8	0	0	0	1	(0.7%)	0	0	0	0		0
Total	(122)	(1)	(6)	(11)		(140)	(124)	(1)	(6)	(13)		(144)

TABLE B-25. CHARACTERS OF MING SWATOW WARES (CONT.)

Exterior Body Colour

	Ming Swatow BW	Ming Swatow BW/*Merah*	Ming Swatow *Merah*	Plain Ming Swatow	Total Ming Swatow
> N8/-	1.6	0	0	7.7	3 (2.1%)
< N7/-	4.8	0	0	0	6 (4.2%)
N7/-	6.5	0	0	0	8 (5.6%)
< N6/-	0.8	0	0	0	1 (0.7%)
N6/-	0.8	0	0	0	1 (0.7%)
N5/-	0	0	16.7	0	1 (0.7%)
5YR 8/1	2.4	0	0	0	3 (2.1%)
7.5YR8/1	0.8	0	0	0	1 (0.7%)
10YR 8/1	2.4	0	0	0	1 (2.1%)
5Y 8/1	1.6	0	0	0	2 (1.4%)
5YR 8/2	2.4	0	16.7	7.7	5 (3.5%)
7.5YR8/2	1.6	0	0	7.7	3 (2.1%)
10YR 8/2	2.4	0	0	0	3 (2.1%)
5Y 8/2	0.8	0	0	0	1 (0.7%)
5YR 8/3	7.3	0	0	15.4	9 (6.3%)
10YR 8/3	4.8	0	16.7	0	7 (4.9%)
5Y 8/3	0.8	0	0	0	1 (0.7%)
5YR 8/4	0.8	0	0	7.7	2 (1.4%)
7.5YR8/4	2.4	0	0	0	3 (2.1%)
2.5Y 8/4	0.8	0	0	0	1 (0.7%)
<5YR 7/1	4.0	0	16.7	0	27 (18.8%)
5YR 7/1	21.8	0	0	0	27 (18.8%)
7.5YR7/1	1.6	0	0	0	2 (1.4%)
10YR 7/1	2.4	0	0	0	3 (2.1%)
5Y 7/1	0.8	0	0	0	1 (0.7%)
5YR 7/2	4.0	0	0	0	5 (3.5%)
7.5YR7/2	0.8	0	0	7.7	2 (1.4%)
10YR 7/2	0.8	0	0	0	1 (0.7%)
5YR 7/3	2.4	0	0	7.7	4 (2.8%)
5YR 7/4	0	0	0	7.7	1 (0.7%)
7.5YR7/4	0	0	0	7.7	1 (0.7%)
7.5YR7/6	1.6	0	0	0	2 (1.4%)
5YR 6/2	0	0	0	7.7	1 (0.7%)
7.5YR6/2	1.6	0	0	7.7	3 (2.1%)
10YR 6/2	0.8	0	0	0	1 (0.7%)
2.5Y 6/2	0	0	16.7	0	1 (0.7%)
10YR 6/3	0.8	0	0	0	1 (0.7%)
5YR 6/4	1.6	0	0	0	2 (1.4%)
5YR 6/6	2.4	0	0	0	3 (2.1%)
2.5YR6/8	0	0	0	7.7	1 (0.7%)
5YR 5/1	0.8	0	0	0	1 (0.7%)
2.5YR5/2	0.8	0	0	0	1 (0.7%)
2.5YR5/4	1.6	100.0	0	0	3 (2.1%)
5YR 4/2	0.8	0	0	0	1 (0.7%)
10R 5/6	0.8	0	0	0	1 (0.7%)
Total	(124)	(1)	(6)	(13)	(144)

Hardness

	Ming Swatow BW	Ming Swatow BW/*Merah*	Ming Swatow *Merah*	Plain Ming Swatow	Total Ming Swatow
3	0.8	0	0	0	1 (0.7%)
4	1.6	0	0	0	2 (1.4%)
5	12.1	0	16.7	23.1	19 (13.2%)
6	5.6	0	0	7.7	8 (5.6%)
7	62.9	100.0	83.3	61.5	92 (63.9%)
8	15.3	0	0	7.7	20 (13.9%)
9	1.6	0	0	0	2 (1.4%)

% of Body Inclusions

1	22.5	0	16.7	15.4	31 (21.5%)
3	37.1	100.0	16.7	30.8	52 (36.1%)
5	25.8	0	0	53.8	39 (27.1%)
8	0.8	0	0	0	1 (0.7%)
10	11.3	0	50.0	0	17 (11.8%)
15	0.8	0	16.7	0	2 (1.4%)
20	1.6	0	0	0	2 (1.4%)

Body Type

SP	0.8	0	0	0	1 (0.7%)
PP	1.6	0	0	0	2 (1.4%)
SW	92.7	100.0	100.0	84.6	133 (92.4%)
EW	4.8	0	0	15.4	8 (5.6%)
	(124)	(1)	(6)	(13)	(144)

Translucency

N	98.7	100.0	100.0	100.0	90 (98.9%)
F	1.3	0	0	0	1 (1.1%)
	(75)	(1)	(5)	(10)	(91)

Slipping

None	97.6	-	100.0	77.8	133 (96.4%)
X	0.8	-	0	0	1 (0.7%)
X & I	1.6	-	0	22.2	4 (2.9%)
	(125)	(0)	(4)	(9)	(138)

N.B. Ming Swatow *merah* sample includes three pieces with red enamel decorations and three with *famille verte* decorations. Plain Swatow sample includes three "subceladons" as well as outer wall 2.5YR 5/4 and inner wall 2.5YR 5/2 (both BW); outer wall 7.5YR 6/2 and inner wall 2.5YR 5/2 (subceladon). Unglazed central stacking rings were observed on one *famille verte* and four BW specimens; while two open BW vessels had unglazed centres.

TABLE B-26. SWATOW AND QING SWATOW TRAITS (PERCENTAGES)

Exterior Glaze Colour	Swatow BW	Swatow BW/Merah	Swatow Merah	Plain Swatow	Total Swatow	Qing Swatow BW	Qing Swatow Merah	Total Qing Swatow
Green/Brown A5	0	0	4.3	14.3	2 (1.2%)	0	0	0
< 5B 7/1	0	0	0	0	0	1.6	0	1 (1.6%)
5BG 7/1	0.8	0	0	0	1 (0.6%)	9.8	0	6 (9.4%)
< 5BG 7/1	0.8	0	0	0	1 (0.6%)	8.2	0	5 (7.8%)
5G 6/1	0.8	0	0	0	1 (0.6%)	0	0	0
5G 7/1	9.8	0	34.8	0	21 (12.7%)	16.4	0	10 (15.6%)
< 5G 7/1	4.5	0	8.7	0	8 (4.8%)	24.6	66.7	17 (26.6%)
5Gy 6/1	0	0	13.0	14.3	4 (2.4%)	0	0	0
5Gy 7/1	34.6	0	17.4	42.9	53 (32.1%)	4.9	0	3 (4.7%)
< 5Gy 7/1	16.5	0	4.3	0	23 (13.9%)	4.9	0	3 (4.7%)
5y 6/1	0.8	50.0	0	0	2 (1.2%)	0	0	0
5y 7/1	6.8	0	17.4	14.3	14 (8.5%)	0	0	0
< 5y 7/1	12.0	0	0	0	16 (9.7%)	4.9	0	3 (4.7%)
N8/-	3.8	0	0	0	5 (3.0%)	19.7	33.3	13 (20.3%)
> N8/-	2.3	0	0	0	3 (1.8%)	3.3	0	2 (3.1%)
< N7/-	1.5	0	0	0	2 (1.2%)	0	0	0
N7/-	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/1	0.8	0	0	0	1 (0.6%)	0	0	0
5Y 8/1	0.8	0	0	0	1 (0.6%)	0	0	0
7.5YR 8/2	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/2	0.8	0	0	14.3	2 (1.2%)	0	0	0
10YR 8/3	0.8	0	0	0	1 (0.6%)	0	0	0
5YR 7/1	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 7/1	0	0	0	0	0	1.6	0	1 (1.6%)
5Y 7/1	0	50.0	0	0	1 (0.6%)	0	0	0
Interior Glaze Colour								
Neutral 6	0.8	0	0	0	1 (0.6%)	0	0	0
Green/Brown A5	0	0	4.2	14.3	2 (1.2%)	0	0	0
< 5B 7/1	0	0	0	0	0	1.6	0	1 (1.6%)
5BG 6/1	0.8	0	0	0	1 (0.6%)	0	0	0
5BG 7/1	0.8	0	0	14.3	2 (1.2%)	11.5	0	7 (10.9%)
< 5BG 7/1	0.8	0	0	0	1 (0.6%)	6.6	0	4 (6.3%)
5G 6/1	1.5	0	4.2	0	3 (1.8%)	0	0	0
5G 7/1	6.8	0	29.2	0	16 (9.6%)	14.8	0	9 (14.1%)
< 5G 7/1	4.5	0	8.3	0	8 (4.8%)	26.2	66.7	18 (28.1%)
5Gy 6/1	0	0	12.5	14.3	4 (2.4%)	0	0	0
5Gy 7/1	34.6	0	25.0	42.9	55 (33.1%)	3.3	0	2 (3.1%)
< 5Gy 7/1	16.5	0	4.2	0	23 (13.9%)	4.9	0	3 (4.7%)
5y 6/1	0.8	50.0	0	0	2 (1.2%)	0	0	0
5y 7/1	6.0	0	12.5	0	11 (6.6%)	0	0	0
< 5y 7/1	10.5	0	0	0	14 (8.4%)	4.9	0	3 (4.7%)
N8/-	3.8	0	0	0	5 (3.0%)	21.3	33.3	14 (21.9%)
> N8/-	3.0	0	0	0	4 (2.4%)	3.3	0	2 (3.1%)
< N7/-	1.5	0	0	0	2 (1.2%)	0	0	0
N7/-	0.8	0	0	0	1 (0.6%)	0	0	0
5YR 8/1	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/1	1.5	0	0	0	2 (1.2%)	0	0	0
5Y 8/1	0.8	0	0	0	1 (0.6%)	0	0	0
7.5YR 8/2	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/2	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/3	0.8	0	0	0	1 (0.6%)	0	0	0
< 5YR 7/1	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 7/1	0	0	0	0	0	1.6	0	1 (1.6%)
10YR 7/2	0.8	0	0	14.3	2 (1.2%)	0	0	0
5Y 7/1	0	50.0	0	0	1 (0.6%)	0	0	0

TABLE B-26. SWATOW AND QING SWATOW TRAITS (PERCENTAGES)

Exterior Glaze Thickness								
2	6.8	0	17.4	14.3	14 (8.5%)	8.2	0	5 (7.8%)
3	57.9	100.0	60.9	57.1	97 (58.8%)	85.2	100.0	55 (85.9%)
4	2.3	0	0	0	3 (1.8%)	4.9	0	3 (4.7%)
5	33.1	0	21.7	28.6	51 (30.9%)	0	0	0
6	0	0	0	0	0	1.6	0	1 (1.6%)
Exterior Glaze Number								
1 layer	82.7	100.0	73.9	85.7	135 (81.8%)	98.4	100.0	63 (98.4%)
2 layers	16.5	0	21.7	14.3	28 (17.0%)	1.6	0	1 (1.6%)
3 layers	0	0	4.3	0	1 (0.6%)	0	0	0
4 layers	0.8	0	0	0	1 (0.6%)	0	0	0
Interior Glaze Thickness								
1	0.8	0	0	0	1 (0.6%)	0	0	0
2	6.0	0	8.3	0	10 (6.0%)	6.6	0	4 (6.3%)
3	63.2	100.0	66.7	85.7	108 (65.1%)	88.5	100.0	56 (87.5%)
4	0.8	0	0	0	1 (0.6%)	3.3	0	2 (3.1%)
5	29.3	0	25.0	14.3	46 (27.7%)	0	0	0
6	0	0	0	0	0	1.6	0	1 (1.6%)
Interior Glaze Number								
1 layer	83.5	100.0	75.0	85.7	137 (82.5%)	98.4	100.0	63 (98.4%)
2 layers	15.8	0	16.7	14.3	26 (15.7%)	1.6	0	1 (1.6%)
3 layers	0	0	4.2	0	1 (0.6%)	0	0	0
4 layers	0.8	0	4.2	0	2 (1.2%)	0	0	0
Total	(133)	(2)	(23-24)	(7)	(165-166)	(61)	(3)	(64)
Exterior Body Colour								
N8/-	1.5	0	0	12.5	3 (1.8%)	45.9	33.3	29 (45.3%)
> N8/-	7.5	0	8.3	0	12 (7.2%)	14.8	66.7	11 (17.2%)
< N7/-	24.8	0	12.5	0	36 (21.6%)	16.4	0	10 (15.6%)
N7/-	24.1	50.0	37.5	75.0	48 (28.7%)	6.6	0	4 (6.3%)
< N6/-	1.5	0	0	0	2 (1.2%)	0	0	0
N6/-	0	0	12.5	0	3 (1.8%)	0	0	0
5YR 8/1	1.5	0	4.2	0	3 (1.8%)	6.6	0	4 (6.3%)
10YR 8/1	1.5	0	0	0	2 (1.2%)	1.6	0	1 (1.6%)
5Y 8/1	0.8	0	4.2	0	2 (1.2%)	0	0	0
5YR 8/2	2.3	50.0	0	0	4 (2.4%)	0	0	0
10YR 8/2	0.8	0	0	0	1 (0.6%)	0	0	0
10YR 8/3	0.8	0	0	0	1 (0.6%)	0	0	0
< 5YR 7/1	8.3	0	4.2	0	12 (7.2%)	0	0	0
5YR 7/1	14.3	0	0	0	19 (11.4%)	6.6	0	4 (1.6%)
7.5YR 7/1	0.8	0	0	0	1 (0.6%)	1.6	0	1 (1.6%)
10YR 7/1	2.3	0	12.5	12.5	7 (4.2%)	0	0	0
5YR 7/2	1.5	0	0	0	2 (1.2%)	0	0	0
7.5YR 7/2	1.5	0	0	0	2 (1.2%)	0	0	0
< 5YR 6/1	0.8	0	0	0	1 (0.6%)	0	0	0
5YR 6/1	1.5	0	0	0	2 (1.2%)	0	0	0
5YR 6/2	0	0	4.2	0	1 (0.6%)	0	0	0
7.5YR 6/2	1.5	0	0	0	2 (1.2%)	0	0	0
7.5YR 6/4	0.8	0	0	0	1 (0.6%)	0	0	0

TABLE B-26. SWATOW AND QING SWATOW TRAITS (CONT.)

Body Hardness								
5	0.8	0	0	0	1 (0.6%)	0	0	0
6	1.5	0	0	0	2 (1.2%)	0	0	0
7	40.9	0	41.7	25.0	66 (39.8%)	13.1	33.3	9 (14.1%)
8	43.2	50.0	54.2	75.0	77 (46.4%)	41.0	33.3	26 (40.6%)
9	13.6	50.0	4.2	0	20 (12.0%)	45.9	33.3	29 (45.3%)
% Inclusions								
0	0	0	0	0	0	6.6	33.3	5 (7.8%)
1	52.6	0	37.5	12.5	80 (47.9%)	77.0	66.7	49 (76.6%)
3	30.1	100.0	37.5	62.5	56 (33.5%)	11.5	0	7 (10.9%)
5	10.5	0	8.3	12.5	17 (10.2%)	4.9	0	3 (4.7%)
10	5.3	0	12.5	12.5	11 (6.6%)	0	0	0
15	0.8	0	4.2	0	2 (1.2%)	0	0	0
20	0.8	0	0	0	1 (0.6%)	0	0	0
Body Type								
China Porcelain	0	0	0	0	0	54.1	66.7	35 (54.7%)
Almost CP	3.1	0	0	0	4 (2.4%)	26.2	33.3	17 (26.6%)
Semi-porcelain	31.3	0	29.2	12.5	49 (29.7%)	13.1	0	8 (12.5%)
Stoneware	65.7	100.0	70.8	87.5	112 (67.9%)	6.6	0	4 (6.3%)
Slipping								
None	97.0	100.0	91.7	87.5	160 (95.8%)	100.0	100.0	64 (100%)
Interior only	0.8	0	0	0	1 (0.6%)	0	0	0
X and I	2.3	0	8.3	12.5	6 (3.6%)	0	0	0
Total	(131-133)	(2)	(24)	(8)	(165-167)	(61)	(3)	(64)
Translucency								
No	94.2	100.0	90.0	100.0	109 (94.0%)	27.7	33.3	14 (28.0%)
Faintly	4.7	0	10.0	0	6 (5.2%)	21.3	33.3	11 (22.0%)
Yes	1.2	0	0	0	1 (0.9%)	51.1	33.3	25 (50.0%)
Total	(86)	(2)	(20)	(8)	(116)	(47)	(3)	(50)

Basal Glazing Traits	Swatow BW	Swatow *Merah*	Plain Swatow	Total Swatow	Qing Swatow BW	Qing Swatow *Merah*	Total Qing Swatow
Ordinarily glazed base	28.1	37.5	0	12 (27.9%)	92.6	100.0	26 (92.9%)
Pink-glazed base	0	0	0	0	3.7	0	1 (3.6%)
Red-glazed base	15.6	0	33.3	6 (14.0%)	0	0	0
Glaze-splashed base	12.5	0	0	4 (9.3%)	0	0	0
Dirty glazed base	28.1	12.5	0	10 (23.3%)	3.7	0	1 (3.6%)
Chocolate base	3.1	0	0	1 (2.3%)	0	0	0
Unglazed base	12.5	50.0	66.7	10 (23.3%)	0	0	0
Total	(32)	(8)	(3)	(43)	(27)	(1)	(28)

N.B. The Swatow plain sample included four Swatow "subceladons" and four just plain pieces. One of the Swatow BW bodies coloured 5YR 7/1 exteriorly was coloured 2.5YR 4/4 on the interior wall. One of the Qing Swatow BW bases noted as ordinarily glazed had dirty feet as is typical of Ming Swatow and Swatow feet. Unglazed central stacking rings were observed on one Swatow BW vessel and one Swatow subceladon.

a trend away from plates towards bowls; and the greater occurrence of small bowls and even a cup and a spoon. A notable proportion of the Qing Swatow plates were also defined as small in our notes.

Tables B-25 and B-26 describe the variability within and between the Ming Swatow, Swatow and Qing Swatow classes, as summarised above.

B.3.12 Qing blue-and-white

SSPHAP's Qing blue-and-white category excludes pieces which looked modern (20th century) but includes enamelled wares, as well as BW wares, belonging to the previous centuries under Qing. The composition of the Qing BW sample studied in the laboratory (Table B-27) may not be fully representative of the general sherdage at the sites for three reasons. Firstly, much of the laboratory sample comes from collections made at sites which appear to have been abandoned by at least the 19th century because European sherdage was conspicuously rare. Hence the sample probably underrepresents the proportions of 18th and especially 19th century pieces. Secondly, some of the pieces dated to the Ming period in the field and collected for confirmation were demoted to the status of Qing BW, especially Kangxi BW, in the laboratory. Thirdly we tended to collect pieces which stood outside of the general ruck, notably those with a brown glaze on the exterior cavetto (called "Batavian wares" by Jakarta archaeologists) and spoon fragments.

The sample is nonetheless adequate to demonstrate certain general points. Large closed vessels were rare and bowls dominated over plates (many of which were small and hence more like saucers). Overglaze enamels constituted an important supplement to the dominant strains of cobalt blue. These included *famille verte* (i.e., including at least some green) and red enamels, mainly on the Kangxi pieces, and *famille rose* enamels on 18th to 19th century pieces (cf. Medley, 1980:242-250).

As regards the critical issue of dating the underglaze blue decorations, the most relevant general source was Macintosh (1977). His description of Kangxi glazes as thin

and tinged with a suspicion of bluish-green (see Table B-28), and his notes on the delicately graded, sapphire blue Kangxi decorations (Macintosh, 1977:73), directly applied to legions of SSPHAP's BW sherdage. We also followed Macintosh (1977:77,83) in expecting lavendar decorations with the early 18th century pieces, and almost blackish tones against a strongly white background (see Table B-28) with the Qianlong pieces. In addition, Qing tradewares embraced new decorative styles, as exemplified by the ceramics cargo salvaged from the "Geldermalsen" 1760s shipwreck (van der Waals and Sheaf, 1986): miniature landscapes such as those in the Chinese Imari style; panels of crosses along the rims, which distinguish the so-called Nanking wares; simplified and rather blobby versions of decorations as old as Chinese blue-and-white itself, such as the *lingchih* fungus and lotus sprays; and coarse calligraphic decorations. Other commonly occurring variants in South Sulawesi included "Kangxi birthday bowls", copied after the original plates made in 1713 (Medley, 1980:243); "wheelware" bowls (as I call them), as figured in Macknight (1976:Figure 29a), which were particularly prominent in the assemblages containing no or few European sherds; and "endless entrails" (cf. Macintosh, 1977:132).

We also partly followed Willetts (1981) in adapting his "Kitchen Ch'ing" (*Qing dapur*) category. Willetts proclaims a 19th to early 20th century date for all sorts of Qing tradewares including "Kangxi birthday bowls" (which were presumably copied from 1713 onwards) and precise counterparts to pieces from the "Geldermalsen" (mid-18th century). Indeed the only dated[28] pieces Willetts refers to, the Balambangan sherds from Malaysian Borneo, date either c.1770 or c.1800 (Willetts, 1981:1), and so refer specifically to the late 18th century. However, we found Willetts' general idea useful as a way of referring to the Qing BW pieces which looked the most recent (19th century): pieces with stamped or particularly devolved decorations; and the Fu and related plates.

[28] i.e. dated by criteria other than Willetts' intuitive judgment of how old the pieces are.

TABLE B-27. COMPOSITION OF SSPHAP'S QING BLUE-AND-WHITE WARES

	"Kangxi" Late 17th-early 18th centuries	"Yungzheng" Early 18th century	18th century	"Qianlong" Late 18th century	18th-19th centuries	"Kitchen Qing" 19th century	Total
Bowls	200#	110	93	61	13	44	527*
Small bowls	19	2	7	0	1	1	30
Plates	165	24	25	8	16	31	269
Cups	8	0	1	0	2	0	11
"Open"	3	0	1	0	0	0	5*
Boxes	14	3	5	0	1	0	23
Jarlets	2	2	1	0	0	0	5
Vases	8	1	1	3	0	1	14
Bottles	0	0	0	1	0	0	1
Jars	9	2	1	0	0	0	12
Balubu	3	0	0	0	0	0	3
Spoons	3	2	1	3	2	4	15
Total	434	146	136	76	35	82	915*

	"Kangxi"	"Yung-zheng"	18th century	"Qian-long"	18th-19th centuries	"Kitchen Qing"	Total
Blue-and-white decorations only	387	144	95^	73	9	72	780
With brown glaze exteriorly	0	0	10	0	0	0	10
In conjunction with underglaze black	0	0	0	1	0	0	1
In conjuction with red enamels	3	1	1	0	0	1	6
In conjuction with *famille verte*	11	0	1	0	0	0	12
In conjuction with *famille rose*	1	0	1	0	0	0	2
Total with BW decorations	402	145	108	74	9	73	811
Famille verte enamels only	25#	0	0	0	1	0	26
F. verte enamels on brown glaze	2	0	0	0	0	0	2
Red enamels only	5	0	0	0	0	0	5
Total with "*merah*" decorations	46	1	2	0	1	1	51
Famille rose enamels only	0	1	27	2	25	9	64
With brown glaze exteriorly	0	0	1	0	0	0	1
Total with *f. rose* decorations	1	1	29	2	25	9	67
Total with brown glazing	2	0	11	0	0	0	13

One specimen was identified as having come from a set of stacking bowls.
* Include a few pieces dated no more closely than as Qing.
^ Include three Nanking wares and one decorated in the "Imari" style.

TABLE B-28. QING BLUE-AND-WHITE TRAITS (PERCENTAGES)

Exterior Glaze Thickness	"Kangxi" Late 17th-early 18th centuries	"Yungzheng" Early 18th century	18th century	"Qianlong" Late 18th century	18th-19th centuries	"Kitchen Qing" 19th century	Total
2	0	9.5	15.2	0	25.0	18.2	11 (8.9%)
3	87.2	76.2	78.8	100.0	75.0	63.6	100 (80.6%)
4	6.4	9.5	3.0	0	0	9.1	7 (5.6%)
5	6.4	4.8	3.0	0	0	9.1	6 (4.8%)

TABLE B-28. QING BLUE-AND-WHITE TRAITS (CONT.)

Exterior Glaze Colour	"Kangxi" Late 17th-early 18th centuries	"Yungzheng" Early 18th century	18th century	"Qianlong" Late 18th century	"Kitchen Qing" 18th-19th centuries	19th century	Total
5B 7/1	0	9.5	0	0	0	0	2 (1.6%)
< 5B 7/1	6.4	9.5	0	0	12.5	0	6 (4.8%)
5BG 7/1	19.1	9.5	9.1	0	0	0	14 (11.3%)
< 5BG 7/1	4.3	0	6.1	0	0	0	4 (3.2%)
5G 7/1	12.8	23.8	6.1	0	0	18.2	15 (12.1%)
< 5G 7/1	25.5	4.8	21.2	0	25.0	18.2	24 (19.4%)
5Gy 7/1	2.1	4.8	18.2	0	0	9.1	9 (7.3%)
< 5Gy 7/1	10.6	9.5	15.2	0	0	9.1	13 (10.5%)
5y 7/1	0	9.5	0	50.0	12.5	9.1	5 (4.0%)
< 5y 7/1	2.1	4.8	6.1	0	0	0	4 (3.2%)
N8/-	14.9	4.8	6.1	50.0	25.0	18.2	17 (13.7%)
> N8/-	0	4.8	0	0	0	0	1 (0.8%)
< N7/-	2.1	0	0	0	0	0	1 (0.8%)
7.5YR 8/2	0	0	0	0	12.5	0	1 (0.8%)
5Y 7/1	0	4.8	0	0	12.5	0	2 (1.6%)
2.5Y 7/2	0	0	0	0	0	9.1	1 (0.8%)
5YR 6/2	0	0	0	0	0	9.1	1 (0.8%)
10YR 3/3	0	0	3.0	0	0	0	1 (0.8%)
10YR 4/3	0	0	3.0	0	0	0	1 (0.8%)
2.5YR 2.5/4	0	0	3.0	0	0	0	1 (0.8%)
7.5YR 5/6	0	0	3.0	0	0	0	1 (0.8%)
Total	(47)	(21)	(33)	(2)	(8)	(11)	(124)
X Glaze Number							
1	100.0	100.0	100.0	100.0	100.0	100.0	124 (100%)
Total	(47)	(21)	(33)	(2)	(8)	(11)	(124)
I Glaze Colour							
5B 7/1	0	4.8	0	0	0	0	1 (0.8%)
< 5B 7/1	6.4	9.5	0	0	12.5	0	6 (4.8%)
5BG 7/1	17.0	19.0	12.1	0	0	0	16 (12.8%)
< 5BG 7/1	4.3	0	6.1	0	0	0	4 (3.2%)
5G 7/1	14.9	19.0	6.1	0	0	36.4	17 (13.6%)
< 5G 7/1	29.8	4.8	21.2	0	25.0	18.2	26 (20.8%)
5Gy 7/1	0	4.8	18.2	0	0	9.1	8 (6.4%)
< 5Gy 7/1	8.5	9.5	24.2	0	0	9.1	15 (12.0%)
5y 7/1	0	9.5	0	33.3	12.5	9.1	5 (4.0%)
< 5y 7/1	2.1	4.8	6.1	0	0	0	4 (3.2%)
N8/-	14.9	4.8	6.1	33.3	25.0	9.1	16 (12.8%)
> N8/-	0	4.8	0	33.3	0	0	2 (1.6%)
< N7/-	2.1	0	0	0	0	0	1 (0.8%)
5Y 7/1	0	4.8	0	0	12.5	9.1	3 (2.4%)
7.5YR 8/3	0	0	0	0	12.5	0	1 (0.8%)
I Glaze Thickness							
2	6.4	9.5	12.1	0	12.5	9.1	11 (8.8%)
3	87.2	85.7	81.8	100.0	87.5	81.8	107 (85.6%)
4	0	0	3.0	0	0	0	1 (0.8%)
5	6.4	4.8	3.0	0	0	9.1	6 (4.8%)
I Glaze Number							
1	93.6	100.0	97.0	100.0	100.0	100.0	121 (96.8%)
2	4.3	0	3.0	0	0	0	3 (2.4%)
4	2.1	0	0	0	0	0	1 (0.8%)

TABLE B-28. QING BLUE-AND-WHITE TRAITS (CONT.)

Body Colour							
N8/-	29.8	33.3	39.4	0	50.0	27.3	43 (34.4%)
> N8/-	29.8	4.8	12.1	0	25.0	9.1	22 (17.6%)
< N7/-	14.9	14.3	0	33.3	0	0	11 (8.8%)
N7/-	10.6	4.8	24.2	33.3	0	18.2	17 (13.6%)
N6/-	0	0	3.0	0	0	0	1 (0.8%)
5YR 8/1	10.6	9.5	3.0	0	0	18.2	10 (8.0%)
5YR 8/2	0	9.5	9.1	33.3	12.5	0	7 (5.6%)
5YR 7/1	4.3	4.8	6.1	0	0	0	5 (4.0%)
5YR 7/2	0	14.3	0	0	0	9.1	4 (3.2%)
7.5YR 8/2	0	0	0	0	12.5	0	1 (0.8%)
7.5YR 7/2	0	4.8	0	0	0	0	1 (0.8%)
10YR 7/1	0	0	3.0	0	0	0	1 (0.8%)
2.5Y 8/2	0	0	0	0	0	9.1	1 (0.8%)
5Y 8/2	0	0	0	0	0	9.1	1 (0.8%)
Hardness							
7	12.8	33.3	30.3	33.3	25.0	45.5	31 (24.8%)
8	40.4	33.3	45.5	33.3	25.0	36.4	48 (38.4%)
9	46.8	33.3	24.2	33.3	50.0	18.2	46 (36.8%)
% Inclusions							
0	10.6	0	12.1	33.3	37.5	0	13 (10.4%)
1	63.8	71.4	48.5	0	37.5	45.5	71 (56.8%)
2-3	21.3	14.3	30.3	33.3	12.5	36.4	29 (23.2%)
4-5	2.1	9.5	9.1	0	0	9.1	7 (5.6%)
10	2.1	4.8	0	33.3	12.5	9.1	5 (4.0%)
Body Type							
China Porcelain	59.6	38.1	51.5	0	62.5	27.3	63 (50.4%)
Almost CP	14.9	19.0	6.1	0	0	0	13 (10.4%)
Semi-porcelain	17.0	4.8	12.1	33.3	12.5	9.1	16 (12.8%)
Protoporcelain	0	4.8	0	0	0	0	1 (0.8%)
Stoneware	8.5	33.3	30.3	66.7	25.0	63.6	32 (25.6%)
Slipping							
None	100.0	100.0	100.0	100.0	100.0	100.0	125 (100%)
Total	(47)	(21)	(33)	(3)	(8)	(11)	(125)
Translucency							
Not translucent	24.3	45.0	42.9	100.0	80.0	72.7	44 (41.9%)
Faintly	18.9	20.0	21.4	0	0	0	17 (16.2%)
Translucent (Y)	56.8	35.0	35.7	0	20.0	27.3	44 (41.9%)
	(37)	(20)	(28)	(2)	(5)	(11)	(105)
Basal glazing							
Ordinarily glazed	91.7	100.0	100.0	50.0	-	100.0	39 (95.1%)
Unglazed	8.3	0	0	50.0	-	0	2 (4.9%)
	(12)	(9)	(10)	(2)	(0)	(8)	(41)

N.B. Except for basal glazing, the total sample includes two pieces identified only as Qing blue-and-white. The "Yungzheng" sample includes one piece with BW/red enamel decorations and one piece with *famille rose* decorations; the 18th century sample one piece with BW/*famille verte* decorations and four Batavian wares, one with *famille rose* rather than BW decorations; the 18th-19th century sample includes one piece with *famille rose* decorations; otherwise BW decorations throughout. One of the ordinarily glazed Kangxi BW bases had a dirty foot. Unglazed central stacking rings were observed on one Yungzheng BW piece, one 18th century BW piece, two Qianlong BW pieces and four Kitchen Qing BW pieces.

B.3.13 White Qing or Recent

Most of the sites were sprinkled with a residue of nondescript porcellanous sherdage which SSPHAP dutifully recorded under the headings *Qing putih* (white Qing) or *Baru* (Recent). The class included small quantities of pieces with enamel decorations of very modern appearance (Table B-29), but even the most modern looking pieces decorated only in underglaze blue were classified as Qing BW (or Japanese [B.3.14]).

The theoretical legitimacy of the class is premised on the assumption that Bugis-Makassar villagers have used hardly any tradewares other than white porcelain during recent times. While I did not carry out any inventories of the crockery assemblages in people's houses or village tradestores, I can at least refer to my informal survey of the streets of Malino (founded 1923) where I saw only five of 130 tradeware sherds with visible traces of decoration. But as regards the complementary assumption, to the effect that the fragmentary remnants of older Qing and Ming assemblages would not contain the same nondescript sherdage, a brief glance at the expanses of white background found on many blue-and-white wares is enough to raise serious doubts. Hence Demmanari and I tried to date the collected examples identified to the class, based on subtle criteria such as the tints of white in the body and glaze, and microscopic clues. We were wary of identifying the pieces as Ming unless there were very good reasons, but we were prepared to opt for time slots as small as half-century intervals for the 17th century onwards (Table B-29). Our attribution of many of the pieces to the 17th to 19th centuries is undoubtedly correct, even if carefully sampled assemblages would have to be collected to know the exact proportions.[29] The preponderance of bowls over plates in the earlier Qing white pieces, and the resurgence of plates from around the 18th century, also match the results found with

[29] Most of the collections which included "Qing white" pieces were made at sites or subsites which appeared to have been abandoned by at least the 19th century. SSPHAP's only collections of Qing white pieces at sites known to be still under settlement occurred at Paknakkukang (UP2) and Barombong (UP3) at the very end of the field season.

TABLE B-29. COMPOSITION OF SSPHAP'S "RECENT" CLASS

	Bowls	Small Bowls	Plates	Cups	"Open"	Boxes	Jar-lets	Tea-pots	Vases	Jars	Spoons	Total
Dehua 17th century white	0	0	0	0	0	2	0	0	0	0	0	2
Other 17th century white	19	0	7	0	0	0	1	0	0	0	0	27
Kangxi white	2	1	3	0	0	0	0	0	1	1	0	8
17th-18th century white	17	2	11	0	0	0	0	0	0	0	1	31
Early 18th century white	0	0	2	0	0	0	0	0	0	0	0	2
Qianlong white	2	0	1	0	2	0	0	0	0	0	0	5
18th century white	1	0	1	0	0	0	0	0	0	0	0	2
18th-19th century white	4	0	4	0	0	1	0	0	1	0	0	10
18th-20th century white	0	0	0	1	0	0	0	0	0	0	0	1
19th century white	1	0	12	0	0	0	0	0	0	0	0	13
19th-20th century white	1	0	1	0	0	0	0	0	0	0	0	2
20th century white	18	0	34	1	33	1	0	1	2	0	1	91
"Qing white"	0	0	4	0	7	0	0	0	0	0	0	11
20th c. *famille verte*	1	0	0	0	0	0	0	0	0	0	0	1
20th c. *famille rose*	0	0	1	0	0	0	0	0	0	0	0	1
20th c. overglaze red	1	0	1	0	0	0	0	0	0	0	0	2
20th century "overglaze"	0	0	2	0	0	0	0	0	0	0	0	2
20th c. BW/overglaze red	1	0	0	0	0	0	0	0	0	0	0	1
"Recent"	7	0	41	3	60	0	0	0	0	0	0	111
Total	75	3	125	5	102	4	1	1	4	1	2	323

N.B.The figures exclude 8 pieces of unidentified form identified only as "Recent".

TABLE B-30. SSPHAP'S JAPANESE AND EUROPEAN CLASSES

Japanese BW	Bowls	Plates	Cups	"Open"	Boxes	Flower-pots	Vases	Bottles	Jars	Total
Fine wares	4	1	0	0	3	0	4	0	0	12
Flower wares	22	0	0	0	0	0	0	0	0	22
Total	26	1	0	0	3	0	4	0	0	34
European										
Whiteware	31	42	1	1	0	0	0	0	0	75
Pale brown ware	0	0	0	0	0	0	0	0	1	1
"Blue-and-white"	2	11	0	0	0	0	0	0	0	13
Blue transferware	9	24	0	0	0	0	0	0	0	33
Blue,green,red transfer	1	0	0	0	0	0	0	0	0	1
Green and red transfer	3	0	0	0	0	0	0	0	0	3
Green transferware	2	3	0	0	0	0	0	0	0	5
Red transferware	6	3	0	0	0	0	0	0	0	9
"European"	34	25	5	0	0	1	4	3	0	72
Total	88	108	6	1	0	1	4	3	1	212

N.B. The colour(s) before transfer(ware) indicates the colour(s) of the extant decorations. The pieces identified as "blue-and-white" were presumably also transferwares. The figures exclude 17 pieces of unidentified form identified only as European.

TABLE B-31. TRAITS OF "RECENT", JAPANESE AND EUROPEAN PIECES

X Glaze Colour	17th-18th century white	18th-20th century white	Overglaze 20th century	Total "Recent"	Japan Fine wares	Japan Flower wares	Total Japanese	European
5B 7/1	0	0	0	0	0	0	0	1 (11.1%)
5BG 7/1	0	0	0	0	0	1	1 (20.0%)	0
< 5BG 7/1	0	0	0	0	1	0	1 (20.0%)	0
5G 7/1	0	1	0	1 (5.9%)	0	0	0	0
< 5G 7/1	0	1	1	2 (11.8%)	0	0	0	0
5Gy 7/1	0	0	1	1 (5.9%)	0	0	0	0
< 5Gy 7/1	0	2	0	2 (11.8%)	0	0	0	0
5y 7/1	1	0	0	1 (5.9%)	0	0	0	0
N8/-	1	5	3	9 (52.9%)	0	1	1 (20.0%)	4 (44.4%)
< N7/-	0	0	0	0	1	0	1 (20.0%)	0
5YR 8/1	0	0	0	0	0	0	0	2 (22.2%)
10YR 8/1	1	0	0	1 (5.9%)	0	0	0	0
5Y 8/1	0	0	0	0	0	0	0	1 (11.1%)
10YR 8/2	0	0	0	0	0	0	0	1 (11.1%)
5YR 3/3	0	0	0	0	0	1	2 (20.0%)	0
X Glaze Thickness								
2	0	5	2	7 (41.2%)	0	1	1 (20.0%)	5 (55.6%)
3	3	4	3	10 (58.8%)	2	2	4 (80.0%)	4 (44.4%)
I Glaze Colour								
5B 7/1	0	0	0	0	0	1	1 (20.0%)	0
5BG 7/1	0	0	0	0	0	1	1 (20.0%)	0
< 5BG 7/1	0	0	0	0	1	0	1 (20.0%)	0
5G 7/1	0	1	0	1 (5.9%)	0	0	0	0
< 5G 7/1	0	1	0	1 (5.9%)	0	0	0	0
< 5Gy 7/1	0	2	1	3 (17.6%)	0	0	0	0
5y 7/1	1	0	0	1 (5.9%)	0	0	0	0
N8/-	1	5	4	10 (58.8%)	0	1	1 (20.0%)	4 (44.4%)
> N8/-	0	0	0	0	1	0	1 (20.0%)	0
5YR 8/1	0	0	0	0	0	0	0	2 (22.2%)
10YR 8/1	0	0	0	0	0	0	0	1 (11.1%)
5Y 8/1	0	0	0	0	0	0	0	1 (11.1%)
10YR 8/2	0	0	0	0	0	0	0	1 (11.1%)
7.5YR 7/2	1	0	0	1 (5.9%)	0	0	0	0
I Glaze Thickness								
1	0	0	0	0	0	0	0	1 (11.1%)
2	0	5	2	7 (41.2%)	1	1	2 (40.0%)	4 (44.4%)
3	3	4	3	10 (58.8%)	1	2	3 (60.0%)	4 (44.4%)
Hardness								
5	0	0	0	0	0	0	0	1 (11.1%)
6	0	0	0	0	0	0	0	1 (11.1%)
7	1	0	0	1 (5.9%)	1	0	1 (20.0%)	7 (77.8%)
8	0	4	3	7 (41.2%)	0	2	2 (40.0%)	0
9	2	5	2	9 (52.9%)	1	1	2 (40.0%)	0

TABLE B-31. TRAITS OF "RECENT", JAPANESE AND EUROPEAN PIECES (CONT.)

Body Colour								
N8/-	2	5	3	10 (58.8%)	2	1	3 (60.0%)	1 (11.1%)
> N8/-	0	0	1	1 (5.9%)	0	0	0	0
< N7/-	0	2	1	3 (17.6%)	0	0	0	0
5YR 8/1	0	0	0	0	0	1	1 (20.0%)	0
5YR 8/2	1	0	0	1 (5.9%)	0	0	0	1 (11.1%)
5YR 7/1	0	2	0	2 (11.8%)	0	1	1 (20.0%)	0
7.5YR 7/4	0	0	0	0	0	0	0	1 (11.1%)
10YR 8/1	0	0	0	0	0	0	0	1 (11.1%)
10YR 8/2	0	0	0	0	0	0	0	3 (33.3%)
5Y 8/1	0	0	0	0	0	0	0	2 (22.2%)
Translucency								
Not translucent	0	1	0	1 (5.9%)	0	2	2 (50.0%)	9 (100%)
Faintly	0	0	0	0	0	1	1 (25.0%)	0
Translucent (Y)	3	8	5	16 (94.1%)	1	0	1 (25.0%)	0
% Inclusions								
0	0	0	1	1 (5.9%)	0	0	0	0
1	1	7	3	11 (57.9%)	1	2	3 (60.0%)	5 (55.6%)
3	0	2	1	3 (17.6%)	0	0	0	4 (44.4%)
5	2	0	0	2 (11.8%)	1	1	2 (40.0%)	0
Body Type								
China Porcelain	1	8	5	14 (82.4%)	2	0	2 (40.0%)	0
Almost CP	1	0	0	1 (5.9%)	0	0	0	0
Semi-porcelain	1	0	0	1 (5.9%)	0	0	0	0
Protoporcelain	0	0	0	0	0	1	1 (20.0%)	0
Stoneware	0	1	0	1 (5.9%)	0	2	2 (40.0%)	9 (100%)
Total	(3)	(9)	(5)	(17)	(1-2)	(2)	(4-5)	(9)

N.B. None of the pieces showed slipping or more than one applied layer of glaze.

the Qing BW pieces (Table B-27), even if we sometimes dated the white pieces to an unsustainable degree of precision.

The small sample of 17 pieces studied in detail (Table B-31) shows proportions of pure white bodies and glazes, and fully porcelain bodies, unmatched by any other class. Hence there is some support for the general chronological distinctiveness, specifically a 20th century date, of the class as a whole.

B.3.14 The Japanese and European classes

Fine Japanese porcelains have been exported to Indonesia

since the 17th century (Adhyatman et al., 1984), and some examples are among the heirlooms of the Soppeng royal family (Kallupa et al., 1989), but we did not recognise any instances among the surface tradewares recorded at SSPHAP's sites. The South Sulawesi classificatory system recognises a Japanese class (Hadimuljono and Macknight) which is not among the wares looted at pre-Islamic burial grounds (*pace* Adhyatman et al., 1984:93). One category involves a group of very finely decorated blue-and-white wares which includes vases and boxes as well as open forms. The second category involves bowls decorated with stereotyped flowers created by repeated stamping of petal and sepal motifs (Table B-30).[30]

The very small sample I studied in detail suggests a few distinguishing traits. Pure white or light bluish glazes apparently characterise both categories, apart from the isolated instance of a brown-glazed exterior on one of the flowerwares. But the fine wares are porcelains whereas the flowerwares are either "protoporcelains" or stonewares (Table B-31). The fine wares are quite at home among the descriptions of later Japanese porcelain (e.g. Jenys, 1965), and the category possibly represents only the tip of the Japanese iceberg floating on the sea of "Qing Chinese" identifications. However, I know of no references in the literature that would prepare one for the flowerwares.

European sherdage was recorded in abundance but very rarely collected (see footnote 29). The 230 collected specimens reiterate the preponderance of plates, followed by bowls, noted for the Qing white pieces dated to the last few centuries. European transferwares of course tend to be very distinctive from Oriental ceramics, but as undecorated whitewares, possibly up to half the European pieces would have been identified in the field by glaze and body traits alone (Table B-30). In this regard the European pieces do present a distinctive constellation of characters, notwithstanding the small size of the sample I studied in detail. The distingushing traits include an often chalky stoneware body, soft yet comparatively free of inclusions,

[30] I thank Dick Richards for confirming the positive identification of these flowerwares as Japanese.

and generally coloured off-white; and a thin unblemished glaze, rather like a plastic film, which tends to pure white and off-white tones (see Table B-31).[31]

B.3.15 Vietnamese ceramics

219 Vietnamese pieces divided among three classes were recognised in the laboratory: 63 monochromes, eight pieces with underglaze black decorations, and 148 "blue-and-white" pieces. The last class also includes two pieces with only overglaze enamels and seven pieces which combined underglaze blue with overglaze enamels. Bowls, including conical bowls, were the main vessel form among the monochromes, black-and-white and calligraphic blue-and-white wares. With the non-calligraphic "blue-and-white" wares, plates, boxes and *balubu* were more frequent (Table B-32). Three-quarters of the *balubu* came from West Soppeng's former palace site of Tinco Tua (see Kallupa et al., 1989:25).

All but one of the Vietnamese black-and-white pieces showed calligraphic decorations, as described by Guy (1986) and Brown (1988).[32] The single exception involves specimen G.5.1.2, a base to a bowl decorated with a single solar motif (Photo 11-24). The motif occurs occasionally on Thai wares (e.g. Harper, n.d.:37; Brown, 1988:Plates XXXa and 50b) but G.5.1.2 is certainly not Sawankhalok or Sukothai.[33] A Vietnamese identification is likely because the piece's body and glaze traits are lost among the range of variability shown by the Vietnamese polychromes (see Table B-33), and a parallel decoration occurs on a cup identified as 11th-12th century Vietnamese (Frasché, 1976:106).

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[31] There is of course a tremendous range of European ceramics with their own specialist literature to match. Here my intention is nothing more than to characterise the probably Dutch products which found their way into the Bugis-Makassar countryside.

[32] Two of the pieces were also sent to Dick Richards who confirmed the identification.

[33] The piece's body could possible resemble the northern Thai Kalong bodies, which are desribed by Brown (1988:84) as fine-grained and whitish, but the piece's unglazed central stacking ring would seem to rule a Thai identification out of contention.

TABLE B-32. COMPOSITION OF SSPHAP'S VIETNAMESE CLASSES

	Bowls	Conical Bowls	Plates	Boxes	Jarlets	Vases	Jars	*Balubu*	Total
Underglaze iron black decorations	5	3	0	0	0	0	0	0	8
Blue-and-white calligraphic decs	6	0	1	1	0	0	0	0	8
Blue-and-white other decorations	18	0	50	29	4	2	5	23	131
BW/red overglaze enamels	1	0	1	1	0	1	0	0	4
BW/overglaze (colour not recorded)	1	0	1	0	0	0	0	1	3
Green overglaze enamels	0	0	1	0	0	0	0	0	1
Red and green overglaze enamels	0	0	0	0	1	0	0	0	1
Total "Vietnam Blue-and-white"	26	0	54	31	5	3	5	24	148
Celadon "13th-14th centuries"	1	0	0	0	0	0	0	0	1
Celadon "15th-16th centuries"	4	1	2	1	1	0	1	0	10
Celadon "16th century"	2	0	0	0	0	0	0	0	2
Subceladon "12th-13th centuries"	0	0	0	0	1	0	0	0	1
Subceladon "14th century"	1	0	1	0	0	0	0	0	2
Subceladon "14th-15th centuries"	1	0	1	0	0	1	0	0	3
Subceladon "15th-16th centuries"	8	3	2	0	0	0	0	0	13
Oliveware "13th-14th centuries"	1	0	0	0	0	0	1	0	2
Oliveware "14th-15th centuries"	0	0	0	1	0	0	0	0	1
Oliveware "15th-16th centuries"	3	0	0	1	0	0	0	0	4
Brownware "14th-15th centuries"	1	0	0	0	0	0	0	0	1
Brownware "15th-16th centuries"	1	0	0	0	0	0	0	0	1
Whiteware "13th-14th centuries"	0	1	0	0	0	0	0	0	1
Whiteware "14th-15th centuries"	0	0	0	1	0	0	0	0	1
Whiteware "15th century"	1	0	0	0	0	0	0	0	1
Whiteware "15th-16th centuries"	4	1	1	1	0	0	0	0	6
"Monochrome 15th-16th centuries"	8	0	4	0	0	0	0	0	12
Total Vietnam Monochromes	36	6	11	5	2	1	2	0	63
Total Vietnamese ceramics	67	9	65	36	7	4	7	24	219

N.B. Figures exclude Vietnamese "coarse stoneware" jars (Table B-10).

TABLE B-34. CHARACTERS OF VIETNAMESE MONOCHROMES (PERCENTAGES)

	Exterior Glaze					Interior Glaze				
Glaze Thick.	Celadon	Sub-celadon	Olive wares	White wares	Total	Celadon	Sub-celadon	Olive wares	White wares	Total
1	0	0	28.6	0	2 (5.9%)	0	0	0	0	0
2	33.3	61.5	42.9	62.5	18 (52.9%)	0	64.3	80.0	66.7	18 (58.1%)
3	50.0	38.5	28.6	25.0	12 (35.3%)	100.0	35.7	20.0	33.3	13 (41.9%)
5	16.7	0	0	12.5	2 (5.9%)	0	0	0	0	0
Total	(6)	(13)	(7)	(8)	(34)	(5)	(14)	(5)	(7)	(31)
Slipping										
None	16.7	57.1	71.4	50.0	18 (51.4%)	Unglazed base and foot (UB)/Glaze does not reach non-extant foot (ULC)				
Exteriorly	0	0	14.3	12.5	2 (5.7%)					
Interiorly	33.3	7.1	0	0	3 (8.6%)	UB 100.0	40.0	0	100.0	4 (50.0%)
X and I	50.0	35.7	14.3	37.5	12 (34.3%)	ULC 0	60.0	100.0	0	4 (50.0%)
	(6)	(14)	(7)	(8)	(35)	(1)	(5)	(1)	(1)	(8)

TABLE B-34. CHARACTERS OF VIETNAMESE MONOCHROMES (CONT.)

Colour	Exterior Glaze: Celadon	Sub-celadon	Olive wares	White wares	Total	Interior Glaze: Celadon	Sub-celadon	Olive wares	White wares	Total
Green/Brown A4	33.3	15.4	0	0	4 (11.8%)	20.0	14.3	0	0	3 (9.7%)
Green/Brown A5	16.7	0	0	0	1 (2.9%)	20.0	7.1	0	0	2 (6.5%)
Green/Brown A6	0	23.1	0	0	3 (8.8%)	0	21.4	0	0	3 (9.7%)
Green/Brown A7	0	7.7	0	0	1 (2.9%)	0	0	0	0	0
5G 5/1	0	0	0	0	0	20.0	0	0	0	1 (3.2%)
5G 6/1	16.7	0	0	0	1 (2.9%)	20.0	0	0	0	1 (3.2%)
5Gy 4/1	16.7	0	0	0	1 (2.9%)	0	0	0	0	0
5Gy 6/1	16.7	0	0	0	1 (2.9%)	20.0	0	0	0	1 (3.2%)
5Gy 7/1	0	7.7	0	0	1 (2.9%)	0	7.1	0	0	1 (3.2%)
5y 6/1	0	7.7	0	0	1 (2.9%)	0	0	0	0	0
5y 7/1	0	7.7	0	0	1 (2.9%)	0	14.3	0	0	2 (6.5%)
5YR 8/1	0	0	0	37.5	3 (8.8%)	0	0	0	28.6	2 (6.5%)
7.5YR 8/2	0	0	0	25.0	2 (5.9%)	0	0	0	28.6	2 (6.5%)
10YR 8/3	0	0	0	12.5	1 (2.9%)	0	0	0	14.3	1 (3.2%)
10YR 7/2	0	0	0	12.5	1 (2.9%)	0	0	0	14.3	1 (3.2%)
10YR 7/3	0	15.4	0	0	2 (5.9%)	0	21.4	0	0	3 (9.7%)
5Y 7/2	0	7.7	0	0	1 (2.9%)	0	7.1	0	14.3	2 (6.5%)
5Y 7/3	0	0	0	0	0	0	0	20.0	0	1 (3.2%)
5Y 6/2	0	7.7	0	0	1 (2.9%)	0	7.1	0	0	1 (3.2%)
5Y 6/3	0	0	42.9	12.5	4 (11.8%)	0	0	40.0	0	2 (6.5%)
5Y 5/2	0	0	42.9	0	3 (8.8%)	0	0	40.0	0	2 (6.5%)
2.5Y 5/4	0	0	14.3	0	1 (2.9%)	0	0	0	0	0
Total	(6)	(13)	(7)	(8)	(34)	(5)	(14)	(5)	(7)	(31)

Body Colour	Celadon	Sub-celadon	Olive wares	White wares	Total
> N8/-	0	7.1	0	0	1 (2.9%)
N7/-	33.3	7.1	0	0	3 (8.6%)
5YR 8/1	0	0	0	37.5	3 (8.6%)
5YR 8/2	0	0	0	12.5	1 (2.9%)
5YR 8/3	0	7.1	0	12.5	2 (5.7%)
7.5YR 8/2	0	7.1	14.3	0	2 (5.7%)
10YR 8/1	0	7.1	0	0	1 (2.9%)
10YR 8/2	16.7	0	0	25.0	3 (8.6%)
> 5Y 8/1	0	7.1	0	0	1 (2.9%)
5YR 7/1	33.3	14.3	14.3	0	5 (14.3%)
5YR 7/2	0	7.1	14.3	0	2 (5.7%)
7.5YR 7/2	0	0	0	12.5	1 (2.9%)
10YR 7/1	0	14.3	0	0	2 (5.7%)
10YR 7/2	0	0	14.3	0	1 (2.9%)
5YR 6/1	16.7	0	0	0	1 (2.9%)
5YR 6/2	0	7.1	14.3	0	2 (5.7%)
10YR 6/1	0	0	14.3	0	1 (2.9%)
> 10YR 6/1	0	7.1	0	0	1 (2.9%)
10YR 6/2	0	0	14.3	0	1 (2.9%)
7.5YR 4/2	0	7.1	0	0	1 (2.9%)
	(6)	(14)	(7)	(8)	(35)

Hardness	Celadon	Sub-celadon	Olive wares	White wares	Total
5	0	7.1	0	0	1 (2.9%)
6	0	7.1	14.3	12.5	3 (8.6%)
7	50.0	64.3	71.4	37.5	21 (60.0%)
8	33.3	21.4	14.3	25.0	8 (22.9%)
9	16.7	0	0	12.5	2 (5.7%)

% of Body Inclusions	Celadon	Sub-celadon	Olive wares	White wares	Total
0	16.7	7.1	0	0	2 (5.7%)
1	16.7	21.4	0	12.5	5 (14.3%)
3	0	14.3	0	37.5	5 (14.3%)
5	50.0	28.6	57.1	37.5	14 (40.0%)
10	16.7	21.4	28.6	12.5	7 (20.0%)
15	0	7.1	14.3	0	2 (5.7%)

Body Type	Celadon	Sub-celadon	Olive wares	White wares	Total
PP	16.7	21.4	14.3	50.0	9 (25.7%)
SW	83.3	78.6	85.7	50.0	26 (74.3%)
	(6)	(14)	(7)	(8)	(35)

N.B. All glazes were applied in one layer only and all bodies are opaque. An unglazed central stacking ring was observed on one whiteware and one subceladon.

TABLE B-33. VIETNAMESE POLYCHROME TRAITS (PERCENTAGES)

Exterior Glaze Colour	Underglaze Iron	Calligraphic Blue-and-white	Other Blue-and-white	BW/overglaze enamels	Overglaze decorated	Total "Vietnam BW"
Green/Brown A6	0	0	9.1	0	0	1 (5.6%)
< 5G 7/1	0	0	9.1	0	50.0	2 (11.1%)
10YR 8/1	0	0	9.1	0	0	1 (5.6%)
5Y 8/1	1 (12.5%)	0	0	0	0	0
5YR 8/2	1 (12.5%)	33.3	0	0	0	1 (5.6%)
7.5YR 8/2	0	0	9.1	0	0	1 (5.6%)
10YR 7/1	2 (25.0%)	33.3	0	50.0	0	2 (11.1%)
5Y 7/1	0	0	9.1	0	0	1 (5.6%)
7.5YR 7/2	0	0	9.1	0	50.0	2 (11.1%)
10YR 7/2	1 (12.5%)	0	0	0	0	0
5Y 7/2	0	0	18.2	0	0	2 (11.1%)
5YR 7/3	0	0	0	50.0	0	1 (5.6%)
10YR 7/3	1 (12.5%)	0	9.1	0	0	1 (5.6%)
10YR 7/4	0	33.3	0	0	0	1 (5.6%)
5Y 6/2	0	0	9.1	0	0	1 (5.6%)
5Y 6/3	1 (12.5%)	0	0	0	0	0
7.5YR 6/4	1 (12.5%)	0	0	0	0	0
7.5YR 5/6	0	0	9.1	0	0	1 (5.6%)
X Glaze T						
1	0	33.3	0	0	0	1 (5.6%)
2	3 (37.5%)	66.7	36.4	0	50.0	7 (38.9%)
3	5 (62.5%)	0	63.6	100.0	50.0	10 (55.6%)
	(8)	(3)	(11)	(2)	(2)	(18)
I Glaze Colour						
Green/Brown A6	0	0	11.1	0	0	1 (5.9%)
5G 6/1	0	0	0	0	50.0	1 (5.9%)
< 5G 7/1	0	0	11.1	0	50.0	2 (11.8%)
5YR 8/2	1 (12.5%)	0	0	0	0	0
7.5YR 8/2	0	0	11.1	0	0	1 (5.9%)
10YR 7/1	2 (25.0%)	25.0	0	50.0	0	2 (11.8%)
5Y 7/1	1 (12.5%)	0	0	0	0	0
5YR 7/2	0	25.0	0	0	0	1 (5.9%)
7.5YR 7/2	0	0	11.1	0	0	1 (5.9%)
10YR 7/2	1 (12.5%)	0	0	0	0	0
5YR 7/3	0	0	0	50.0	0	1 (5.9%)
5Y 7/2	0	25.0	22.2	0	0	3 (17.6%)
10YR 7/3	1 (12.5%)	0	11.1	0	0	1 (5.9%)
10YR 7/4	0	25.0	0	0	0	1 (5.9%)
5Y 6/3	1 (12.5%)	0	0	0	0	0
10YR 6/2	0	0	11.1	0	0	1 (5.9%)
7.5YR 6/4	1 (12.5%)	0	0	0	0	0
7.5YR 5/6	0	0	11.1	0	0	1 (5.9%)
I Glaze T						
1	1 (12.5%)	0	0	0	0	0
2	2 (25.0%)	75.0	44.4	0	100.0	9 (52.9%)
3	5 (62.5%)	25.0	55.6	100.0	0	8 (47.1%)
	(8)	(4)	(9)	(2)	(2)	(17)

TABLE B-33. VIETNAMESE POLYCHROME TRAITS (CONT.)

Exterior Body Colour	Underglaze Iron	Calligraphic Blue-and-white	Other Blue-and-white	BW/overglaze enamels	Overglaze decorated	Total "Vietnam BW"
> N8/-	0	25.0	0	0	0	1 (5.3%)
N7/-	0	0	9.1	0	0	1 (5.3%)
10YR 8/1	0	25.0	0	0	50.0	2 (10.5%)
5Y 8/1	0	0	9.1	0	0	1 (5.3%)
5YR 8/2	2 (25.0%)	0	0	50.0	0	1 (5.3%)
7.5YR 8/2	1 (12.5%)	0	9.1	0	0	1 (5.3%)
5YR 7/1	3 (37.5%)	25.0	18.2	0	0	3 (15.8%)
7.5YR 7/1	1 (12.5%)	0	0	0	0	0
10YR 7/1	0	0	9.1	0	50.0	2 (10.5%)
5Y 7/1	0	0	9.1	0	0	1 (5.3%)
5YR 7/2	0	0	18.2	50.0	0	3 (15.8%)
7.5YR 7/2	0	0	9.1	0	0	1 (5.3%)
5YR 6/1	0	0	9.1	0	0	1 (5.3%)
5YR 6/3	0	25.0	0	0	0	1 (5.3%)
Hardness						
5	0	0	9.1	0	50.0	2 (10.5%)
6	2 (25.0%)	0	0	0	0	0
7	3 (37.5%)	75.0	63.6	0	50.0	11 (57.9%)
8	2 (25.0%)	25.0	18.2	50.0	0	4 (21.1%)
9	1 (12.5%)	0	9.1	50.0	0	2 (10.5%)
% Inclusions						
0	2 (25.0%)	0	0	50.0	0	1 (5.3%)
1	1 (12.5%)	0	36.4	0	0	4 (21.1%)
3	2 (25.0%)	25.0	18.2	0	50.0	4 (21.1%)
5	3 (37.5%)	50.0	36.4	50.0	0	7 (36.8%)
10	0	0	9.1	0	50.0	2 (10.5%)
15	0	25.0	0	0	0	1 (5.3%)
Body Type						
Protoporc.	1 (12.5%)	75.0	54.5	100.0	50.0	12 (63.2%)
Stoneware	7 (87.5%)	25.0	45.5	0	50.0	7 (36.8%)
Slipping						
None	6 (75.0%)	0	63.6	100.0	50.0	10 (52.6%)
Exterior	0	0	9.1	0	0	1 (5.3%)
Interior	0	50.0	0	0	0	2 (10.5%)
X and I	2 (25.0%)	50.0	27.3	0	50.0	6 (31.6%)

Basal Glazing Traits	Underglaze Iron (2-3)	Calligraphic Blue-and-white (3)	Other Blue-and-white (2)	Total "Vietnam BW" (5)
Chocolate base	0	0	100.0	2 (40.0%)
Glaze-splashed base and foot	0	33.3	0	1 (20.0%)
Unglazed base and foot	66.7	66.7	0	2 (40.0%)
Glaze does not reach to non-extant foot	33.3	0	0	0
Open vessel with unglazed centre	0	66.7	0	2 (40.0%)
Unglazed stacking ring	50.0	0	0	0

N.B. All glazes were applied in one layer only and all bodies are opaque. One of the iron-decorated wares has walls coloured 5YR 8/2 and a core coloured 5YR 6/1.

Rather than the Yuan-like decorations typical of the blue-and-white wares, eight of the pieces had calligraphic decorations in underglaze blue. The four pieces studied in detail showed the same sorts of characters - e.g. pinkish white to brownish white (straw-coloured) body and glaze, and a stoneware body which tended to be chalky (protoporcelain) - as the other polychromes, although two of the pieces were idiosyncratic in having unglazed centres. Guy (1986) argues that the tradewares with blue calligraphic decorations were coeval with the iron-painted tradewares, but here I do not recognise them as constituting their own blue-and-white class because they are not numerous, and identification of the extant decorations as calligraphic is not always clear. Although the Vietnamese polychromes show a distinctive accent in their traits when considered as a group (Table B-33), isolated examples may be difficult to distinguish from Chinese Ming period pieces when only a small amount of decoration is extant (cf. Chin, 1981).

Vietnamese monochromes can also be difficult to difficult to distinguish from coarser Chinese early monochromes, and Demmanari and I preferred a Chinese identification in ambiguous cases. The full range of glazes described by Brown (1988) for the monochrome tradewares was observed although we categorised them somewhat differently. The dates we ascribed to the pieces (Table B-32) essentially followed (Frasché, 1976). The whitewares appear quite like the polychromes in their general characteristics, and only the "subceladons" and olivewares showed clearly darker bodies.

B.3.16 Thai ceramics

The recent surge of research in Thai high-fired ceramics has located several kiln sites in northern Thailand (e.g. Shaw, 1981; Brown, 1988; Rooney, 1989), and further provincial kilns formerly produced coarse stoneware jars too (Hein and Sangkhanukit, 1985; Harper, pers. comm. 1988). Wares from these kilns may well have reached South Sulawesi but Demmanari and I could not identify them. The only products we identified were from Sukothai and Sawankhalok (Si Satchanalai). The repertoire and chronology of Sawankhalok's

production is probably better understood than that of any other Oriental kiln site, owing to the research of the Thai-Australian Ceramics Project (e.g. Richards et al., 1984; Brown, 1988). Demmari and I recognised two Sawankhalok classes, wares decorated with iron oxides (black-and-white), and monochromes. We left the Sawankhalok wares glazed brown or black in the coarse stoneware class (B.3.5). Our primary source for identifying Sawankhalok wares was the South Australian Museum Catalogue (Richards, 1977).

The Sawankhalok iron-painted wares were almost entirely restricted to boxes (Table B-35) and readily assignable to the "mature export period" (Richards et al., 1984). Glaze colour usually varied between light greenish and light grey, and the bodies were generally light grey (Table B-34), just as Harper (n.d.) describes the sherds she collected at Si Satchanalai. Three bowl fragments with less standardised decorations and a celadon-like glaze might be slightly earlier than the others, but no cases were found of the apparently oldest category which features bold fish and floral designs (Richards et al., 1984; Brown, 1988:63-65).

The monochromes consisted mostly of the celebrated Sawankhalok celadons with their strongly green, transparent glazes, supplemented by nine pieces with murkier glazes ("subceladons"), and three jar fragments carrying a white glaze. Plates and bowls dominated the class but a wide range of other forms were also represented (Table B-35). Although the black speckled, light grey body is usually characteristic, there is some overlap with the highly variable Chinese celadons, and we tended to classify borderline cases as Chinese.

The Sukothai pieces generally stood out through the combination of a slip over a dark or reddish stoneware body generally full of ferruginous and quartz inclusions, and brownish to grey glaze colours (Table B-36). The Sukothai decorative repertoire is also distinctive, but most of SSPHAP's pieces carried only undiagnostic components. Examples of this trend are a Sukothai jar sherd (G.1.75.9) decorated only by the circumscribing lines found on Sukothai covered jars and closed vessels (see Brown, 1988:Plate 33),

and a small Sukothai plain sherd (G.62.13.49) which could well have originally come from a black-and-white rather than a whiteware. The great variety of SSPHAP's Sukothai bodies, notably the change between bodies largely free of inclusions (five percent) to bodies where inclusions and ground matrix appeared co-dominant at 50 percent (Table B-36), is a worry. Variability overlap between the Sukothai and Sawankhalok "mature export period" wares is negligible, but SSPHAP's Sukothai class possibly includes bits from the Sawankhalok "fish and flower" wares or from the northern Thai kilns.

B.4 Analysis With SSPHAP's Fine Tradeware Classes

B.4.1 Seriating the fine tradeware classes

Most seriation exercises involving ceramics use the proportions of ceramics recovered in excavated units from related sites to place all the excavated units along a single chronological scale (e.g. Irwin, 1985). The validity of the exercise is predicated on the chronological discreteness of the excavated units, and hence may not be applicable to surface assemblages which tend to be chronologically jumbled. To be sure, it might still be possible to seriate SSPHAP's assemblages of surface tradewares, aligning them according to whichever aggregation of tradewares dominates. However, this would restrict the interpretation of the sites to their apparent main phase of tradeware-related use, and ignore any formal demonstration of earlier origins or later use. Hence I prefer to seriate the tradeware classes so as to interpret all the chronological information contained in the assemblages.

SSPHAP's sample of 42,980 tradeware pieces includes around 84% identified only in the field and 16% with confirmed, corrected or original identifications made under laboratory conditions (B.1). Taken together, the 84% field identifications and 16% laboratory identifications are the most precise identifications available, and will be used in my first batch of seriation exercises. The possible logical inconsistencies in using identifications made under different

TABLE B-35. COMPOSITION OF SSPHAP'S THAI CLASSES

	---- Sawankhalok Monochromes ----				---- Sukothai ----		
	Sawankhalok Black-and-white	Sawankhalok Celadons	Sawankhalok Subceladons	Sawankhalok White	Sukothai Black-and-white	Sukothai Plain	Total Thai
Plates	0	60	0	0	12	1	73
Bowls	4	15	5	0	10	0	34
Dishes	0	1	0	0	0	0	1
"Open"	0	2	0	0	0	0	2
Boxes	164	2	2	0	0	0	168
Jarlets	2	5	0	0	0	0	7
Vases	1	6	0	0	0	0	7
Kendis	1	0	0	0	0	0	1
Bottles	0	1	0	0	0	0	1
Jars	0	2	2	3	0	1	8
Total	173	94	9	3	22	2	302

TABLE B-36. CHARACTERS OF THE THAI CLASSES (PERCENTAGES)

	Exterior Glaze			Interior Glaze		
Colour	Sawankhalok Black-and-white	Sawankhalok Celadons	Sukothai	Sawankhalok Black-and-white	Sawankhalok Celadons	Sukothai
5BG 7/1	0	1 (11.1%)	0	1 (6.7%)	1 (16.7%)	0
5G 5/2	0	1 (11.1%)	0	0	1 (16.7%)	0
5G 6/2	0	2 (22.2%)	0	0	1 (16.7%)	0
5G 6/1	2 (6.9%)	2 (22.2%)	0	0	1 (16.7%)	0
5G 7/1	7 (24.1%)	0	0	1 (6.7%)	0	0
5Gy 6/1	1 (3.4%)	3 (33.3%)	0	2 (13.3%)	2 (33.3%)	0
5Gy 7/1	12 (41.4%)	0	1 (5.3%)*	5 (33.3%)	0	0
< 5Gy 7/1	0	0	1 (5.3%)	0	0	0
5y 5/1	0	0	0	1 (6.7%)	0	0
5y 6/1	1 (3.4%)	0	0	0	0	0
5y 7/1	1 (3.4%)	0	0	0	0	0
< 5y 7/1	1 (3.4%)	0	0	0	0	0
5Y 8/2	0	0	1 (5.3%)	0	0	1 (5.6%)
7.5YR 8/2	0	0	1 (5.3%)	0	0	2 (11.1%)
10YR 8/2	0	0	1 (5.3%)	0	0	3 (16.7%)
5YR 8/3	0	0	2 (10.5%)	0	0	2 (11.1%)
10YR 8/3	0	0	1 (5.3%)	0	0	0
5YR 7/1	0	0	0	1 (6.7%)	0	0
10YR 7/1	0	0	0	1 (6.7%)	0	0
5Y 7/1	0	0	0	0	0	1 (5.6%)*
7.5YR 7/2	1 (3.4%)	0	1 (5.3%)	0	0	1 (5.6%)
10YR 7/2	0	0	1 (5.3%)	0	0	1 (5.6%)
2.5Y 7/2	1 (3.4%)	0	1 (5.3%)	1 (6.7%)	0	1 (5.6%)
5Y 7/2	0	0	2 (10.5%)	0	0	2 (11.1%)
5YR 7/3	0	0	1 (5.3%)	0	0	1 (5.6%)
10YR 7/3	0	0	2 (10.5%)	0	0	2 (11.1%)
5Y 6/1	2 (6.9%)	0	1 (5.3%)	1 (6.7%)	0	1 (5.6%)
5YR 6/3	0	0	1 (5.3%)	0	0	0
2.5Y 4/2	0	0	0	1 (6.7%)	0	0
5YR 2.5/1	0	0	1 (5.3%)#	0	0	0

TABLE B-36. CHARACTERS OF THE THAI CLASSES (CONT.)

	Exterior Glaze			Interior Glaze		
Thickness	Sawankhalok Black-and-white	Sawankhalok Celadons	Sukothai	Sawankhalok Black-and-white	Sawankhalok Celadons	Sukothai
1	1 (3.3%)	0	1 (5.3%)	1 (6.7%)	0	2 (11.1%)*
2	11 (36.7%)	0	13 (68.4%)*	11 (73.3%)	0	8 (44.4%)
3	15 (50.0%)	8 (88.9%)	5 (26.3%)#	3 (20.0%)	6 (100.0%)	8 (44.4%)
4	2 (6.7%)	1 (11.1%)	0	0	0	0
5	1 (3.3%)	0	0	0	0	0
Number						
1	30 (100.0%)	8 (88.9%)	19 (100.0%)*#	15 (100.0%)	5 (83.3%)	18 (100%)*#
2	0	1 (11.1%)	0	0	1 (16.7%)	0
	(29-30)	(9)	(19)	(15)	(6)	(18)

	Exterior Body Colour		
> N8/-	1 (3.2%)	0	0
N7/-	14 (45.2%)	4 (44.4%)	0
< N6/-	1 (3.2%)	0	0
N6/-	5 (16.2%)	2 (22.2%)	0
N5/-	0	0	2 (10.5%)*
N4/-	0	0	1 (5.3%)
5YR 7/1	7 (22.6%)	3 (33.3%)	0
7.5YR 7/1	1 (3.2%)	0	0
10YR 7/1	1 (3.2%)	0	0
5YR 7/2	0	0	1 (5.3%)
5YR 7/4	0	0	1 (5.3%)
7.5YR 6/2	1 (3.2%)	0	1 (5.3%)
5YR 6/3	0	0	1 (5.3%)
10YR 6/3	0	0	1 (5.3%)#
2.5YR 6/4	0	0	1 (5.3%)
5YR 6/4	0	0	1 (5.3%)
5YR 5/1	0	0	2 (10.5%)
10YR 5/1	0	0	1 (5.3%)
10R 5/2	0	0	1 (5.3%)
2.5YR 5/2	0	0	1 (5.3%)
5YR 5/2	0	0	2 (10.5%)
5YR 5/4	0	0	1 (5.3%)
5YR 4/1	0	0	1 (5.3%)
	(31)	(9)	(19)

	Hardness		
6	3 (9.7%)	0	2 (10.5%)
7	12 (38.7%)	3 (33.3%)	7 (36.8%)
8	13 (41.9%)	6 (66.7%)	9 (47.4%)*#
9	3 (9.7%)	0	1 (5.3%)

	% of Body Inclusions		
3	1 (3.2%)	0	0
5	11 (35.5%)	5 (55.6%)	1 (5.3%)
10	16 (51.6%)	2 (22.2%)	2 (10.5%)*#
15	1 (3.2%)	2 (22.2%)	1 (5.3%)
20	2 (6.5%)	0	2 (10.5%)
25	0	0	3 (15.8%)
30	0	0	8 (42.1%)
35	0	0	1 (5.3%)
50	0	0	1 (5.3%)

	Slipping		
None	31 (100%)	9 (100%)	0
X & I	0	0	19 (100%)*#
	(31)	(9)	(19)

N.B. * tags the traits of the plain Sukothai piece and # tags the traits of the Sukothai jar. The Sawankhalok celadons include a "subceladon", none of whose traits distinguish it from the celadons. All bodies observed were opaque stonewares. The following variegated bodies were observed: one Sawankhalok celadon had outer and inner walls coloured N7/- and N5/- respectively; two Sukothai black-and-white wares had cores, one with its core 10YR 4/2 and its walls 10YR 5/1, and the other with its core 5YR 6/3 and its walls 5YR 7/4; the Sukothai jar had an outer wall coloured 10YR 6/3 and an inner wall coloured 10YR 6/1. The three studied bases of Sawankhalok black-and-white were unglazed. Two Sukothai black-and-white pieces had unglazed base and foot, while the glaze on a lower cavetto also stopped short of the foot; the Sukothai plain piece had glaze to its outer foot but unglazed base and inner foot; the glaze on the Sukothai jar stopped above the foot.

conditions, and the erection of broader, methodologically more robust classes, will be considered later (B.5.1). Seriation of the fine classes should be enacted first because the results will, among other effects, provide a guide on how classes should be pooled.

During fieldwork it was quite apparent that tradewares we believed to be of the same general antiquity tended to occur in the same surface assemblages. From the Law of Archaeological Association we would certainly expect pieces sharing the same stratified context to be of approximately the same age. By the same token those same relationships should be somewhat muffled in surface assemblages, owing to the noise introduced by the lack of stratigraphic control, for example the disturbance which must have occurred to bring buried artefacts to the surface. On top of that, further noise can be expected from factors which are independent of the lack of a statified context. Some classes are rare and so may show oddities in their associations; some classes were produced over several centuries; and the average time between production of the piece and its deposition in an archaeological context undoubtedly varied between the classes. In addition, socio-economic status of the original owners rather than simple chronological contemporaneity may be the main determinant behind some particular associations. Great care is obviously required to handle these sorts of obstacles effectively.

Now considering SSPHAP's available database (Appendix D), we see that the vast majority of SSPHAP's surveyed zones had low tradeware counts consisting of a depauperate selection of the 31 classes. To demonstrate patterns of mutual association we must accommodate technical difficulties such as the huge number of surveyed zones, the great range in the number of tradewares recorded per zone, and the dominance of "zero" as the recorded count. We could pool the zones into sites, but this would grant merely insubstantial relief, whilst ignoring the possibility that some sites (e.g. Benteng Tua) incorporate a mosaic of spatially and temporally discrete phases of use. Hence I follow another approach altogether, based on the point that all zones can be characterised either

as having or as lacking a particular tradeware class. If we take all the zones which have a particular tradeware class, and sum up the tradewares present in those zones, we have a precise calculation of the frequencies of the other tradewares associated with the tradeware class under consideration.

Table B-37 presents the results, to be read in the following way. The zones under consideration run along the rows, identified by the tradeware class whose acronym heads the row (i.e is shown in the first column). The tradewares present in those zones are shown in the other columns, as identified by the acronym which heads the column. The total tradewares present in those zones are shown in the last column. The total count of any particular tradeware class is, of course, the quantity found in those zones which include the tradeware class, as identified along the top-left to bottom-right diagonal. They are recited along the bottom row which also shows the total 42,980 pieces identified. For instance, in zones with early whitewares (top row) we find 120 early whiteware pieces, 181 early monochrome pieces, 28 Vietnamese monochrome pieces, and so on, with 5431 tradeware pieces in all.[34]

From inspecting the figures it is clear that the proportions of associated tradewares vary markedly with the tradeware class considered. To standardise this variation I use the "differences of proportions" statistic (Startup and Whittaker, 1982:110-112) to convert each and every cell in Table B-37 into a z-value. The positive z-values show that the tradeware class indicated by the column heading occurred at a greater than expected frequency in the zones having the tradeware class indicated by the row heading, and negative z-values show the reverse. Moreover the amplitude of the z-value shows the probability that the over-occurrence or under-occurrence was not due to chance. Hence it is possible to rank the z-values in the columns from "1" (the highest

[34] The frequencies given here differ slightly from those published previously (Bulbeck, 1989:87) where the early overglaze-decorated pieces were pooled with Ming Swatow, and where the Ming BW "hexagonal" wares had been left with the other Ming BW pieces.

TABLE B-37. FREQUENCIES OF TRADEWARES IN SSPHAP'S ZONES HAVING THE TRADEWARE SHOWN IN THE FIRST COLUMN

	EW	EM	VM	VH	EBW	EFV	JZ	SAN	VBW	MC	MW	SWH	SWM	SUK	YMC	SWR	MS	MBW	HEX	MFV	WLB	BL	LBW	WLW	SWT	QS	QBW	QC	ER	JPN	QPR	Sum
EW	120	181	28	3	7	6	3	6	58	13	8	32	21	7	21	229	487	228	10	7	117	3	100	4	679	477	1226	15	354	34	947	5431
EM	90	289	33	3	12	6	5	11	87	41	15	65	49	16	30	432	923	471	19	11	153	6	158	10	1380	879	2470	31	587	53	1652	9987
VM	40	110	63	3	9	5	1	5	54	17	9	29	18	11	12	204	497	210	12	7	109	3	87	4	559	450	1193	21	285	40	926	5093
VH	5	7	4	8	4	0	0	1	3	1	1	4	2	1	0	13	28	9	0	0	1	0	5	0	70	61	205	4	86	5	159	687
EBW	19	61	9	2	25	1	0	2	17	10	3	14	6	3	1	44	141	58	4	0	35	1	45	1	172	138	353	0	89	8	168	1430
EFV	21	31	10	0	1	17	1	2	23	2	9	12	2	1	6	133	316	159	4	5	106	3	50	4	284	229	542	7	232	20	296	2528
JZ	8	51	2	0	0	1	7	5	33	1	4	12	13	0	13	111	306	178	4	5	88	1	36	0	356	148	325	3	35	4	159	1909
SAN	8	52	5	1	2	1	3	16	40	8	6	33	18	2	5	121	373	192	5	5	93	1	57	2	377	164	481	5	53	4	238	2371
VBW	35	146	20	1	8	3	4	10	150	39	12	85	49	12	33	254	698	398	16	10	203	7	219	16	1020	656	1869	42	605	98	1362	8080
MC	14	76	12	1	4	2	1	5	54	90	9	47	38	11	27	203	479	252	7	7	39	2	117	12	904	700	1682	25	545	50	1149	6564
MW	8	29	9	2	3	4	1	3	30	14	30	31	11	2	9	136	347	189	3	5	112	2	74	6	349	239	665	7	348	20	476	3164
SWH	24	119	21	3	10	5	4	11	95	42	12	188	51	15	31	361	929	547	24	14	166	5	215	19	1348	912	2536	44	758	113	1846	10468
SWM	20	117	19	1	4	1	5	11	82	27	9	73	110	12	22	235	599	337	26	9	106	2	115	9	929	572	1505	26	490	38	1134	6645
SUK	8	30	12	1	2	1	0	2	22	13	5	29	15	24	7	69	136	61	3	3	26	1	53	7	229	104	310	7	83	3	150	1416
YMC	17	91	14	0	1	4	3	5	63	24	9	28	21	7	53	204	524	224	9	7	115	3	105	7	715	370	877	13	225	15	473	4226
SWR	83	237	39	5	16	10	7	14	111	57	16	110	65	17	38	755	1207	628	30	18	228	8	283	25	1983	1530	4390	99	1519	199	3750	17477
MS	47	192	39	6	16	7	7	15	122	72	19	125	82	16	41	590	1654	752	37	23	253	10	325	26	2432	2120	5485	131	2494	316	5697	23151
MBW	45	174	33	5	19	5	6	13	117	58	17	121	78	17	38	488	1253	921	41	19	254	9	326	30	2051	1612	4100	114	1830	171	4071	19135
HEX	10	46	11	0	3	3	1	3	28	12	4	27	22	7	6	59	185	70	75	8	11	1	41	6	410	337	741	20	467	46	771	3431
MFV	5	26	3	0	0	1	1	2	35	5	4	18	6	6	2	98	329	216	5	28	121	3	66	4	342	151	392	14	200	14	237	2334
WLB	24	77	10	1	11	4	2	7	58	19	15	68	23	5	13	233	624	390	11	15	299	7	220	18	826	483	1658	42	716	92	1337	7308
BL	17	52	6	0	2	3	1	2	30	2	7	14	4	1	5	127	319	197	1	7	148	13	111	9	343	131	403	15	116	8	393	2487
LBW	39	154	24	4	13	5	3	11	96	46	18	90	51	12	38	348	879	467	18	15	229	8	420	24	1444	1113	3558	94	1529	171	3115	13836
WLW	7	37	7	0	1	3	0	1	25	21	6	29	14	10	10	85	190	82	6	7	55	4	131	36	314	164	502	18	113	12	484	2374
SWT	60	201	44	5	15	12	7	16	129	79	23	159	87	20	48	659	1528	805	65	26	281	10	374	32	3250	2733	7791	241	4372	494	9529	33095
QS	45	181	41	6	16	9	7	14	123	72	23	113	69	18	48	601	1460	728	49	24	259	11	350	21	2703	3365	8099	241	4678	498	10287	34159
QBW	76	234	54	6	21	13	6	15	133	86	27	161	102	21	49	682	1539	813	62	27	274	12	400	33	3063	3240	9397	309	5899	627	13127	40508
QC	11	41	16	1	0	3	1	3	35	13	10	32	15	4	9	159	460	250	10	12	123	5	110	7	755	851	2448	324	2712	285	4569	13274
ER	56	177	45	6	13	9	6	10	109	47	21	98	66	14	39	494	1192	540	48	20	222	9	289	20	2339	2759	8039	306	6168	650	12679	36490
JPN	32	84	24	4	8	5	2	3	26	19	7	44	26	4	18	180	406	151	22	10	38	4	111	9	959	1477	4407	205	3559	689	7285	19818
QPR	86	222	50	7	14	11	6	14	123	67	25	130	76	19	48	628	1461	752	58	25	268	12	357	32	2832	3020	8641	297	5827	635	14396	40139
All	120	289	63	8	25	17	7	16	150	90	30	188	110	24	53	755	1654	921	75	28	299	13	420	36	3250	3365	9397	324	6168	689	14396	42980

EW = Early Whitewares; EM = Early Monochromes; VM = Vietnamese Monochromes; VH = Vietnamese Black-and-white; EBW = Early Blue-and-white; EFV = Early Overglaze-decorated; JZ = Jizhou; SAN = Sancai; VBW = Vietnamese Blue-and-white; MC = Ming Celadons; MW = Ming Whitewares; SWH = Sawankhalok Black-and-white; SWM = Sawankhalok Monochromes; SUK = Sukothai; YMC = Yuan-like Ming Celadons; SWR = Coarse Stonewares; MS = Ming Swatow; MBW = Ming Blue-and-white; HEX = Ming Blue-and-white "Hexagonal" Wares; MFV = Ming Red; WLB = Wanli Blue-and-white; BL = Bluewares; LBW = Late Ming Blue-and-white; WLW = Wanli Whitewares; SWT = Swatow; QS = Qing Swatow; QBW = Qing Blue-and-white; QC = Qing Monochromes; ER = European; JPN = Japanese; QPR = Qing White/Recent.

TABLE B-38. SPEARMAN'S RANK CORRELATION COEFFICIENTS (R_s) BETWEEN THE 31 TRADEWARE CLASSES

	EM	VM	VH	EBW	EFV	JZ	SAN	VBW	MC	MW	SWH	SWM	SUK	YMC	SWR	MS	MBW	HEX	MFV	WLB	BL	LBW	WLW	SWT	QS	QBW	QC	ER	JPN	QPR
EW	0.83	0.85	0.48	0.69	0.76	0.35	0.45	0.53	0.26	0.64	0.30	0.35	0.46	0.35	0.62	0.44	0.37	0.37	0.24	0.50	0.46	0.35	0.24	0.26	0.07	0.00	-0.42	-0.46	-0.39	-0.19
EM		0.76	0.44	0.66	0.59	0.57	0.75	0.80	0.54	0.63	0.57	0.66	0.65	0.65	0.72	0.63	0.70	0.42	0.31	0.52	0.43	0.62	0.35	0.57	0.13	0.16	-0.65	-0.77	-0.64	-0.48
VM			0.56	0.71	0.72	0.28	0.43	0.49	0.50	0.53	0.43	0.57	0.69	0.41	0.55	0.43	0.33	0.48	0.17	0.27	0.36	0.42	0.33	0.31	0.26	0.16	-0.51	-0.48	-0.44	-0.27
VH				0.76	0.23	0.12	0.37	0.23	0.30	0.19	0.35	0.33	0.34	0.21	0.26	0.25	0.22	0.12	-0.14	0.14	0.07	0.26	0.12	0.15	0.23	0.33	-0.49	-0.35	-0.30	-0.22
EBW					0.47	0.22	0.53	0.42	0.46	0.41	0.54	0.52	0.53	0.30	0.45	0.44	0.32	0.49	0.20	0.32	0.39	0.42	0.43	0.35	0.29	0.42	-0.45	-0.51	-0.31	-0.39
EFV						0.24	0.21	0.41	0.30	0.79	0.31	0.23	0.44	0.37	0.63	0.43	0.36	0.40	0.48	0.57	0.59	0.43	0.43	0.22	0.02	-0.13	-0.37	-0.33	-0.36	-0.15
JZ							0.81	0.77	0.25	0.28	0.41	0.53	0.25	0.62	0.79	0.81	0.78	0.36	0.48	0.55	0.30	0.36	0.17	0.78	0.33	0.08	-0.65	-0.78	-0.66	-0.72
SAN								0.85	0.51	0.34	0.68	0.80	0.49	0.70	0.71	0.77	0.71	0.53	0.55	0.46	0.26	0.47	0.35	0.82	0.38	0.33	-0.72	-0.89	-0.67	-0.78
VBW									0.51	0.55	0.66	0.74	0.63	0.75	0.78	0.81	0.82	0.53	0.66	0.70	0.50	0.61	0.43	0.72	0.16	0.04	-0.60	-0.82	-0.70	-0.63
MC										0.38	0.76	0.79	0.79	0.62	0.40	0.49	0.37	0.49	0.27	0.14	0.41	0.72	0.71	0.66	0.49	0.34	-0.51	-0.66	-0.49	-0.60
MW											0.50	0.35	0.38	0.46	0.59	0.52	0.46	0.32	0.52	0.75	0.70	0.53	0.57	0.29	-0.15	-0.20	-0.35	-0.35	-0.41	-0.21
SWH												0.85	0.70	0.58	0.43	0.53	0.54	0.65	0.53	0.39	0.44	0.68	0.78	0.65	0.19	0.28	-0.45	-0.37	-0.40	-0.55
SWM													0.75	0.73	0.51	0.60	0.59	0.60	0.42	0.22	0.27	0.58	0.63	0.75	0.43	0.35	-0.58	-0.68	-0.58	-0.60
SUK														0.56	0.43	0.48	0.42	0.67	0.39	0.18	0.42	0.61	0.59	0.54	0.34	0.27	-0.41	-0.59	-0.48	-0.43
YMC															0.69	0.67	0.60	0.32	0.36	0.43	0.42	0.62	0.51	0.78	0.44	0.29	-0.66	-0.79	-0.70	-0.71
SWR																0.89	0.80	0.35	0.54	0.70	0.54	0.53	0.41	0.71	0.31	0.12	-0.76	-0.84	-0.77	-0.69
MS																	0.89	0.45	0.64	0.71	0.61	0.61	0.47	0.81	0.37	0.21	-0.65	-0.66	-0.65	-0.73
MBW																		0.38	0.62	0.72	0.55	0.68	0.43	0.73	0.24	0.03	-0.57	-0.78	-0.66	-0.33
HEX																			0.53	0.31	0.32	0.33	0.49	0.54	0.28	0.19	-0.25	-0.48	-0.26	-0.43
MFV																				0.73	0.66	0.53	0.65	0.50	0.20	-0.17	-0.18	-0.47	-0.33	-0.36
WLB																					0.78	0.52	0.46	0.42	-0.12	-0.17	-0.33	-0.48	-0.40	-0.44
BL																						0.71	0.69	0.39	-0.05	-0.07	-0.19	-0.50	-0.30	-0.40
LBW																							0.79	0.60	0.20	0.17	-0.35	-0.67	-0.51	-0.53
WLW																								0.57	0.13	0.24	-0.21	-0.33	-0.32	-0.46
SWT																									0.52	0.43	-0.64	-0.88	-0.68	-0.89
QS																										0.77	-0.53	-0.46	-0.45	-0.51
QBW																											-0.22	-0.29	-0.07	-0.51
QC																												0.76	0.69	0.67
ER																													0.79	0.83
JPN																														0.63

EW = Early Whitewares; EM = Early Monochromes; VM = Vietnamese Monochromes; VH = Vietnamese Black-and-white; EBW = Early Blue-and-white; EFV = Early Overglaze-decorated; JZ = Jizhou; SAN = Sancai; VBW = Vietnamese Blue-and-white; MC = Ming Celadons; MW = Ming Whitewares; SWH = Sawankhalok Black-and-white; SWM = Sawankhalok Monochromes; SUK = Sukothai; YMC = Yuan-like Ming Celadons; SWR = Coarse Stonewares; MS = Ming Swatow; MBW = Ming Blue-and-white; HEX = Ming Blue-and-white "Hexagonal" Wares; MFV = Ming Red; WLB = Wanli Blue-and-white; BL = Bluewares; LBW = Late Ming Blue-and-white; WLW = Wanli Whitewares; SWT = Swatow; QS = Qing Swatow; QBW = Qing Blue-and-white; QC = Qing Monochromes; ER = European; JPN = Japanese; QPR = Qing White/Recent.

N.B. The two values of 0.89 to two decimal places are distinct at the third decimal place, showing that Coarse Stonewares and Ming Swatow are the closest classes.

probability that the column tradeware class occurred at above-expected frequencies in the zones with the row tradeware class)[35] to "31" (the highest probability that the column tradeware class occurred at below-expected frequencies in the zones with the row tradeware class). The data are then in a suitable form to apply the Spearman's r_s rank correlation coefficient and construct a half-matrix of the degree of similarity between each pair of tradeware classes, whereby a value approaching +1 shows that the tradeware classes share the same pattern of co-associations, and a value approaching -1 shows that the tradeware classes have opposite patterns of co-associations (Table B-39).[36]

The usual seriation procedure at this stage would simply use the measures in Table B-39, but it would be flawed on two counts. Firstly, leaving aside the coefficients in the last six columns, we can see that certain classes show generally high coefficients, in sharp contrast with other classes whose coefficients are low almost throughout. The classes with high coefficients (e.g. MS, MBW, SWR, EM) tend to be the more common ones, while the classes with low coefficients (e.g. VH, BL, JZ, MFV) tend to be the rare ones (Table B-38). This "normatising effect", which promotes the similarities of the common classes at the expense of the rarer ones, constitutes noise which muffles chronological similarities involving rarer classes.[37]

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[35] This of course usually occurred in cases involving the same tradeware class in both the column and the row heading. However, during the pooling process the most numerous of the "Ming" classes sometimes found their highest above-expected occurrence in zones defined on the basis of the presence of some other tradeware class, notably the early monochromes, than in zones defined on the basis of their own presence.
[36] For an example of the table of z-values leading to the Spearman's r_s distances, see my already published seriation based on 29 tradeware classes. The calculations discussed here were carried out using a Borland "Reflex" PC package.
[37] One of the reasons for my rather complex method of calculating measures of similarity is that it keeps the "normatising effect" in check to some degree. I have experimented with the computationally simpler Robinson coefficient, whose normatising properties are described by Irwin (1985:120) as a good quality, and found that the tendency of common classes to be similar with each other reaches tyrannical proportions.

Secondly, consider the main disturbances in the Bugis-Makassar countryside (antique looting; ploughing and tilling; sundry holes for wells, rubbish pits, building foundations and plants) which have brought buried artefacts to the surface. The passage of older, more deeply buried artefacts to the surface would have usually been accompanied by the passage of younger, stratigraphically higher artefacts, but the reverse obviously does not hold. Hence, as I show elsewhere from consideration of the z-values (Bulbeck, 1989:88,92), zones defined by the presence of some older tradeware class tend to have disproportionately large frequencies of later tradeware classes. As a result, older classes sometimes show spurious patterns of co-association with younger classes. However, the point specifically fails to apply to the "recent" classes, i.e. the Qing monochrome, Japanese, European and Qing white classes. In these cases it would seem that the majority had not been deposited long enough ago to have been buried over, except in disturbed areas where the disturbance would indeed act as a burying agent. Consequently "recent" pieces either dominate the surface assemblages in comparatively undisturbed zones or occur in specifically lower than expected frequencies in disturbed zones. Hence these classes show their strongest negative coefficients against the more common pre-Qing classes (e.g. MS, MBW, SWR, EM) rather than against those which are necessarily the oldest (Table B-38); partly as the statistical mirror image of the "normatising effect", partly because surface assemblages in disturbed zones will include the more common pre-Qing classes more often than the rarer classes.

Two procedures are mandatory to overcome these problems. Firstly, we have to pool tradeware classes to counteract the "normatising effect", and to abolish what we can of the spurious patterns of co-association between older and younger classes. Secondly, we have to seriate via immediate relationships rather than in terms of the total half-matrix of coefficients given in Table B-38. These procedures are reiterative clustering and down-the-line seriation.

As regards reiterative clustering, I hold that when any two "Operational Taxonomic Units" (OTUs) are joined in a hierarchical cluster, logically they become one pooled OTU. Not only might the general relationships of the new OTU differ significantly from the relationships shown by the original two OTUs, but also the the relationships among other OTUs might be affected. For instance, as shown in Table B-38, the first cluster involved Ming Swatow and coarse stonewares at 0.89. Hence I pooled them into a "Ming Swatow/coarse stoneware" class and recalculated Table B-38 on the basis of 30 classes. After that the highest coefficient, 0.89 again, occurred between "Ming Swatow/coarse stonewares" and Ming BW - an outcome which is not predictable from the original coefficients. After pooling them into a "Ming Swatow/coarse stoneware/Ming BW" class and recalculating the r_s coefficients based on 29 classes, early whitewares and Vietnamese monochromes joined at 0.86 - a slight improvement on their original 0.85 coefficient (Table B-38). And so on, in the order shown in Figure B-2. As also shown in Figure B-2, OTUs continued to cluster with coefficients greater than 0.8 right to the penultimate joins, involving classes which sometimes did not appear particularly similar in Table B-38. Analogously, the effects of pooling classes are generally most marked on the relationships involving rarer classes, thereby ameliorating the "normatising effect". Moreover, the procedure provides the statistical basis for choosing which classes to pool.

Down-the-line seriation utilises the sequence of half-matrices of r_s coefficients which had been steadily reduced to pool the classes, but in the reverse order. At the point when any two OTUs are pooled, they belong to a half-matrix which otherwise includes the OTUs depicted as stems at that level. For instance, when Qing Swatow (QS) joined the main cluster (labelled "B" for convenience) at rs=0.9, there were six OTUs in a 5 by 5 half-matrix. Consideration of the other rs values allows all the OTUs to be placed next to (and, where relevant, between) their most similar OTUs, producing the seriation "B":Qing Swatow:Qing BW:Japanese/Qing Monochrome:"A" (Figure B-2). With Qing

Swatow set next to the "B" cluster, the next split within "B" is seriated with respect to Qing Swatow; as further splits within "B" occur, so the seriations occur with respect to subsidiary stems within "B". The end result is the seriated order shown at the bottom of Figure B-2.

The advantages of seriated dendrograms over their unseriated counterparts are quite obvious, as also shown in my analysis of South Sulawesi lexicostatistical relationships (Appendix A). For instance, without seriation we might decide that Qing Swatow and Qing BW belonged to different clusters and hence were unrelated, whereas seriation proves their adjacency. However, a difficulty with down-the-line seriation is it tends to seriate with respect to marginal and hence rather anomalous OTUs (e.g. MFV and SUK in Figure B-2). To be sure, the anomaly becomes apparent because, at the point of splitting, both subsidiary OTUs would prefer to sit next to the same flanking OTU. With the lexicostatistics it was possible to resolve the tension by choosing the order which involved the least immediate stress, and the resulting seriation performed at almost maximum "goodness of fit" at the global level (A.5). But this option is not available with the tradewares because the rs coefficients are not Euclidean measures. Instead what we can do, when the flanking OTUs would produce different seriated orders, is to consider the next OTUs immediately beyond and see if they would prefer one seriated order over the other. Every seriation step (bar two; see below) in Figure B-2 could be resolved by working outwards until the majority of the neighbouring OTUs determined the order: the two flanking OTUs when they agreed on the order; otherwise two out of three, or three out of four of the neighbouring OTUs, when the two flanking OTUs came into conflict.

B.4.2 Other seriations involving the fine classes

The seriated order shown in Figure B-2 conforms quite well with the chronological order that would be expected from my understanding of the classes (B.3). The main cluster of pre-Qing classes divides roughly into "Early" and "Ming" clusters, while Qing Swatow and Qing BW sit between the

"Ming" and "Recent" clusters. However, there are some anomalies. Early overglaze-decorated (EFV) and Ming whitewares (MW) should not be the oldest classes; the four classes between Ming BW hexagonal (HEX) and Wanli BW wares (WLB) should be middle to late rather than early Ming; while the seven classes between early monochromes (EM) and Ming celadons (MC) should be pre-Ming to early Ming rather than late Ming.

These anomalies did not characterise my original published seriation (Figure B-1, slightly adapted from Bulbeck [1989:Figure 24]). To read the seriating decisions, note that I there used the distances which create the r_s coefficients rather than the r_s coefficients themselves; either may be used, but with the former we of course seriate by the smallest distances (rather than by the highest coefficients). Note also that there were two cases, indicated by asterisks, when it was not possible to secure a majority seriation from the four flanking OTUs, and hence I have seriated by the smallest of the compared distances.38 The crucial point is that Figure B-1 seriated only 29 classes, because "early overglaze-decorated" pieces (EFV) had been pooled with Ming Swatow, and Ming BW hexagonal pieces (HEX) had been left in the Ming BW class. The seriated order conforms marvellously well with the expected chronological order of the tradeware classes, and the few unexpected results resolved uncertainties I personally had. Vietnamese monochromes (VM) and Vietnamese BW (VB), for instance, appeared earlier than Demmanari and I had allowed, which supported the earlier datings of these classes to be found in the literature (e.g. Brown, 1988) rather than the later datings (e.g. Frasché, 1976). Jizhou wares, supposedly a Yuan class (Medley, 1977), instead appeared early Ming, which agreed with their absence from SSPHAP's few clearly pre-Ming assemblages. And the "Yuan-Ming" celadons Demmanari and I dated to the 14th or the 14th-15th centuries appeared clearly Ming.

Rather than immediately reject the EFV and HEX classes, I redid the larger analysis without, however, including the

[38] As a further stylistic difference, I tried to give characterising labels to the pooled classes rather than the arbitrary capital letters used in Figure B-2.

coarse stonewares. Coarse stonewares are not a good chronological marker of any sort, since their dates would span the 2nd millennium AD, and the alacrity with which they joined Ming Swatow and Ming BW in Figure B-2 would appear to reflect the "normatising effect". And indeed the resulting seriation (Figure B-3) does remove some of the anomalies present in Figure B-2. Early monochromes find their place with the other pre-Ming classes; what I take to be specifically late Ming classes (WLB, BL, MBL and WLW) bunch together, even if in a middle rather than a late Ming position; and Ming red (MFV) takes up a chronologically more acceptably position. On the other hand, the classes between Yuan-like Ming celadons (YMC) and Ming whitewares (MW) appear too late, while Sukothai (SUK) and especially the hexagonal BW wares (HEX) appear too early.

The HEX class worried me because, even though it occurred fairly commonly, it was specifically absent from the Makassar palace assemblages (B.3.9). Puzzling over my results I also noticed that HEX and MFV pieces occurred together in only one zone (T.27.1). Because there were three MFV pieces (a rare class) to the one HEX piece (a more common class), the HEX row ranked high in the MFV column but not vice versa, and consequently HEX and MFV could not cluster. Moreover, because the HEX row generally ranked low in the columns involving "Ming" classes, MFV could not cluster anywhere until after HEX, obviously an anomalous class, had clustered (Figures B-2 and B-3). Having worked out that one lonely statistical quirk was disrupting the general clustering procedure, I redid the larger analysis with HEX pooled with the other Ming BW pieces (MBW).

The resulting analysis (Figure B-4) incurred one case, indicated by a double asterisk, where I had to use the smallest coefficient (0.54, between the "K" and "I" stems) to seriate the cluster split, because there was no single largest distance (the coefficient of 0.84 occurred on both sides of the fence). By using the lowest coefficient as the "ultimate seriating clause", a seriation decision can be made in virtually all conceivable circumstances, except when a

symmetrical half-matrix prevents seriation until the next step in the splitting process (as in Figure B-2).

The Figure B-4 seriation correctly joins MFV and MBW at an early stage, but is generally rather disappointing. The specifically late Ming classes (BL, WLB, LMB and WLW) fall far apart; what I take to be early Ming classes (SAN, VBW, SWM, YMC, MC, SUK and SWH) are spread far and wide; "early blue-and-white" and Vietnamese black-and-white (EBW and VHP) appear far too late; Swatow (SWT) appears too early. These disruptions from more the sensible pattern shown in Figure B-1 can be attributed to my recognition of the EFV class.

Nonetheless, all four seriations show the same primary structural organisation into "early", "Ming" "Qing" and "recent" groups. They also agree on details such as the early dating of Vietnamese monochromes and early whitewares, and the status of QPR as the most recent class. Maybe it is not surprising that the least consistency involves the 22 classes which crowd the interval between the c.14th and 17th centuries, given that the seriation is based on surface assemblages, that the recognition of some of the classes is biased by the conditions under which identifications were made (B.5.1), plus the other difficulties mentioned above. I will follow Figure B-1 as the best seriation even if I must then admit a certain element of luck in its "rectitude". I will also accept the combined results of Figures B-2 to B-4 showing my EFV class as early, even if these seriations were unsatisfactory in other respects.

B.4.3 Dating the classes

The present thesis adopts a general chronological scheme rounded off to 50 year intervals, primarily to simplify my standardised interpretations of the tradeware frequencies (B.4.4).[39] Hence I do not accept the Chinese reigns and dynasties as a chronological straitjacket binding on the Chinese tradewares, but only as a useful notation by which to refer to particular periods. All datings posited for the

[39] Including the present century which, although it had lasted only until the survey, is treated as though 1986 were the year 2000.

tradeware classes and categories are best estimates of the main distribution of the total chronological range, just as the classes themselves were recognised on the basis of trying to wrap up the total ceramic variability into cohesive packages.

Early whitewares and early monochromes. Some of these are clearly Song, especially the *Qingbai* bowls with thickened rims (cf. Lam, 1985). Some proportion of the early monochromes has almost certainly been deposited in Ming contexts (cf. Figure B-2), even though the export of Chinese celadons appears to have been largely phased out by the early 15th century (Guy, 1986:34). Rather than indulge in speculative splitting I consign both classes to a "Yuan" time slot, i.e. 13th-14th centuries, particularly because these centuries mark the origins of Makassar protohistory.

Vietnamese monochromes. Backdated by one century from whatever date Demmanari and I gave them (Table B-32), except for the few pieces we dated between the 12th and 14th centuries which are here all consigned to the 13th-14th centuries.

Vietnamese black-and-white. Guy (1986:45-46,110-111) suggests the 14th to early 15th centuries. Here I simplify the estimate to the 14th century.[40]

Early blue-and-white. The seriations indicate that Demmanari and I had identified an early group of Chinese BW wares. The evidence now suggests that Chinese potters adopted the technology by the early 14th century, initially for the Middle East market, and by around 1350 were exporting substantial quantities of BW porcelain to at least some Indo-Malaysian "countries" (Guy, 1986:25-28). Presumably South Sulawesi was caught in the "trickle-down" effect. AD 1350-1450 if we identified a piece as "Yuan"; 1400-1450 if we identified it as "early 15th century" or "Yunglo"; 1350-1450 for the other pieces (see Table B-7).

Early overglaze-decorated. 13th-14th or 14th-15th centuries, as originally identified (Table B-8).

[40] Elsewhere Guy (1988:233) suggests 'no later than the mid-sixteenth century' for four Vietnamese iron-decorated pieces excavated from Agop Atas, Sarawak, which Bellwood (1988:231) interprets as no earlier than the 16th century.

Vietnamese blue-and-white. Figure B-2 strongly suggests a predominantly 15th century date, but the other seriations suggest that the major phase of the production of these wares for export lasted well into the 16th century (cf. Brown, 1988). For two reasons I will use a 15th century date. Firstly, the class was remarkably well represented at West Soppeng's original palace site of Tinco Tua (Kallupa et al., 1989) but very scarce at the Makassar palace sites. Secondly, the 16th century is well served by other classes, to be explained in due course.

Jizhou and Sancai. The Jizhou class consistently took up an early Ming, say 15th century, position in the seriations. The comments and dating outlined above for Vietnamese BW also apply to Sancai (cf. Guy, 1986).

Coarse stonewares. SSPHAP's identifications are not generally reliable, and even if they had been reliable the datings would have still been problematical (B.3.5). Attempting to date these pieces would only prejudice, distort or reify the dates derived from the other classes.

Sawankhalok and Sukothai. Figure B-1 strongly accords with the 15th-16th century date currently favoured by experts. These classes also enjoyed a more marked presence at Tinco Tua than at the Makassar palace sites. I do not believe the more recent dating for Sawankhalok suggested by Figures B-2 to B-4.

Ming whitewares and Ming celadons. Although Figure B-1 is our most reliable guide on these classes, it is interesting that Ming whitewares appeared "early Ming" or even "early" in the other seriations. There is no need to reject the dates assigned to these pieces, including the 14th-15th century date posited for some of the whitewares (Table B-13 and B-16). A default 15th-16th century date can be used when no finer estimate was ventured.

Yuan-like Ming celadons. The Ming credentials of this class appear unquestionable. Hence I bring the dates a century forward from whatever date Demmanari and I had preferred (cf. Table B-13). With this, I think the Chinese celadons as a whole are distributed fairly correctly through

time, with those dated too early or too late balancing each other out.

Ming Swatow. Approximately equivalent to Harrisson's (1979) "Simple" Swatow category, differing mainly by the inclusion of coarse examples of Harrisson's "Complex" Swatow category, and coarse pieces which Harrisson would presumably leave in undifferentiated Ming (B.3.11). So while Harrisson recommends a mid-16th century date for most "Simple" Swatow pieces, the dating of SSPHAP's "Ming Swatow" class can certainly be expanded to cover the whole 16th century. Some of the Ming Swatow pieces must be 15th century, but I cannot say which ones, and Ming Swatow pieces constitute inadequate grounds to infer use of a site before the 16th century.

Ming BW (including "hexagonal wares") and Ming Red. Remarks on chronology as with Ming Swatow, except that the monolithic 16th century date can be partly relieved by using the earlier dates sometimes suggested for the Ming BW pieces (see Table B-19).

Wanli. While Figure B-1 seriates the Wanli BW class according to prior expectations, the placement is unstable, and the class shifts to an "early Ming" position in the other seriations (cf. Bulbeck, 1989:94). The late Ming position of Wanli whitewares, at least, appears stable. Wanli's reign (1573-1619) is here interpreted as 1550-1650.

Bluewares. The dates we advanced for these pieces, ranging between the 16th and the 18th centuries (Table B-15), might as well be retained. The class is of no computational significance whatsoever.

Late Ming blue-and-white. The class consistently clusters with Wanli whitewares in a late Ming serial position.

Swatow. Approximately equivalent to Harrisson's (1979) "Complex" Swatow category, but also including finer wares decorated in the "Simple" style, and a reasonable proportion of monochrome pieces (B.3.11). Hence SSPHAP's Swatow class might appear at least no later than Harrisson's "Complex" Swatow category, which she dates to the reign of Wanli, except that it consistently seriates later than the classes SSPHAP associates with Wanli (Figures B-1 to B-3). Following Medley's dating of "Swatow" to cover the 16th and 17th

centuries, and noting that the 16th century is already well represented by SSPHAP's Ming Swatow class, we can date SSPHAP's Swatow class to the 17th century.

Qing Swatow. The seriations demonstrate the very early Qing affinities of the class. Given the tremendous popularity of Swatow-type wares leading into the Qing dynasty, it would indeed be most surprising if the tradition had not cast its shadow further forward in time. SSPHAP's Qing Swatow class probably also includes some late *Kraak porselein* wares (as conventionally understood). AD 1650-1750 is consistent with all these points.

Qing blue-and-white. The r_s coefficients (Table B-38) and seriations indicate very little chronological overlap between this class and the "recent" classes. This supports our finer classifications in which only around ten percent of Qing BW pieces were assigned to the 19th century (Table B-27). 19th century "Kitchen Ch'ing" wares were apparently a minor tradeware to South Sulawesi, compared to the earlier Qing BW categories, and (*pace* Kwan and Martin, 1985:79-80) a 19th century date for the class needs to be positively identified rather than assumed by default. Moreover, evidence for the continuity of the use of a site after the 18th century should be based on the presence of the "recent" classes rather than Qing BW pieces. Accordingly we can date Qing BW pieces (no closer identified) to 1650-1800; 1650-1750 if identified as Kangxi; 1700-1750 if identified as Yungzheng; 1750-1800 if identified as Qianlong; century datings if identified that way; and 1800-1900 for the few specimens identified as "Kitchen Ch'ing".

Qing monochromes. Demmanari and I posited a wide range of dates spanning the 17th to the 20th centuries, although with most dated to the 18th-19th centuries (Table B-14). Our estimates appear slightly too early and need to be generally brought forward. 1700-1800 if we identified a piece as 17th century; 1750-1800 if we identified it as Qianlong; 1700-1900 if we dated it to the 17th, 17th-18th or 18th centuries; 1800-1900 if we dated it to the 18th-19th or 19th centuries; 1900-1986 if we dated it to the 19th-20th or 20th centuries.

European. Kwan and Martin (1985:80) give good reasons for dating most of the European pieces found on Tioman island to the 19th and initial 20th centuries. Similarly, between the mid-19th and initial 20th centuries, the Netherlands Indies colonial government consistently expended more on its tradewares imported from Holland than from all other places combined (see the *Koloniale Verslagen*). As the 20th century is more than amply represented by the Qing white/recent class, we can restrict the European pieces to 1800-1900.

Japanese. Based on the same reasoning used to date the European pieces, I had previously dated the Japanese pieces found in South Sulawesi to the 19th century (Bulbeck, 1989:94). However, the Netherlands Indies' government survey of Chinese economic activity, undertaken in the early 20th century, singles out for comment the mass quantities of Japanese tradewares imported to Makassar (Ujung Pandang) by local Chinese traders (Vleming, 1926:274). Even if this reference also betokens whitewares, quite a few of the Japanese flowerwares we recorded were almost entire, suggesting very recent disposal. Hence I now apply a 19th-20th century date to the class.

Qing white/recent. All the seriations confirm a 20th century default dating for this class. However, I will retain earlier dates when these were posited (Table B-29), as these earlier dated pieces were collected mainly from sites which had been abandoned before the Dutch land-use maps were produced in the early 20th century.

Table B-39 shows how the 36,996 tradeware pieces identified during the Gowa survey are distributed by tradeware class and by 50- or 100-year interval. As often as not the number of tradewares in a class assigned to a particular interval include a fraction, reflecting the point that the recognised intervals cut across the dates posited for the tradewares. The cross-tabulated assignments are, after all, estimates of probability, no less than the posited datings are. To take one example, a single early whiteware piece is considered to have a probability of 0.5 that it dates to the interval 1200-1300, a probability of 0.25 that

TABLE B-39. FREQUENCIES OF THE 31 TRADEWARE CLASSES FROM THE GOWA SURVEY ASSIGNED BY 50 OR 100-YEAR PERIODS

	1200-1300	1300-1350	1350-1400	1400-1450	1450-1500	1500-1550	1550-1600	1600-1650	1650-1700	1700-1750	1750-1800	1800-1900	1900-1986	Total
EW	52	26	26	0	0	0	0	0	0	0	0	0	0	104
EM	96	48	48	0	0	0	0	0	0	0	0	0	0	192
VM	5	13.5	13.5	11.5	11.5	0	0	0	0	0	0	0	0	55
EFV	6.5	4.25	4.25	1	1	0	0	0	0	0	0	0	0	17
VH	0	3.5	3.5	0	0	0	0	0	0	0	0	0	0	7
EBW	0	0	5.5	15.5	0	0	0	0	0	0	0	0	0	21
MW	0	1.5	1.5	6	6	5	5	0	0	0	0	0	0	25
JZ	0	0	0	2	2	0	0	0	0	0	0	0	0	4
SAN	0	0	0	4.5	4.5	0	0	0	0	0	0	0	0	9
VBW	0	0	0	44	44	0	0	0	0	0	0	0	0	88
MC	0	0	0	12.5	12.5	9	9	0	0	0	0	0	0	43
YMC	0	0	0	6.75	6.75	4.25	4.25	0	0	0	0	0	0	22
SWH	0	0	0	36.5	36.5	36.5	36.5	0	0	0	0	0	0	146
SWM	0	0	0	16	16	16	16	0	0	0	0	0	0	64
SUK	0	0	0	3.75	3.75	3.75	3.75	0	0	0	0	0	0	15
MBW	0	0	0	2.25	15.75	391.25	386.75	0	0	0	0	0	0	796
HEX	0	0	0	0	0	32	32	0	0	0	0	0	0	64
MFV	0	0	0	0	0	12.5	12.5	0	0	0	0	0	0	25
MS	0	0	0	0	0	681	681	0	0	0	0	0	0	1362
BL	0	0	0	0	0	2	2	2.25	2.25	2.25	2.25	0	0	13
WLB	0	0	0	0	0	0	143.5	143.5	0	0	0	0	0	287
WLW	0	0	0	0	0	0	13	13	0	0	0	0	0	26
LBW	0	0	0	0	0	0	161.5	161.5	0	0	0	0	0	323
SWT	0	0	0	0	0	0	0	1305	1305	0	0	0	0	2610
QS	0	0	0	0	0	0	0	0	1484.5	1484.5	0	0	0	2969
QBW	0	0	0	0	0	0	0	0	2678.2	2888.95	2645.5	93.5	0	8306
QC	0	0	0	0	0	0	0	0	2	15.25	34.25	246.25	3	301
ER	0	0	0	0	0	0	0	0	0	0	0	5900	0	5900
JPN	0	0	0	0	0	0	0	0	0	0	0	332.5	332.5	665
QPR	0	0	0	0	0	0	0	22	25.5	14.5	14	19	12442	12537
Sum	159.5	96.75	102.25	162.25	160.25	1193.25	1506.75	1647.25	5497.45	4405.45	2695.95	6591.5	12777.5	36996

EW = Early Whitewares; EM = Early Monochromes; VM = Vietnam Monochromes; EFV = Early Overglaze; VH = Vietnamese Black-and-white; EBW = Early Blue-and-white; MW = Ming Whitewares; JZ = Jizhou; SAN = Sancai; VBW = Vietnamese Blue-and-white; MC = Ming Celadons; YMC = Yuan-like Ming Celadons; SWH = Sawankhalok Black-and-white; SWM = Sawankhalok Monochromes; SUK = Sukothai; MBW = Ming Blue-and-white; HEX = Ming Blue-and-white "Hexagonal" Wares; MFV = Ming Red; MS = Ming Swatow; BL = Bluewares; WLB = Wanli Blue-and-white; WLW = Wanli Whitewares; LBW = Late Ming Blue-and-white; SWT = Swatow; QS = Qing Swatow; QBW = Qing Blue-and-white; QC = Qing Monochromes; ER = European; JPN = Japanese; QPR = Qing White/Recent.

it dates to the interval 1300-1350, and the same probability as regards the interval 1350-1400.

B.4.4 Standardising the tradeware frequencies

Table B-39 shows very clearly that the various intervals are represented by wildly different numbers of pieces. Generally speaking the later the interval, the greater its representation, although the order is essentially reversed with the four intervals between 1650-1700 and 1800-1900.[41] The general pattern reflects some combination of (i) growing availability of tradeware over time; (ii) expanding population leading to a larger number of "target sites" (5.5.1) over time; (iii) systematic underrepresentation of the earlier classes still buried underground (B.4.1); and (iv) the datings I use for the classes, e.g. that the interval 1650-1700 happens to fall in the overlap between the three common classes Swatow, Qing Swatow and Qing BW.

Regardless of the precise factors responsible, use of the raw frequencies per interval is likely to lead to peculiar results. For instance, the almost ten-fold increase in the number of pieces assigned 16th century dates as opposed to 15th century dates would make detection of a predominantly 15th century site virtually impossible. In the report of the Soppeng sites (Kallupa et al., 1989) I used raw frequencies to construct "chronological histograms" of the sites, and only the most patently obvious inferences could be drawn, because the overall raw frequencies forced the histograms into a small number of basic shapes. Finer inferences, at the level which is conceivable given the fineness of the "Ming" datings, and certainly at the level which is desirable if the archaeology is to tell us anything about the history, were available only after standardising the histograms (Kallupa et al., 1989). Hence the present thesis uses only "standardised chronological histograms", also referred to as "tradeware profiles" for convenience.

[41] The period 1800-1900 has had more pieces assigned to it than to the three preceding intervals, but it represents 100 years whereas the three previous intervals only represent 50 years.

The standardisation procedure can be explained with a simple example, Pakkala Toa or "Takalar site 4" (11.7.4). 18 pieces were recorded but the two coarse stoneware pieces are excluded from the exercise. The other 16 pieces were identified as shown in the bottom row in Table B-40, and disributed across the various time intervals as shown in the columns. The number of pieces per time interval is summed up along the rows. These sums are then divided by the respective total frequencies shown in the bottom row of Table B-39, to standardise them, and expressed as a percentage (Table B-40; Figure 11-24).[42]

TABLE B-40. STANDARDISATION OF THE TRADEWARES AT PAKKALA TOA

	EW	MC	MBW	MS	SWT	QBW	ER	QPR	Sum	%
1200-1300	0.5								0.5	0.31
1300-1350	0.25								0.25	0.26
1350-1400	0.25								0.25	0.24
1400-1450		0.25							0.25	0.15
1450-1500		0.25							0.25	0.16
1500-1550		0.25	0.5	0.5					1.25	0.10
1550-1600		0.25	0.5	0.5					1.25	0.08
1600-1650					1				1	0.06
1650-1700					1	1.33			2.33	0.04
1700-1750						1.33			1.33	0.03
1750-1800						0.33			0.33	0.01
1800-1900							4		4	0.06
1900-1986								3	3	0.02
Total	1	1	1	1	2	3	4	3	16	0.04

N.B. Tradeware class acronyms as in previous tables. The Ming celadon piece was not dated specifically and so receives the default "15th-16th century" dating. The Ming BW piece was dated as 16th century. Two of the Qing BW pieces were identified as "Kangxi", i.e. 1650-1750, and the other merely as "Qing BW" (1650-1800). The Qing whiteware pieces receive the default dating 1900-1986.

B.4.5 Issues in interpreting the standardised histograms

The Pakkala Toa example brings out strengths and weaknesses in the technique, both generally speaking and particularly as

[42] Note that I standardise against all the tradewares recorded during the Gowa survey, even though the sites recorded during the south coastal survey, and along the Jeknekberang upstream from Bontona Songkolo, are not described in this thesis.

applied to a site with only a small tradeware sample. The single early whiteware piece can scarcely be used to prove two centuries of use of the site, but I have no particular grounds for preferring any point within the period 1200-1400. In the same vein 16 pieces can scarcely indicate 726 years of constant human presence, but it would be fair to say that the pieces have been dated to all ages, and there is no indication of any particular break. The raw frequencies generally increase from "early" (1) to "Ming" (5) to "Qing" (3) to "recent" (7), but the standardised frequencies generally decrease with less age. Assuming the identifications are correct, we can indeed say that the single early piece would appear to be more significant than the seven recent pieces, but we would be hard pressed to infer it is six times more significant than the European pieces and 15 times more significant than the Qing whiteware pieces.

Hence the apparent precision contained in the standardised chronological histograms does not imply that the site's history of tradeware-related use has been precisely captured. Rather it implies that if the identifications are correct and also representative of their dating (e.g. that the "early whiteware piece" correctly represents a larger population of pieces brought to the site throughout the 13th and 14th centuries), and if the Gowa survey's overall tradeware identifications and datings are also valid, then the standardised chronological histogram portrays the history of Pakkala Toa's share of tradeware-related activities by the standards of the other Gowa sites. As so few tradeware were recorded at Pakkala Toa, not a great deal of faith should be attached to the first assumptions, and the site interpretation is accordingly scaled back to a very general statement (11.7.4). However, we are obviously in a much better position to qualify our inferences on the site if we first understand what those inferences might be.

On the topic of inferences, the exercise of standardisation encompasses several conceptual difficulties which resist ready formulation. "Tradeware-related activities" in the Gowa survey area certainly include the

burial of tradewares as gravegoods and the use of tradewares in domestic contexts. The average period in circulation of the former may have differed from the average period in circulation of the latter, but the possible factors involved are imponderable. Given also that the various contexts cannot always be distinguished, Pakkala Toa being a case in point, I assume comparability whatever the context. I further assume that tradewares *per se* not only date human presence in the immediate vicinity, but have also been luxury items and thus represent wealth and status. But I have not factored in variable "status-loadings" for want of reasonable controls. The issues touched on here are addressed in many of the site descriptions in an impressionistic fashion, but against the backdrop of the general validity of my two general assumptions.

Population and wealth undoubtedly followed a trajectory of general increase between the origins of Makassar protohistory in the 13th-14th centuries, and the survey area's incorporation within the state of greater Gowa during the 17th century. However, I standardise against the same figure (100%) on every chronological interval. Therefore a real growth in tradeware-related activities during the period is likely to be dampened, nullified or even reversed in the tradeware profiles. A key examples is Gowa's core palace centre of Benteng Tua whose flat standardised chronological histogram during the period disguises what must have been a dramatic population increase (Chapter 6). For instance, in estimating population growth I used the number of sites with tradewares dated to a particular interval as a proxy for population size, which suggested a three-fold increase in population between the 14th and 17th centuries (13.3.2). Hence it would be possible to factor estimated general growth into the chronological histograms. e.g. if the 13th-14th century frequencies are standardised against 100%, then the 17th century frequencies could be standardised against 300%, thus suggesting a three-fold population increase at Benteng Tua during the period. However, I have not had time to experiment with the exercise or tackle whatever methodological difficulties might be involved.

In addition, an exercise like that would feed in interpretation at the level of data presentation, and so obstruct interpretation through the informal considerations which survey archaeology, and especially survey historical archaeology, regularly deals. On top of that, I would then have found myself removing or otherwise compensating for the data transformations fed into the histograms, so as to portray wider intersite patterns based on the relative proportions of the tradewares. For instance, Benteng Tua's flat tradeware profile between the 13th-14th and 16th-17th centuries stands beside an overall profile, shown by the other sites along the middle Jeknekberang, which dips over time (Chapters 7 to 9). Hence I was able to interpret Benteng Tua's flat histogram as signifying centralisation of population and wealth within the site's immediate social landscape. All in all, I doubt if my site interpretations could have proceeded without the standardised chronological histograms used in Chapters 6 to 12, and the inclusion of yet further, "transformed standardised chronological histograms" might have been excessive for writer and reader alike.

The histogram segments which are standardised against 18th to 20th century tradeware totals are less complex in their interpretation. Firstly, the pre-Islamic burial traditions which involved gravegoods had probably ceased by this juncture, and so tradeware pieces can be interpreted to represent occupation. Secondly, interpretation is assisted by the 20th century land-use maps (5.4.2). In particular, I am interested in whether the sites were occupied between the 18th and 20th centuries because of the possible consequences for understanding earlier use of the sites, not because I want to reconstruct 18th to 20th century settlement patterns, and so representativeness is a lesser concern.

B.5 Analysis With SSPHAP's Broad Tradeware Classes

B.5.1 Erection of broad tradeware classes

Around 84% of SSPHAP's tradeware pieces only have field identifications (FIs) by which they are assigned to field identification classes (FICs), and only 16% have laboratory

Table B-41. Composition of the Laboratory Identifications by Fieldwork Identifications

Laboraty Identification Classes (LICs)

Field Identification Classes (FICs)	JPN	SWH	SWR	QC	SWM	MC	YMC	SUK	VM	EW	EM	HEX	MBW	MS	SWT	VH	VBW	JZ	SAN	EBW	BL	MFV	MW	WLW	EFV	QBW	QS	LBW	WLB	QPR	ER	Sum
Japanese (JPN)	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Sawankhalok Black-and-white (SWH)	0	131	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137
Coarse Stonewares (SWR)	0	2	246	2	2	0	0	0	0	0	7	0	0	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	264
Qing Monochromes (QC)	0	0	0	190	4	1	0	0	6	0	13	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	1	0	219
Sawankhalok Monochromes (SWM)	0	1	2	2	76	0	1	0	14	2	47	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	147
Ming Celadons (MC)	0	0	0	7	2	46	38	0	3	9	78	0	0	1	4	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	193
Yuan-like Ming Celadons (YMC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sukothai (SUK)	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Vietnamese Monochromes (VM)	0	0	0	2	2	0	0	0	23	8	16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	52
Early Whitewares (EW)	0	0	0	0	0	3	0	0	2	67	3	0	1	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	2	0	82
Early Monochromes (EM)	0	0	2	0	1	1	0	0	1	2	55	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	64
Ming BW "Hexagonal" Wares (HEX)	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Ming Blue-and-white (MBW)	0	1	0	0	0	0	0	0	0	0	0	66	367	11	30	1	11	0	0	11	0	0	0	0	0	72	17	121	29	0	0	737
Ming Swatow (MS)	0	0	0	4	0	0	4	0	0	2	1	0	44	314	156	1	10	0	1	2	0	0	1	0	5	35	9	24	3	0	0	619
Swatow (SWT)	0	1	2	3	2	3	1	1	3	4	4	0	24	45	223	0	6	0	0	0	0	0	2	0	0	37	12	33	6	2	0	415
Vietnamese Black-and-white (VBW)	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Vietnamese Blue-and-white (VH)	0	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	73	0	0	1	0	0	0	0	0	0	0	0	0	0	0	78
Jizhou (JZ)	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	9
Sancai (SAN)	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	13
Early Blue-and-white (EBW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Bluewares (BL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6
Ming Red (MFV)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	6	0	0	0	3	0	0	0	0	0	11
Ming Whitewares (MW)	0	0	0	2	0	2	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	4	5	14	0	1	0	3	1	4	0	41

TABLE B-41. COMPOSITION OF THE LABORATORY IDENTIFICATIONS BY FIELDWORK IDENTIFICATIONS (CONT.)

Laboraty Identification Classes (LICs)

	JPN	SWH	SWR	QC	SWM	MC	YMC	SUK	VM	EW	EM	HEX	MBW	MS	SWT	VH	VBW	JZ	SAN	EBW	BL	MFV	MW	WLW	EFV	QBW	QS	LBW	WLB	QPR	ER	Sum
Wanli Whitewares (WLW)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Early Overglaze-decorated (EFV)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Qing Blue-and-white (QBW)	0	0	0	1	0	0	0	0	0	0	1	1	5	0	14	0	2	0	0	1	2	0	0	6	0	148	33	43	38	13	0	308
Qing Swatow (QS)	0	0	0	0	0	0	0	0	0	1	0	0	12	2	29	0	1	0	0	1	0	0	0	2	0	77	61	34	16	1	0	237
Late Ming Blue-and-white (LBW)	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	0	0	0	0	0	0	0	41	3	38	14	0	0	106
Wanli Blue-and-white (WBW)	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	24	0	0	33
Qing White/Recent (QPR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	4	2	0	0	34	1	47
European (ER)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	13	19
Total LICs given determinate FICs	11	140	252	213	89	56	44	22	52	96	227	74	461	374	472	7	107	6	12	17	8	14	10	28	14	431	139	297	131	57	15	3876
LICs given indeterminate FIs	0	0	1	3	1	1	0	0	3	5	8	1	0	0	0	0	0	0	0	0	0	0	4	0	1	1	0	0	0	0	0	29
Identified in field as earthenwares	0	0	21	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Collected without any FI given	23	33	126	28	16	20	9	2	7	18	54	0	284	386	379	1	41	1	4	8	4	13	11	8	2	483	124	117	159	266	197	2827
Total identified in the laboratory	34	173	400	244	106	77	53	24	63	119	289	75	745	760	851	8	148	7	16	25	12	27	25	36	17	915	263	416	290	323	212	6754
Total (LICs + unchecked FICs)	635	188	755	324	110	90	53	24	63	120	289	75	921	1654	3250	8	150	7	16	25	13	28	30	36	17	9397	3365	420	299	14396	6168	42980

N.B. The small number of tradewares identified in the field as earthenwares were collected as decorated or otherwise unusual earthenwares. I have not done the necessary work to have any notion of how many further tradewares might lie among uncollected sherds identified in the field as earthenwares and so I will not consider that particular problem further.

identifications (LIs) by which they are assigned to laboratory identification classes (LICs). The reliability or otherwise of the former identifications is testable only by reference to those specimens identified under both circumstances.

Ideally, the test would proceed with collected examples drawn representatively from the population given FIs. However, SSPHAP's general policy on collecting focussed on items of highest perceived archaeological value and critical nature in substantiating the field records of the sites. Hence only the pieces given indeterminate FIs (e.g. "?"), assigned to the FICs considered diagnostic (e.g. Ming BW), or considered a likely source of confusion with diagnostic FICs (e.g. Qing monochromes) were regularly collected. They were otherwise supplemented by pieces which appeared valuable for their completeness or unusual appearance. Sometimes, also, the total tradeware assemblage from a site or subsite was collected as diagnostic when it provoked the hypothesis of abandonment during historical times, but these are obviously not representative of the general ruck of less interesting assemblages. To be sure, SSPHAP did make complete collections of several zones with the specific intention of testing general identifications made in the field, but these "grab samples" were not selected on a controlled basis. Notwithstanding the foregoing, the pieces assigned to a particular FIC and then collected remain my best guide to the likely behaviour of the total population of pieces given that particular FIC.

Table B-41 shows how the collected FICs were distributed across the various LICs. In all only 2196/3877 or 56.6% of the FIs remained unchanged when identified in the laboratory. However, the apparent reliability of the FIs varies greatly depending on the FIC considered, e.g. no Japanese FIs needed to be re-assigned, whereas nearly 90% of the Ming Whiteware FIs were re-assigned. In addition, the Japanese LIC seems to be very reliable because no non-Japanese FIs were assigned to it, whereas the Wanli Whiteware LIC is constituted primarily by FIs re-assigned from other FICs, notably Ming Whitewares.

This consideration introduces the simplest measure of performance:

Percentage of LIs correctly identified (%COR) - the number of pieces in the LIC also given the same FI, divided by the number of pieces in the LIC which were given an FI whether correct or not; expressed as a percentage.

Now unreliability of an FIC is not necessarily a problem in itself, as long as the FIC was regularly collected. For instance, from the bottom two rows we can work out that only five Ming Whitewares have been accepted on the basis of their FI alone. Scanning further up we see that 36/41 of the collected pieces within the Ming Whiteware FIC had been incorrectly identified. Hence our best estimate of the number of Ming Whitewares incorrectly accepted is 5 times (36/41) or 4.4 pieces, i.e. 14.6% of the total 30 accepted Ming Whitewares. Turning that into a measure of positive performance, 85.4% have probably been correctly assigned.

But a major difficulty arises with those FICs which were very rarely collected and not, apparently, very reliable. For instance, performing the same exercise on Qing Swatow pieces we calculate that of the 3102 pieces accepted on the basis of their FI alone, 74.3% (2304 pieces) have been incorrectly identified (as our best estimate). Hence of the total 3365 accepted as Qing Swatow, only 3365 minus 2304 or 31.6% have probably been correctly assigned. This then leads to our second measure of performance:

Percentage probably correctly assigned (%PCR) - the total number assigned to a class, minus the best estimate of the number of pieces incorrectly assigned to a class on the basis of a faulty FI, divided by the total number assigned to that class; expressed as a percentage.

As shown in Table B-42, the percentage of FICs checked (%CH) varies between 100% and 0.3%. In essence, the rarer FICs were collected more than 70% of the time; the middlingly common FICs (Ming Swatow and Coarse Stonewares) were collected approximately 40% of the time; Swatow FIs were collected 15% of the time; the late BW FICs (Qing Swatow, Qing BW and Japanese) 2-7% of the time; and European and Qing white/recent FIs less than 1% of the time. Here our enquiry

looks at the possible effects of allowing the unchecked FICs to be re-assigned to other classes on the basis of how the checked FICs were re-assigned.

Consider the case where we decide to re-assign uncollected FIs belonging to the rarer FICs which were collected at least 70% of the time. After the re-assignment, the effects on the estimated composition of the classes can be investigated in two ways.

Firstly, the unchecked re-assigned FIs represent a best estimate but one which is uncontrolled (owing to the lack of representative sampling). In contrast, the checked re-assigned FIs belonging to the same FICs are controlled since they have been positively identified in the laboratory. Considering any class, we can calculate the proportion of controlled identifications as the number of correctly identified LIs (see above) plus the number of controlled re-assigned FIs, divided by that sum plus the number of uncontrolled re-assigned FIs. Express this measure of performance as a percentage and call it % Controlled.

Secondly, after the redistribution we tally the number of pieces in the class and use it as the quotient by which to divide the number of pieces originally accepted in the class (as shown along the bottom row of Table B-41), and express the result as a percentage. This "% Correspondence" shows the degree to which the quantity used in the seriation exercise corresponds to the quantity we would estimate the class to have.[43]

Having done that we decide to continue re-assigning the uncollected examples of the less rare FICs, and carry out the above calculations. These results are then added to our table of performance measures (Table B-42). Specifically, the effects of re-assigning the rarer FICs are flagged as "70%", re-assigning them plus Ming Swatow plus Coarse Stonewares as

[43] Note that in the case of classes represented by FICs collected at least 70% of the time, the tally excludes the FIs now re-assigned to other classes, as well as including the FIs now re-assigned to the class under consideration from other classes. But as regards the classes represented by FICs collected less than 70% of the time, the tally is either augmented by the re-assigned FIs, or stays the same if no re-assigned FIs are re-assigned to it.

"40%", re-assigning them plus Swatow as "15%", re-assigning them plus the late BW FICs as "1%", and re-assigning the whole lot as "0.1%".

In Table B-42 the classes are arranged in approximate descending order of estimated reliability based on the performance criteria, exluding %COR which is a simple but not a useful measure. The three classes at the top appear very reliable by any perceptible standards, and a further 12 classes show percentages which hover around 80% or above. Below that the reliability of the classes drops steeply, especially when we consider the possible consequences of re-assigning the late BW, European and Qing white pieces left uncollected in the field. This particularly affects the Wanli classes whose LIs contain significant proportions of re-assigned Qing FIs.

To handle the unreliable classes, we pool the classes based on the criteria of (i) likely sources of confusion between FICs and LICs, based on the cross-tabulation in Table B-41, and (ii) approximate contemporaneity, based on the seriation exercises (B.4.1 and B.4.2).[44] To take an obvious example, join Qing Swatow and Qing BW into a pooled class with 12,762 pieces (cf. bottom row of Table B-41). What had previously been reclassifications, made in the laboratory, across the two former classes now become correct classifications made in the field, i.e. 319 of the 545 collected FIs (58.5%) conform to their LIs, and 319 of the 570 LIs (56.0%) were spotted in the field. Recalculating our performance measures demonstrates a marked improvement in the reliability of the pooled class, but still at unacceptable levels, so we look for other classes to join.

It is unneccesary to pool the most reliable classes (those scoring around 80% or better on all criteria) so these remain unchanged, apart from pooling the two conceptually similar Ming celadon classes, and also sinking "early overglaze enamelled" wares into early monochromes (Table B-43). The less reliable classes can be pooled into "Ming" and

[44] Note also that pooling rarely collected FICs should also improve the general reliability of our estimates of how the unchecked FIs would have been re-assigned during laboratory checking.

TABLE B-42. PERFORMANCE MEASURES OF THE UNPOOLED CLASSES

	% CH	% COR	% PCR	--- % Controlled--- 70%	40%	15%	1%	0.1%	- % Correspondence- 70%	40%	15%	1%	0.1%
JPN	2	100	100	100	100	100	100	100	100	100	100	100	100
SWR	43	90	96	99	99	95	95	95	103	103	102	102	102
SWH	91	94	100	98	97	94	94	94	101	99	96	96	96
JZ	100	57	100	83	86	86	86	86	100	88	88	88	88
SAN	93	75	100	83	86	86	86	86	100	89	89	89	89
VH	100	57	100	86	88	88	88	88	100	89	89	89	89
SWM	98	84	99	92	94	85	85	85	98	97	88	88	88
QC	73	88	96	95	95	89	80	80	104	101	96	89	89
SUK	100	50	100	91	91	77	77	77	96	96	79	79	79
MC	94	81	95	95	95	77	77	77	113	113	93	93	93
EM	98	23	100	90	89	83	76	76	96	93	86	80	80
VM	100	41	100	91	91	75	75	75	97	97	77	77	77
EW	99	66	100	91	91	77	77	72	99	97	82	75	75
YMC	-	-	100	83	81	75	75	75	95	85	78	78	78
ER	0.3	87	68	93	93	93	93	5	100	100	100	100	136
EFV	100	7	100	67	68	68	68	68	100	71	71	71	71
HEX	100	91	100	76	76	76	60	60	76	76	76	60	60
MFV	85	43	100	67	68	56	56	56	97	85	72	72	72
MS	41	84	71	87	87	58	56	56	100	135	111	109	109
MBW	75	80	92	95	92	67	47	47	106	99	86	86	86
VBW	98	68	100	78	77	64	47	47	97	88	73	55	55
MW	85	36	85	79	80	52	52	52	125	120	81	81	81
EBW	100	6	100	62	63	63	26	26	86	78	78	34	34
SWT	15	47	61	55	60	60	41	20	100	93	137	110	80
QBW	4	34	50	59	60	43	38	13	100	99	97	104	118
LBW	85	13	93	49	56	42	14	14	103	95	66	19	19
QPR	0.3	60	72	71	71	61	13	13	100	100	100	132	132
BL	86	75	100	75	75	75	13	13	100	100	100	19	19
QS	7	44	31	56	65	45	25	7	100	99	97	107	114
WLB	77	18	93	46	48	42	9	9	97	96	86	19	19
WLW	100	6	100	57	57	57	49	3	95	95	95	78	3

N.B. Acronyms as per Table B-41. Percentages, expressed to round figures, calculable from figures in Table B-41. Yuan-Ming celadons (YMC) is not a category recognised in the field.

TABLE B-43. PERFORMANCE MEASURES POOLED AND UNPOOLED CLASSES

	% PCR	% Controlled 70%	40%	15%	1%	0.1%	% Correspondence 70%	40%	15%	1%	0.1%
Japanese	100	100	100	100	100	100	100	100	100	100	100
Coarse Stone.	96	99	99	95	95	95	103	103	102	102	102
Swank H.	100	98	97	94	94	94	101	99	96	96	96
Jizhou	100	83	86	86	86	86	100	88	88	88	88
Sancai	100	83	86	86	86	86	100	89	89	89	89
Vietnam H.	100	86	88	88	88	88	100	89	89	89	89
Swank Monc.	99	92	94	85	85	85	98	97	88	88	88
Qing Monc.	96	95	95	89	80	80	104	101	96	89	89
Sukothai	100	91	91	77	77	77	96	96	79	79	79
"Ming Celadon" (MC/YMC)	96	92	91	78	78	78	105	101	87	87	87
"Early Monc." (EM/EFV)	100	88	88	82	75	75	97	91	85	79	79
Viet Monc.	100	91	91	75	75	75	97	97	77	77	77
Early White	100	91	91	77	77	72	99	97	82	75	75
"Ming" (MFV/ MW/MS/VBW/ MBW/HEX/EBW)	88	90	90	68	56	56	101	115	97	84	84
"Aggregate" (QBW/QS/WLW/ QPR/WLB/LBW/BL)	90	80	80	61	61	38	100	100	98	98	104
Swatow	61	55	50	60	41	20	100	93	137	110	80
European	68	93	93	93	93	5	100	100	100	100	136
Options											
"Ming"/Swatow	84	94	93	93	69	42	100	102	115	99	82
"Aggregate"/ Swatow	96	66	79	80	80	42	100	100	97	97	101
"Aggregate"/ European	90	80	81	62	62	62	100	100	100	100	109

N.B. Acronyms where used as in Table B-42. %CH and %COR not shown here as no longer relevant to the argument.

"Aggregate" megaclasses in which approximately 90% of the assigned specimens are correctly assigned, and the number recognised falls within 16% of the estimated probable number, even if our control over re-assigning the least collected FICs remains poor (Table B-43). Swatow and European are still quite unreliable, but it is not clear how they should be pooled. Pooling Swatow with "Aggregate" creates a reliable megaclass, although a pooled "Aggregate"/European megaclass would be nearly as reliable, and under tighter control overall. This would then allow Swatow to be pooled with "Ming", as would be the preferable course by comparison with the seriations, and create a "Ming"/Swatow megaclass with almost the same reliability that the "Ming" megaclass had shown (Table B-43).

As the best procedure of pooling is unclear, we take the 17 classes above "Options" in Table B-43 and subject them to reiterative clustering and down-the-line seriation, as described in section B.4.[45] Where comparable, the seriated order (Figure B-5) closely approximates the order in the main seriation with 31 classes (Figure B-1). Further, Swatow sits next to "Ming" and European sits next to "Aggregate", confirming that the pooling steps involving these respective pairs would have been more appropriate than pooling Swatow with "Aggregate". Indeed even these pooling steps are unnecessary because the seriation produces a comparable result. Hence the classes shown in Figure B-5 are recognised as SSPHAP's reliable "broad" classes.

[45] One adjustment, however, was necessary. Owing to the biasing effects of surface assemblages, or the small sample of Vietnamese black-and-white pieces, the "A" branch in Figure B-5 should strictly be placed next to Vietnamese black-and-white rather than next to Swatow, making the "A" branch appear very early rather than late (and having no effect on the order between Vietnamese black-and-white and Swatow). From our previous seriations we know that Swatow should be placed next to the post-Ming classes, and so the top three-way split is forced as shown in Figure B-5. The same effect could be achieved by simply sinking the Vietnamese black-and-white pieces into some other class, which I have not done because it is not clear how Vietnamese black-and-white should best be pooled.

B.5.2 Dating and standardising the broad tradeware classes

The unpooled pre-Qing "broad" or reliable classes can retain the same datings suggested previously (B.4.3). The pooled classes should be dated more generally than their individual constituents, and in a manner which reflects the seriated order in Figure B-5. Hence the early overglaze-decorated pieces are, like the early monochromes, all dated to the 13th-14th centuries; the "Ming celadons" (MC/YMC) are simply dated to the 15th-16th centuries; as indeed are the members of the "Ming" megaclass.

However, a problem arises with the "post-Ming" classes in that the expected order is more or less reversed, running from Japanese (19th-20th centuries), to Qing Monochromes (18th-19th centuries), to European (19th century) and on to "Aggregate" (which includes pieces dated to the 16th century onwards, even if 20th century pieces are in the majority). Now the pooling of pieces of such different ages into "Aggregate" expunges whatever controls we would have had to detect abandonment or main initial occupation of sites during the 18th to 20th centuries, which was the point behind trying to date the later pieces. Hence all the "post-Ming" classes can simply be dated to the 18th to 20th centuries. This procedure allows the relative proportions of the Swatow and "post-Ming" classes to act as a barometer of changes between the 17th and later centuries.

The 36,996 tradeware pieces identified during the Gowa survey and assigned to broad classes are distributed by 100-year intervals as shown in Table B-44. Standardisation of the frequencies at any particular site can then proceed as described for the fine classes (B.4.4).

Comparing the "standardised chronological histograms" for the fine classes and the broad classes (Chapters 6 to 12) produces the expected result that the latter are flatter, particularly during the middle-Ming (15th-16th) and post-Ming (18th to 20th) centuries. The latter tradeware profiles might appear sounder in the sense that I cannot really mark off the date of all the pieces to the degree that the fine tradeware profiles indicate. However, some major qualifications should be borne in mind.

Firstly, most of the confusion between FICs (as picked up by the LICs) was reciprocal (Table B-41) so that, as long as the FICs were collected at around the same regularity, the unchecked FIs should have swapped backwards and forwards. Hence our estimates of the performance of these classes (Table B-42) strongly overstates their unreliability, and indeed the seriations often demonstrate their distinctness (e.g. Swatow compared with Qing Swatow and Qing BW; or Qing Swatow and Qing BW compared with Qing white). Or to take the example of a poorly collected FIC which appears to include many pieces from another class according to Table B-41, e.g European compared against Qing Swatow and Qing BW, then the confusion of identifications should disguise a real chronological difference and not gratuitously create it. For these reasons I think that the seriated order of the Swatow and later classes shown in Figures B-1 to B-3 is correct.

Secondly, 15th century use of sites is difficult to detect by tradewares because the most numerous of the century's recognisable classes continued into the 16th century with an equal or greater emphasis (e.g. Watt, 1984:189). Undoubtedly SSPHAP's Ming Swatow and 16th century Ming BW pieces include a healthy proportion of 15th century pieces, but they are not identifiable. The only real control on distinguishing these centuries lies in the proportions of Vietnamese BW, Sancai, Jizhou, Ming celadon and Thai pieces (all comparatively rare) as compared with the proportions of Ming BW and Ming Swatow pieces. Greater than expected proportions of the former indicate a 15th century emphasis (e.g. Tinco Tua in Soppeng [Kallupa et al., 1989]), while greater than expected proportions of the latter indicate a 16th century emphasis (e.g. Somba Opu [11.3] and Benteng Tallok [12.2]). As long as large samples of tradewares are available at a site, the distinction is reliable. Indeed when the predominantly 15th century and predominantly 16th century BW/whiteware classes are bundled together, as with the reliable "Ming" megaclass, the tradeware profiles suggest patent nonsense, e.g. that Somba Opu's main period of occupation began in the 15th century (Figure 11-8).

Table B-44. FREQUENCIES OF THE 17 BROAD TRADEWARE CLASSES FROM THE GOWA SURVEY ASSIGNED BY 100-YEAR PERIOD

	1200-1300	1300-1400	1400-1500	1500-1600	1600-1700	1700-1800	1800-1900	1900-1986	Total
Vietnamese Black-and-white	0	7	0	0	0	0	0	0	7
Vietnamese Monochromes	5	27	23	0	0	0	0	0	55
Early Whitewares	52	52	0	0	0	0	0	0	104
Early Monochromes/Overglaze	104.5	104.5	0	0	0	0	0	0	209
Sancai	0	0	9	0	0	0	0	0	9
Jizhou	0	0	4	0	0	0	0	0	4
Ming Celadons inc. Yuan-like	0	0	32.5	32.5	0	0	0	0	65
Sawankhalok Black-and-white	0	0	73	73	0	0	0	0	146
Sawankhalok Monochromes	0	0	32	32	0	0	0	0	64
Sukothai	0	0	7.5	7.5	0	0	0	0	15
"Ming" (MBW/MFV/MW/MS/HEX/VBW/EBW)	0	0	1190.5	1190.5	0	0	0	0	2381
Swatow	0	0	0	0	2610	0	0	0	2610
Japanese	0	0	0	0	0	221.67	221.67	221.67	665
Qing Monochromes	0	0	0	0	0	100.33	100.33	100.33	301
European	0	0	0	0	0	1966.67	1196.67	1196.67	5900
"Aggregate" (QPR/WLW/QBW/QS/BL/WBW/LBW)	0	0	0	0	0	8153.67	8153.67	8153.67	24461
Sum	161.5	190.5	1371.5	1335.5	2610	10442.33	10442.33	10442.33	36996

In summary, the broad tradeware classes and their standardised chronological histograms are useful particularly for sites with only a small sample of tradewares, either within a particular epoch or as a total sample, or for sites whose dating relies heavily on the most unreliable classes such as the Wanli classes. In other cases the fine tradeware classes are far superior.

B.6 Defining a "Historical Site" by Uncollected Tradewares

SSPHAP's self-imposed policy of regularly collecting only diagnostic tradeware classes, as identified in the field, would appear to have been misguided. I had been thinking along the lines of conserving cultural resources in the landscape, but my experience of revisiting tradeware-rich zones rather suggests that tradeware sherds in South Sulawesi are not a scarce resource. If there is indeed any danger of the sites being "picked over", which I doubt, then selecting only diagnostic classes not only removes the principal resources, but also leaves a biased record for posterity.

On the other hand, with 31 tradeware classes to choose from, and a reliability of identifications made in the field of just over 50 per cent (Table B-41), the fine chronological interpretations required for purposes of historical reconstruction are not always available from identifications made in the field. Representative sampling of the field identifications, e.g. collecting every tenth zone, would allow general data-fitting exercises but would probably still leave key questions of site interpretation hanging. These considerations suggest that, if at all possible, the tradeware contents of the sites should simply be collected in total. Of course, the 42,980 tradeware pieces recorded during SSPHAP's survey - maybe as much as a third of them of no apparent archaeological merit whatsoever - would impose a considerable strain on laboratory time and curation resources. But decisions on how to manage the tradeware identifications are best handled in the controlled atmosphere of the laboratory. And the tradeware pieces can always be returned to their original location at a later date. From the point of view of preserving an unbiased cultural resources

record at the sites, even a decision to throw out unwanted sherdage with the garbage would possibly be preferable to leaving that sherdage, robbed of its more diagnostic companions, clogging up historical sites.

I have argued that, even though tradeware pieces identified in the field were collected on an uncontrolled basis, the assumption of representativeness of those pieces paints too grim a picture of the reliability of the field identifications. The rarely collected fieldwork classes, which cause the most consternation in terms of conceivable re-identifications, are clearly distinguished chronologically by seriation (B.4 and B.5). Moreover, general collections made after field identifications had been assigned generally occurred when the assemblage suggested abandonment in historical times, with the consequence that the pieces identified as post-Ming in these assemblages are more likely to have been misidentified than would generally be the case. Hence the re-assignments which Table B-41 might indicate for uncollected pieces could well be a "worst case" scenario. Anyway, taking those as the only available standard, I wish to consider the probability that a piece given a particular identification in the field but not collected could represent a "historical site", where these are defined as sites containing Swatow or older sherdage (as per the seriations in Figures B-1 to B-3). Table B-45 lists the probabilities across the different classes as identified in the field.

In summary, the broad tradeware classes and their standardised chronological histograms are useful particularly for sites with only a small sample of tradewares, either within a particular epoch or as a total sample, or for sites whose dating relies heavily on the most unreliable classes such as the Wanli classes. In other cases the fine tradeware classes are far superior.

Checked field identifications, listed between Sawankhalok black-and-white and Ming whitewares, were identified to a Ming class more than 80% of the time. Hence a single piece given one of these classifications in the field can be taken

TABLE B-45. PROBABLE TYPE OF LABORATORY IDENTIFICATION RESULTING FROM A GIVEN FIELDWORK IDENTIFICATION

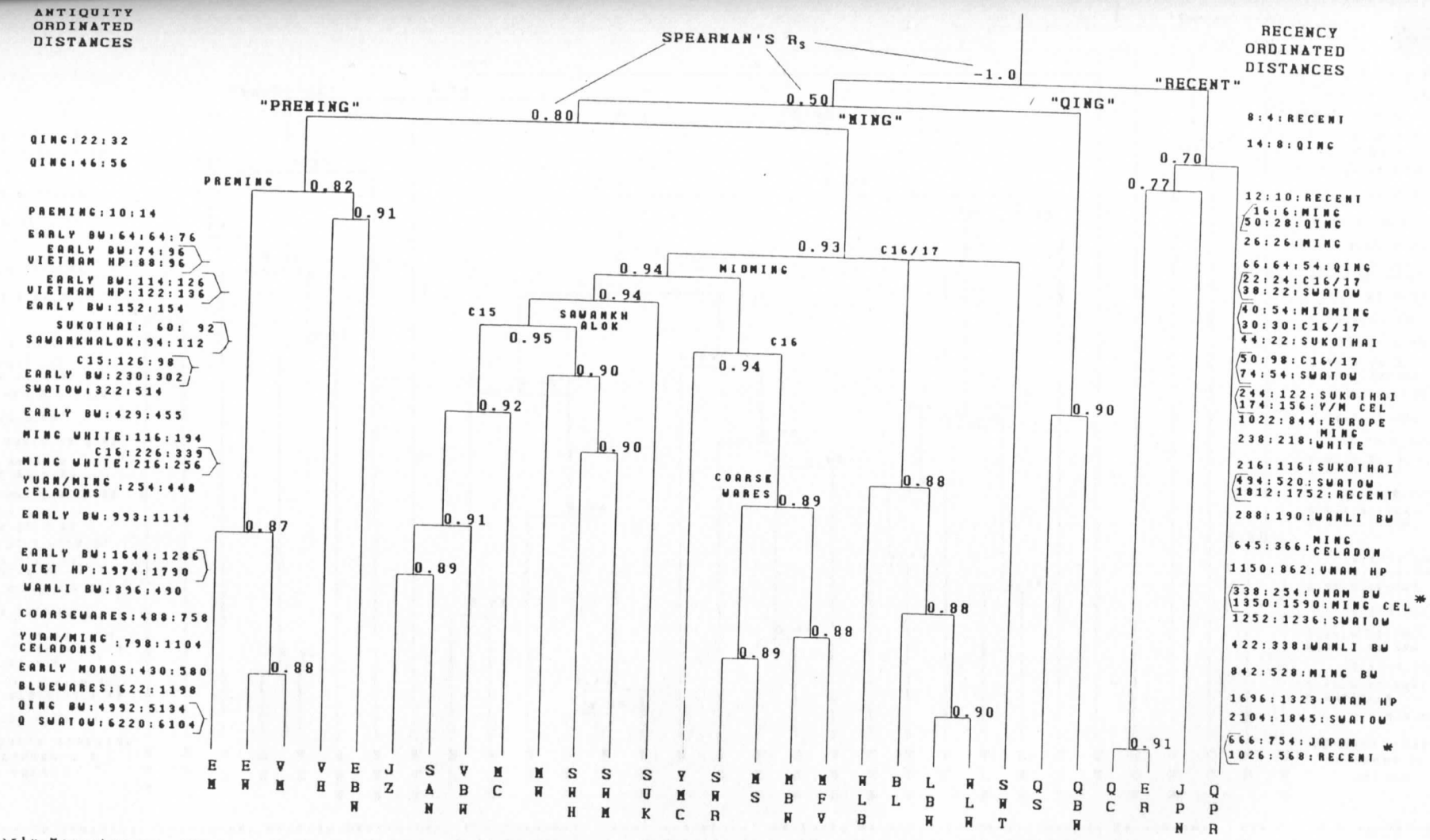
Field Identification	Expected Laboratory Identification "Pre-Qing" ("Historical")	"Post-Ming"	Coarse Stonewares
Sawankhalok Black-and-white (137)	100%	0%	0%
Vietnamese Blue-and-white (78)	100%	0%	0%
Sancai (13)	100%	0%	0%
Sukothai (11)	100%	0%	0%
Ming BW Hexagonal wares (7)	100%	0%	0%
Vietnamese Black-and-white (6)	100%	0%	0%
Bluewares (6)	100%	0%	0%
Wanli Whitewares (2)	100%	0%	0%
Early Blue-and-white (1)	100%	0%	0%
Early overglaze-enamelled	100%	0%	0%
Early Monochromes (64)	96.9%	0%	3.1%
Sawankhalok Monochromes (147)	96.6%	2.0%	1.4%
Ming Celadons (193)	96.4%	3.6%	0%
Early Whitewares (82)	96.3%	3.7%	0%
Vietnam Monochromes (52)	96.2%	3.8%	0%
Jizhou (9)	88.9%	1.1%	0%
Ming Swatow (619)	92.2%	7.8%	0%
Ming Blue-and-white (737)	87.9%	12.1%	0%
Swatow (415)	86.5%	13.0%	0.5%
Wanli Blue-and-white (33)	84.8%	15.2%	0%
Ming Whitewares (41)	83.0%	17.0%	0%
Ming Red (11)	72.7%	27.3%	0%
Late Ming Blue-and-white (106)	58.5%	41.5%	0%
Qing Swatow (237)	41.4%	58.6%	0%
Qing Blue-and-white (308)	37.7%	63.3%	0%
Qing white/Recent (47)	12.8%	87.2%	0%
Qing Monochromes (219)	11.9%	88.1%	0%
European (19)	0%	100%	0%
Japanese (11)	0%	100%	0%
Coarse Stonewares (264)	6.1%	0.8%	93.2%

N.B. Coarse stonewares are not considered datable as a class.

as reliable identification of a SSPHAP "historical site". However, a single piece identified in the field as Ming red or Late Ming BW (Transitional BW) appears less convincing and should not be considered diagnostic.

Some proportion of the pieces identified in the field as Qing Swatow, Qing BW or Qing white/recent clearly would have found a pre-Qing identification in the laboratory, even though retention of a Qing classification would have been the more likely outcome. As these classes were rarely collected, probably there are considerably more "pre-Qing" pieces on the ground than have been allowed for. However, without closer attention to sampling I cannot say whether these extra

"pre-Qing" pieces were essentially restricted to zones already characterised as containing pre-Qing pieces, or whether comprehensive collection of the surface tradewares would have revealed significantly more "historical" zones and sites than I have recognised. Hence unchecked field identifications listed between Qing Swatow and Qing white/recent must, like the European and Japanese identifications, be interpreted as failing to provide evidence of a SSPHAP "historical site".



EM=Early Monochromes; EW=Early Whitewares; VM=Vietnamese Monochromes; VH=Vietnamese Black-and-white; EBW=Early Blue-and-white; JZ=Jizhou; SAN=Sancai VBW=Vietnamese Blue-and-white; MC=Ming Celadons; MW=Ming Whitewares; SWH=Sawankhalok Black-and-white; SWM=Sawankhalok Monochromes; SUK=Sukothai; YMC=Yuan-like Ming Celadons; SWR=Coarse Stonewares; MS=Ming Swatow; MBW=Ming Blue-and-white; MFV=Ming Red; WLB=Wanli Blue-and-white; BL=Bluewares; LBW=Late Ming Blue-and-white; WLW=Wanli Whitewares; SWT=Swatow; QS=Qing Swatow; QBW=Qing Blue-and-white; QC=Qing Monochromes ER=European; JPN=Japanese; QPR=Qing White/Recent.

FIGURE B-1. CLUSTERING AND SERIATION OF 29 TRADEWARE CLASSES (AFTER BULBECK, 1989)

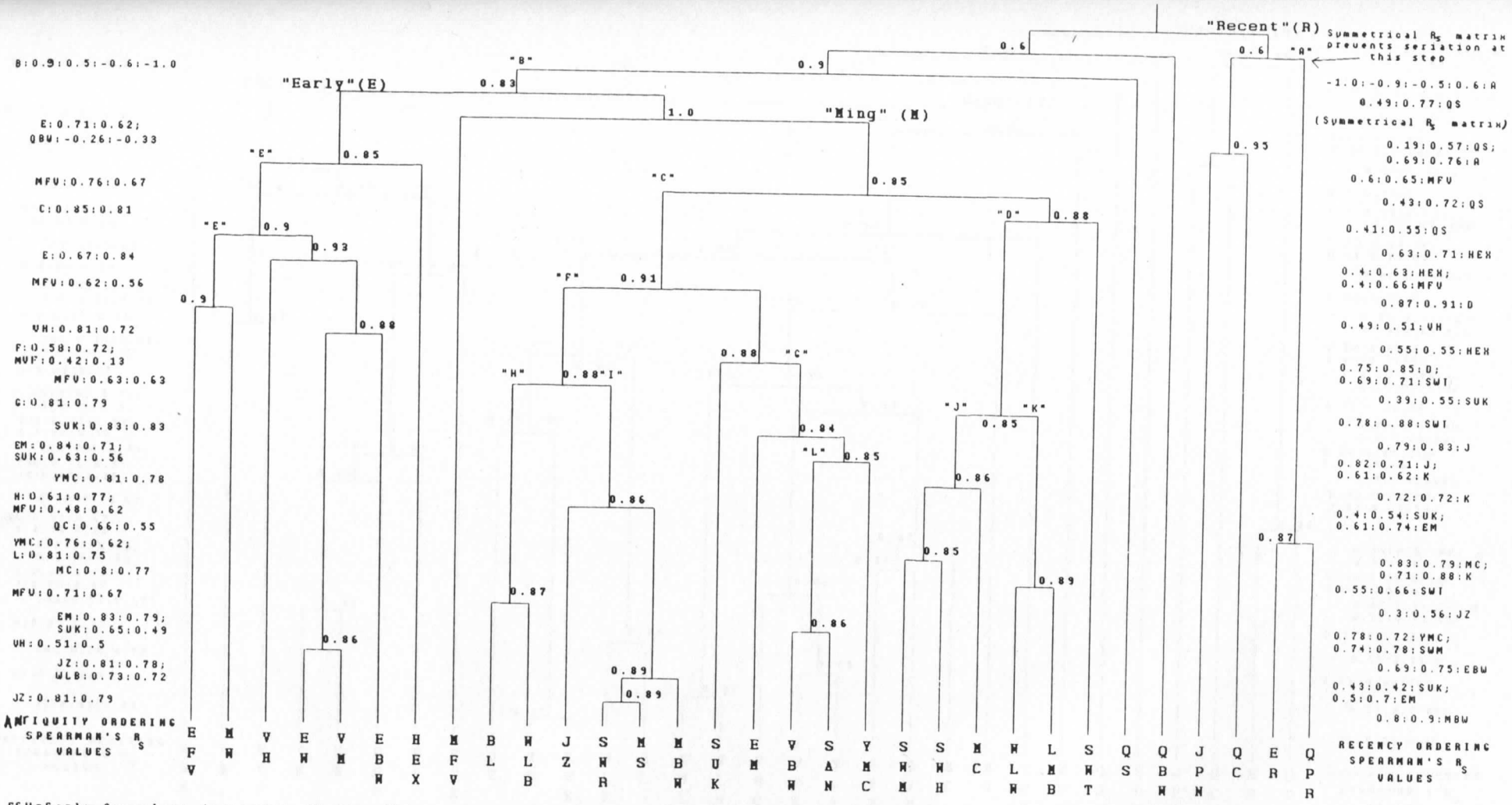


FIGURE B-2. REITERATIVE CLUSTERING & DOWN-THE-LINE SERIATION OF 31 TRADEWARE CLASSES

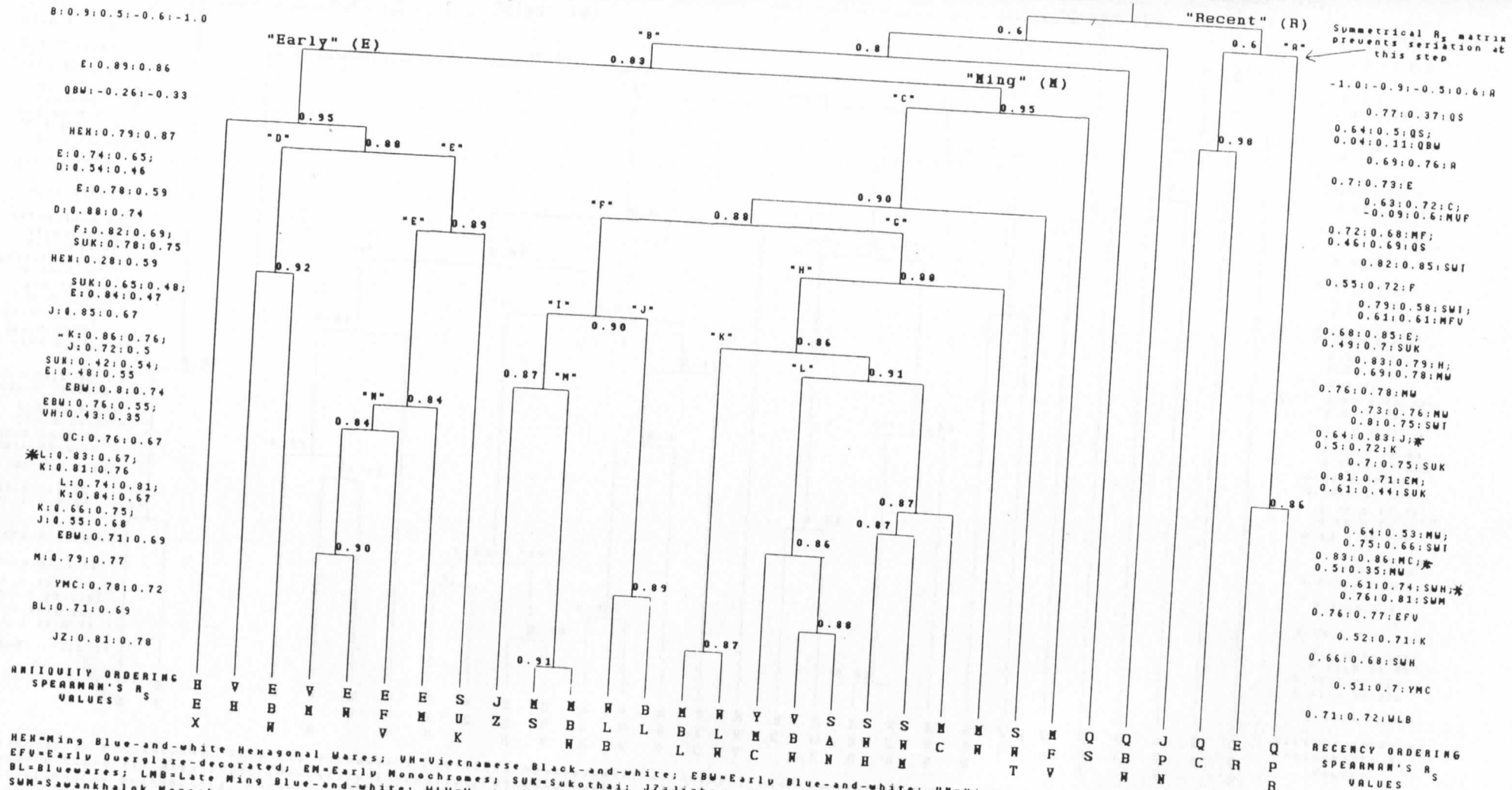
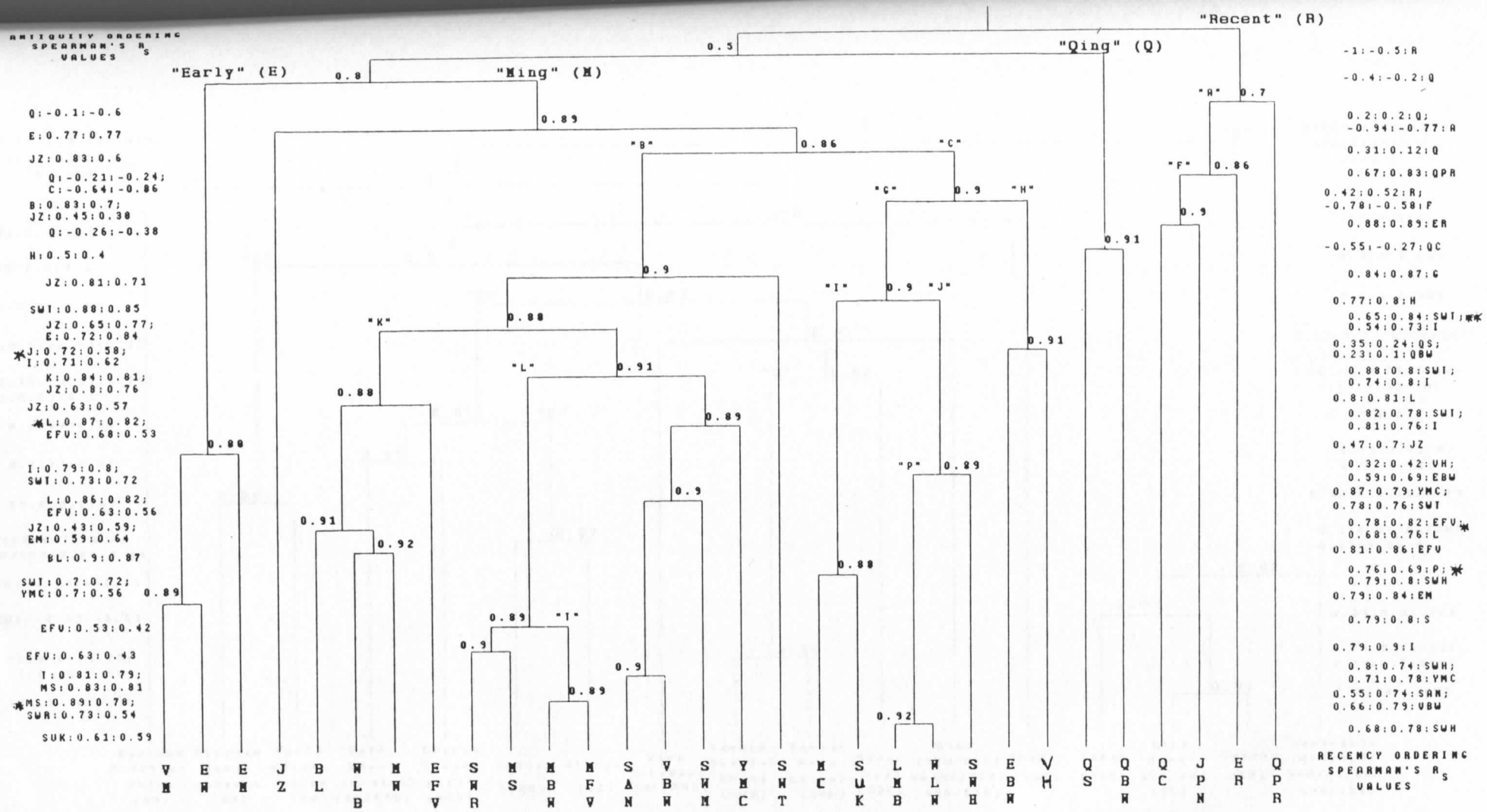


FIGURE B-3. CLUSTERING & SERIATION OF 30 TRADEWARE CLASSES (COARSE STONEWARES EXCLUDED)



VM=Vietnamese Monochromes; EW=Early Whitewares; EM=Early Monochromes; JZ=Jizhou; BL=Bluewares; WLB=Wanli Blue-and-white; MW=Ming Whitewares; EFV=Early Overglaze-decorated; SWR=Coarse Stonewares; MS=Ming Swatow; MBW=Ming Blue-and-white; MFV=Ming Red; SAN=Sancai; VBW=Vietnamese Blue-and-white; SWM=Sawankhalok Monochromes; YMC=Yuan-like Ming Celadons; SWT=Swatow; MC=Ming Celadons; SUK=Sukothai; LMB=Late Ming Blue-and-white; WLW=Wanli Whitewares; SWH=Sawankhalok Black-and-white; EBW=Early Blue-and-white; VH=Vietnamese Black-and-white; QS=Qing Swatow; QBW=Qing Blue-and-white; QC=Qing Monochromes; JPN=Japanese; ER=European; QPR=Qing White/Recent.

FIGURE B-4. CLUSTERING & SERIATION OF 30 TRADEWARE CLASSES (HEXAGONAL WARES POOLED IN MING BW)

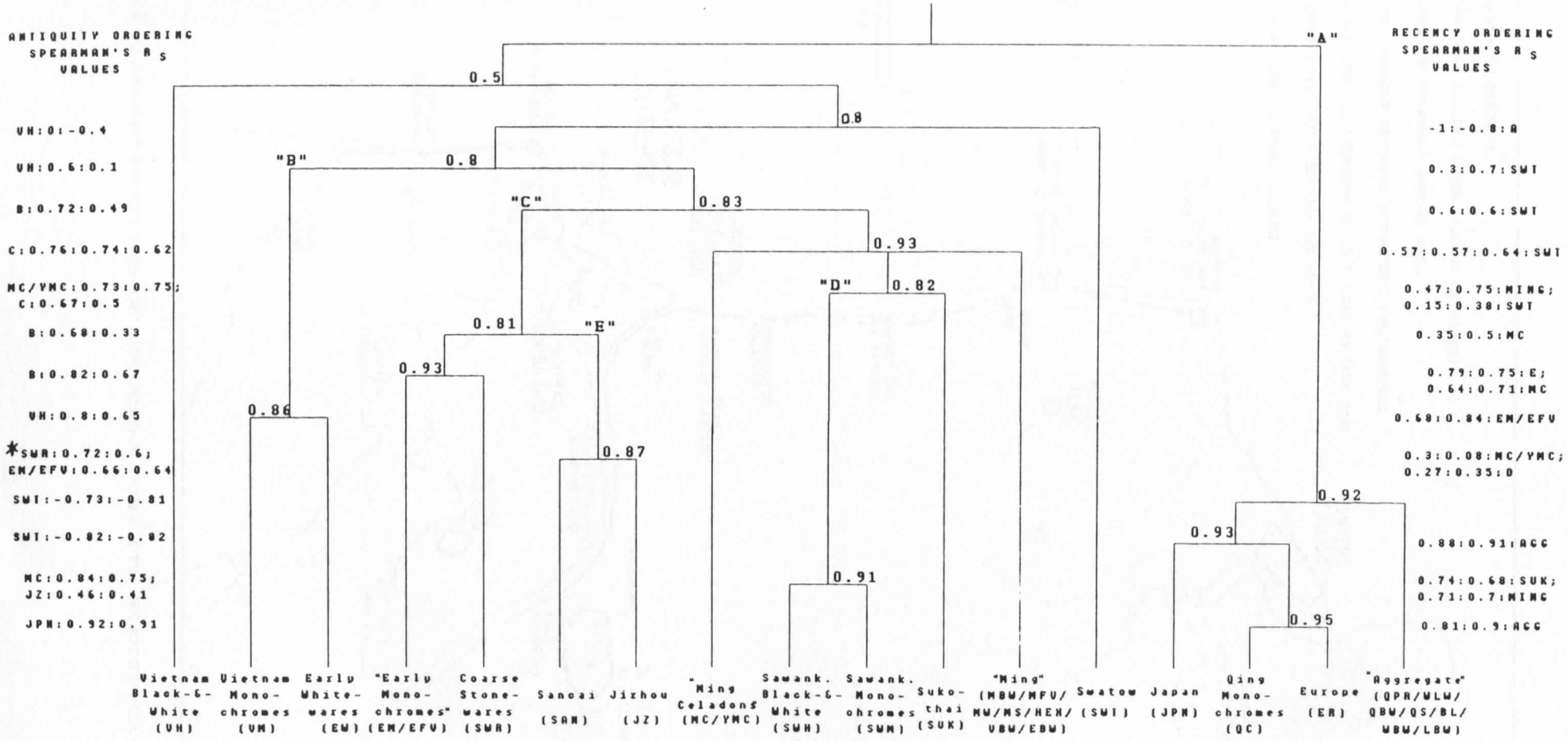


FIGURE B-5. REITERATIVE CLUSTERING & DOWN-THE-LINE SERIATION OF 17 TRADEWARE CLASSES