Chapter 10

The "Om Kaeo" and "Ban Chiang painted" ware problems

Two distinctive kinds of surface decoration were encountered at Ban Na Di among exotic wares. One involved incised and/or incised and slipped or painted surfaces, the other featured painted designs only. The first variety has often been categorised as "Om Kaeo" ware after the site wares of this surface finish were first recognised. Similarly, it has been common practice to equate the painted wares with Ban Chiang where this surface finish was prominent. Because both kinds of wares have often been used as chronological "markers", and they have been postulated as having had a relatively wide distribution, their wider context needs to be considered.

10.1 The "Om Kaeo" problem

Many of the problems which beset stylistically orientated characterisations of Southeast Asian ceramics can be summarized through the analysis of pottery often labelled "Om Kaeo". Since the discovery in 1972 at Ban Om Kaeo (Preecha and Pukajorn 1976), of globular cord-marked vessels with decorated fields, almost any similarly decorated sherd has been categorised "Om Kaeo". The decoration consists of intricately incised and slipped or painted fields often ingeniously arranged. Ban Om Kaeo lies about 1 km from Ban Chiang.

When a "wealth of this pottery" was recovered at the latter important site, the excavators, Gorman and Charoenwongsa, "almost" designated a single phase "Om Kaeo". They note that "various renderings of this technique exhibit one common feature - the design motifs so carefully incised on the buff background are later filled with highly contrasting red pigment" (Gorman and Chareonwongsa 1976). Characterised by curvilinear and geometric designs, the ware was "probably the most distinctive " and considered "highly diagnostic" (Gorman and Charoenwongsa 1976:20-21). In the light of this report, perhaps predictably, such decorated wares were often used for intersite chronological correlations (Bayard 1987, White in: Bronson and White 1984, Higham and Kijngam 1984). Subsequent reconstruction of Ban Chiang vessels has revealed considerable variety, and recently these wares have been used to help designate three phases in a revised Ban Chiang chronology (White 1986:240- 245, 279).

White has pointed out that the term is now so "broadly and imprecisely applied" to render it meaningless for stylistic crossdating. She notes that the lumping of these vessels together on the basis of "incised and painted designs" (i.e their mode of surface decoration), "caused considerable confusion" (1986:245). Yet in spite of this, specific distinctive (sic) forms may

be diagnostic, White argues. Recognition of this problem epitomises the shortcomings of style-oriented classification.

As with "Om Kaeo", so it is with many other style-derived groupings of prehistoric Thai ceramics. Almost any heavily reduced, burnished ware has been labelled "Phimai Black" (Solheim and Ayres 1979), because many such sherds were recovered at Phimai. Bronson and White (1984) refer to the "Black Ware" phase at Phimai. Similarly "Ban Chiang Painted" could be almost any red painted or slipped sherd, particularly when it has spiral or circular designs. "Nong Bua Buff" (Bayard 1980), refers to an oxidised ware surface collected from Nong Bua in the Pa Mong region. "Roi Et ware" and "Roi Et white" have been discussed above. Categories such as "red slipped and burnished", "red-on-buff painted", "incised and painted", "beaker forms", "curvilinear incised", and "black to grey burnished and incised" have been employed to define important chronological sequences. These terms are as broad and imprecise as "Om Kaeo".

At Ban Na Di, the presence of "Om Kaeo" sherds generated much excitement amongst some archaeologists prepared to use these distinctive, and hence apparently easily identified, sherds as chronological markers. Bayard (1987:119-121) placed considerable stress on their provenance and used them directly in correlations of Sakon Nakhon Basin and Chi Valley sequences, and, by implication, with Non Nok Tha. This propensity of Southeast Asian workers to correlate surface decoration with momentous archaeological events extends to single vessels, particularly those with a distinctive style. White (1986:269), for example, used a single distinctive vessel at Ban Tong to help correlate the Ban Chiang chronology.

In order to test the validity of using incised and painted or slipped wares for correlating relative chronologies, a sample of twenty-four sherds with "Om Kaeo" decoration from levels 6 and upper level 7 at Ban Na Di have been examined. They represent six different fabric groups. Twelve belong to fabric group 6 and three to fabric group 9. These groups have been previously identified with the "whole" vessel assemblage (Appendix one). The remaining fabrics will be discussed in general terms only. A summary of surface finish details is set out in Table C.1 (Appendix three). Many sherds are weathered, making determinations of colourant bonding impracticable. As they cover the complete range of surface finishes represented, sherds composed of fabric groups 6 and 9 material only will be considered in detail.

Fabric group 6 sherds vary slightly in colour but are principally a reddish brown (5YR/6/3). All are dense and usually oxidised. A few have slightly reduced cores and two (including O19 fig. 10.1), are substantially reduced to internal surfaces. Figures 10.1 to 10.7 illustrate the range of decorative designs. Four principal modes of decoration are evident. Plain, cord-marked, incised and slipped or painted surfaces are employed. Backgrounds are mainly smooth, but often display residual cord impressions indicative of a two-stage forming process. Unmodified cord-marking sometimes acts to emphasize fields. Incised designs, either with or without a paint or slip, may be curvilinear or geometric. One sherd appears to copy a Phu Wiang motif (sherd O3 fig. 10.2).

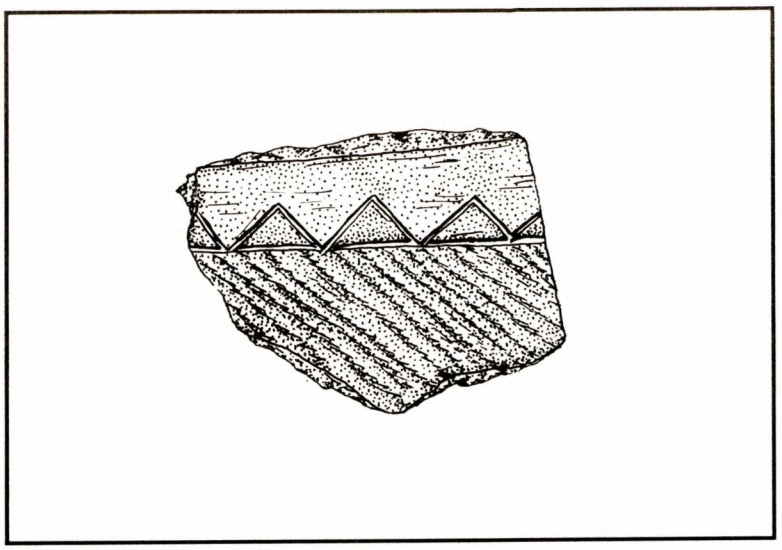

FIGURE 10.1: "OM KAEO" WARE AT BAN NA DI: SHERD O19. Scale 1:1.

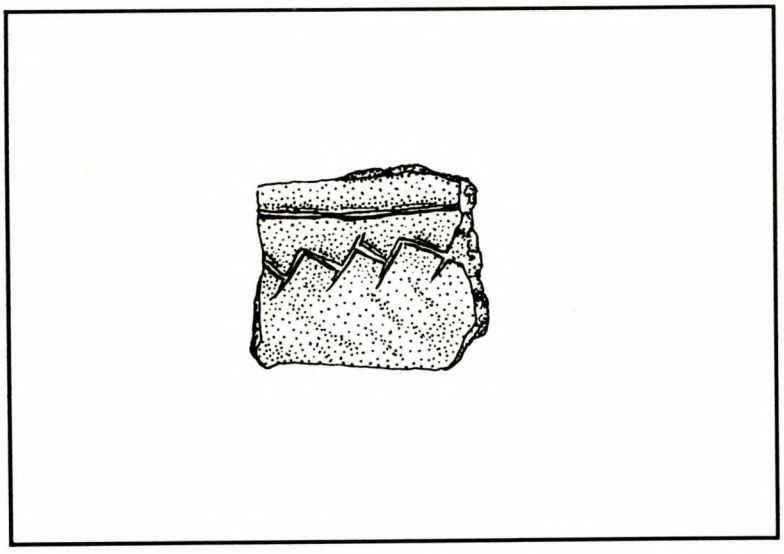

FIGURE 10.2: "OM KAEO" WARE AT BAN NA DI: SHERD O3. Scale 1:1.

Fabric group 9 sherds (fig. 10.3) are a pinkish grey to grey (5YR/7/2 to 5YR/5/1) with fields of meticulously painted geometric panels or ribbons. The paint is a red (10R/4/6 to /8) iron oxide, probably hematite. It readily scrapes off to reveal a homogeneous smooth substrate, indicative of post-firing application (Shepard 1971:168-178). This contrasts with fabric 6 colourants which are chemically bonded.

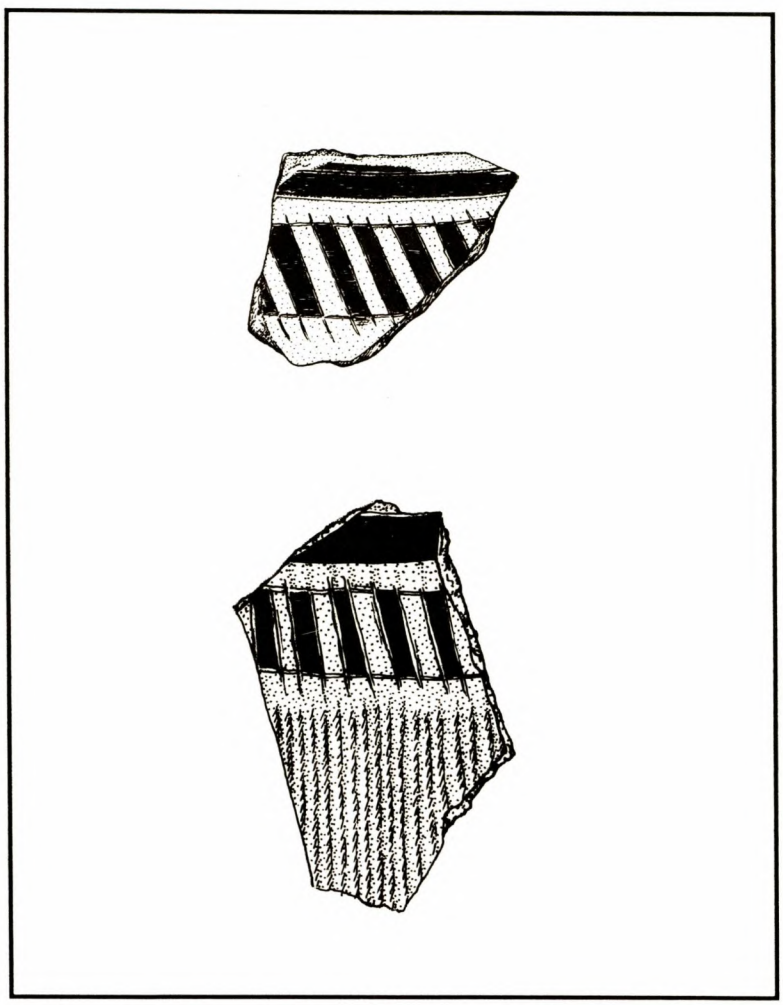

FIGURE 10.3: "OM KAEO" WARE AT BAN NA DI: SHERDS O20 AND O25.Scale 1:1.

Four further fabrics, two mineralogically consistent with Sakon Nakhon Basin sources and one with the Western Piedmont, are also present. The latter fabric is petrographically comparable with a Non Nong Chik sherd kindly identified by Bayard as representative of his Non Nok Tha "soft sand" temper category. Although sandy, it is lightly tempered with rice husk. Its highly micaceous matrix and distinctive nonplastic mineralogy are probably characteristic of the Phu Wiang region. An angular medium-sized sand, dominated by mono- and polycrystalline quartz, with several grains of chert and plagioclase feldspar, subrounded coarse sand-sized grains of hematite, with angular fine sand-sized quartz inclusions, brown biotite, accessory tourmaline, and rare quartzofeldspathic igneous rock fragments comprise the parent body. As a few composite grains of chert-cemented monocrystalline quartz are also present, a micaceous sandstone source is indicated. It is possible that some intermingling of weathered igneous country rock has also occurred. Although further work is required on this fabric, it is clearly distinct from the Sakon Nakhon Basin clays. Non Nok Tha and Non Nong Chik are located within the Phu Kradung Formation. Sherds composed of this fabric are illustrated on the following page.

Two sherds (O1 and O3 fig. 10.4) contain the Phu Wiang fabric. They are dense and oxidised red (2.5YR/5/6). The former has red infilled fields probably consisting of an unbonded iron oxide paint.

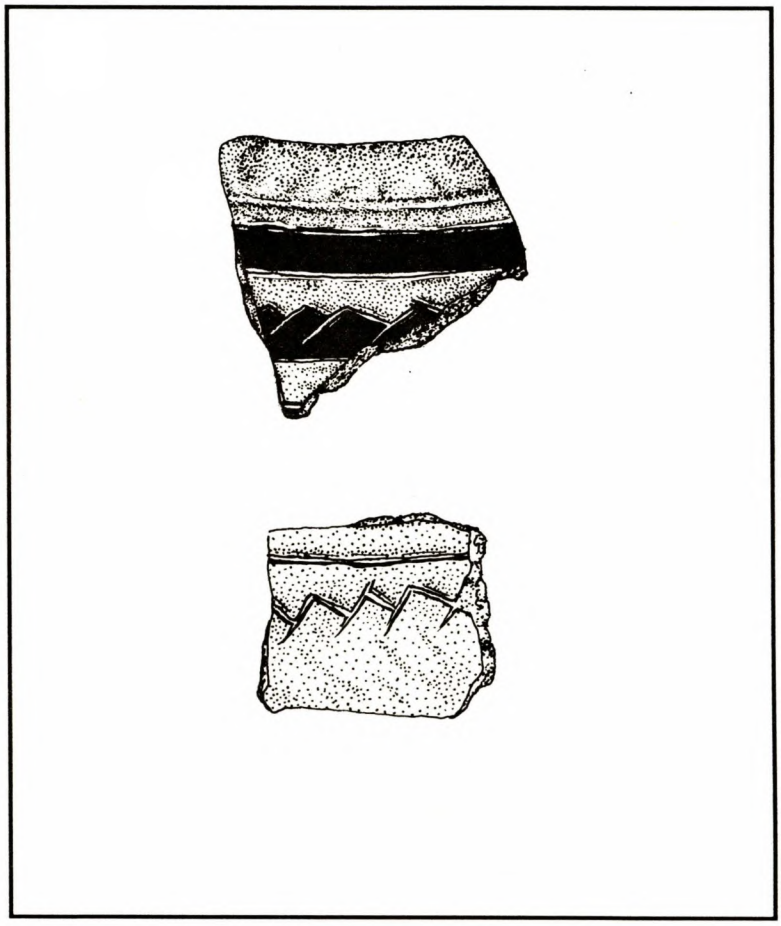

FIGURE 10.4: "OM KAEO" WARE AT BAN NA DI: SHERDS O1 AND O3. Scale 1:1.

Three other sherds are composed of material mineralogically similar to fabric group 15, but lack iron-rich ooid-like inclusions, and this distinguishes them from the latter fabric group. A Sakon Nakhon Basin source outside the plagioclase zone is indicated, and an origin northeast of Ban Na Di seems likely. The fabric is moderately micaceous and tempered with orthodox grog (figure 10.5).

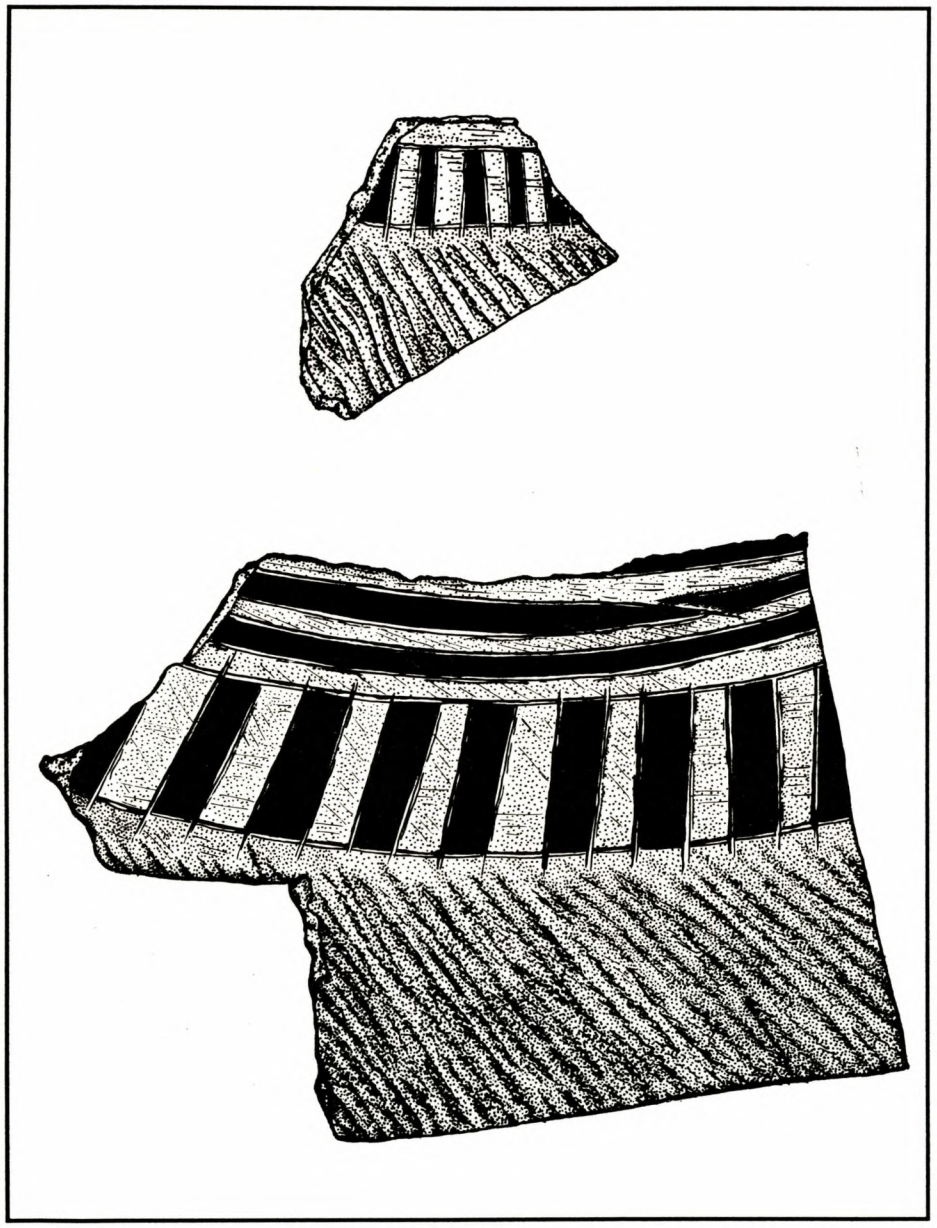

FIGURE 10.5: "OM KAEO" WARE AT BAN NA DI: SHERDS O24 AND O42. Scale 1:1.

Sherd O42 is reduced throughout (2.5YR/2.5/0) with red (10R/4/8) probably unbonded painted fields. Residual cord-marks are visible beneath the incised and painted area. Sherd O24 is oxidised (2.5YR/6/4). Note the angle of cord-marking application.

Sherd O38 (fig. 10.6) is characterised by an orthodox grog temper. The parent matrix is composed of material compatible with clay 5, a source near to Ban Chiang and Ban Om Kaeo (fig. 4.7). Note that sherd O38 is oxidised (10YR/8/3 to 7/3). The dark fields are red (10R/4/6). Note the vertical cordmarks, a characteristic apparent in many of the published Ban Om Kaeo vessel forms.

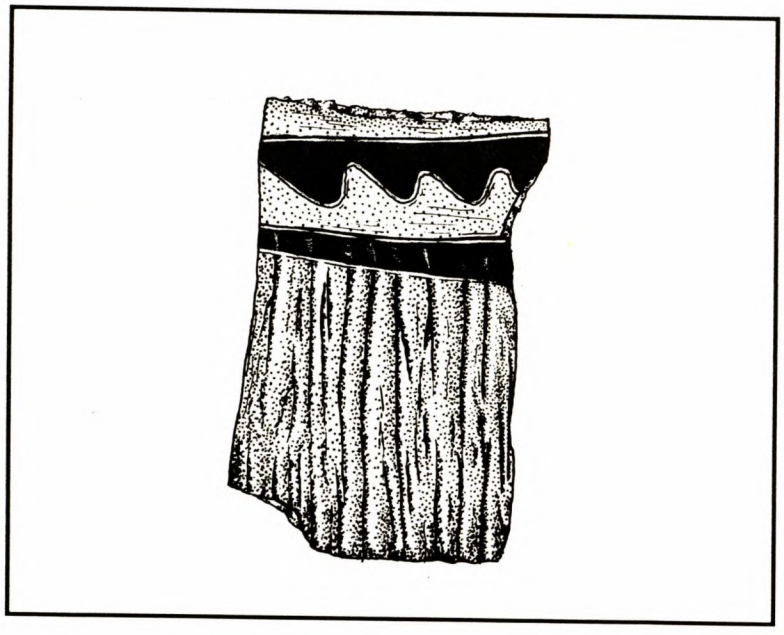

FIGURE 10.6: "OM KAEO" WARE AT BAN NA DI: SHERD O38. Scale 1:1.

Three further sherds are heavily tempered with rice husk. Carbon released from the husk during firing probably affected the associated extensive reduction. The parent body contains very few nonplastics. These are mainly microcrystalline quartz, which is rarely greater than silt size. None exceed fine sand dimensions. A few ferruginous grains are also evident. In polarised light the fabric is moderately micaceous. It is geologically non-specific. Figure 10.7 illustrates rice tempered sherd O7. An oxidised (2.5Y/6/4) external surface area 1mm deep masks a heavily reduced (2.5Y/4/0) body. The fields are red (10R/4/6). Two sherds not illustrated are incised only.

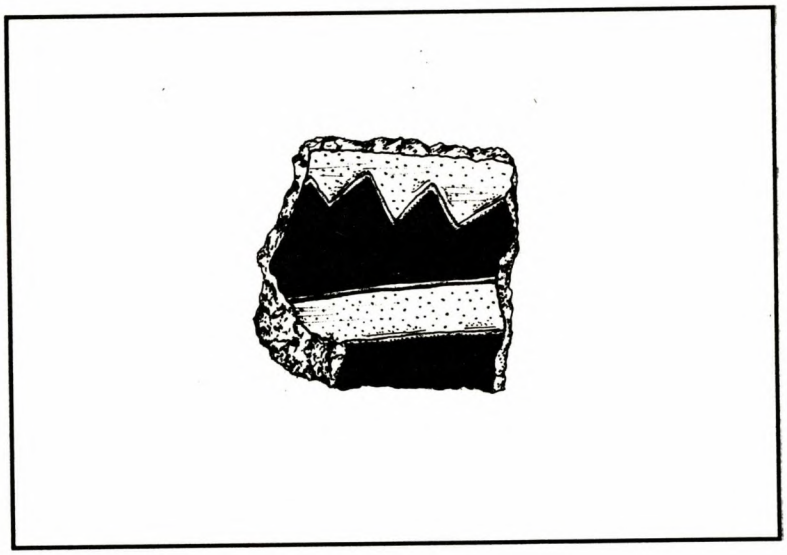

FIGURE 10.7: "OM KAEO" WARE AT BAN NA DI: SHERD O7. Scale 1:1.

Clearly, the manufacture of incised and painted wares was not restricted to a single production centre. Of the six types set out above, only one, sherd O38, is likely to have originated from Ban Om Kaeo. Yet the design motifs, particularly those depicted on sherds O24, O42, O20, and O25 (figs. 10.5 and 10.3), duplicate Ban Om Kaeo forms. Such copied forms often confuse style-orientated analyses. Conversely, however, imitations may provide important information regarding prestige or regional cohesiveness. Thus the prestige attached to traded wares is emphasized through local copies. A different sociological focus, intersocietal cohesiveness, is demonstrated when fashionable contemporary designs are regionally adopted. We may reasonably expect that the intensity of such processes will be indicated by the quantity and quality of such production, particularly if it cuts across local technological and stylistic traditions.

A homogeneous mode of decoration, if associated with design elements which together create popular forms, suggests close relationships between regional production centres. If such production also spans several different pottery traditions, then these conditions strengthen the notion of close regional connectivity within the Sakon Nakhon Basin. In this respect fabric groups 6 and 9 are particularly informative. Together they link both level 7 and mortuary subphases 1b and 1c at Ban Na Di with Ban Chiang MP VII. This is because at Ban Na Di, in addition to "whole" vessels, six rimforms (Appendix one) which contain either fabric are paralleled at Ban Chiang during the Middle Period (White 1986:239-240). One Non Kao Noi level 3 rim is also composed of fabric 9 (Table 8.3 chapter eight). It would be unwise to stretch this latter comparison too far on the basis of a single rimform, however, and caution is warranted until further data are available.

It seems reasonable to view "Om Kaeo" wares as representing a popular regional type during the period prior to the inception of level 5 at Ban Na Di, where they are obviously rare. A paucity of a regionally distributed ware may be associated with "a period of first appearance or imminent disappearance of a type" Shepard (1971:336). It may be significant in this respect that at Ban Na Di fabric groups 6 and 9 are clearly concentrated below the level 5/6 interface in both mortuary and occupational contexts. The incised and painted or slipped wares seem to have enjoyed widespread popularity during the millennium or so prior to the arrival of the new bleb temper ceramic tradition from the south. Unlike the orthodox grog-tempering method, however, the style does not appear to have survived beyond the major change to a new range of styles rendered with a different mode of decoration. The succeeding "painted" wares in turn are subsequently evident over much of the region. This phenomenon typifies the kinds of changes which may be precipitated by the diffusion of a different pottery tradition with its associated new methods and styles. In the following section we will assess problems related to "Ban Chiang Painted" pottery, a distinctively decorated ware well known publicly.

10.2 The "Ban Chiang Painted" problem

Ban Chiang is probably best known by art historians, style analysts, and the general public for its outstanding pottery. The so-called "Ban Chiang Painted" wares have stimulated worldwide interest among art collectors (van Esterick 1973:75). According to White (1982:28), it was this "red-on-buff pottery which gave the site its early renown." Three important studies of Ban Chiang pottery have recently been undertaken. Glanzman and Fleming (1985:114-121) consider vessel fabrication methods, McGovern *et al.* (1985:104-113) fabric petrology, and White (1986) undertook a major style analysis. Our attention here is concentrated on "Ban Chiang Painted" ware.

Stratigraphically, it was encountered "above the incised-and- painted pottery" initially associated with Phase IV (Gorman and Charoenwongsa 1976:24). White (1986:279) revised this chronology and places "incised and painted" pottery into three new phases (Early Period V, Middle Periods VI and VII). White sandwiches a ceramically undefined phase, (Middle Period VIII), between the succeeding "red-on-buff painted" phase (Late Period IX). This latter phase, originally characterised by "Ban Chiang painted" (Gorman and Charoenwongsa 1976:23), is now defined by a stylistic "provisional type" (*pt*-16), by White (1986:100-102), who dates the period to 300-1 B.C.(1986:279). Thus Late Period IX is partly contemporaneous with the Ban Na Di level 5/6 interface.

Late Period vessels, according to White, can be grouped "on the basis of surface treatment", differences in "coil-and-slab" construction techniques in comparison with Early Period vessels, a paucity of plant material compared with previous periods, and the presence of green hornblende. This latter point is important and we will return to it later.

According to Hastings (1982:38-39), over 300 pots (341 are inferred in caption 2), were recovered from Ban Chiang. Of these, all funerary ceramics have since been fully examined "and most have been reconstructed" White (1986:61). This has allowed White to identify major stylistic groups, each characterised by a specific vessel or vessels. Eighteen were considered in detail by White (1986:61, 279). Two are assigned to Late Period IX (LP IX). Both are categorised "Late Period provisional type 16 (Group J)" (White 1986:102). McGovern *et al.* analysed one LP IX and three LP X vessels. Glanzman and Fleming consider three of these.

To date, no data are available regarding the areal distribution of specific vessels in the various burials concerned. This information would determine individual mortuary assemblage structures, and allow comparison of individual wealth. Variety, and the differential presence of quality wares, helps to delineate the "shape" of individual burial vessel assemblages. Vessel quality as well as quantity may both be measures of the deceased's rank and status. Although this information is unavailable, the Late Period "provisional types" are considered by White to represent styles distinctive enough to define burials stratigraphically associated with this phase.

Asymmetry in funerary furniture between individual graves could symbolise, in mortuary ritual, the social structure of a society. It could act to distinguish relationships in living populations such as those involved in social stratification. The differential access to "prestige" wares has thus been used to demarcate social structure through assessments of relative wealth (Bayard 1984, Higham 1984). Differentially "rich" burials, depending on whether the apparent wealth is ascribed or inherited, could suggest social ranking (Peebles and Kus 1977). Exotic items, including pottery, imply prestige (Renfrew 1972:42) and differential access to prestige goods implies social stratification (Fried 1967, Dumond 1972, Renfrew 1975).

Access to exotic prestige goods requires a trade or exchange system which in turn entails organization. The intensity of this exchange activity correlates directly with the degree of social organization involved (Renfrew 1975). The distribution of any prestige ware relates to social and economic levels of activity. A key component in the identification of trade/exchange networks involving pottery requires an assessment of regional resources and production centres. In order to bring "Ban Chiang Painted" ware into a regional perspective we need to distinguish between the technological and mineralogical information available for the Ban Chiang sample. We can then look for any correlations with the known Sakon Nakhon Basin clay mineralogy and "Ban Chiang Painted" sherds from Ban Na Di and other regional sites.

McGovern *et al.* (1985:105-106) divided their petrographic analysis into two parts. Predominant inclusions were identified in thin-section and point-counted. Subsequently "the presence/absence of heavy mineral accessories (e.g. green hornblende, hematite, etc.), which were poorly represented in thin-section, was assessed by inclusion analysis of disaggregated 25 mg. samples." The major inclusions identified were quartz, grog and plant material, most of which was "easily recognizable as parts of rice plants." A photomicrograph (Plate 2) of "quartz-tempered grog inclusions" within the fabric of vessel BC- 9 (McGovern *et al.* 1985:106) appears to illustrate reduced blebs. Clearly it is important to establish the identity of these inclusions. For if they are blebs then we have *prima facie* evidence that Ban Chiang was affected by the broadscale changes in Sakon Nakhon Basin pottery production documented above.

White (1986:263), however, reports that the petrologist who undertook the thin-section analysis (Dr. William Vernon, McGovern *et al.* 1985) did not recognize any grog resembling blebs. But, according to White he noted "little if any obvious plant material associated with the grog fragments. Any plant remains were found within the clay matrix". This association is consistent with the relationship noted for blebs. Only a few grog fragments actually include rice husk. Rice husk in the clay matrix, however, is one of the defining criteria set out in chapter six. Blebs were first described by the writer (Vincent 1984b:669-670) as associated with rice husks. The association was not described in detail, thus it may have been unclear whether the husk was within the grog or the parent matrix.

If we put aside, for a moment, the question of temper specie identification, what ceramic evidence regarding the affiliations of "Ban Chiang Painted" ware do we have? First, the temper specie is grog. Second, the surface decoration involves a red "paint". A clear correlation is evident between bleb temper and "painted" wares at Non Chai and Ban Muang Phruk (Rutnin 1979, Wichakana 1984). At Ban Na Di, 86.6% (n = 112) of bleb tempered rims were treated this way. Conversely, orthodox grog is correlated with unpainted wares. Surface-collected assemblages from 29 Sakon Nakhon Basin sites include 24, (82.72%), with bleb-tempered pottery. All three excavated sites revealed abundant bleb-tempered ware. This raises the percentage of sites with bleb wares to 84.37%. Obviously, the distribution of bleb tempered wares was widespread, if not ubiquitous, throughout the region. In view of this ubiquity it may be unwarranted to reject the notion that they were also present at Ban Chiang during the Late Period.

In the absence of compelling evidence that bleb-tempered wares were not present during the Late Period at Ban Chiang, we will assume it also played a part in the exchange network discussed in chapters eight and nine. We may recall this was evidenced both by a long tradition in exotic material movement within the region and a rapidly developed pottery exchange system with the much larger Khorat Basin. We will proceed in the knowledge that our sample is comprehensive. We are fortunate that it includes modern pottery of known composition for comparative purposes. Petrographic information of this kind greatly assists with the identification of argillaceous inclusions. Without these data, blebs could be difficult to detect. Thus the writer is confident, in terms of the published photomicrograph discussed above, that the Late Period "Ban Chiang Painted" ware fabric represented is bleb-tempered. The origin of "Ban Chiang Painted" ware, however, is not as secure.

We need not confine ourselves to temper species in searching for the likely source of "Ban Chiang Painted" ware at Ban Chiang. For this we can turn to mineralogy. In this respect the evidence is unequivocal. McGovern *et al.* (1985:109) report that in each Late Period vessel examined petrographically, green hornblende is present in association with grog temper. Our examination of Sakon Nakhon Basin clays has revealed that Ban Chiang lies outside the

plagioclase zone (fig. 5.3). Dry samples (45 grams) of each clay from both sources adjacent to Ban Chiang were first washed with water and then boiled in 10% dilute hydrochloric acid to produce a clean sand and silt sample. This was examined under a binocular microscope at 65x magnification. A detailed scan of about 10,000 grains in each sample failed to reveal hornblende. Of course it is possible hornblende is so poorly represented that this method failed to reveal the mineral. The mineralogical maturity of each of the 14 Sakon Nakhon Basin clays, however, makes this most unlikely.

Both the potting clays adjacent to Ban Chiang contain quartz varieties diagnostic of mineralogically mature reworked quartzarenites (chapter five). According to Krynine (1942:545-546), light and heavy mineral assemblages are usually similar in their degree of maturity. Orthoquartzitic sandstones, such as the Phra Wihan from which the reworked quartzes were probably eroded, are almost exclusively composed of ultrastable quartzes, zircon, tourmaline and rutile (Hubert 1971:460). Unstable heavy minerals such as hornblende are therefore unlikely to occur in clays 1 or 5 (Hubert 1971:459). In view of this information it seems unlikely that the so-called "Ban Chiang Painted" pottery considered by McGovern (*et al.*) was manufactured at Ban Chiang. Before leaving the important question of origin, we shall try to refute this explanation as a test of its validity.

Typical arguments against the technological identification of intrusive pottery, which rests on exotic material recognition, are that insufficient local resources have been investigated to rule out the existence of the given raw material; or alternatively, that although the raw materials are not locally present, they may have been imported. Thus merely the raw clay, and not the pots, may have been exotic (Shepard 1971:337). If we demand an absolute knowledge of all the region's clay resources, we need no further test. Our argument is destroyed because no such information is available, or ever likely to be. We cannot even aspire to a thorough knowledge of local or regional resources as native potters have. Yet this is no counsel of despair. Our "crucial tests" should not ignore a major portion of the hypothesis, and we must remember that we are not dealing with raw materials in isolation, but in a specific archaeological context.

What does the archaeological context of "Ban Chiang Painted" ware tell us? Judging from the available data, 341 vessels were recovered from Ban Chiang covering a period of nearly 4000 years, with the Late Period forming *c.* 600 years (White 1986:279). Fifteen of a total one hundred and twenty five burials have been provenanced to the Late Period. Extrapolating burial vessels from burials this gives an estimated 41 pots for the Late Period, few enough for all to be exotic even if pottery was locally produced. Evidence for local production is scant. Glanzman and Fleming (1985:116) noted impressions possibly attributable to anvils, but give no information regarding whether any anvils were found at Ban Chiang. The only firm evidence for pottery production at Ban Chiang is four ceramic anvils; one is undated, one dated to *c.* 100 - 300 B.C., and two *c.* 300 B.C.- A.D.200 (White 1982:76). These dates, in White's revised chronology, are consistent with Late Period IX and X.

According to White (1986:83), Late Period surface treatments are "sufficiently distinctive and common" to provide satisfactory classification evidence. Unfortunately, shape is not a criterion in White's "provisional types" (*pt's*). In addition, it is unclear what this classification refers to as it is often confused with "type" *sensu stricto*. This point apart, it is "key burial ceramics" which are emphasised by White (1986:84). Late Period painted vessels were interred with six burials and "the red-on-buff style of pottery (*pt*-16) is found on a number of vessel shapes" (White 1986:323, 108). We can proceed no further for the present, as only limited technical and "no statistical information" is available (White 1986:233). She notes (1986:85), however, that anvils were used throughout the sequence, but unfortunately does not explain

this observation. She also observed (1986:263, 314), that the presence of iron, blue glass beads, and the "increased use of red paint" at Ban Na Di and Ban Chiang supports their contemporaneity, and that the broad dispersion of "certain pottery styles and technologies" may reflect the presence of specialized manufacturing centres.

In order to bring into focus the regional context of "Ban Chiang Painted" pottery, we need now to summarise archaeological and technological evidence from Ban Chiang and beyond. First, we have little direct evidence for *in situ* pottery manufacture at Ban Chiang. According to White (1986:28), the total area excavated is 130.8 m^2, compared to 65 m^2 at Ban Na Di (Higham and Kijngam 1984:37). Twenty three anvils were recovered at Ban Na Di, only four are reported from Ban Chiang. Even allowing for statistical effects involved in the sampling nature of excavations, a clear discrepancy is obvious. Recent data from a postulated major pottery manufacturing centre at Khok Phanom Di suggests the inclusion of accoutrements as funerary furniture is an important component of mortuary ritual in such societies (Vincent 1987). If such a response can be generalised, the prehistoric inhabitants of Ban Chiang were unlikely to have been specialised potters. As White has suggested (1986:313-316), we may need to look further afield for such specialised production.

Second, we have firm evidence of longstanding regionality in pottery exchange, the movement of potters between different clay source areas, and *prima facie* evidence of the existence of itinerant metallurgists (chapter seven and appendix one Table A.14, crucible 1371). At Ban Na Di, the differential use of local versus imported clays for figurines, and the evidence for blended clays in mortuary vessels, demonstrates that manufacturing was sometimes carried out under adverse conditions. Access to quality clays is critical for satisfactory pottery production and is restricted by their natural distribution. Such differential resource access favours craft specialisation (Renfrew 1972, 1975, Redman 1978). Craft specialisation in turn provides stimulus for social ranking.

Third, after the level 5/6 interface at Ban Na Di, a major new type of ware was widely distributed throughout the region. This new bleb-tempered pottery did not totally replace the previously dominant product, but appears to have been assimilated into a new configuration which involved both production and consumption. Here, surely, are the hallmarks of an intensive and dynamic process of cultural change, based on a "deviation amplification" (Flannery 1968), involving the injection of a new ceramic technology into an existing pottery manufacturing tradition which involved a regional exchange system. Under this milieu, access to high quality pottery rendered in the new style, such as "Ban Chiang Painted" wares, could help confer prestige. Sites which occupied a nodal position in the exchange network are likely to have benefited from this, particularly if an organizational role was involved (Haggett 1975). Accessibility to resources, and node connectivity, are important factors in such regional networks. Ban Chiang occupies a pivotal location intermediate between the major, metallurgically important, eastern region of the Sakon Nakhon Basin and the smaller Kumpawaphi region which links the northern and southern portions of the Khorat Plateau.

According to Kijngam's *et al.* (1980), mathematical model, a site hierarchy is absent in the Kumpawapi area. A major difficulty with this approach is lattice distortion over time (Haggett *et al.*1977:106). We simply have no adequate information regarding contemporaneous site sizes. Factors affecting size during one period may later become meaningless. Static analyses fail to cope with this problem. Ban Chiang, while not a central place in terms of its size, may well have been nodal because of its geographic location. It was occupied early in the known regional sequence, and, to date, sites revealing greater material wealth have not been identified within the Sakon Nakhon Basin. Thus, in terms of present *archaeological* information, we

cannot dismiss its importance.

Christaller's theory places importance on the role of central places in providing or distributing sought after, or "central", goods and services. They characteristically occupy geographically nodal locations in exchange networks. Thus Ban Chiang could reasonably be conceived of as a net importer of high quality goods. This would not necessarily exclude the possibility of some local utilitarian pottery production (Arnold 1985). When the lack of pottery accoutrements, relative material wealth and centrality of Ban Chiang are considered in combination, it is predictable that pottery such as "Ban Chiang Painted" wares were imports.

Eleven sherds, categorised by the Ban Na Di excavators as "Ban Chiang Painted", have been examined in thin-section. Seven fabrics representing three temper species, orthodox grog, blebs, and rice are present. These are summarised in Appendix three.

Three bleb-tempered sherds display a surface decoration stylistically compatible with White's "*pt*-16" (1986:Fig.13a.). Two are illustrated in figure 10.8. The parent fabric is consistent with clay within the plagioclase zone. The presence of composite mosaic/chalcedonic and mammillated chert grains suggest a source close to the Phu Phan Range.

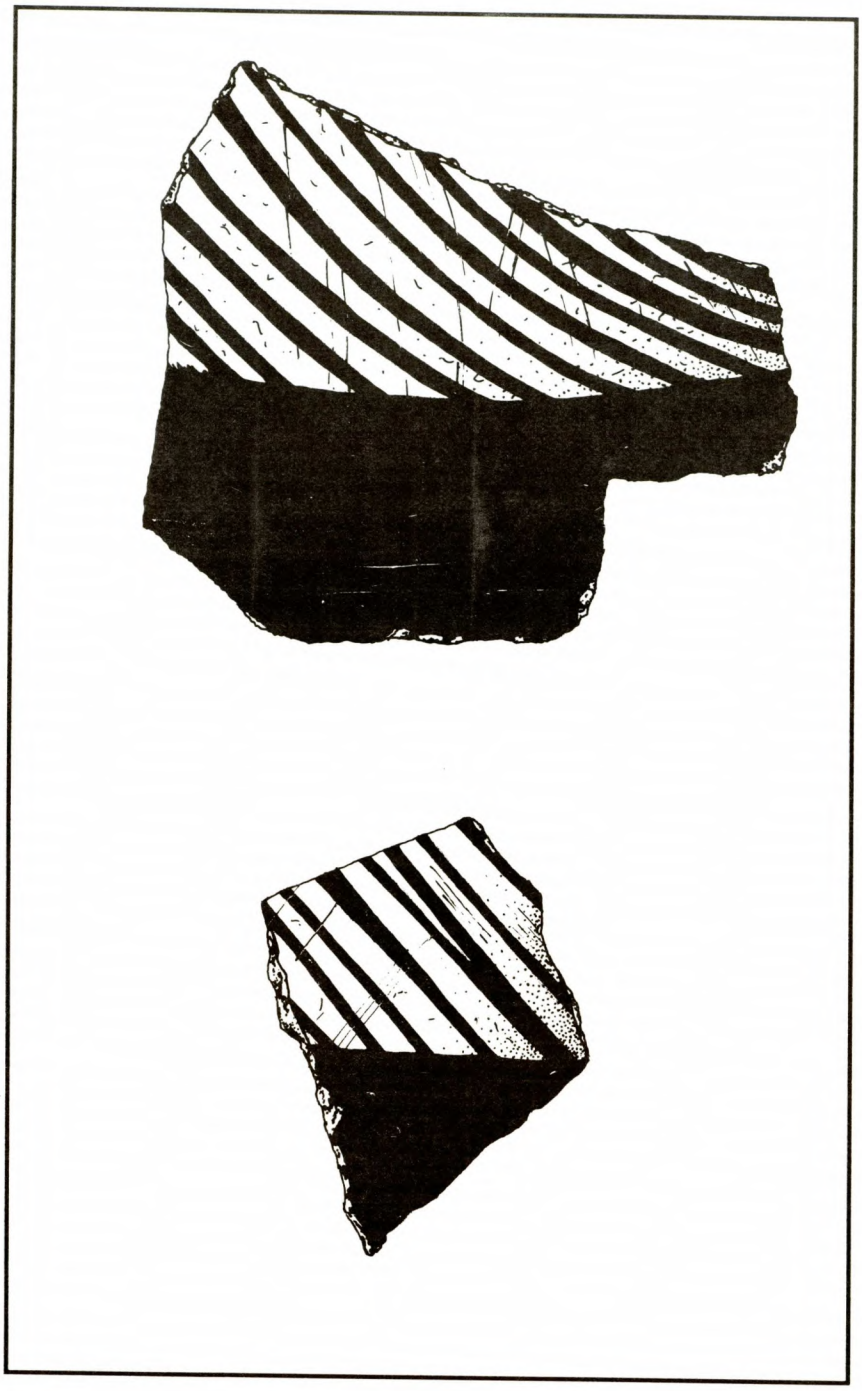

FIGURE 10.8: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERDS O29 (top) AND O37. Scale 1:1

Sherd O29 is oxidised to surfaces. Colours: interior 10YR/7/4, exterior field background 10R/5/3, curvilinear design and frame 10R/4/3. Sherd O37 is slightly reduced. Colours: interior 10YR/4/1, exterior field background 10R/5/6, design 10R/4/3. Two separate coats of an iron oxide based paint have probably been applied, although self-slip could be involved in the case of O37. An oxidised sherd (O40 not shown), has a 10YR/7/6 unpainted background and a 10R/4/4 painted design.

One sandy bleb tempered sherd (fig. 10.9) is petrographically similar to Chi Valley fabrics.

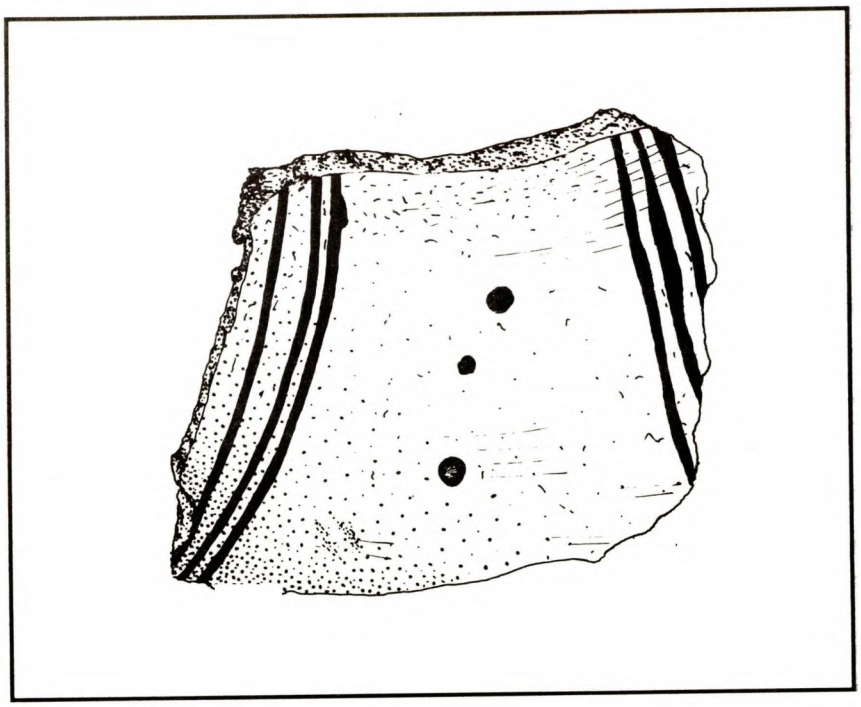

FIGURE 10.9: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERD O30. Scale 1:1

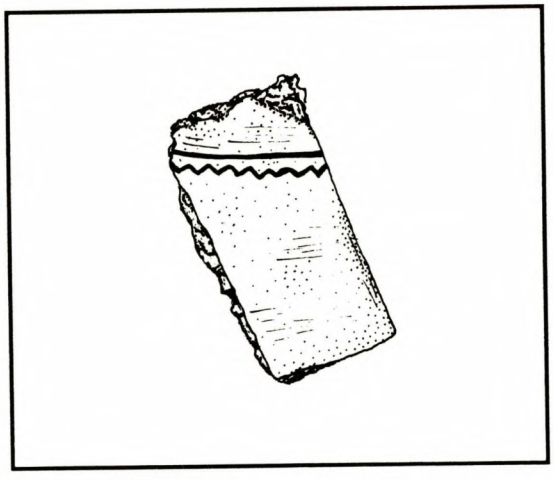

FIGURE 10.10: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERD O34. Scale 1:1

The surface 1 mm of sherd O30 only is oxidised. Colours: exterior background 2.5YR/6/6, design 10R/4/6, (probably an iron oxide). The interior background is coloured 2.5YR/6/6. A thin 10R/4/8 line at the upper interior fractured rim remnant suggests that this sherd represents the remains of a painted rim. Sherd O34 (fig. 10.10) is composed of fabric 12 material. The exterior 1 mm of sherd O34 is oxidised. Colours: exterior background 7.5YR/7/4, design 10R/5/6, (probably an iron oxide). The interior is coloured 7.5YR/3/0.

Sherd O32 (fig. 10.11) is bleb-tempered. Level 6 rimform US 56 also contains this fabric (appendix one). No plagioclase is evident, diatoms are prominent and spicules are rare. Polycrystalline quartz, mosaic chert, zircon and tourmaline also occur. The parent matrix is moderately micaceous. This mineral association suggests a Sakon Nakhon Basin source close to clay 4 (chapter five).

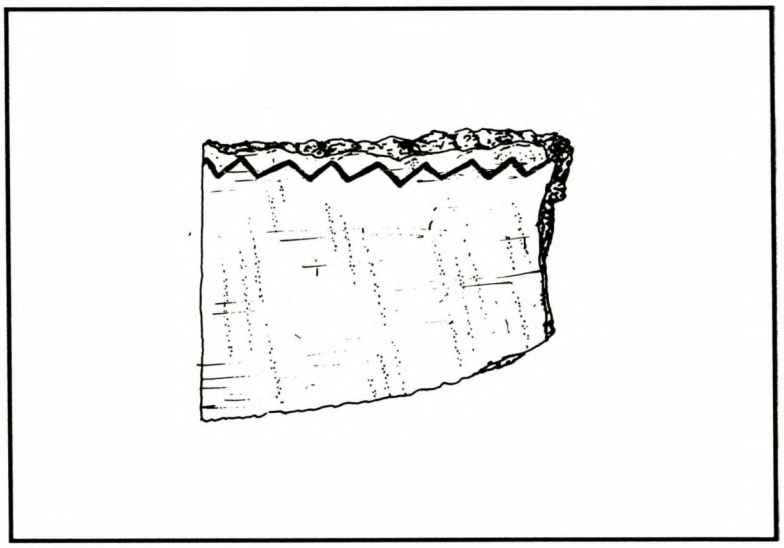

FIGURE 10.11: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERD O32.
Scale 1:1
The exterior 1 mm of sherd O32 is oxidised. Colours: exterior background 5YR/6/3, design 10R/4/6, (probably an iron oxide). Interior red paint 10R/4/4, unpainted surface 5YR/3/1. An oxidised sherd (O31 not illustrated) has a 5YR/7/3 background with a 10R/4/8 design similar to sherd O37.

Rice husk temper in association with a moderately micaceous, geologically non-specific, matrix which contains mostly quartzose nonplastics characterises the fabric of sherd O28 (fig. 10.12). The exterior 1 mm of sherd O28 is oxidised. Colours: exterior background 7.5YR/7/4, design 10R/4/6 (iron oxide?). The interior is coloured 7.5YR/3/0.

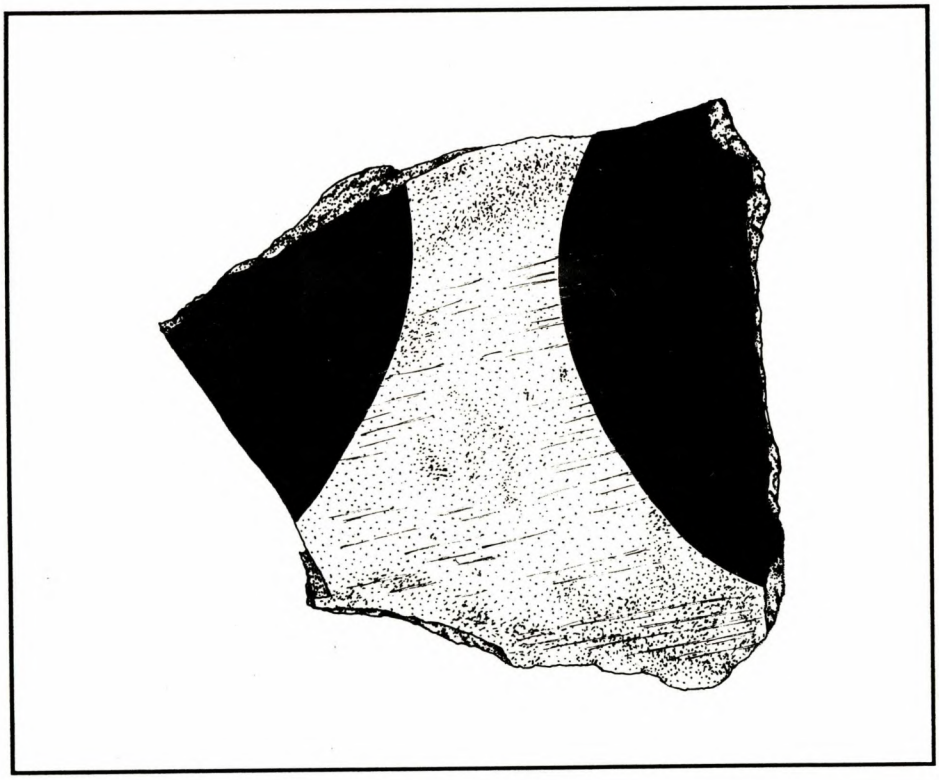

FIGURE 10.12: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERD O28.
Scale 1:1

Two further rice husk tempered fabrics (not illustrated) are present.The first (sherd O33), has an oxidised (7.5YR/7/2) exterior surface, to 1 mm depth, with a (10R/4/4) painted design similar to O37. All the interior is painted (10R/4/3). The parent matrix is consistent with clay 10 (chapter five). Sherd O36 has a moderately sandy matrix containing a principally quartzose nonplastic suite. It probably derived from an Eastern Sakon Nakhon Basin source. Surfaces are oxidised to 1 mm in depth (7.5YR/7/4), and two thin parallel lines are coloured 10R/4/8. Orthodox grog has been used to temper sherd O35 (fig. 10.13). The parent matrix is not, in terms of the present work, geologically specific. The outer surface has been burnished prior to receiving the painted design. Note also that the exterior 1 mm of sherd O35 is oxidised. Colours: exterior background 5YR/7/4, the design contains a 10R/4/6 iron oxide. The interior is coloured 7.5YR/3/0.

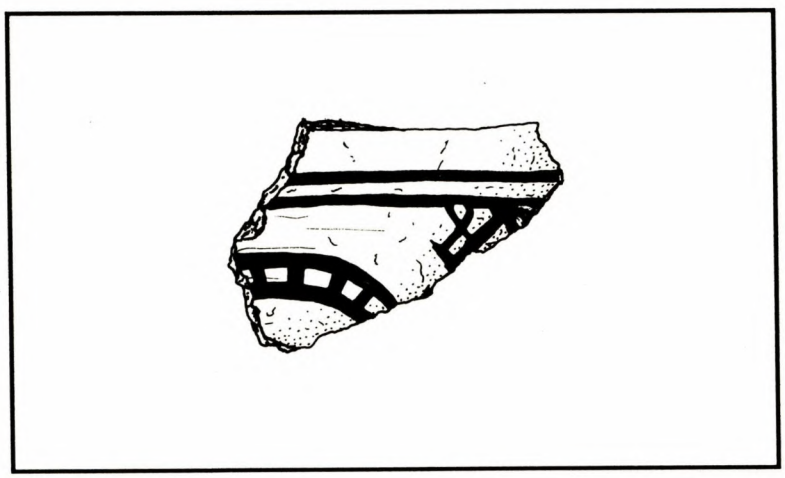

FIGURE 10.13: "BAN CHIANG PAINTED" WARE AT BAN NA DI: SHERD O35.
Scale 1:1

In terms of pottery types, and hence probably manufacturing centres, the regional nature of "Om Kaeo" wares is repeated again in "Ban Chiang Painted" wares. Suitable potting clays, according to local informants, are locally restricted. This is a pattern which is probably quite common in many countries worldwide (Grim 1962). A regional distribution of small, locally confined deposits, would favour the development of production centres. We have noted a marked variation in potting clay composition in the Sakon Nakhon Basin sample. Access to known high-quality clays may have accentuated the value of this resource and intensified the process of craft specialization (Arnold 1985).

Inter- and intra- regional exchange networks are both reflected in the exotic fabric spectrum at Ban Na Di. This increased both in extent and intensity with time. Restricted clay resources, specialised production and exchange networks appear to have been interrelated. Together they may have helped produce a degree of regional cohesiveness. From a ceramic viewpoint, it may be useful to characterise the resultant pottery distribution pattern as representing a mosaic of pottery users and producers. We have already noted that modes of pottery production can vary widely (Peacock 1982). The distribution of "Om Kaeo" and "Ban Chiang Painted" wares, their exceptional technical and aesthetic quality, and value as mortuary furniture, suggests they were in demand and that specialist production centres acted to supply that demand.

If Ban Chiang during the Late Period was a manufacturing site, with local potters producing "Ban Chiang Painted" wares, the two nearby clay sources adjacent to Ban Kham O could have readily supplied their needs in terms of clay quality. In terms of our present understanding of the local geology, however, the only Late Period IX and X vessels examined petrographically to date were not fabricated from either of these clays. They contain clay mineralogically inconsistent with a local derivation. This is because clays within the Upper Songkhram catchment are not known to include hornblende. In the light of this evidence it seems most likely that these vessels were imported. The alternative explanation, that the clay was imported, appears untenable because suitable clay sources were locally available.

What proportion of Ban Chiang pottery was imported is yet to be determined. Resolving this question may require additional technical information of the kind already provided. The present practice among Southeast Asian researchers of grouping pottery together into a single taxon, on the basis of surface decoration, seems likely to promote further confusion if continued. Terms such as "Phimai Black", "Nong Bua Red", "Roi Et ware", "Om Kaeo" and "Ban Chiang Painted" should not be used by serious scholars of prehistory. Recent ceramic research in South America, Africa and Europe has reinforced Shepard's earlier findings that the presence of pottery, even *in abundance*, in prehistoric sites is insufficient cause to presume they were locally manufactured. Although much of the pottery uncovered at Ban Chiang may have been the product of local potters, until further information is available, it seems unwarranted to continue with such a broad and imprecise term as "Ban Chiang Painted".

Chapter 11

Concluding remarks and future prospects

The principal aims of a technological analysis of ceramics are the exploration of temporal changes in the potters' craft, and the illumination of possible cultural relations through material identifications and the location of their sources. In this work particular attention has been given to clay sources, temper, fabric mineralogy, vessel construction including firing and fabrication, and to non-pottery ceramics related to pottery and metallurgical industries. The long period of occupation and clear stratigraphic contexts of mortuary wares and industrial features at Ban Na Di, coupled with a comprehensive and geographically extensive sample of comparative pottery, have provided an opportunity to investigate these variables.

A model, which combines both technical analysis and aspects of archaeological data related to both physical and sociological factors, has been employed to bring into focus aspects of prehistoric ceramic production in Northeast Thailand. Evidence for broadscale changes in ceramic traditions, possibly originating beyond the southern borders of the Khorat Plateau, in addition to extensive exchange networks, has been presented. Such networks are indicated both within the Sakon Nakhon Basin and between it and Chi Valley sites. All possible clay sources were sought with the help of local informants. Suitable sources are few and locally restricted in extent. The Ban Na Di clay is only suitable for a limited variety of uses. For pottery making, a blended composition of local and quality imported clays was often used. Artefacts less demanding in utility were often rendered in local clays, thus conserving valuable imported raw materials.

Recognition of mineralogically distinctive materials plays a central role in technological analysis. About 70% of the Earth's terrestrial surface is sedimentary in origin (Tucker 1981:1). As most sedimentary deposition occurs in continental areas, local geology, relief and climate determine the kind and quantity of material deposited. When exploited clays were derived from sediments adjacent to distinctive country rock, the potential of petrographic analysis is likely to be increased. Such regions, however, are anticipated to be poorly represented, compared with regions where sedimentary country rock dominates, in view of the overall proportion of sedimentary terrain mentioned above.

The natural distributions of distinctive source rocks, likely to provide clear associations for sourcing purposes, may often be limited to areas outside those of immediate concern. This problem may not be as elusive as it at first appears, however, as methods are available with the potential to solve such problems. Our most pressing problem, however, probably concerns deciding what depth of analytical intensity is appropriate to the problem at hand. This question is likely to be a recurring one, for, apart from the natural distributions of indistinctive materials, pottery production sites have a tendency to concentrate in such regions (Arnold 1985). This bias will act further to exacerbate the disproportionate occurrence of sedimentary deposits.