Luster and Fritware Production and Distribution in Medieval Syria

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The production of glazed fritware (artificial paste bodied) ceramics in medieval Syria is examined in the light of neutron activation analysis of an excavated sample from the site of Gritille. Reevaluation casts doubt on two main commonplaces of Islamic ceramic history: 1) the decorative technique of lustering, used on some of these fritwares, was highly restricted; and 2) the production of such luxury ceramics in the medieval Islamic world in general was centralized. We propose that regional ceramic production corresponded to the decentralized system of government then current in Syria and other geographic and demographic factors there.

Introduction

Almost half a century after Frederick Waagé (1948: 82) regretted the gulf between connoisseurship of unprovenienced Islamic ceramics and studies of excavated examples, little progress has been made in bridging the gap between art historical and archaeological approaches to the study of Islamic ceramics. In recent years, however, the excavation of Islamic sites has been on the increase, thanks in part to the rise both of national archaeology services and salvage archaeology in the Near East. As the local knowledge that comes with archaeology grows, so does a desire to situate developments at any one site in a broader framework of medieval Islamdom.

Historians of Islamic art generally reflect the elite biases of medieval, largely urban, sources. Since the finest artistic products are generally linked with royal courts, vast regions and entire classes of objects have gone unstudied by scholars.

Fritware—vessels with bodies of artificial paste—was widely produced in the 12th and 13th centuries. Fritware vessels were largely made up of a mixture of ground quartz and amounts of white clay and ground alkali glass, or frit. When fired, the glass and clay fused the predominantly quartz matrix into a compact, white fabric. The production of fritware was likely stimulated during this period by ceramics imported from China (e.g., Watson 1985: 23). Conventional scholarship, dependent upon medieval sources, emphasizes "proprietary knowledge" and "centralized production" of fritware.

Our study examines the fritware from Gritille, a small, rural site in the borderlands of historic northern Syria. The paper concentrates on fritwares decorated with the overglaze painted metallic decoration known as luster, a major technical innovation associated with the courts of the Abbasid caliphs of Iraq in the ninth century. Gritille was located far from centers of population and power, and yet glazed and lustered fritwares were found consistently in domestic contexts stretching over a century-long sequence. How could this penetration of so-called luxury ceramics, in small but consistent quantities, to the lower levels of medieval Near Eastern society be reconciled with centralized production and urban consumption?

Arguments for Diverse and Local Production

Writing almost fifty years ago, Arthur Lane first proposed the movement of potters skilled in the making of lustered ceramics from Egypt to Syria upon the abolishment of the Fatimid dynasty there in the 12th century. There, they introduced the technique, which he characterized as "secret" (Lane 1947: 37). Based on published accounts of the presence of kilns, Lane also identified Raqqa (FIG. 1), a Syrian town on the Euphrates River, as the center for the production of lustered, underglaze painted, and other luxury ceramics (1947: 38, 44; Porter 1981:

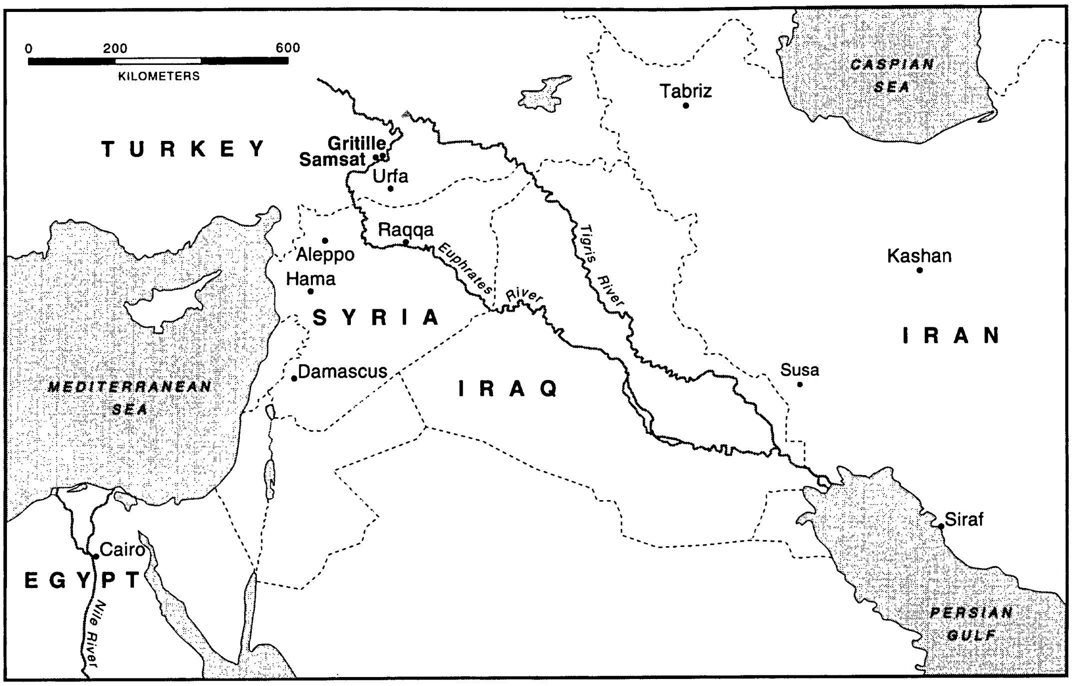


Figure 1. Map of the Near East showing principal sites mentioned in the text.

10–11). Lane's theory neatly tied the rise and fall of production at Raqqa to historical events: the end of the Egyptian Fatimid dynasty in 1171 and the sack of Raqqa by the Mongols in 1259. Because all of these vessels possessed fritware bodies, fritware technology was presumed to have followed the same lines of diffusion.

The art historical argument for the "secret" nature of luster production and for single centers of production is based on two considerations: first, the technical difficulty of producing luster, essentially a decorative film of metallic oxide painted on, and then fixed to, the glazed surface of the pot in a reduction atmosphere kiln (Rhodes 1973: 283–284); and second, the added expense of the additional firing required to produce this effect. Lane's scheme for the diffusion of lusterware implicitly associated its production with the ruling dynasty, in that the collapse of the Fatimids is seen as the impetus for the proposed exodus of Egyptian potters to Syria (Porter 1981: 8).

Works of Egyptian pottery directly associated with the Fatimid dynasty are scarce, and a gradual diffusion of techniques to Fatimid Syria beginning as early as 1100 has been proposed as a counter to Lane's argument (Philon 1980: 168, 177). Differences between Fatimid pottery in Egypt and early Syrian fritwares found in unstratified deposits at the central Syrian site of Apamaea also suggests a slower spreading of techniques, styles, and potters from Egypt to Syria in the later twelfth century (Rogers 1972: 259–60).

The movement of craftsmen from Egypt has also been put forward as a way of explaining the appearance and subsequent popularity of fritware and luster technology in Iran. Medieval Iranian ceramics from the late 12th, 13th, and early 14th centuries are most accomplished. At this time, the production of fine, white fritware bodies reaches its apogee.

Against a background of the paucity of written or reliable archaeological evidence, two sources of information from 13th- and early 14th-century Iran have been used to great effect to argue for the elite and restricted nature of lusterware production. The first is art historical. There exist numerous signed frit-bodied luster tiles and to a lesser extent fritware-lustered vessels made by craftsmen identifying themselves as coming from, or residing in, Kashan, a town south of Tehran in central Iran (FIG. 1). The names of these craftsmen include those of a dynasty, the Abo'l Taher family, whose members signed and dated tiles for most of the 13th century. This apparent dominance of Kashan in the production of luster tiles and the lack of provenienced wasters from other Iranian sites has led to the assertion that Kashan was the only production center of lusterware in all of Iran (Watson 1985: 44).

In addition, a treatise exists on the making of fritwares and lusterwares, written by a member of the same Abo'l Taher clan, one Abo'l Qasem, an historian at the court of the Mongol Ilkhanid dynasty at Tabriz in NW Iran at the very beginning of the 14th century (Allan 1973). The precise description of materials, their sources, and recipes found in this treatise reinforce the argument for the difficulty of making both fritware and lusterware, and the lineage of its author adds to the argument that Kashan was a major, if not the sole, production site.

Given the location of most of the Iranian luster tiles in prestigious architectural settings, the court setting for Abo'l Qasem's treatise, and an argument for restricted access technology and centralized production, one might expect that Iranian lusterware was distributed largely to elite destinations. But the very ubiquity of lusterware in Iran, found at the humblest of sites, and other factors encouraged Watson to argue for a bourgeois demand for this product:

> The repetitive nature of designs and inscriptions, and the virtual absence of dedications to individuals indicate that the pottery was not, with rare exceptions, made to special order for high-ranking patrons, but was a commercial product dependent on a "middle-class" market. The economy of the country as a whole was flourishing sufficiently to provide markets for these luxury goods. The political situation cannot have been so troubled as to prevent merchants travelling the length and breadth of the country to satisfy their customers—a fact made plain by the occurrence of lustre sherds at virtually every archaeological site in Persia (Watson 1985: 20).

The ubiquity of extremely breakable fritwares, in quantities massive enough to supply virtually every archaeological site in Iran with luster pottery, argues against extensive transshipments from a few manufactories. Long distance trade by sea is a possibility, as the abundance of Chinese and other imported wares at Siraf and other Persian Gulf sites indicate (Rougeulle 1991: 42).

This model of single production centers of lusterware has been expanded to the entire medieval Islamic world. Petrographic analysis of ceramics traditionally associated with certain production centers or actually excavated at particular sites has led scholars to postulate certain petrofabric types that can be used to identify the fritware of an entire dynasty and state (Mason and Keall 1988, 1991: 63–64).

The argument for centralized production centers developed for medieval Iran has been applied to medieval Syria by Porter and Watson (1987) based on the study of groups of archaeologically unprovenienced ceramics. In this study, an as-yet-unidentified Syrian site is said to have produced early fritwares of various kinds, including lusterware. These wares are referred to by the conventional name of "Tell Minis" wares. The observable variations in quality of fabric, glaze, and decoration of these wares led the authors to posit not multiple centers of production, but rather "different levels of cost in the finished product" (Porter and Watson 1987: 189). Elsewhere, they attribute differences in quality of decoration to the same notion of production of varying quality for varying market sectors:

> All the pieces, whether of simple or more considered designs, share similar shapes and material and have the appearance of being from a single kiln, or a closely related group of kilns, which produced wares at different levels of sophistication. (Porter and Watson 1987: 182)

At the same time, the authors refer to "a small, idiosyncratic kiln" (Porter and Watson 1987: 188) and a provincial kiln that produced lustered vessels that were ". . . probably the sad attempts at a sophisticated decoration by a kiln that mostly produced rather coarse frit wares" (Porter and Watson 1987: 188) in order to explain the variation in these ceramics.

Petrographic analysis seems to support the argument for centralized production despite qualitative variation. Thin sections of several sherds of "Tell Minis" ware as well as "Raqqa" type ceramics have yielded "petrographically cohesive" types of both "wares" (Mason 1995).

In contrast to the models of centralized production outlined above, we offer an alternative hypothesis based on the Gritille sample: the wide varieties in fabric density, color, and composition as well as in quality of design execution and lustering and variety of decorative techniques and colors used in Syrian glazed fritwares result from decentralized, regional ceramic production. It applies to the period of medieval occupation at Gritille (mid-12th to the mid-13th centuries).

Our objection to the notion of the massive dissemination of glazed fritware ceramics by land in Iran extends to Syria. It is true that Raqqa, Samsat, and other sites lie on the Euphrates River, and medieval geographers mention rafts of inflated animal skins for river commerce, but these references are few compared to detailed land itineraries for regions of northern Syria and the Jazira near the river. No doubt there was some commerce using the river, but the relative weight of the sources indicates that it must have been minor compared to the caravan trade.

Williamson (1987: 19–20) employed the results of an archaeological survey to discuss the ubiquity of regional pottery production centers in early Islamic Iran. He referred to luster as one technique that would have been impossible to produce regionally because of technical difficulty and cost. This explanation may be true for the early Islamic period, during which luster was often polychrome, but the monochrome lusters of medieval Iran cannot have been as difficult to produce. Another analysis concluded that the SW Iranian site of Susa, although close to major centers of luxury ceramic production in medieval Iraq, had its own ceramic production, including luster (Kervran 1977: 91). Regional production at Susa was based on the quality of the fabric as well as the decoration of glazed ceramics found frequently there.

Williamson's comments on regional Iranian glazed ceramics and their imitation of finer polychrome wares bear directly on the situation in Syria from approximately the mid-12th to late 13th centuries. As many authors have noted (e.g., Philon 1980: 180), Syrian glazed fritwares sometimes derive their decoration and shape from Fatimid Egypt, sometimes from Iran. Just as striking as these external influences, however, is the wide qualitative variation among Syrian vessels. The thick bodies and glazes and slap-dash decoration of green lustered manganese glazed vessels discussed by Porter and Watson (1987) were found in large quantities at Samsat and Gritille (see Öney 1982: fig. 27-3, 1994: 293–294; Redford 1986: 119, fig. 15 for more complete examples). Lusterware constituted 29% of the total excavated glazed ceramics at Samsat (Öney 1982: 75) and over 26% of the fritwares at Gritille (113 of 411 sherds [Redford 1989: 214, 216]), but these are almost exclusively restricted to three glaze colors—turquoise, clear, and manganese purple.

For sites as distant as Gritille and Samsat from a hypothetical centralized production site in central Syria, it is difficult to accept the long-distance transport of these industrial products. If previous petrographic analyses suggest centralized manufacture, it may be that the small number of samples examined in those studies does not warrant the sweeping conclusions about Islamic ceramic production drawn from it. Mason and Keall (1990: 166) assert that

> [t]he products of an Islamic kiln site tend to be very uniform in their petrographic fabric (petrofabric), so that usually two samples are adequate to define a fabric.

Underlying the assumption of uniform petrofabric is uniform access to the same raw materials by workshops, and by extension long-term production there.

Since lusterware is a component of both the proposed "Tell Minis" ware production and the ceramic sample from Gritille, in order to accept decentralized production one has to discard many of the "exclusive" and "elite" attributes lusterware has garnered as a technique. We do not claim that there was no specialized quality production of luster and other fine ceramics in medieval Syria; rather, our theory assumes the presence of high quality potteries, presumably but not necessarily located near centers of consumption. We do believe that this production arrangement was imitated by provincial kilns, which were in turn imitated by even more geographically remote kilns in places like Samsat. It may be that the expense often associated with luster was not excessive, either in terms of special kiln construction or fuel. One medieval Islamic luster kiln found in Spain was small in size and differed in design from other kilns only in the size and construction of its flue (Rhodes 1981: 60–61). Rhodes (1981: 60–61, fig. 56) asserts that a luster kiln needs only to be fired at peak temperature for one half hour before the heat may be reduced to a modest flame.

If we assume that luster production was not excessively difficult or expensive, our potters still required the formula and materials for the proper metallic salts to form the luster. It is not only the slap-dash decoration of our candidates for Syrian provincial production that attracts attention, but also the quality of the luster itself. As noted below, on many of the sherds sampled, the luster is, simply put, not lustrous.

While lusterware has not been considered to have been manufactured in many places, the widespread production of fritware in the 12th and 13th centuries is not in question. Adams has noted basic characteristics of the middle Islamic period (10th–13th centuries) on the Euphrates plain in central Iraq that parallel notions of decentralized production of both fritwares and glazed earthenwares, with the introduction of underglaze painted black and turquoise fritware and fritware bowls covered with a manganese glaze as being new in this period in Iraq (Adams 1981: 241). These conclusions, derived from survey data, are temporally broad, but they parallel the conclusions reached by excavators of Hama, a major city in central Syria, whose medieval deposits were so riddled with intrusions that a strict ceramic chronology could not be developed. The excavators proposed several pottery production centers for early fritware found at Hama, with an efflorescence at the end of the 12th century (Riis and Poulsen 1957: 136).

Porter (1981: 10) notes medieval sources mentioning potteries at two small settlements in Syria. To these, and as yet unpublished French work on medieval kilns from Balis in northern Syria, we can add two small sites: Tell Hrim on the Euphrates in northern Syria, where evidence of glazed ceramic production was found (Berthier and Geyer 1988); and the medieval reoccupation of Qasr al-Hayr East, where wasters of blue-green glazed pottery and kiln furniture were recovered (Grabar et al. 1978: 127). As far south as southern Israel, glazed fritwares associated with 13th-century Syria were found on the smallest medieval sites in the region (Pringle 1985: 174).

Archaeological Context

Until its recent flooding by the waters of the Atatürk Dam in SE Turkey, Gritille was a small mound located on the right bank of the Euphrates River soon after it emerged from the Anatolian highlands (FIG. 1). It was situated 8 km upstream from Samsat, the principal site in the region and one that guarded the major river crossing on the route from northern Syria to the eastern Anatolian plateau. The Samsat region was peripheral to both Anatolia proper and Syria, although historically it participated more in the history of northern Syria and the Jazira (northern Mesopotamia). Gritille itself was peripheral to Samsat and served to guard a minor river crossing at the upper end of the valley that was Samsat's hinterland.

Four seasons of excavations at Gritille on the 1980s, directed by Richard Ellis of Bryn Mawr College, have revealed up to 4.5 m of medieval deposits. The mound was first occupied in the mid-11th century, when a towered perimeter wall enclosed the settlement. The site was soon abandoned and then reoccupied and rebuilt about a century later. This occupation, also a fortified settlement, ended in a conflagration and was itself followed by a brief reoccupation; these events can be associated by coin finds with the fall of the Crusader Count of Edessa, whose capital, present-day Urfa, fell in 1144. Samsat itself was not captured from the crusaders by the Artuqid Turks until 1150.

From the mid-12th through the mid-13th century Gritille was under Islamic rule and served as a rural agricultural settlement with primarily domestic architecture (Ellis and Voigt 1982; Redford 1986). Early in this sequence, the the settlement moved almost entirely to the flanks of the mound, while the top of the site was used for industrial activity. Settlement later returned to the mound at a time when control of the region was passing from the Artuqid dynasty to the Ayyubids, an Islamic dynasty centered in Syria and Egypt. Coin finds date the abandonment of medieval Gritille to before the middle of the 13th century.

The fritware sample from Gritille was taken from all parts of the excavations on the mound and from all levels. Since most of the excavations sampled the latter part of the stratigraphic sequence, most of the samples analyzed here date from the period of occupation between the mid-12th and the mid-13th century.

Chemical Analysis

Our study correlates categories (derived mainly from decorative technique) of Islamic glazed fritwares with chemical composition. A random subset of 168 sherds (of a total of 411) from later medieval levels at Gritille was chemically analyzed using instrumental neutron activation analysis (INAA). The sample of fritware from Gritille includes examples from all parts of excavation on the mound and all levels. Initially, analysis yielded an unexpected result: of the 168 glazed sherds, 37 were found not to be fritwares at all, but instead were from vessel bodies of calcareous clay. This result points to the continuity of previous techniques of ceramic manufacture even after the introduction of artificial paste bodies to the Near East sometime in the 12th century (Blackman and Redford 1994).

The fritware sample, now reduced to 131 sherds, consisted almost exclusively of open form vessels. Most vessels were covered with either manganese purple or turquoise glaze, but clear glazed vessels were also found. The most common decorative technique was luster of a green color. The variability of luster finish is something observed occasionally on whole vessels of even fine Iranian luster vessels. It is not clear whether these sherds truly are lacking luster or are simply lackluster.

The sherds sampled were small and sometimes not well preserved. At times, the decoration, while overglaze painted in the same colors and style as lustered vessels, did not exhibit the shiny finish normally associated with luster. This may be due to factors of preservation or to incomplete oxidation during firing. Dullness of decorative finish was found most often on turquoise glazed sherds with green luster decoration.

The selected sherds were drilled with a tungsten carbide bit and approximately 200 mg were extracted and dried; 100 mg subsamples were taken for analysis. Analysis at the Smithsonian Institution Conservation Analytical Laboratory's INAA facility used the National Institute of Standards and Technology's 20 megawatt research reactor. The analytical protocol was similar to that described by Blackman (1984), but the lower concentrations of most of the elements in the fritware required an increase in the g-ray scheme to include three counts. Samples and standards were counted for one hour beginning six days after irradiation. The second count was for two hours starting twelve days after irradiation, and the final count for two hours beginning thirty days after the end of the irradiation. This protocol quantified 26 elements.

The chemical data from the 131 fritware sherds were first processed with the hierarchical aggregative clustering program AGCLUS using a nearest neighbor clustering algorithm on a mean Euclidean distance matrix based on the elements listed in Table 1. Cluster analysis divided the sample into 9 groups, with 16 samples remaining unassigned (FIG. 2).

Of the 16 outliers, two—GT 6 and 13—are characterized by very high sodium (about 2.5%), very low calcium (below 1%), and low iron (0.23% in both samples); based on glaze, shape, and decorative technique, they may be Iranian imports. Another outlier, GT 151, is characterized by high calcium (6.5%), high iron (about 2%), and

Table 1. Means and coefficients of variation for the 9 chemical groups of fritware.

Frit group	*Na* %	*K* %	*Ca* %	*Fe* %	*Sc* ppm	*Cr* ppm	*Rb* ppm	*Cs* ppm	*La* ppm	*Ce* ppm	*Eu* ppm	*Yb* ppm	*Lu* ppm	*Hf* ppm	*Ta* ppm	*Th* ppm
Group 1	1.44	0.764	2.89	0.966	3.52	74.5	15.8	0.705	5.49	10.4	0.244	0.826	0.123	0.894	0.163	1.36
% 1s	18.0	20.9	19.6	8.6	6.8	14.1	19.0	9.5	4.5	6.3	6.9	14.1	13.8	11.5	23.1	9.6
Group 2	1.62	0.684	3.02	0.832	2.97	64.5	12.3	0.541	4.67	9.03	0.214	0.751	0.124	0.830	0.155	1.18
% 1s	14.4	19.8	17.1	5.7	8.2	10.4	14.6	12.3	5.5	6.9	5.7	10.9	12.9	6.6	19.9	8.4
Group 3	1.77	0.728	2.95	1.04	3.62	91.2	15.1	0.635	5.24	9.37	0.222	0.525	0.081	0.763	0.181	1.42
% 1s	14.9	24.0	20.3	6.8	6.9	12.4	18.5	13.1	8.2	7.4	7.1	12.8	9.5	10.1	27.7	11.2
Group 4	1.57	0.672	2.33	0.886	3.07	73.6	12.6	0.638	4.36	7.71	0.191	0.479	0.078	0.584	0.119	1.17
% 1s	19.8	14.0	16.3	4.2	3.5	9.7	10.4	21.2	6.5	3.9	8.2	16.5	11.6	8.5	18.3	6.6
Group 9	1.67	0.715	3.37	0.980	3.58	80.2	12.9	0.367	5.29	9.54	0.222	0.620	0.100	0.729	0.157	1.51
% 1s	15.3	16.1	10.4	3.6	1.2	11.5	11.2	19.3	4.3	6.5	3.4	13.0	18.2	19.3	50.1	12.9
Group 5	1.60	0.645	3.04	0.976	3.39	24.6	13.2	0.620	4.29	8.92	0.200	0.499	0.081	0.744	0.170	1.34
% 1s	12.0	12.2	26.7	8.0	7.8	24.8	15.2	15.7	9.4	8.5	9.5	16.1	7.4	16.4	14.1	12.8
Group 6	1.47	0.655	1.47	0.490	2.08	30.3	10.8	0.395	3.70	7.95	0.200	0.877	0.138	0.978	0.126	0.79
% 1s	8.4	27.8	16.8	12.4	7.6	15.4	16.7	14.4	8.6	10.2	6.7	7.2	10.4	14.4	23.8	11.7
Group 7	1.55	0.580	2.05	0.669	2.51	44.8	11.4	0.511	4.05	7.98	0.191	0.817	0.131	0.839	0.137	0.97
% 1s	15.0	29.2	15.6	9.1	7.3	18.1	13.6	17.4	9.6	8.6	14.9	13.1	11.2	13.7	28.6	12.0
Group 8	1.58	0.510	1.06	0.335	1.65	15.7	6.8	0.290	2.94	6.75	0.177	0.838	0.133	0.913	0.121	0.58
% 1s	13.1	8.9	19.4	14.3	10.8	24.8	10.8	18.6	7.4	9.0	14.5	7.4	10.4	5.0	33.6	14.7

low sodium (under 0.7%). Sample GT 151 is not by strict definition a fritware, and will be discussed later in this paper.

The remaining 128 samples exhibit very similar sodium compositions with a mean of 1.60% and coefficient of variation of 15.3%. Two other major constituents, calcium and iron, however, exhibit much higher coefficients of variation, 37% and 32% respectively. The consistency of the sodium content seems to indicate that a reasonably standard recipe for the admixture of alkali glass frit for Syrian production was being followed. The greater variability in the other major, minor, and trace elements indicates multiple geological sources for the other two raw materials, quartz and clay.

The validity of the groups formed in the cluster analysis was tested using Mahalanobis distance calculation and Hotelling's T^2 statistic to calculate probability of group membership. With minor reassignment, the groups initially formed by cluster analysis were statistically validated by these tests.

In order for Mahalanobis distance calcuations to give valid results, the number of samples should exceed the number of variables (here, mineral elements) by at least 3:1. Given this stricture, Groups 4, 5, and 9 contained too few samples to be rigorously tested. The validity of these three groups is, however, inferred by the low probability of any individual member of Groups 4, 5, or 9 belonging to any of the six larger groups.

Groups 1, 2, 3, 4, and 9 are closely linked in the cluster analysis (FIG. 2). When tested against each other using the same statistical analysis, however, Groups 1, 2, and 3 were readily distinguished. No sample in Groups 1 and 2 had a probability of membership in Group 3 of >2%, while Groups 1 and 2 were distinct at the 90% confidence level. Principal components analysis confirms this finding. The plot of the first and sixth principal components (FIG. 3) shows clear separation of Group 3 from Groups 1 and 2, having only minor overlap at the 90% confidence interval. Similar testing of Groups 6, 7, and 8 produced the same results. Group 8 is readily distinguished from Groups 6 and 7 at the 95% confidence level. The plot of principal components 1 and 4, (FIG. 4) shows the distinctiveness of Group 8 from 6 and 7, and the separation with only slight overlap of Groups 6 and 7 at the 90% confidence level. Group 5, as in the cluster diagram, is easily distinguishable from all other groups. The means and coefficients of variation of selected elements for the 9 groups are presented in Figure 5.

Groups 1, 2, 3, and 4 have similar but distinguishable chemical compositions while having relatively low chromium contents of under 100 parts per million. Relative to the other groups, they have higher percentages of iron, averaging around 1%. Groups 1–4 also have a relatively high calcium content of about 3%. Group 5 is readily separated from all other groups by its high chromium content, an average of 246 ppm. Iron content averages around 1% and calcium of about 3% in Group 5.

Groups 6, 7, and 8 have lower concentrations of all the trace elements and also the major constituents calcium and iron than are the other groups. Group 7 has the highest concentrations of calcium, iron, and chromium of the three groups and Group 8 has the lowest; Group 6 is

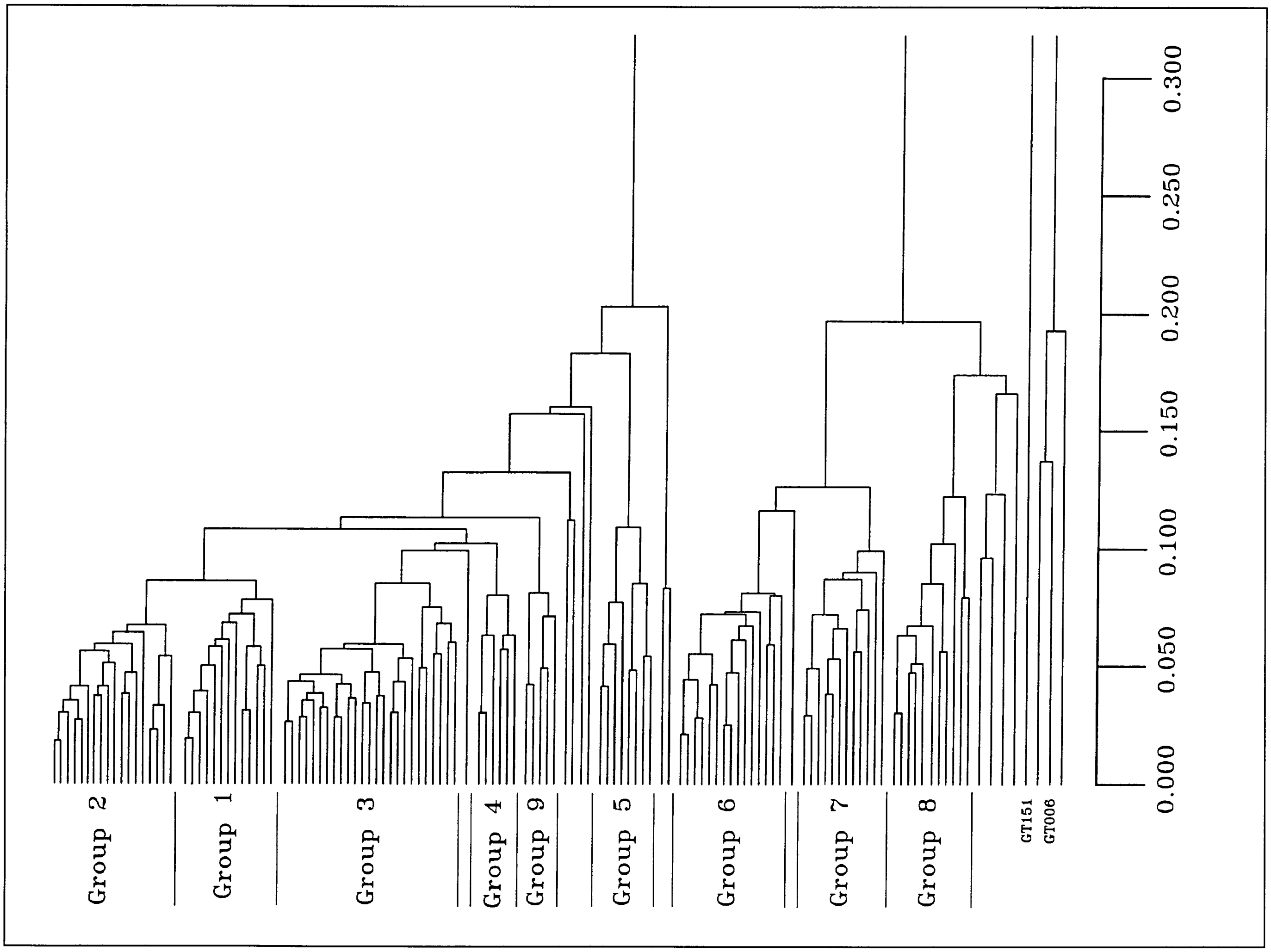


Figure 2. Cluster dendrogram of Gritille fritware using Ca, Sc, Cr, Fe, Cs, Ce, La, Eu, Yb, Hf, and Th.

intermediate. Group 8 has approximately 1% calcium, 16 ppm chromium, and 0.3% iron. These groups appear to be made of higher purity starting materials than Groups 1–4.

In a previous article (Blackman and Redford 1994) we examined a sample of glazed calcareous clay ceramics from Gritille. Binary plots of a number of elements show correlations between the clay in calcareous clay ceramic Group 1 and fritware Groups 1, 2, and 3 of the present study (FIG. 5).

This figure shows one such plot of the rare earth elements lanthanum and ytterbium, demonstrating the relationship between fritware Group 3 and calcareous clay earthenware Group 1, with fritware Groups 1 and 2 falling off the regression line. Intermediate between these two groups is GT sample 151, a turquoise glazed lamp base which appears to be a hybrid, a semi-frit.

When the data for fritware Group 3 are fitted to the mean concentration of scandium in calcareous clay earthenware group 1, all elements but one fall within the 95% confidence interval for the calcareous clay group. The one exception not explicable by the addition of sodium and potassium from the alkali glass to the frits is chromium, which is at a higher level in the earthenwares than in the fitted fritwares. This could be explained by the presence of chromite or another chrome-rich material in an aplastic temper added to the calcareous clay earthenwares. This possibility is currently being investigated through thin section analysis.

These data support the conclusion that the clays used to produce calcareous clay Group 1 and fritware Group 3 are the same. GT 151, a lamp base mentioned earlier, lends this hypothesis further credence. The position of GT 151

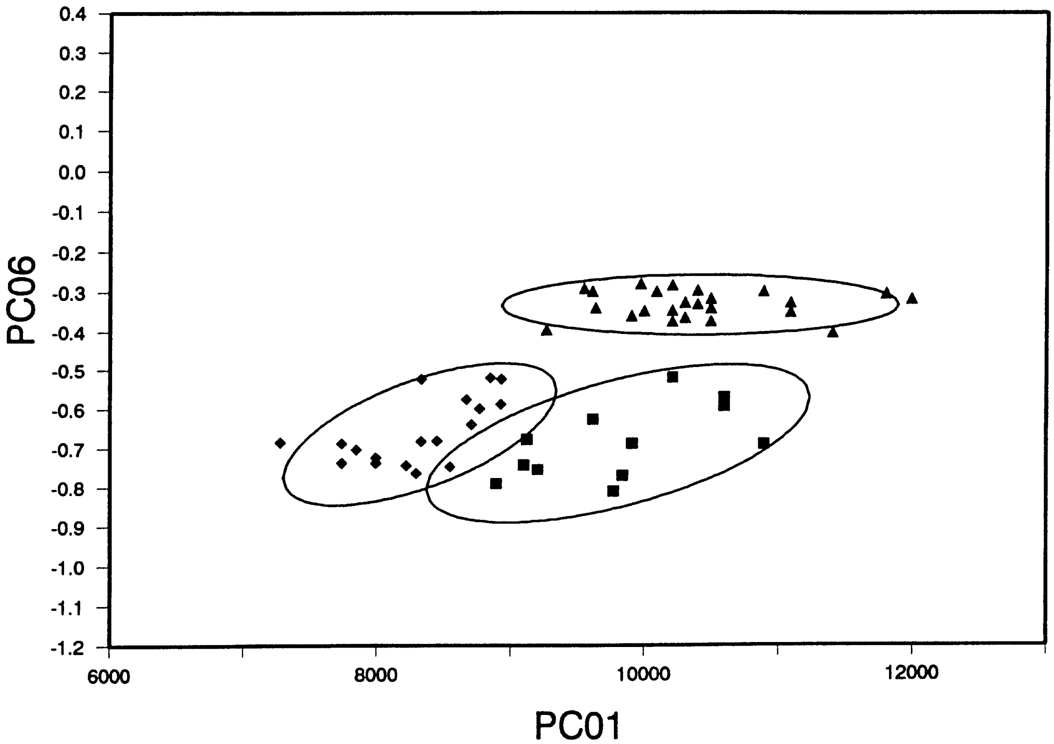
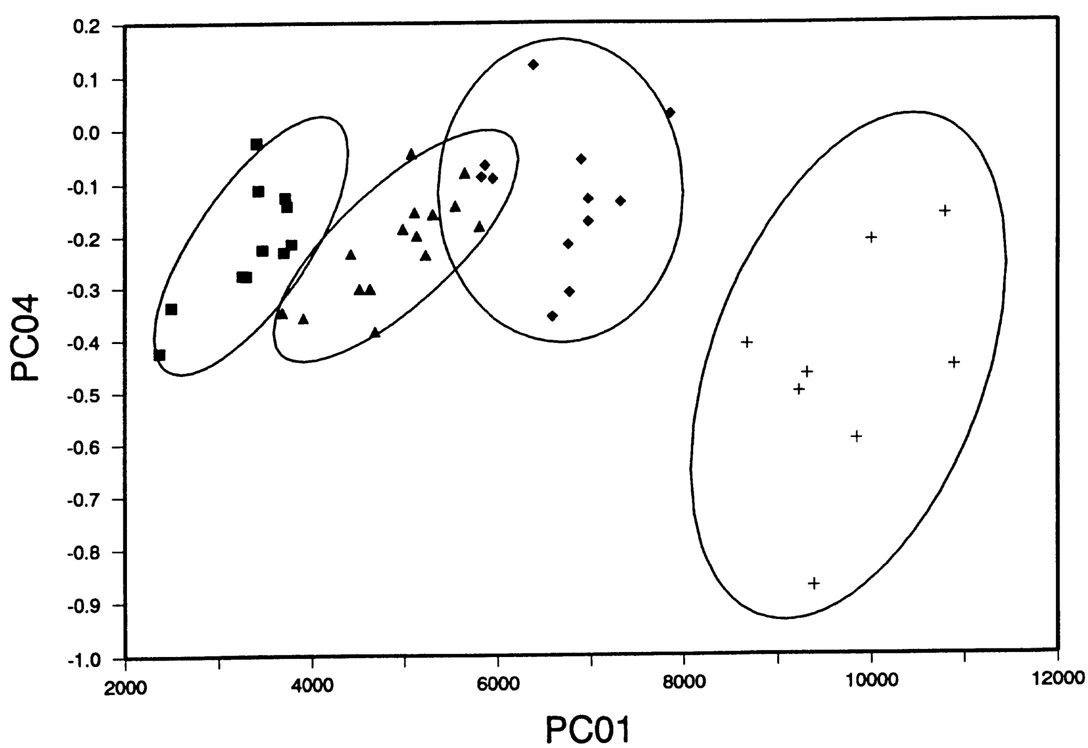


Figure 3. Plot of principal components 1 and 6 showing differentiation among frit group 1 (solid squares), group 2 (solid diamonds), and group 3 (solid triangles). Ellipses represent the 90% confidence intervals.

Figure 4. Plot of principal components 1 and 4 showing differentiation among frit group 5 (solid squares), group 7 (solid diamonds), group 6 (solid triangles), and group 5 (crosses). Ellipses represent the 90% confidence intervals.



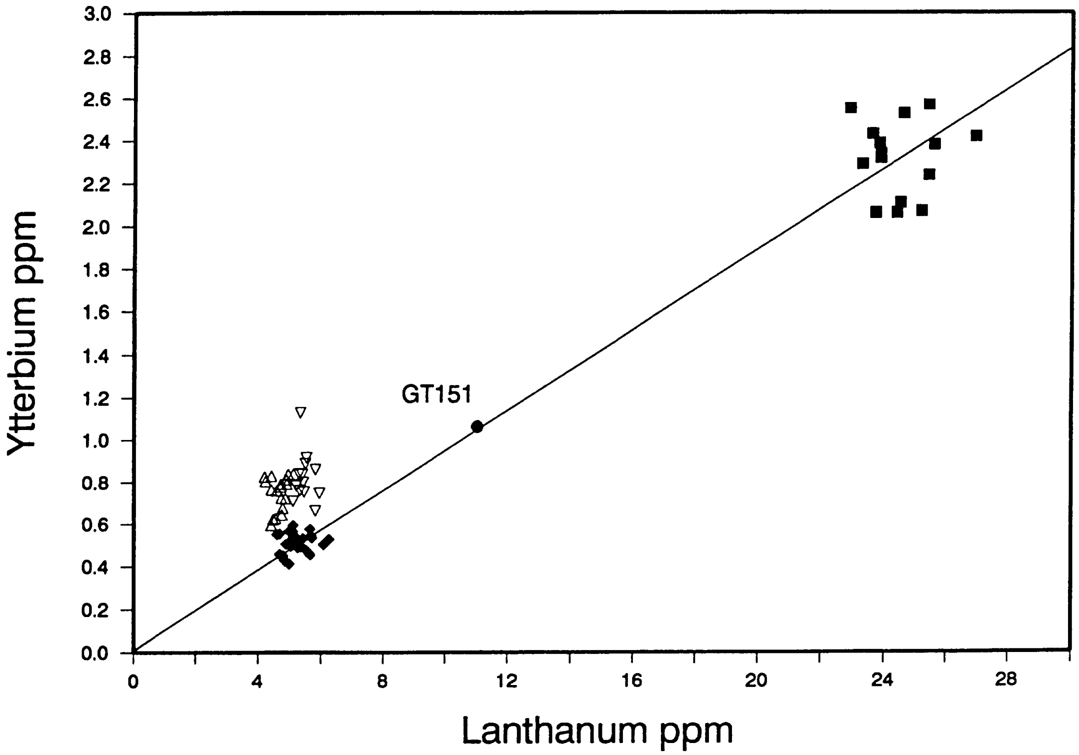


Figure 5. Plot of the rare earth elements lanthanum and ytterbium showing the relationship between glazed calcareous earthenware (solid squares), frit group 3 (solid diamonds), and lamp base (GT 151). Open symbols are frit groups 1 (open up triangles) and 2 (open down triangles).

between these two groups and squarely on the regression line strongly suggests that the same clay was used here, too, but in a different proportion. It is difficult to know whether to describe GT 151 as a heavily tempered calcareous earthenware or a fritware with a very high clay content. It is possible that the high percentage of clay in this vessel results from the need for more plasticity in executing the form of an oil lamp with a reservoir, spout, base, and rim.

GT 151 does suggest a continuum of source material between calcareous clay and fritware vessels. This continuum is not only one of materials and types but also one of production. With these samples ranging from almost the entire medieval sequence of about a century at Gritille, we suggest a constant manufactory near the site that produced vessels using sources of clay that remained constant for the different wares. The production of fritware and earthenware at the same spot seems a natural conclusion.

Visual Description of Chemical Group Members

Table 2 lists the sampled sherds in terms of sample number, excavation number, interior and exterior glaze, and decoration.

With the exception of GT 6, all of the sherds sampled were of types traditionally associated with Syria in the 12th and 13th centuries. The vast majority of sherds in all groups as well as the outliers was turquoise and manganese glazed. Green luster decoration on manganese and/or turquoise glaze was also found in all groups. In the larger groups, small numbers of underglaze painted (Group 3), moulded (Groups 1, 2, 3, and 7), and brown lustered sherds (Groups 2 and 3), were found. Likewise, rim shapes were not limited to one group.

In the excavations at Gritille, turquoise and manganese glazed fritwares were found in all medieval levels with the exception of the first, which was explored in only limited areas. Turquoise glazed fritwares constituted 50% of the total, and manganese glazed sherds 30% (Redford 1989: 188). Green luster on manganese glaze sherds (32% of total lusterwares) were found in all levels save the uppermost at Gritille. In contrast to this constancy, green luster on clear glaze (37% of total lusterwares) and green luster on turquoise glaze (25% of total lusterwares) were found with one exception in the later levels at Gritille (Redford 1989: 188–190). This is not to say that these wares were abundant. Glazed sherds are estimated to have formed well under 5% of the total ceramic assemblage from medieval levels at Gritille, and fritwares formed over half of these.

Table 2. The Gritille fritware sample listed by chemical compositional groups

GT #	*Excavation #*	*Int. glaze*	*Ext. glaze*	*Decoration*
Group 1				
22	5720	mang.	mang.	green luster
35	5720	mang.	mang.	–
48	1457	clear	turq.	moulded panels
59	1960	clear	turq.	moulded panels
69	5720	mang.	mang.	–
70	5720	mang.	mang.	–
73	9173	mang.	mang.	–
74	5720	mang.	mang.	–
84	5723	mang.	–	–
103	1927	turq.	turq.	green luster
106	7887	turq.	turq.	green luster
111	7105	clear	turq.	–
132	1457	turq.	–	green luster
Group 2				
1	15600	clear	clear	–
2	5742	turq.	turq.	green luster
10	6208	clear	clear	green luster
15	16257	clear	clear	green luster
50	16100	clear	turq.	moulded panels
58	–	mang.	–	green luster
78	6233	mang.	mang.	–
79	6233	mang.	mang.	–
80	1671	mang.	mang.	green luster
94	7159	mang.	mang.	green luster
97	7159	mang.	mang.	–
98	7159	mang.	mang.	green luster
112	6205	turq.	turq.	green luster
125	6717	b. green	b. green	–
140	8716	clear	clear	brown luster
142	5961	clear	clear	brown luster
155	18578	turq.	turq.	–
156	8103	turq.	turq.	–
Group 3				
29	15715	turq.	turq.	moulded panels
33	901	mang.	–	–
37	5193	turq.	turq.	–
47	4976	turq.	turq.	green luster
51	1960	clear	turq.	moulded panels
54	2325	mang.	mang.	green luster
55	17683	mang.	mang.	green luster
56	6724	mang.	mang.	green luster
57	1795	mang.	mang.	green luster
89	1960	mang.	–	green luster
96	1969	mang.	mang.	green luster
105	1444	turq.	turq.	green luster
108	1842	turq.	–	–
109	1041	turq.	–	–
119	1960	turq.	turq.	–
121	700	turq.	turq.	–
122	1041	turq.	turq.	moulded panels
123	975	turq.	turq.	green luster
127	528	turq.	turq.	underglaze ptd. black
133	2401	clear	clear	underglaze ptd. cobalt
141	5961	clear	clear	brown luster
159	5894	turq.	turq.	–
160	1026	turq.	turq.	–
164	5260	turq.	turq.	–
167	15209	turq.	turq.	–

Table 2. (cont.)

GT #	Excavation #	Int. glaze	Ext. glaze	Decoration
Group 4				
7	5179	clear	clear	br. lust. undrptd cobalt
16	16100	clear	clear	green luster
19	2501	clear	–	brown luster
24	6331	clear	clear	underglaze ptd. cobalt
28	2660	turq.	turq.	green luster
128	4121	turq.	turq.	underglaze ptd. black
Group 5				
23	1259	turq.	turq.	underglaze ptd. black
25	692	turq.	turq.	underglaze ptd. black
46	645	turq.	turq.	–
49	692	turq.	–	underglaze ptd. black
107	1041	turq.	turq.	–
129	691	turq.	turq.	underglaze ptd. black
131	1041	clear	clear	underglaze ptd. black, cob.
135	221	clear	clear	underglaze ptd. black, cob.
Group 6				
4	1977	clear	clear	–
11	16728	clear	–	–
14	2221	clear	clear	–
27	5739	turq.	turq.	green luster
31	6241	turq.	–	–
44	7170	turq.	turq.	–
64	5961	mang.	mang.	–
66	7882	turq.	–	–
76	7882	turq.	turq.	green luster
83	969	mang.	mang.	–
90	8711	mang.	mang.	green luster
157	17654	b. green	b. green	–
161	18241	b. green	b. green	–
163	17658	turq.	turq.	–
166	6211	turq.	turq.	–
Group 7				
9	6717	clear	clear	–
32	16257	mang.	mang.	moulded panels
60	2517	mang.	mang.	green luster
62	1476	mang.	mang.	–
67	9173	turq.	turq.	–
95	6717	mang.	mang.	green luster
118	1671	clear	turq.	–
120	7159	turq.	turq.	–
126	8718	turq.	turq.	–
134	6343	clear	turq.	green luster
162	17680	turq.	turq.	–
165	8103	turq.	turq.	–
Group 8				
8	18233	clear	clear	–
12	18233	clear	clear	–
20	16097	clear	clear	green luster
21	77	clear	clear	green luster
26	17027	clear	turq.	green luster
30	16716	clear	–	–
36	16070	mang.	mang.	green luster
52	2321	mang.	mang.	–
72	8119	mang.	mang.	–
81	2301	mang.	mang.	–
88	2481	mang.	mang.	–

Table 2. (cont.)

GT #	*Excavation #*	*Int. glaze*	*Ext. glaze*	*Decoration*
Group 9				
61	18836	mang.	mang.	green luster
77	1671	mang.	mang.	–
85	1046	turq.	turq.	green luster
87	7876	mang.	mang.	–
136	18654	turq.	turq.	green luster
Outlying Samples				
6	2443	clear	clear	moulded, incised
13	18892	clear	clear	–
17	–	clear	clear	green luster
18	15963	clear	clear	green luster
41	8808	turq.	turq.	–
53	5716	mang.	mang.	green luster
63	7115	clear	turq.	–
82	1671	mang.	mang.	–
91	7159	mang.	mang.	green luster
93	7105	mang.	mang.	–
99	7159	mang.	mang.	–
130	4976	turq.	turq.	green luster
138	7159	clear	clear	green luster
139	1969	clear	clear	green luster
151	18824	turq.	turq.	–
158	8711	turq.	turq.	–
168	18838	turq.	turq.	–

If almost all decorative categories were found in almost all chemical groups, what, if anything, separates these groups visually? First, fabric compactness and whiteness seem remarkably confined to Groups 6, 7, and 8, while the softer bodied wares are found in Groups 1, 2, 3, 4, and 9. Groups 6, 7, and 8, in keeping with their finer fabrics, have far larger numbers of clear glazed sherds, lustered and unlustered, than Groups 1, 2, and 3.

Underglaze painted ceramics also seem to be associated with certain groups, especially Group 5, but also Group 4. Underglaze painted sherds are also found in Group 3, but are entirely absent from both Groups 6, 7, and 8 and all outlying samples. A certain specialization of production of underglaze painted ceramics is implied by their association with smaller groups and their limited presence at the site.

Even with these exceptions, the dominant impression of the Gritille sample is one of a shared repertoire of glazes, shapes, and decorative techniques across both the stratigraphic sequence as well as the chemical groups outlined above. Two findings deserve emphasis. First, lustered fritware sherds and monochrome glazed fritware sherds are found together in groups of similar chemical composition. Second, the shared repertoire of color, shape, and decorative techniques found at Gritille was an extremely limited one when compared to medieval Syrian fritware production as a whole.

Conclusions

In order for a hypothesis of centralized production of monochrome glaze fritwares and lustered fritwares to fit the Gritille chemical groups, we could say that Groups 6, 7, and 8 represent a finer production, while Groups 1, 2, and 3 represent the production of coarser wares at the same site. If this were true, then during the decades-long production life of these wares, different sources of raw materials must have been used consistently for the production of similar, but different, wares at the same site. This switching of raw materials would not have taken place over time as one source was exhausted and others exploited, but would have taken place concurrently. Also, even the finer end of production represented in Groups 6, 7, and 8 does not approach the diversity of shape and decorative technique found in medieval Syrian ceramic production.

But should we view the same chemical compositional groups as the products of different regional workshops, it is easier to explain the consistent presence of these groups over a decades-long sequence. Group 3, with its composition linked through GT 151 to calcareous clay Group 1, implies that raw materials were used for both the lower quality fritwares and for calcareous clay ceramics that share the same shapes, glazes, and chronological distribution as certain fritwares. The archaeological and historical records, though spotty, support this argument for small-scale production in regional workshops. They do not support the massing of materials, labor, and kilns necessary for exclusive centralized ceramic production.

Given the size of the sample analyzed, and all from a single site, we cannot possibly propose how many centers of production there may have been. It is entirely possible, even probable, that regional, small-scale potteries switched sources of raw materials during an extended production life. Nevertheless, the nine main compositional groups at Gritille, taken together with the numerous outliers, imply that there were many, and provincial, production centers in medieval Syria.

The Near East was not particularly prosperous during this period. Internecine warfare amongst petty dynastic rivals marked the history of Syria in the late 11th century (Gibb 1933–1935). The 12th century was marked by the increased consolidation of power in Syria culminating in the reign of Saladin from 1171 to 1193, but it was a century of almost continuous warfare centering around the Crusader states established in the Levant as much as a century earlier. This military burden must have been a severe strain on the Syrian polity living in what were, effectively, the front lines. These stressful conditions persisted during the reign of the Zengids and the dynasty founded by Saladin, the Ayyubids. Only the subsequent first half of the 13th century, with its long periods of peaceful coexistence between Crusaders and Ayyubids and the expansion of the Seljuk state in Anatolia, can be viewed as prosperous.

If marked prosperity cannot be invoked to explain the rise and spread of glazed fritwares wares during this period, we propose that only the "top end" of this production can really be considered to be a luxury ware in the sense that it was a limited production of high quality materials and workmanship. Despite the fact that glazed ceramics generally constitute a very small percentage of the total assemblage at all medieval sites, the consistent recovery of small numbers of sherds of luster and glazed fritwares from a small rural site like Gritille shows that while fritware was a luxury in the statistical sense, it was such to the lowest levels of medieval Islamic society. During this period some local production center turned out glazed calcareous clay and fritware vessels, making them available and affordable to the rural populace of this remote region. For Gritille, that center must have been Samsat, the nearby commercial and administrative center. Excavations in medieval levels at Samsat have uncovered kiln furniture, wasters, and unfinished pottery (Bulut 1991: 285), but only further publication of these discoveries will reveal whether or not these included frit and lusterwares.

In closing, we would like to propose another correlation between the historical and archaeological records. This concerns the decentralization of administration in 12th- and 13th-century Syria. Here as elsewhere in the Islamic world, there existed an appanage system, in which extensive land holdings, Arabic *iqta*, were granted to princes and the chief amirs of the state by the ruling sultan. In return for rights of revenue collection from these lands, their holders had to furnish levies of troops (Humphreys 1973: 371–380). Under both the Zengids and the Ayyubids, some of these iqta were quasi-hereditary fiefs, including major Syrian cities of the second rank like Hama and Homs, as well as smaller towns like Shayzar and others. While not all iqta holders resided in their territories, and the head of state could intervene at any time to depose these local rulers, the necessity of raising and maintaining a strong army and keeping key cities well defended resulted in long stretches of quasi-independent rule at many Syrian cities and towns.

This decentralization of administration paralleled medieval Syrian geopolitics during a time when Syria was seldom united. A continuous rivalry between Damascus to the south and Aleppo to the north made for shifting allegiances among cities and towns and rendered economies uncertain in the provinces. In short, with multiple centers of power, administration, and population, the presence of multiple centers of pottery production should not surprise us. While the larger urban centers may have set standards of taste, there was ample opportunity for the fine wares of the center to be imitated for local markets in the provinces. These local markets could have included the court of the local ruling prince or governor. But the prevalence of ceramics at all sizes of sites argues for consumption not only by petty nobility and urban bourgeoisie, but by all classes of society.

The situation is slightly different to the north of Syria, in the border regions in which Samsat lay. There the local rulers, whether governors or iqta holders, were resident in the chief fortress of the district they controlled. These march wardens had considerable autonomy, not in the least due to their distance from centers of power. At Samsat, Saladin's eldest son, al-Afdal, ruled first as an iqta holder and then as a quasi-independent princeling until his death in 1225. Excavation of his residence inside the citadel at Samsat yielded a wide variety of glazed ceramics and glass; the glass ranged from the finest gilded and enameled glass cups to undecorated forms, while the pottery ranged from Iranian imports to the most commonplace turquoise and manganese glazed bowls (Redford 1994, 1995). The presence here of lustered, moulded, underglaze painted, and monochrome fritwares suggests that these wares were produced with the full range of the medieval Near Eastern market in mind.

Analysis of the fritware sample from Gritille isolates chemical compositional groups of similarly potted and decorated fritwares. This unity points to single sites producing a wide range of techniques with a small range of glazes and shapes. At the same time, it also points to a distinct difference in quality of fabric between compositional Groups 1, 2, 3, and 4 and 6, 7, and 8. Given the size of the sherds sampled, it is not possible to identify this finer fabric with a commensurately finer decoration or quality of luster. Our study shows the need for further analysis of both archaeologically derived fritwares and more complete pieces in museums in order to understand the history and technology of this period of Islamic ceramics and the place of glazed luster and fritware in medieval Islamic society.

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