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GLAZED CALCAREOUS CLAY CERAMICS FROM GRITILLE, TURKEY

The twelfth and thirteenth centuries constitute a high point in the history of Islamic ceramics, with finely potted and decorated fritwares produced in both Syria and Iran. The widespread production of fine-bodied fritwares (also known as artificial paste or stonepaste-bodied ceramics) and techniques either new (underglaze painting, ajouré, and mina'i) or refined to new heights (luster and molded wares) have focused deserved attention on these two areas. Here we will examine the production of glazed ceramics in Syria and the Jazira in the twelfth and thirteenth centuries by examining part of a sample of glazed ceramics found during excavations at the southeastern Turkish site of Gritille. Until its recent flooding by the waters of the Atatürk Dam, Gritille was a small mound on the right bank of the Euphrates River soon after it came down from the Anatolian highlands.[1] It was located some five miles upstream from Samsat, the principal site in the region, which served to guard the major river crossing on the route from Syria to the eastern Anatolian plateau, and dominated a small valley surrounding it. The Samsat region was peripheral to both Anatolia and Syria, although it had participated more in the history of north Syria and the Jazira. Gritille itself was peripheral to Samsat, in that it guarded a minor river crossing at the upper end of the valley that was Samsat's hinterland.

Gritille was first fortified in the medieval period in the mid eleventh century and soon abandoned, only to be refortified about a century later near the end of the Crusader county of Edessa.[2] Thereafter, from the mid twelfth century through the early to mid thirteenth century, Gritille served as a rural agricultural settlement with largely domestic architecture.

To examine the production of glazed ceramics, a subset of 168 sherds from medieval levels at Gritille were sampled and chemically analyzed using instrumental neutron activation analysis (INAA).[3] This study correlates visual categories of Islamic glazed fritwares (derived mainly from decorative technique) with categories of chemical composition to answer questions relating to glazed ceramic production in Syria and the Jazira in the twelfth and thirteenth centuries. The project is still in progress, but it has already yielded an unexpected result that we will present in this paper. Of the 168 glazed ceramics sampled, 37 were found not to be fritwares at all, but instead had calcareous clay bodies as determined by chemical analysis. Figure 1 contains drawings of indicator sherds (rims and bases) in the calcareous clay ceramic sample. The sherds constituting this sample were of small open form vessels. The one exception to this is a vessel (ID # GT143) whose shape and glaze indicated that it belonged to a closed form vessel. The indicator sherd drawings show these open form vessels to be small bowls with rim diameters of approximately ten centimeters. The sample contains two distinct rim shapes, a flared everted rim and a squared bead rim. Those sherds large enough to show more body shape point to carination a few centimeters below the rim. There are also two bases, one of which belongs to an oil lamp. Most of the sherds are of turquoise or blue-green glaze, with three manganese purple glazed sherds and two with turquoise glaze on the exterior and manganese on the interior.

Chemical analysis. The sherds were sampled for chemical analysis by drilling with tungsten carbide drill bits. Approximately 200 milligrams were extracted, dried, and 100 milligram subsamples taken for analysis. Analysis was conducted by INAA at the Smithsonian Institution Conservation Analytical Laboratory's INAA facility using the National Institute of Standards and Technology's 20 megawatt research reactor. The analytical protocol was similar to that described in Blackman 1984.[4] For the calcareous clay bodied ceramics 28 elements were quantifiable.

The chemical data from the 37 calcareous clay sherds were first processed with the hierarchical aggregative clustering program AGCLUS using a nearest neighbor clustering algorithm on a squared mean Euclidean distance matrix based on the elements listed in figure 2. Clustering analysis divided the sample into five groups with one outlier displayed in figure 2. Chemical groups 1 through 4 all contained calcium in excess of 10 percent.

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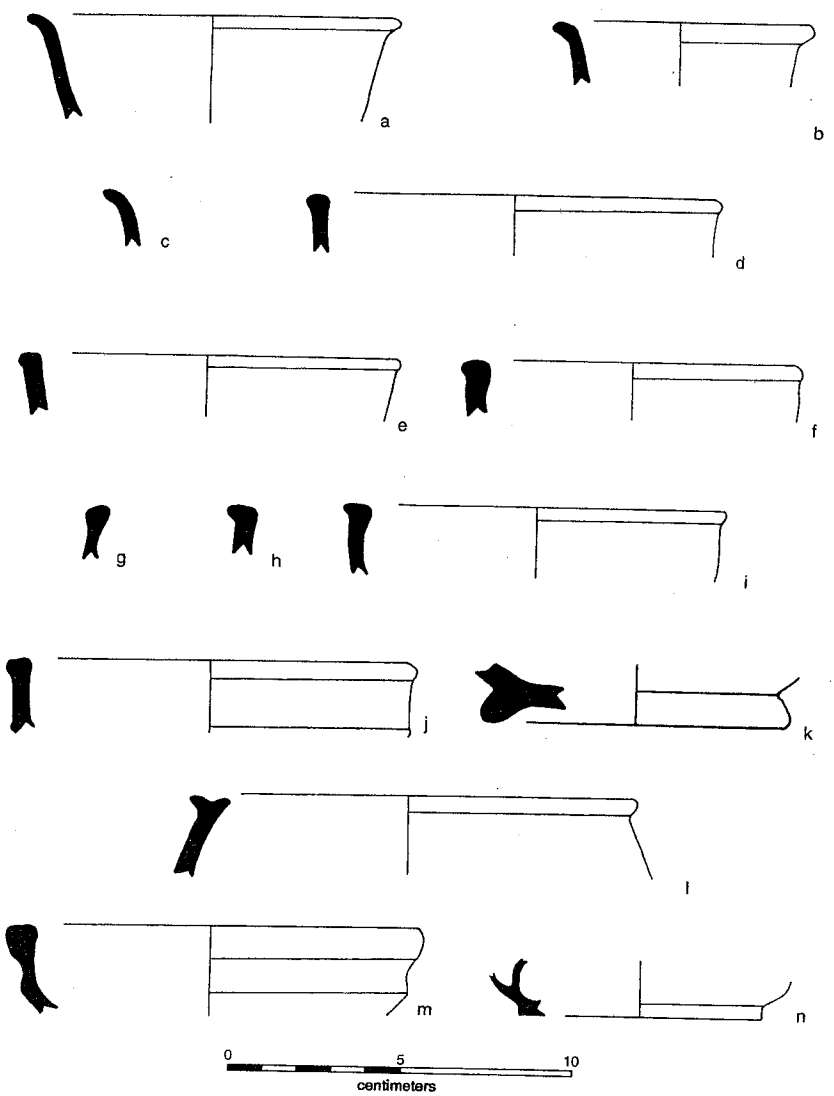

Fig. 1. Rim and base indicator. Sherds of calcareous clay vessels. a = GT 104; b = GT 38; c = GT 116; d = GT 42; e = GT 86; f = 43; g = GT 153; h = GT 115; i = GT 40; j = GT 39; k = GT 3; l = GT 34B; m = GT 137; n = GT 146.

All body colors ranged from pale yellow through white. Chemical group 5, containing only two samples, averaged about 7.5 percent calcium and the bodies displayed a brown color. Group 5, distinctive in both chemistry and body color, and probably better classified as an earthenware, was excluded from further statistical analysis.

Principal components analysis was carried out on the remaining four groups using the elements Na, Cr, Fe, Rb, and La. Figure 3 is a plot of the second and third principal components for the four groups, with the ellipses around the samples in each group representing the 95 percent confidence intervals. This figure readily shows the four groups distinguishable from one another in terms of their chemical composition at better than the 95 percent confidence level. The implications of the statistical analysis of the chemical data are that the calcareous glazed ceramics were produced using four different clay sources. Although it is not possible conclusively to prove multiple production sites without an extensive geological clay sample collection from the region, it seems reasonable to presume that four chemically distinctive clay sources would not have been accessible to or

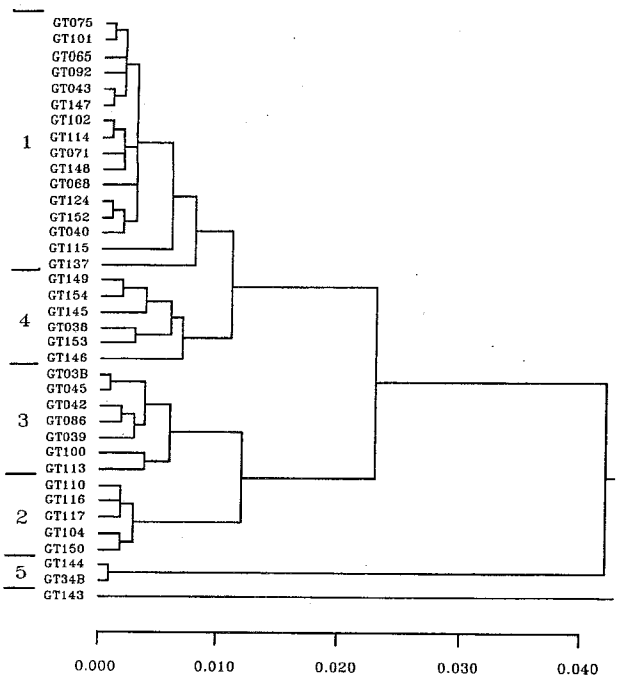

Fig. 2. Hierarchical aggregative cluster dendrogram of Gritille glazed calcareous clay ceramics. The cluster type is nearest neighbor. The distance matrix is squared mean Euclidean distance using the elements Na, K, Ca, Sc, Cr, Fe, Rb, Cs, La, Ce, Eu, Yb, Lu, Hf, Ta, and Th.

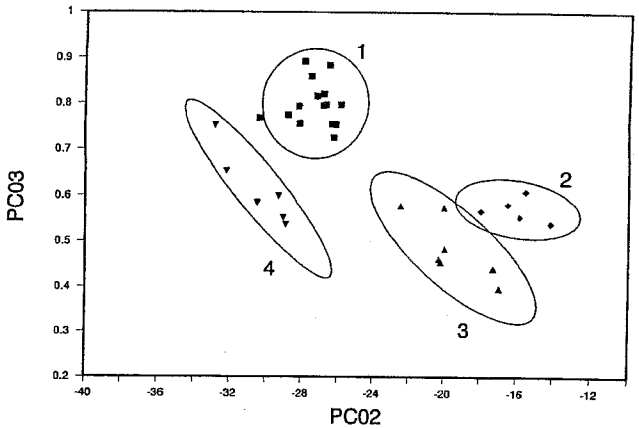

Fig. 3. Plot of the second and third principal components for the Gritille glazed calcareous clay ceramics.

utilized by a single ceramic workshop. Therefore, as many as four production locations may be indicated by the chemical data.

Discussion. At Gritille, calcareous clay glazed vessels were recovered in levels dated by coin finds from the sixth decade of the twelfth century through the third decade of the thirteenth century.[5] The squared bead rim is found in three of the four major compositional groupings, and examples from the earliest to latest phases are also found in these groups. This suggests two things: first, a local production, exemplified in Group 1, that lasted well over seventy years but was confined to a limited shape and glaze range, and second that this local production imitated imported examples. Our candidate for local production is the town of Samsat, the largest settlement in the region and the center of local administration.

The division of the calcareous clay glazed ceramics from Gritille into groups constituting local production and imports is based on frequency of occurrence. Group 1, our candidate for local production, contains 16 of the 37 sherds sampled. The chemical composition of these sherds is very homogeneous. In addition, 12 of the 16 sherds have a glaze that is distinct from other hues of blue. Instead of the bright, evenly fired turquoise found on other samples (and indeed on some of this self-same group), these 12 sherds have a glaze of blue-green, opaque but not evenly so, with the color varying from spot to spot on the vessel. This suggests a firing temperature lower than that of the turquoise glazed wares.

Group 3, a small group consisting almost entirely of the same everted rim type (possibly even from the same vessel — these sherds were found in the same excavation area and belong to the same phase) points to a production entirely different in shape, quality of glazing or firing (these sherds are all turquoise glazed), and chemical composition. Group 2 also has a different chemical composition, although the rim shapes and glazes are similar to Group 1. Two outliers, GT 27 and GT 34B, both of darker fabric, point to an overlap between the production of regular earthenwares and these calcareous earthenwares. GT 27 has a blue-green glaze similar to many of the samples, and GT 34B a similar squared bead rim and carinated body. An extreme outlier, GT 143, is the only closed form vessel sherd of the entire sample. Fritwares found at Gritille also have the same beaded rim, carinated body, and turquoise or blue-green glaze as the calcareous clay vessels, demonstrating an overlap with fritware production, too.

Comparanda. An analogous ware was found by excavators of the slightly later medieval site of Aşvan Kale to the north of Gritille. There, concurrent with the on-site production of sgraffiato and other earthenwares excavators

noticed that "one other very distinctive type of glazed pot occurs frequently enough to suggest a local origin."[6] This type was a bowl made with whitish or gray clay and covered with dark blue or manganese glaze. Both size and shape recall the Gritille calcareous pottery, although there is just enough difference (especially in the presence of vertical ridges around the pots) to preclude a shared origin.

Similarly, to the south of Gritille, excavations at Antioch produced types of glazed ceramics common enough that one can suppose them to be of local manufacture. Two types of this pottery were characterized by opaque turquoise glaze on a yellow body and greenish-blue glaze on a thick yellow body, similar in glaze, shape, and body color to some of the Gritille sample presented above.[7]

The differing compositional groups of the Gritille calcareous clay ceramics and the examples cited above from sites to the north and south of Gritille together lead one to suppose that the use of this kind of clay body was not just confined to an isolated area. The presence of calcareous clay in fine vessels is testified from earlier eras and other parts of the Islamic world, namely Abbasid Iraq and Fatimid Egypt,[8] so this is not a new ceramic technique. Quite the contrary, it represents the survival of an earlier technique in an era when a new technology had seemingly carried the field. With the rise and spread of fritware production in the eleventh or twelfth centuries,[9] the making of fine vessels with calcareous clay bodies fell out of favor, as the whiteness of the fabric and fineness of potting available from an artificial paste body made it more attractive. The knowledge and exploitation of beds of white clay would not have ceased, however, despite the overwhelming popularity of fritwares in the medieval and late medieval Middle East. White calcareous clay continues to be used as a small part of the fritware process.[10] Interestingly, however, the dominance of fritware in inland Syria and the Jazira in the twelfth century is threatened at the turn of the century, not by a resurgence of interest in calcareous clay vessels, but by another kind of pottery production — glazed earthenware and sgraffiato. In our opinion, then, the observable wide variety in fineness of potting, glazing, firing, and decoration of late-twelfth- and early-thirteenth-century Syrian ceramics must be due to many production centers, in as small and peripheral areas as the Samsat valley. The production of calcareous clay vessels is part of the wide variety of ceramic production that goes with this decentralization. Until activation analysis is performed on them, these vessels, with calcium contents of between 10 and 17 percent, are visually indistinguishable from the lower end of the spectrum of fritware production occurring at the same time.

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NOTES

1. Excavations at Gritille took place between 1981 and 1984. They were directed by Professor Richard S. Ellis, Bryn Mawr College, Bryn Mawr, Penna. Scott Redford would like to thank Prof. Ellis for his assistance, and Bay Emin Yener, Director of the Adiyaman Museum for permission to export the Gritille medieval potsherds for scientific analysis.
2. For a summary of the medieval sequence at Gritille, see Scott Redford, "Excavations at Gritille (1982–84): The Medieval Period. A Preliminary Report," *Anatolian Studies* 36 (1986): 111 ff.
3. The authors would like to thank the Nuclear Methods Group and the Reactor Irradiation Division at the National Institute of Standards and Technology, Gaithersburg, Maryland, for their help in this project.
4. M. James Blackman, "Provenance Studies of Middle Eastern Obsidian from Sites in Highland Iran," in Joseph Lambert, ed., *Archaeological Chemistry III,* ACS Advances in Chemistry series no. 205 (Washington, D.C., 1984), pp. 23–26.
5. Levels 5–8. Level 5 has coins from the reign of the Artuqid Najm al-Din Alpi. Level 7 can be dated by a small hoard of Ayyubid coppers deposited around the year 1225; Redford, "Excavations at Gritille (1982–1984)," p. 117; idem, "The Ceramic Sequence from Medieval Gritille," Ph.D. diss., Harvard University, 1989, p. 94.
6. Stephen Mitchell, *Aşvan Kale. Keban Rescue Excavations, Eastern Anatolia* (Oxford: BAR, 1980), p. 74. This pottery was also found in medieval levels at the site of Tille, intermediate between Aşvan and the Samsat region. Here, the excavators call these vessels "cups". See David French et al., "Excavations at Tille 1979–1982: An Interim Report," *Anatolian Studies* 32 (1982): fig. 9, 4–6.
7. Frederick Waagé, "The Glazed Pottery," in idem, ed., *Antioch on the Orontes* 4, 1 (Princeton, 1948), p. 101.
8. See, e.g., R. E. Jones, "Analysis of Some Islamic Lustre Ware from Egypt," in Helen Philon, *Early Islamic Ceramics* (London, 1980), p. 304, table 1. These vessels have, with only one exception, percentages of calcium in excess of 15 percent. They are referred to as "clay" in fabric, and the body color is typified as buff, gray, pink, etc.
9. Marilyn Jenkins, "Early Medieval Islamic Pottery: The Eleventh Century Reconsidered," *Muqarnas* 9 (1991): 65, suggested the earlier date.
10. J. W. Allan, "Abu'l-Qasim's Treatise on Ceramics," *Iran* 11 (1973): 117–18.