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Provenance of the Clay Artifacts from the Favissa at ʿEn Ḥaẓeva

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Introduction

The cultic objects found in the favissa at ʿEn Ḥaẓeva (see Ben-Arieh, this volume) have been associated with the Edomite religion ("Edomite shrine"; see Cohen and Israel 1995:224). Scholars argue that Edomites either expanded into Judah (Beit-Arieh 1996:34–35; Eph'al 2003:77) or, alternatively, took part in trade activities within the Judean territory in the seventh century BCE (E. Mazar 1985; Finkelstein 1992:157–166; A. Mazar 1992:499; Cohen and Yisrael 1995:230; 1996:51). However, the political relationship between the populations of the Negev sites and the heartland of Edom still needs to be illuminated (Beck 1996:112).

This study aims to examine petrographically the raw material used for the clay artifacts from the seventh-century BCE favissa and to identify its origin.[1] The results should aid in assessing where the vessels were manufactured and may clarify whether the "Edomite-style" artifacts in the favissa were imported from Edom or were locally produced in the ʿEn Ḥaẓeva region.

Provenance studies of pottery from sites along the ʿArava Valley are scarce. An exception is the petrographic study of pottery from Timna in the southern ʿArava Valley, which included samples of Edomite wares and described the raw material without identifying its origin (Slatkine 1978:116–118). So far, all the provenance studies of Edomite pottery and cult artifacts from the Negev sites indicate that they were made of raw materials that originated in the Be'er Sheva' region, the Judean Hills or the Shephelah. However, these raw materials are different from those used in Edomite sites in Jordan, such as ʿUmm el-Biyara, Busayra, Tell el-Ghrareh and Tawilan (Gunneweg and Mommsen 1990:12–14; 1995:285–286; Gunneweg et al. 1991:248–249; Iserlis and Thareani 2011). The only exceptions are the Edomite cooking pots from the Negev sites that were produced on the Jordanian Edomite plateau (Tebes 2006:53; Thareani 2010:37).

Petrographic studies of the pottery from Busayra indicate that the raw material of Edomite pottery in the heartland of Edom is characterized by an abundance of shale fragments and quartz grains (up to 500 μm) and occasionally contained basalt fragments (Slatkine 1978:121; Oakeshott and Berlin 2002).

Geological Setting

It is essential for the present ceramic analysis to assess the geological setting of the excavated site and the surrounding area, as well as other regions, suspected of being the origin of the analyzed pottery, such as the Edomite cities in Transjordan. The site of ʿEn Ḥaẓeva is situated near outcrops of the Miocene Ḥaẓeva Formation, undifferentiated Neogene conglomerate units and Quaternary alluvial sediments (Sneh et al. 1998). The Ḥaẓeva Formation is exposed along the central and northern ʿArava Valley, in several synclines of the northern Negev, such as Yeroḥam, Rotem-Ef'e, ʿArad and ʿAroʿer, in western Sinai and in Transjordan (Saʿar 1986:11; Gardosh 1991:2; Calvo 2002). The Ḥaẓeva Formation is composed of clastic fluvial units (sandstone, clay, silt and conglomerate) and carbonatic lacustrine-derived units of limestone and marl

(Calvo 2002). The main rock sources of the formation are the Precambrian magmatic rocks, Nubian sandstones and Cretaceous carbonates and cherts, which have been transported from the east and south by a wadi system that stemmed from Transjordan (Gardosh 1991:14, 19). The sandstones of the Ḥaẓeva Formation are medium-sorted and composed mainly of quartz (50–80%), feldspar (10–25%) and carbonatic particles (up to 25%). Small amounts of chert, glauconite, mica, chlorite and heavy minerals appear as accompanying minerals and rock fragments (Sa'ar 1986:2*).

The Edomite capital of Busayra is situated on limestone, dolostone, chalk and marl of the Albian-Cenomanian Age and is close to outcrops of Lower Cretaceous sandstone (Sneh et al. 1998). Basalt outcrops are widespread east of Busayra in the Edomite plateau.

SAMPLING AND METHOD

The present study comprised 24 clay artifacts from the favissa, including anthropomorphic statues, fenestrated pedestal bowls, bowls decorated with a denticulated fringe, goblets, tripod-perforated cups and small bowls (Table 1).

The local outcrops of the Ḥaẓeva Formation are a potential raw material that could have been used by the potters who manufactured the clay artifacts of 'En Ḥaẓeva. The kaolinite and illite clay minerals are abundant in the upper part of the Ḥaẓeva Formation section (Bentor 1966:42). These minerals are advantageous in ceramic production as they do not swell or shrink upon wetting and drying. Therefore, for comparative analysis, two different members of the Ḥaẓeva Formation (Gidron and Rotem) were sampled. The samples were moistened and shaped into small briquettes and then fired at a temperature of 650ºC. Subsequently, a thin section was prepared from the briquettes and examined under the petrographic (polarizing) microscope. In addition, petrographic descriptions of the different members of the Ḥaẓeva Formation in geological studies (Bentor 1966:15, 21, 42; Sa'ar 1986:50–52; Calvo 2002:140–144) were compared to the analyzed vessels from the favissa.

Table 1. Inventory of the Petrographically Examined Vessels

Sample No.	Cat. No.[i]	Description	Fig.
1	2	Anthropomorphic statue	2
2	3	Anthropomorphic statue	1
3	1	Anthropomorphic statue	
4	14	Fenestrated stand with bowl on top	
5	11	Fenestrated stand with bowl on top	
6	25	Fenestrated stand with bowl on top	
7	21	Fenestrated stand with bowl on top	
8	15	Fenestrated stand with bowl on top	
9	23	Fenestrated stand with bowl on top	
10	29	Bowl with denticulated fringe	
11	37	Bowl with denticulated fringe	
12	38	Bowl with denticulated fringe	
13	65	Pomegranate	
14	31	Bowl with denticulated fringe	
15	55	Tripod cup	
16	41	Goblet	
17	43	Goblet	
18	47	Goblet	
19	49	Goblet	
20	60	Bowl	4
21	27	Fenestrated stand with bowl on top	
22	10	Stand decorated with incised bull	
23	7	Cylindrical stand	
24	4	Cylindrical stand with applied animals and human figures	3

[i] See Ben-Arieh, this volume.

RESULTS

All the examined pottery from 'En Ḥaẓeva, except for one bowl (Table 1:20), bear the same petrographic affinities. Two varieties are observed within the matrix: (1) clayey matrix, showing optical orientation—fresh breaks of these samples have a reddish hue; (2) vitrified matrix due to high firing temperatures—fresh breaks of these samples have a yellowish hue. Both are often rich in shale fragments

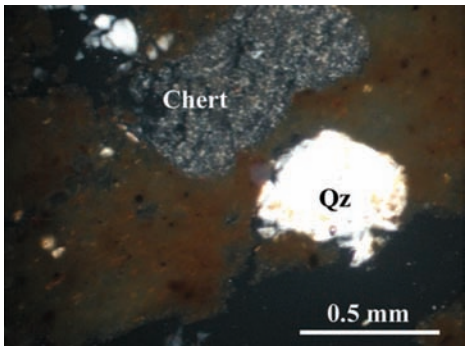

Fig. 1. Photomicrograph of an anthropomorphic statue (Table 1:2). Quartz grain and chert fragment embedded in argillaceous clay (crossed-nicoles).

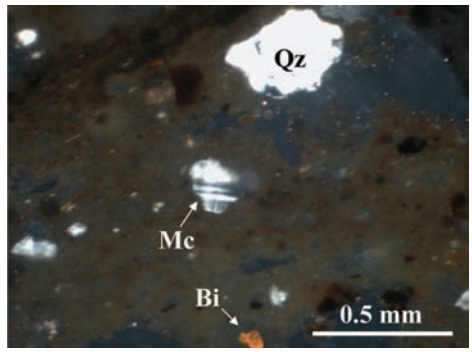

Fig. 2. Photomicrograph of an anthropomorphic statue (Table 1:1). Quartz, microcline and fine mica grain embedded in argillaceous clay (crossed-nicoles).

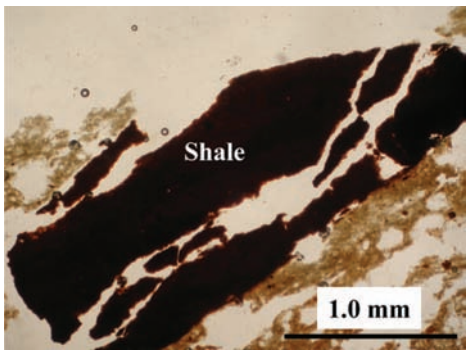

Fig. 3. Photomicrograph of decorated stand (Table 1:24). Ferruginous shale fragment (plain polarized light).

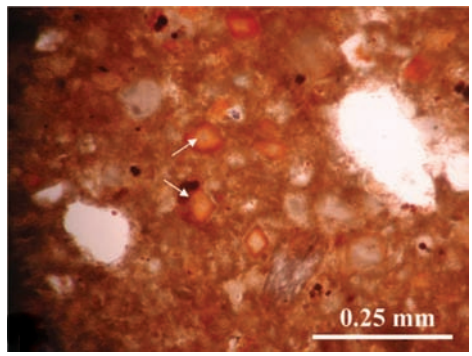

Fig. 4. Photomicrograph of a bowl (Table 1:20). The arrows show limonite pseudomorph after dolomite (plain polarized light).

(Fig. 3). The shale fragments are oval to rectangular, up to ~2 mm in size. Their color varies from red to yellow to gray or black. They have a preferred orientation or an opaque appearance of the iron-rich fragments. The matrix also contains silty mica laths of biotite and muscovite. The non-plastic components $(f{:}c_{\{0.062\ mm\}} = \sim 90–80{:}10–20)^2$ comprise quartz grains, which appear to be the main inclusion in all samples. The quartz grains are badly sorted and have a spherical or rectangular rounded to subangular shape; they reach a size of up to 800 µm. Several grains are polycrystalline and some exhibit an undulatory extinction. Most of the samples also contain coarse (up to 2.5 mm), rounded carbonatic rock fragments that occasionally appear milky and decomposed to various degrees. The carbonatic fragments often show silty quartz grains trapped within them. Most of the samples show a few fine feldspar grains (often microcline) and a few fine chert fragments (Figs. 1, 2). Siltstone fragments cemented with iron oxides rarely appear.

Sample No. 20 (bowl; Cat. No. 60) is characterized by a different petrofabric. The matrix of this bowl is clayey and consists of tiny rhombohedral dolomite crystals (less than 50 µm) altered into limonite (Fig. 4) and a few shale fragments. The non-plastic components are dolomite and chalk fragments and few quartz grains of up to 500 µm. Fine sand-sized or silty dolomite crystals are observed in many pottery assemblages of different periods, mostly scattered throughout the vicinity of the Judean-Samarian Hills (Glass et al. 1993:272) and are related to the Cenomanian ʻAminadav

and Moẓa Formations (Bentor 1945). The Moẓa Formation, or the equivalent ‘En Yorqe‘am Formation that is exposed in the Negev and the Judean Desert (Mor 1987), are possible sources, but the provenance of the bowl is undetermined.

CONCLUSIONS

The favissa assemblage is typified by a homogeneous petrofabric. The raw material used for the production of the ‘En Ḥaẓeva clay artifacts originated in a clastic unit that contains mainly quartz grains, as well as carbonatic fragments, chert and noncalcareous shale-rich clay. The Ḥaẓeva Formation seems to be that unit. There are no previous petrographic studies that consider this formation as a source for ceramic raw material.

It is noteworthy that the quarried substances of the Ḥaẓeva Formation (Gidron Member) are utilized in the modern-day roof-tile industry (Sendler 2004). The appearance of angular and rectangular quartz grains accompanied by some feldspar grains rules out the Lower Cretaceous mature sandstones, which are widely exposed near the Edomite sites in Transjordan, as a likely origin. Hence, the petrographic results indicate a local manufacture for the clay artifacts from the favissa at ‘En Ḥaẓeva. Neutron Activation Analysis results for one cultic stand from ‘En Ḥaẓeva suggested a local manufacture (Gunneweg and Balla 2002). The homogeneous petrofabric of the assemblage, as recognized in this study, is in accordance with the homogeneous iconography concluded by Beck (1996:111). The study of pottery from a cultic context is especially interesting and a few questions emerge; for example, did the worshippers bring the vessels with them or did they purchase them at the sanctuary? The results support the latter option. The local manufacture of the favissa assemblage at ‘En Ḥaẓeva on the border between Judah and Edom, on a route of diverse nomadic ethnic groups, hampers any attempt to attribute an ethnic identification, national or political entity to the finds by the provenance study.

Only one bowl from the favissa (Cat. No. 60) was made of a raw material different from that of the other vessels. It is rich in rhombohedral dolimitic crystals, which are also abundant in the Edomite pottery from Timna (Slatkine 1978:116–118). Recent studies by the author of pottery from sites in Har Ha-Negev suggest dolimite-rich petrofabrics, whose source has not yet been identified.

NOTES

[1] The petrographic method in this article is based on the examination of thin sections (30 microns thick) under petrographic (polarizing) microscope (see further details of the petrographic method in Whitbread 1995; Vaughan 1999).

[2] The f:c ratio expresses the relative proportions of the fine (f) and coarse (c) components of a fabric. In this case, the boundary between these two components is 0.062 mm, which is the boundary between silt and sand size (Kemp 1985:22).

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