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Petrographic Results of Selected Chalcolithic Pottery Vessels from Ḥorbat Nevallaṭ

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Introduction

This study presents the results of petrographic analyses carried out on 12 Chalcolithic pottery vessels found during excavations at Ḥorbat Nevallaṭ (see van den Brink and Lazar, this volume). Multiple vessel types were analyzed, including bowls, cornets, pithoi and jars.[1] Macroscopic examination of the Chalcolithic pottery from this site gives the impression of a homogeneous fabric throughout the assemblage. The aims of this study were to identify the raw materials used, describe their variability, determine the geological sources of the raw materials and assess the possible geographic region in which the vessels were produced.[2]

This site of Ḥorbat Nevallaṭ demonstrates intensive Chalcolithic settlement activity in the Yarqon basin and the western fringes of the Ramallah anticline. Remains dating to this period were recorded at 12 sites within the Lod survey map (Gophna and Beit-Arieh 1997:5). Several excavations were conducted at Chalcolithic sites in this area, including the Naḥal Qana Cave (Gopher and Tsuk 1996), Giv'at Ha-Oranim (Sheftelovitz and Oren 2004), Qula (Milevski 2002), Mazor (West) (Milevski 2007), Shoham (North) (van den Brink and Gophna 2005), Ḥorbat Tinshemet (van den Brink and Grosinger 2004), Ḥorbat Ḥani (Lass 2003:1–3) and Yehud (Lugano) (Permit No. A-6526; not yet published). The petrographic studies carried out on the pottery from these sites helped build a comparative thin-section collection of the raw materials used in this region (Goren 1996:147–154; Cohen-Weinberger 2003:53–58; 2004).[3] The raw materials observed in the thin sections were compared with the soils and local geology of the site.

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[1] This paper was submitted in 2004; some minor updates were made in 2016.

[2] The petrographic method is based on examination of thin sections (30 microns thick) under a petrographic (polarizing) microscope. For more details concerning the petrographic method, see, e.g., Quinn 2013.

[3] Petrographic examination of the pottery from Qula, Mazor (West) and Yehud (Lugano) was conducted by the author.

Geological Setting

Limestone and dolomite rocks of the Turonian Bina Formation, as well as chalk of the Menuḥa Formation characterize the immediate vicinity of the site. Farther east, dolomite rocks of the Cenomanian Weradim Formation are exposed (Sneh, Bartov and Rosensaft 1998; Yechieli 2008). Several kilometers west, Quaternary *ḥamra* soils and *kurkar* ridges are exposed (Sneh, Bartov and Rosensaft 1998). The area of Ḥorbat Nevallaṭ is also characterized by *terra rossa* and brown alluvial soils (Rabikovitch 1981). In the vicinity of the site, the only potential raw material source for pottery production are clay-rich soils.The clay-rich Moẓa Formation is located some 10 km east of the site (Yechieli 2008).

RESULTS

The analyzed pottery was arranged into three petrographic groups (Table 1), according to raw material.

Group A

This group comprises the majority of the sample (10 out of 12 vessels; Table 1). The material is characterized by calcareous clay, containing foraminifera which had occasionally oxidized. Less than 5% of silty quartz grains appear in this clay. The sand-sized non-plastic components make up about 10% of the paste and comprise diversified coarse carbonatic rock fragments (up to 3 mm across)—mainly dolomite, chalk and calcrete fragments, as well as some quartz geodes, oolithic limestone, mollusk and bone fragments. In two samples, chert fragments are dominant (Table 1:5, 11). The clay used for these vessels was not identified.

Table 1. Petrographic Results of the Analyzed Chalcolithic Vessels

No.	Petrographic Group	Vessel	Locus	Basket	Area	Phase	Figure (see van den Brink and Lazar, this volume)
1	A	Bowl	167	4279/4	A	1	53:2
2	A	Cornet rim (decorated)	117	4057/2	A	1	56:8
3	B	Jar (ledge handle)	167	4279	A	1	
4	A	Cornet (medial fragment)	117	4070/1	A	1	56:9
5	A	Bowl (internal handle)	120	4082/1	A	1	59:11
6	A	Jar	169	6	A	1	66:6
7	A	Bowl	169	5	A	1	65
8	C	Holemouth jar	150	1249	A	?	
9	A	Bowl (imitation of basalt bowl)	169	7	A	1	66:2
10	A	Pithos	322	3045/4	B	-	68:6
11	A	Cornet	117	4070/2	A	1	56:11
12	A	Bowl	169	5b	A	1	65:2

The non-plastic assemblage strongly suggests the local environment as a possible source. As mentioned, most of the analyzed vessels belong to this group.

Group B

This clay type is represented by a single sherd in the sample (Table 1:3). The matrix consists of tiny rhombohedral dolomite crystals. The sand-sized non-plastic components are coarse rounded chalk fragments (up to 3 mm across). This raw material is identified as the marl member of the Moẓa Formation, which is exposed along the Judean and Samarian fold belt. The chalk fragments were intentionally added to the paste.

Group C

A single vessel of this material type, a holemouth jar (Table 1:8), was included in the sample. The fabric is characterized by argillaceous clay, exhibiting a strong optical orientation. The added temper are crushed calcite crystals. The clay is most likely the clayey member of the Moẓa Formation. Crushed calcite is very common as the main tempering material of cooking vessels (Shoval et al. 1992:137; e.g., Glass et al. 1993:277).

CONCLUSIONS

Most of the examined vessels belong to Petrographic Group A. The clay of this group was not identified, but the non-plastic components suggest that it was local. The same set of non-plastic components commonly appears in Chalcolithic pottery from sites located between the Yarqon and the Ayyalon basins. The raw material of one holemouth jar (Table 1:8; Group C) was identified as the Moẓa Formation clay member. One jar (Table 1:3; Group B) was made of marl from this formation, which is exposed to the east of the site.

The accumulated petrographic data from Chalcolithic sites enables a reconstruction of the geographical distribution of vessels belonging to different petrographic groups, resulting in a better understanding of the cultural interconnections and exchange patterns during that period.

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