

PETROGRAPHIC ANALYSIS OF POTTERY FROM A MIDDLE BRONZE AGE II SITE WEST OF TELL QASILE

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BACKGROUND AND METHOD

Petrographic analysis of pottery from kilns is significant since it provides reference data for local production. A thin-section collection of local pottery from the many MB II kilns found in the Tel Aviv area (Kletter and Gorzalczany 2001) may eventually enable differentiation between various production sites in a given geographic region.

In this study of material from the site west of Tell Qasile (see Kletter, this volume), 32 vessels were examined from the MB II settlement, tombs and kilns. For comparison, two fragments of a kiln were also analyzed. The aim of the study was to determine the nature of the raw materials used and clarify whether the raw material of the pottery from the kiln is similar to that from the settlement and/or from the tombs.

RESULTS

Most of the samples are related to the same petrographic group. In this group, mainly quartzitic, but also carbonatic sand is mixed with ferruginous or carbonatic clay. Fewer sand-sized grains of accessory minerals, including minerals of the feldspar, amphibole, and pyroxene groups, accompany the quartz sand. Most of the samples are rich in silty quartz, and rarely in other silty minerals, such as mica and hornblende. In some cases *terra rossa* soil was mixed with the clay and appears as mud balls. The nature of this petrographic group clearly points to a coastal origin, where red to dark reddish-brown soils appear as part of the Reḥovot Formation and the related

'Evron Member in northern Israel (Isar 1968; Sivan 1996:107–110; Ministry of Agriculture 1987). It is most likely that this red soil, locally termed *hamra*, was used here. *Hamra* extends northward along the coastal plain of Israel from the Ashdod region to 'Akko and slightly beyond. Hence, this petrographic group relates to that geographical area.

The Quaternary deposits of the coastal plain consist mostly of sand transported by the Nile, which is very poor in carbonates (Nir 1985; 1989). The coastal sands are mostly composed of quartz grains, with small quantities of carbonates and heavy minerals. Presumably, most of the calcium carbonate found in the beach sediment in Israel derives from local sources—principally broken *kurkar*-sandstone grains and bivalve shells. Along the northern Mediterranean coast, from 'Akko northward, this type of sand diminishes and the sediment becomes increasingly calcareous (Rohrlich and Goldsmith 1984:100; Nir 1989). The *hamra* loam of the 'Evron Member around 'Akko reportedly contains only up to 10% quartz (Sivan 1996:155; Nir 1989).

Hamra-made pottery rich in quartz is distributed in Israel at sites located mainly along the central coastal plain. Pottery produced of *hamra* soil is known from some Chalcolithic assemblages of the central coastal plain (Goren 1991). In the Middle Bronze Age this group dominates the ceramic assemblage of the cemetery in the Rishon Le-Ziyyon sands (Cohen-Weinberger, unpublished). A Middle Bronze Age kiln site containing vessels only of this petrographic group was excavated near Yavne-Yam (Singer-Avitz and Levy 1992, with petrography by Goren). Well-preserved

Middle Bronze Age kilns containing pottery of this petrographic group were excavated at Tel Mikhal (Gorzalczany and Rand 1999; Gorzalczany 2006:57).

Only one juglet (see Kletter, this volume: Fig. 23:7), made of carbonatic clay, is related to a different petrographic group. The matrix is rich in tiny (less than 50 µm) rhombohedral dolomite

**Table 1. Inventory of the Petrographically Analyzed Vessels
(Fig. Nos. Refer to the Main Report [Kletter, this volume])**

No.	Basket	Locus	Type	Fig.
<i>Samples from the Kilns</i>				
1		Kiln 808	Mud-brick fragment	
2	1367/1	Kiln 123	Carinated bowl	24:1
3	1367/2	Kiln 123	Jar (rim)	24:3
4	1367/3	Kiln 123	Cooking pot	24:5
5	8092	Kiln 808	Part of the kiln	
6	8094	Kiln 808	Bowl	23:2
7	8096	Kiln 808	Distorted bowl	23:6
8	8100/1	Kiln 808	Fragment of a large jar	23:13
9	8100/2	Kiln 808	Waster body sherd	
10	8102/1	Kiln 808	Jar	
<i>Samples from the Tombs</i>				
11	2043	Tomb 207	One handle jar	15:4
12	2044	Tomb 207	Bowl	15:2
13	2118	Tomb 209	Piriform juglet, double handle	16:7
14	2118	Tomb 209	Dipper juglet	
15	5008	Tomb 510	Juglet	
16	6053	Tomb 606	Jar	18:6
17	6055	Tomb 606	Bowl	
18	7022	Tomb 701	Bowl	19:2
19	7026	Tomb 704	Jar	
20	7029	Tomb 701	Bowl	19:1
21	7051	Tomb 701	Dipper juglet	19:3
22	8049	Tomb 800	Small jar	
23	8063	Tomb 800	Juglet	20:5
<i>Samples from the Settlement</i>				
24	1141/1	116	Cooking pot	
25	1266	115	Juglet	31:1
26	1331/1	116	Bowl (red-slipped)	
27	1359	121	Juglet with double handle	
28	1360	121	Juglet	
29	1363	122	Jug (red-slipped)	
30	2037	201	Cooking pot	15:4
31	2144	214	Juglet	
32	6017/1	601	Jar?	
33	7003	700	Jar	
34	8053	805	Dipper juglet	

crystals, which can be identified only under the microscope. This clay is identified as marl of the Moza Formation. The Moza marl, located beneath the clay unit of this formation, contains about 18% of carbonate minerals compared to about 4% in the higher clay unit (Bentor 1966:48). This group is well documented in previous studies (Goren 1995, and references therein). It is distributed mostly in sites along the Judea-Samaria Hills. Presumably, this juglet was imported from that region.

The pottery from the kiln was made of *hamra* with up to 30% carbonatic non-plastic components. In two samples *terra rossa* soil was added to the clay (Table 1:2, 7). The kiln fragments are similar in petrographic properties to the pottery from the kiln. Likewise, all the

pottery from the tombs, except for the imported vessel, is made of *hamra* rich in carbonatic non-plastic components. Most of the pottery from the settlement was made of the same clay composition, except for two cooking pots and one juglet (Table 1:24, 25, 30) in which carbonatic non-plastic components are almost non-existent. Since defects usually occur around limestone tempers, this would be unsuitable for cooking pots (Shoval et al. 1992:137). *Terra rossa* soil was added to one vessel from the settlement (Table 1:27).

The petrographic results suggest a homogeneous raw material for the whole examined assemblage. Thus, the possibility of contemporaneous use of the settlement, tombs and kilns cannot be proved, neither ruled out.

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