

A PROVENANCE STUDY OF TWO TELL EL-YAHUDIYEH VESSELS AND OTHER MIDDLE BRONZE AGE IIA POTTERY TYPES FROM TEL BURGA

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INTRODUCTION

This study presents the results of petrographic analyses of six MB IIA pottery vessels from the excavations at Tel Burga (for discussion of the petrographic method, see e.g., Whitbread 1995; Vaughan 1999). The petrographically sampled vessels include two Tell el-Yahudiyeh (henceforth TEY) vessels, one of which is a piriform juglet, the other a shoulder-handled jug (see Golani, this volume: Fig. 15:7, 8), as well as one shoulder-handled jug and three piriform juglets without the punctured decoration (see Golani, this volume: Figs. 16:2; 15:4, 6; 18:6 respectively). As TEY vessels vary in both their geographical and chronological distribution, provenance analyses contribute to our understanding of trade relations between geographical areas on a diachronic axis.

Several provenance studies of TEY vessels were conducted in the past (e.g., Artzy and Asaro 1979; Kaplan 1980; Kaplan, Harbottle and Sayre 1982; 1984; McGovern et al. 1994; McGovern 2000; Goren and Cohen-Weinberger 2002). Kaplan (1980) applied Neutron Activation Analysis (NAA) to 203 TEY vessels from sites in Egypt, Cyprus and the Levant. She assigned the TEY vessels that were manufactured in southern Canaan (Israel) to two clay groups: 'red field' and 'limestone hill' (Kaplan 1980:56), although she did not define the geological formation or the soil of these clay groups. These clay groups had been previously used as comparative reference groups in a NAA provenance study of Persian pottery from Tell el-Hesi, conducted by Brooks

(1975). Brooks collected clay samples from modern-day traditional potters' workshops in Gaza and Hebron and assigned them to the 'red field' and 'limestone hill' clay groups respectively, according to their chemical profile (Brooks 1975; Kaplan 1980:56, 131, n. 25). The raw materials used by modern-day traditional potters in these areas are well known (Krispil 1987), and assessment of the geological settings of these two cities suggests that the two clay types originate in the loess soil of the Gaza region and the clay or marl units of the Moza Formation exposed in the Hebron Hills. These clay types have been used by local potters since the beginning of pottery production in these two areas (see references in Goren, Finkelstein and Na'aman 2004). The significance of Kaplan's results, although unintentional, is that most of the TEY vessels from sites in Israel were produced at these two production centers. However, these two types of raw material are hardly sufficient as reference groups for a provenance study of pottery from Tell el-Hesi, which is located in a different geographical setting between these two areas, nor for a provenance study of the widely distributed TEY ware. Kaplan (1980) related the TEY juglets that were recovered in the potter's 'refuse pit' at 'Afula, some of them still unfired (Zevulun 1990), to her 'limestone hill' group (apparently Judea or Samaria), although it was more reasonable to assume that they were local. A petrographic study of TEY vessels from Kabri has suggested other production locations for this ware, apart from the two sources suggested by Kaplan (Goren and Cohen-Weinberger 2002:442).

For these reasons, it was deemed mandatory to conduct a comprehensive provenance study and re-evaluate the sources of this ware (Cohen-Weinberger 2008). Thus, the source of the TEY vessels from Tel Burga was assessed, as well as the relationship between these puncture-

decorated juglets and the plain juglets at the site.

Geological Setting (Fig.1)

An assessment of the geological setting of Tel Burga and its surroundings, along with other

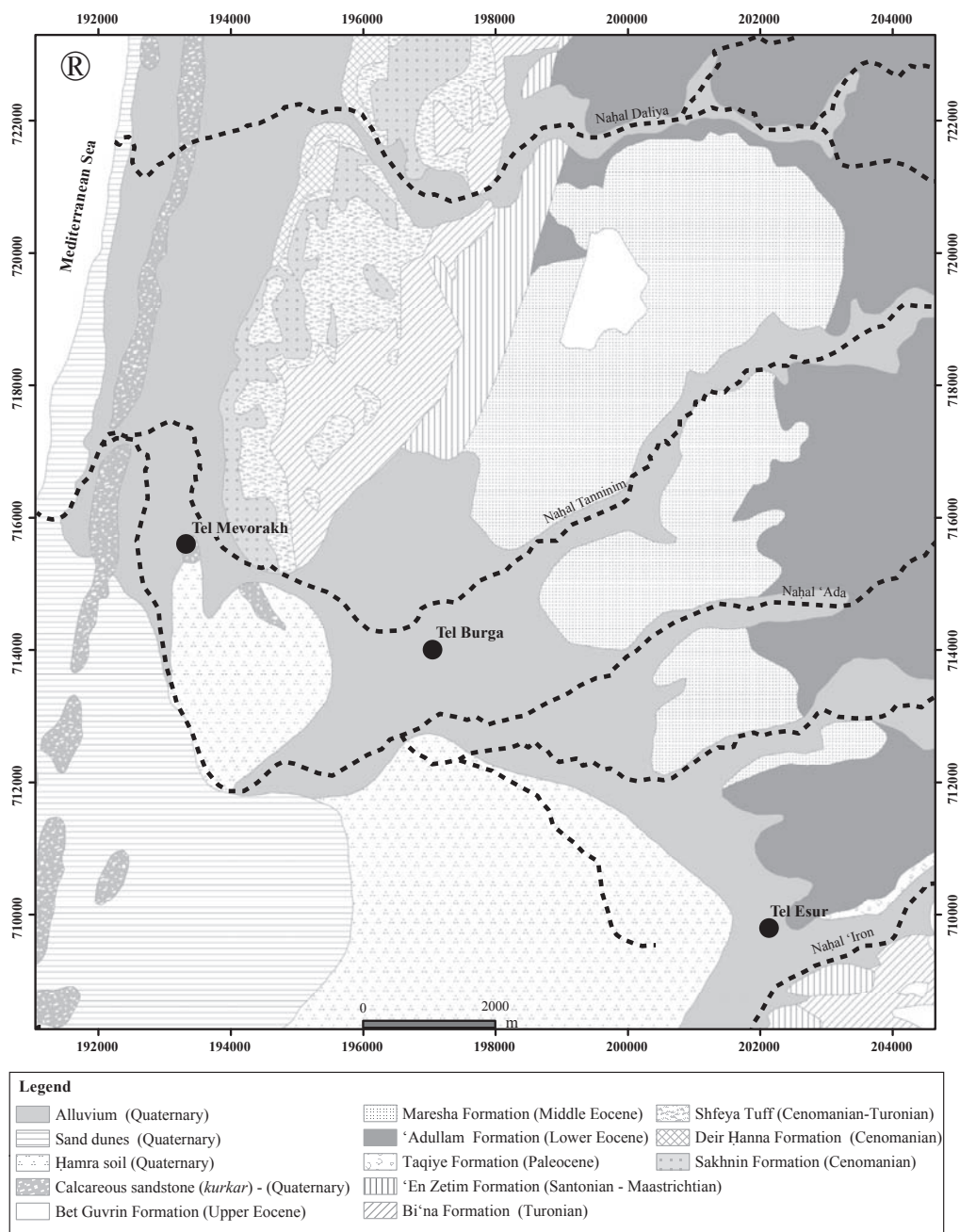


Fig. 1. Map of the geological units around Tel Burga (after Sneh et al. 1996; Sneh, Bartov and Rosensaft 1998).

possible sources of the analyzed pottery, was conducted with the aim of identifying the provenance of the raw material.

Tel Burga is located in the northeastern corner of the Sharon coastal plain, upstream from Tel Mevorakh. It is situated on Quaternary alluvial sediments that are bordered in the north by Mount Carmel, in the south by red *hamra* hills and in the west by a *kurkar* (calcareous sandstone) ridge (Sneh et al. 1996; Sneh, Bartov and Rosensaft 1998). Mount Carmel is characterized by carbonatic rocks (limestone and dolomite) of the Cenomanian Sakhnin and Deir Hanna Formations and the Turonian Bi'na Formation, accompanied by some volcanic (basalt and tuff) intercalations of the Shfeya Tuff Formation (Picard 1956; Sass 1968:115–116; Sneh et al. 1996). Chalk of the Santonian 'En Zetim Formation is exposed on the flanks of Mount Carmel. The region of Ramat Menashe, situated about 2 km to the east of the site, is a syncline between the Carmel and Umm el-Fahm anticlines characterized by Eocene chalk of the Maresha and 'Adullam Formations (Sneh, Bartov and Rosensaft 1998), upon which *grumusols* and *rendzina* soils developed (Ministry of Agriculture 1987).

Sediments rich in clay are essential for pottery manufacture. In the vicinity of the site, the potential raw material includes the Paleocene marls of the Taqiye Formation that are exposed the upper part of Naḥal Tanninim and along Naḥal 'Iron and clay-rich alluvium and soils such as *grumusols* and *rendzina*.

Results

Tell el-Yahudiyah Piriform Juglet (L20, B175; see Golani, this volume: Fig. 15:7).—This juglet is characterized by calcareous, foraminiferous clay with silty quartz grains, rich (f:c ratio_{0.062mm} = ~85:15)¹ in coarse, non-plastic components up to 2 mm in size, including mainly chalk fragments that are often oxidized, and travertine fragments. Some of the travertine fragments were cut perpendicular to the long axis of stems (Fig. 2), others have a pisolithic appearance. Chert fragments and quartz grains

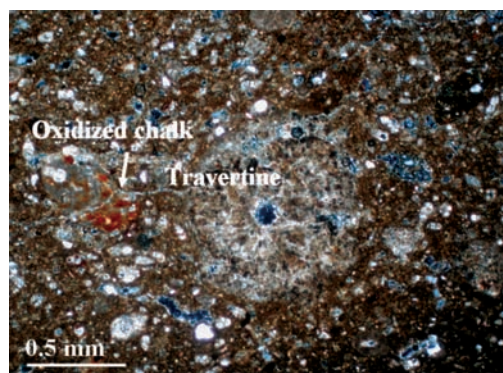


Fig. 2. Travertine fragment and oxidized chalk embedded in calcareous matrix (L20, B175); crossed polarized light.

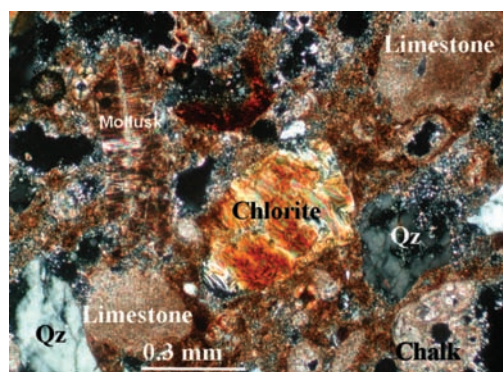


Fig. 3. Chlorite, mollusk and limestone fragments and quartz (Qz) grains embedded in calcareous matrix (L20, B190); crossed polarized light.

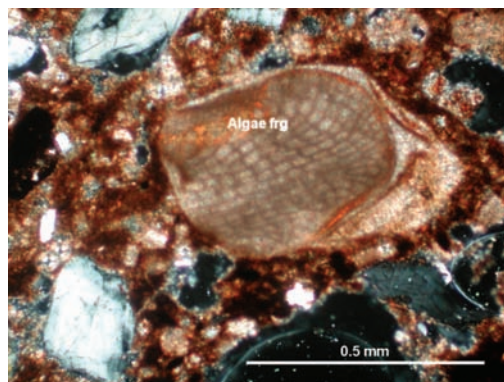


Fig. 4. *Kurkar* fragment containing algae fragment and quartz grains embedded in foraminiferous clay (L20, B194); crossed polarized light.

rarely appear. The raw material is identified as *rendzina* soil, which could have originated in the region of Ramat Menashe. The travertine fragments most probably derived from springs along Nahal Tanninim, which flows at the foot of Tel Burga.

Tell el-Yahudiyeh Shoulder-Handled Jug (L20, B194; see Golani, this volume: Fig. 15:8).—This jug is characterized by calcareous, silty, foraminiferous clay rich (f:c ratio_{0.062mm} = ~85:15) in non-plastic components of mainly well-sorted, fine (~300 µm) quartz grains, poorly sorted carbonatic rock fragments of chalk and limestone (up to 2 mm) and mollusk fragments. Tuff fragments and yellowish-brown chlorite minerals with a fibrous radial texture (Fig. 3), and rounded, weathered basalt appear along with a few chert and *kurkar* fragments (which include calcareous algae or echinoidea fragments; Fig. 4). Rounded hornblende and feldspar grains and silicified limestone including silicified foraminifera are rare. The quartz, feldspar and hornblende grains, as well as the *kurkar* fragments, suggest a coastal origin, as this mineralogical assemblage is typical of the Israeli coast as far north as the Haifa Bay (Nir 1985:507; 1989:12). The clay is identified as *rendzina* soil. This geological combination of Quaternary coastal deposits with tuff and basalt volcanic rock fragments is present in sediments along the Carmel coast, as well as in the alluvial sediments of the western part of Nahal Tanninim (Sass 1968; Sneh et al. 1996). This vessel was locally made at the site or in its vicinity.

Red-Slipped Shoulder-Handled Jug (L20, B194; see Golani, this volume: Fig. 16:2).—This jug is characterized by calcareous clay rich in silty, spherical-shaped carbonate and tiny rhombohedral dolomite crystals. The non-plastic components (f:c ratio_{0.062mm} = ~85:15) comprise mainly rounded to sub-angular quartz grains of 200–300 µm with some coarser grains of up to 500 µm. Rounded, sand-sized grains of feldspar are also embedded in the clay.

Less common non-plastic components include *kurkar*, chert and carbonatic rock fragments, which are partly dolomitized. The appearance and size of the quartz grains suggest a coastal provenance, and the Cenomanian formations that are exposed in the southwestern part of Mount Carmel adjacent to Tel Burga may be the source of the dolomite that appears in the thin section. It is most likely that the raw material used for this vessel was of local origin.

Piriform Juglets (L20, B183B; L20, B181; L9, B135; see Golani, this volume: Figs. 15:4, 6; 18:6).—These are characterized by a calcareous matrix, rich in silty carbonate and silty quartz grains. Some planktonic (rarely oxidized) and bentonic foraminifera, feldspar grains and, rarely, silty heavy minerals appear as well. The non-plastic components (f:c ratio_{0.062mm} = ~95:5) comprise fine (~200 µm), spherical, carbonatic rock fragments, fine quartz grains, poorly sorted *nari* (caliche) fragments of up to 2 mm and, rarely, chert, quartz geods, dolomite and mollusk fragments. This raw material is identified as soil that developed over the chalk and *nari* crust of the Santonian to Eocene Age formations exposed in the vicinity of Tel Burga.

Discussion and Conclusions

Previous petrographic studies have demonstrated that pottery from sites located in areas rich in clay and temper sources was usually made of these local raw materials (e.g., pottery from Tel Bet She'an; see Cohen-Weinberger 1997; 1998; Mazar, Ziv-Asudri and Cohen-Weinberger 2000). At Tel Burga as well, all the examined vessels, including the TEY puncture-decorated vessels and the plain vessels, were manufactured from local raw materials that are exposed in the vicinity of the site. The diverse matrix and non-plastic components reflect the variegated geological environment around the site.

The local provenance of the TEY vessels examined in this study fits well with their uncommon shape and decorative pattern, and reflects the decentralization of the manufacture

of this ware in the Levant (Cohen-Weinberger 2008). An abundance of evidence indicates that diplomatic relations and extensive maritime trade took place between Egypt and the northern Levant during Egyptian Dynasties XII–XIII (MB IIA; see, e.g., Montet 1928–1929; Lilyquist 1993:41–44; Ryholt 1997:86–90; Cohen-Weinberger and Goren 2004; Cohen-Weinberger 2008). The role played by Canaan (Israel) in this trade has been analyzed and discussed (Artzy and Marcus 1992; Marcus and Artzy 1995:145–149; Marcus 1998; Marcus 2002:244–245; Cohen-Weinberger and Goren 2004), and the study of the TEY types appearing in this region has contributed to this discussion (Bietak 1986; 1988; Cohen Weinberger 2008). The most widespread type of TEY juglet appearing during the latest MB IIA phase and the transitional MB IIA–B phase in both Egypt and the northern Levant, including sites along the Israeli coast, such as Kabri, Rishon Le-Ziyyon and Ashqelon (Cohen-Weinberger 2008: Pls. 3.7–3.9), is ‘Piriform 1’ (Bietak 1986; 1988). This type appears in a relatively standard form and decoration in these regions and was defined as a ‘Syrian/Phoenician-Egyptian’ type based on its distribution (Bietak

1986; 1988; 1997). On the other hand, endemic types of TEY juglets appear during the late stages of MB IIA, mainly at inland sites in the southern Levant (e.g., Epstein 1974; Zevulun 1990; Greenberg et al. 2006: Fig. 5.107:9, 11, 12), probably indicating that this region was somewhat isolated from the main trade route between Egypt and the northern Levant. As Tel Burga is located close to the coast, it is interesting to evaluate its part in this maritime trade and the extent to which it was influenced by it. The TEY piriform juglet from Tel Burga is not the classic ‘Syrian/Phoenician-Egyptian’ type (Piriform 1), but a unique variation. Further excavation will probably reveal the classic Piriform 1 type at Tel Burga as well, similar to its occurrences at other coastal sites in Israel. It is evident that the site was involved in the interregional trade system, as the Egyptian scarabs (see Ben-Tor, in Golani, this volume) indicate interaction with Egypt. Furthermore, the fortifications of the site can be viewed as part of the development of urbanism during the Middle Bronze Age, which is associated with the cross-cultural interaction and exchange that took place in that period (see e.g., Marcus 1998:3, 4; Cohen 2002:29, 114).

NOTE

¹ 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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