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State of the art multi-analytical geoscientific approach to identify Cypriot Bichrome Wheelmade Ware reproduction in the Eastern Nile delta (Egypt)

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Abstract

Bichrome Wheelmade Ware originally from Cyprus is under suspicion of being a local reproduction in the Eastern Nile Delta during the early 18th Dynasty (Late Bronze Age I). To elucidate this question, samples from Tell el-Dab[c]a (Egypt) and from Cyprus were examined in detail. Petrologic and geochemical analytical techniques including optical microscopy, XRD, XRF, ICP-MS, EPMA were applied in order to emphasize the differences and similarities of the two products. Micro-textures and mineral-phase reactions provide information about conditioning procedures of raw materials as well as firing-temperatures reached during pottery fabrication. Bulk major and trace element abundances and the chemical compositions of pyroxenes, feldspars and oxide-minerals allows the distinctive discrimination of the wares and the correlation with provenance-indicating reference material.

The original Cypriot Bichrome Wheelmade Ware finds reflect high-level ceramic manufacturing technologies (including pre-conditioning of raw-materials and firing temperatures around 950–1000 °C); their decisive mineralogy and chemistry indicate East Cypriot sediments used for production. Phase reactions and the formation of secondary Ca-silicates like gehlenite and wollastonite make fine temperature estimates possible. The comparison of bulk-and mineral-chemistries to reference data from Cyprus reveals a good correlation with mafic and ultramafic sources together with the calcareous impact of the Kyrenia sediments. The imitational Bichrome Wheelmade Ware from Egypt reflects pottery made directly out of fine-grained Nile alluvia from the Eastern Nile Delta (probably near Tell el-Dab[c]a). From textural investigations and firing-temperature estimates (600–800 °C) a less refined fabrication process is evident.

Keywords: Bichrome Ware; Bronze Age; Cyprus; Egypt; Ceramic analysis; Provenance study; Multi-analytical approach; Mineral chemistry; Firing temperature

1. Introduction

The island of Cyprus in the centre of the Eastern Mediterranean Sea has great potential to illuminate the history of ancient trade routes and networks of the Eastern Levante, which became highly important in particular during the second half of the 2nd Millennium B.C. with the fluctuation of the Copper trade.

Bichrome Wheelmade Ware is one of the most important mirrors for such Bronze Age Mediterranean networks at the beginning of the Late Cypriot Bronze Age (LC I). The ware was widely distributed in the entire Eastern Levante, from Turkey (Alalakh) over the Syrian, Lebanese and Canaanite coast, down to Egypt (Fig. 1a). In Cyprus, Bichrome Wheelmade Ware can be found at nearly 40 sites. This wide distribution makes it an important tool for associating the chronology of Cyprus with that of the Eastern Mediterranean civilizations.

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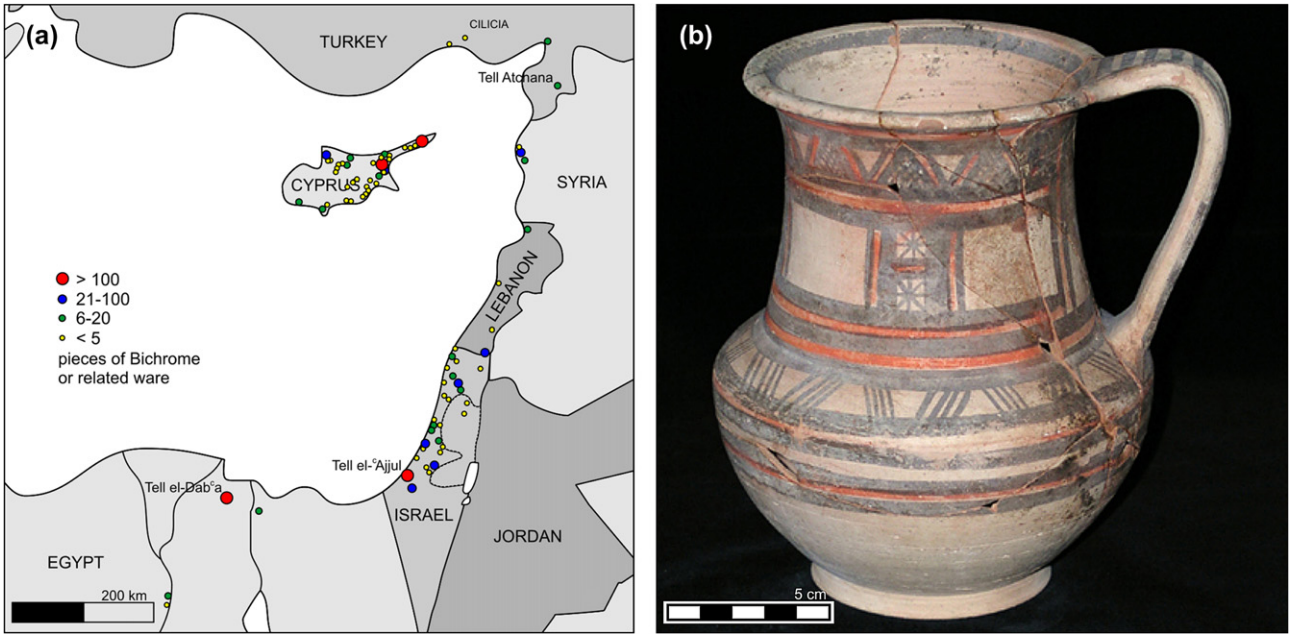

Fig. 1. (a) Distribution of Bichrome Wheelmade Ware in the eastern Mediterranean (taken from an unpublished internal report made by Ragna Stidsing, 2006; modified by author). (b) Typical appearance of Cypriot Bichrome Wheelmade Ware (photograph by Prof. Michal Artzy).

The often beautifully elaborated painting in red and black gives Bichrome Wheelmade Ware a very attractive appearance (Fig. 1b), which apparently made it requested in the Eastern Mediterranean. Because of its wide distribution and its easily recognizable characteristic decoration, Bichrome Wheelmade Ware can be used by archaeologists as a chronological marker for the LC I horizon, and consequently to correlate time-levels in the Late Bronze Age cultures from various regions in the Eastern Levant. For this reason, a large research-program (part of project SCIEM 2000) is currently being undertaken to solve chronological and distributive questions, with the origin-distinction of diverse types of the ware as one main target of the project. Furthermore, studies on typology and decoration are in progress. The large variety of vessel types and decoration motifs demonstrate that we have to consider the LC Bichrome story as a story of originals and imitations in different places in the region, as was already pointed out in Stockholm in 2001 (Hein, 2001a). In the past, several regions and suggestions for the origin of the Bichrome Ware were suggested. Under discussion were e.g.:

- Northern Syria (Petrie, 1931), Cappadocia (Petrie, 1932) or Cilicia (Petrie, 1934);
- Tell el-ʿAjjul in the Gaza strip (Heurtley, 1939) with the idea, the Bichrome Ware was decorated by only one painter, he called the "Tell el-ʿAjjul Painter" according to the large quantities found at this site;
- A Hurrian origin (inland Syria) was proposed by Epstein (1966), based on the motive, referring to material from Tell Atchana (Alalakh, levels VI and V);
- Cyprus was brought into the discussion by Hennessy (1963) and Trendall (1948);
- Cypriot origin was finally proved with the technical development of analytical methods, by Neutron Activation Analysis from Artzy et al. (1973, 1978). In these studies, it was proved that samples from Megiddo could be of Cypriot origin, as well as locally produced in the Syro-Palestinian region.

The number of Egyptian sites with Bichrome Ware is rather small, and the largest amount so far is found in the Egyptian Eastern Nile delta, at ʿEzbet Helmi (Tell el-Dabʿa), where a palatial area from the late Hyksos period and early 18th Dynasty was found (Bietak, 2005). Until today, a total number of 205 Bichrome Wheelmade Ware sherds/vessels from the site has been registered (excavation ongoing). Looking closely at this pottery, it becomes evident, that several types of fabrics exist. The ware shows different surface colours in the unpainted parts, as well as various types of texture characteristics – from unsorted and gritty to very homogenous.

A first attempt to separate fabric groups by visual analysis under a microscope (5 ware families were distinguished) was presented in 2001 (Hein, 2001b). This preliminary work clearly showed the necessity of more intensive analytical investigations, whereas in particular ware-group 3 from Tell el-Dabʿa was questionable in the debate of provenance. These finds show a macro- and microscopically resemblance to Egyptian Nile clay, although most of the sherds belong to vessel types (such as jugs or kraters) of non-Egyptian origin. The general appearance of ware group 3 (at present 34% of registered Bichrome Wheelmade Ware specimen from Tell el-Dabʿa) is mainly reddish-brown (Munsell: 2.5YR 6/4–6) and less varying to reddish-yellow (Munsell: 5YR 6/6). It has a macroscopically fine, quite homogenous but porous paste. In field observation, fine organic fibres are occasionally visible as well as few red grits and some fine black grits. The surface of the pieces is pebble-burnished and the fragments break hard. The interior surface is mostly more reddish brown, but this colour range depends on the sherds position. The