**COMEX - Final Publishable Summary Report**

The world of the Late Bronze Age Eastern Mediterranean provides us with some of the first evidence for the regular, bulk movement of commodities between regions and states. Ceramic transport jars, the precursors of the later ubiquitous amphora of Classical, Hellenistic and Roman times, are of great importance in reconstructing and understanding this movement of goods in its economic and social context. This study concentrates on two of these jar types. Firstly, Transport Stirrup Jars (TSJs) which have attracted interest due to some bearing Linear B inscriptions made before firing, are of great importance in investigating the relationship between the Mycenaean world of the Greek Mainland and what we refer to as the Minoan world of Crete. The second, rarer type of jar is the Canaanite Amphora (CTA) which have their origin on the Levantine coast, in different contexts from domestic deposits to cargoes of some of the shipwrecks found off the coast of Greece and Turkey. Both these jar types were used to transport and perhaps to store liquid commodities in bulk, at least some containing high-value perfumed oil (suggested for the TSJs) and other containing olive oil or Terebinth resin (CTAs).

The study of the TSJs have another wider interest in terms of the methodology of archaeological ceramic analysis, as the jars comprised one of the first set of material analysed by chemical methods in the early 1960s, with the conclusions of such analyses refined since then, as petrography has emerged as major tool for the archaeological scientist and formed a successful integrated approach with chemical analysis, most recently with neutron activation analysis (NAA).

A recent monograph study of TSJs (Haskell et al. 2011) and a study of both types of jars from the important Bronze Age harbour of Kommos in Southern Crete (Day et al. 2011) suggested that:

* the majority of the vessels examined originated in Crete and were transported to the mainland Mycenaean world and throughout the Eastern Mediterranean;
* inscribed TSJs and those with light on dark decoration come mostly from West Crete while those with octopus, or double, deep-wavy-band decoration may originate from Central Crete;
* there were site-specific exchange routes and links (e.g. Central Crete and Mycenae; West Crete and Tiryns);
* mainland TSJs appear in a finer fabric, more globular in shape than Cretan products.
* there were more centres of production identified within Central Crete.
* the CTAs originated in a variety of production centres along the Levantine coast, with many from the Ras Shamra/Ugarit area of coastal Syria.

The present project aimed to test previous hypotheses about the provenance of imported vessels in the Mycenaean world and to illuminate commodity exchange, through the detailed analysis of maritime transport containers of LHIIIB-LHIIIC date in the Argolid. The major citadel of Tiryns (a coastal centre in the Bronze Age) and the citadel of Midea, a neighbouring fortress settlement, slightly inland from Tiryns, were chosen for the study. The research was based on the integrated petrographic and chemical analysis of TSJs (n = 136), CTA (n = 17) and other pottery types (39 samples) from the major deposits at the citadels of Tiryns (148 samples) and Midea (45 samples), to answer questions on their provenance and, in some cases, their technology of production.

Most of the material from Tiryns comes from dumps of the final destruction of the Mycenaean palace, dated to LHIIIB2, while some materials coming from the Lower Town are dated to the LHIIIB2-LHIIIC, samples from Midea come from contemporary, well dated contexts. The establishment of these dates, published in COMEX’s first project publication (Kardamaki et al. 2016) is important, as it represents a period *after* the destruction of the palace of Knossos on Crete and the date of the administrative documents in Linear B at that site.

All 193 were at first characterised and grouped through thin section petrography according to standard procedures. All the TSJs have been compared to Sheffield’s archive of petrographic sections, which are comprehensive in their coverage of TSJs and substantial in terms of relevant pottery from both the Minoan and Mycenaean worlds. A sub-sample of 169 vessels was selected for further, chemical analysis by NAA. The elemental data generated were compared with the ‘ceraDAT’ database of Aegean and Eastern Mediterranean ceramics, in collaboration with NCSR ‘Demokritos’ in Greece, in order to obtain further information on provenance. This multi-analytical approach combining petrography and chemistry produced clear, compatible grouping of the vessels analysed and, in most cases, confident attributions of the location of production of the jars.

Seventeen Canaanite amphorae from Tiryns have been analysed and compared to similar, slightly earlier CTAs from Kommos. The CTAs only occurred in dumped material from the palace itself at Tiryns, perhaps suggesting restricted access to these jars and their contents. Consistent fabric groups have been identified and, in a productive collaboration with P. Waiman-Barak of the University of Haifa, their provenance suggested. Most of the fabrics here come from the region between Haifa and Achziv and from the Carmel coast, just south of Tyre. Those from northern regions (coastal Syria and coastal northern Lebanon) are related to the volcanic and ophiolite complex of northern Syria, but differ from the common ophiolite fabric usually associated with Ugarit/Ras Shamra, which was predominant in the immediately preceding period. This new evidence may demonstrate an interruption of links with Ugarit/Ras Shamra, which fits with epigraphic evidence of an order banning Aegean ships from that harbour, and a more general shift towards southern locations, close to Tyre, which became the dominant centre of the later Phoenicians.

The study of TSJs identified a large number of fabrics and revealed a picture which supplements previous studies in important ways, and in some cases contrasts markedly with those:

A wide range of sources for the jars have identified with a high level of certainty, including those from Crete, the islands, Mainland Greece and the Asia Minor coast:

* Despite previous analysis of material from Tiryns showing an almost exclusive importation of TSJs from West Crete, this study show that the proportion of TSJs of Cretan provenance shoes from Central and West Crete are roughly evenly represented, while there are also imports of small numbers of TSJs from East Crete.
* All Central Cretan TSJs belong to one fabric, from West Mesara (Kommos, Ayia Triada and Phaistos) while all identified West Cretan examples seem to be from the Chania Plain, but in two different fabrics, from two different workshops. This enables re-classification of vessels analysed over the last twenty years and has major implications for understanding literacy and administrative structure in West Crete at the end of the Bronze Age..
* Mainland products were recognised, from the Peloponnese (Corinth?), Attica (Kontopigado) and a local production of Cretan-style jars following Cretan-technology (movement of craftspeople?) was identified at Tiryns and Midea. Another, well represented fabric at both sites may have links to Lakonia.
* Finally, Aegean Islands imported jars (two fabrics from Kythera) and from Asia Minor/Kos were detected.
* The provenance of some vessels characterised (TSJs, CTA and others) remains unknown.

This study has substantial implications for our understanding of political relationships between Crete and the Final Palaces of the Mycenaean mainland. TSJs are not found in numbers in all Mycenaean and Minoan sites, but only in very specific locations; this, together with the presence of Linear B Inscriptions on some, suggests that they had a special meaning, related to the control of resources and the exercise of political power. The project has demonstrated that imports from Crete at were common at Tiryns and Midea even after the fall of Knossos on Crete and in the final phase of the Myceanean palaces of the mainland. In addition to well-documented imports from West Crete, it has also identified a second key source of Cretan jars from the Western Mesara. This has wide-ranging implications for our understanding of the political and economic structure of Crete in the latest phase of LMIIIB. The identification of TSJs of canonical form produced in a variety of production centres in Kythera and the Peloponnese opens an entirely new chapter of examination of trade relations between Mycenaean polities, while the finding of a local Argolid workshop producing jars not only of Cretan style, but of Cretan forming technology suggests the mobility of potters working for the Bronze Age elites at this time.

**References**

Day P.M., Quinn P.S., Rutter J.B., Kilikoglou V., 2011. A world of goods: transport jars and commodity exchange at the Late Bronze Age harbor of Kommos, Crete. *Hesperia* 80, 511–558.

Haskell H.W., Jones R.E., Day P.M., Killen J.T., 2011. *Transport Stirrup Jars of the Bronze Age Aegean and East Mediterranean* (*Prehistory Monographs* 33), Philadelphia.