George Papasavvas

Revista d'Arqueologia de Ponent
n·14 2004

Cypriot bronze stands and their Mediterranean perspective

S'analitzen detalladament els trípodes de barnilles i els suports amb rodes, tot plantejant la seva funció i tipologia, cronologia, tallers de fabricació i, molt especialment, la seva tecnologia. Contra el que s'ha dit usualment, es defensa una manufactura amb motlles de cera compostos que permetien la fosa de la peça completa, en una sola operació. Es relaciona la transferència d'aquesta tecnologia i dels tipus amb el comerç xipriota de metall (coure i estany).

Paraules clau: trípodes, suports de rodes, tècnica de la cera perduda, Bronze Final-I Edat del ferro, metal·lurgia xipriota, tallers cretencs i occidentals.

Road-tripods and wheeled stands are re-studied, examining its typology and function, chronology, workshops and, especially, technology. It is claimed that wax models are composite ones and, then, tripods and stands cast in one piece. Transmission process of this technology and typology is related to Cypriot metal trade (copper and tin).

Key words: tripods, wheeled tands, lost wax technique, Late Bronze Age-First Iron Age, Cypriot metalworking, Cretan and Western workshops.

Introduction*

The bronze rod tripods and four-sided stands from Cyprus occupy a central position in the reconstruction of the island's history and the expansion of its commercial activity in the Mediterranean during the late second millennium BC On the one hand, these artifacts, more than any other product of the Cypriot workshops, testify to the highly developed bronzeworking tradition of Cyprus; and, on the other, they document the role of the Cypriot smiths in the dissemination of metalworking traditions outside the island through the transmission of their form and technique to the East and the West, as both stand types were incorporated into the metalworking traditions of the Syro-Palestinian coast, the Aegean and even Sardinia further to the west, as early as the Late Bronze Age. While these stands were cast with the same methods

* This article was written after an invitation of Prof. Núria Rafel Fontanals, whom I would like particularly to thank for her interest. It is basically a summary, without changes in the original conclusions or argumentation of the results, of my monograph on bronze stands from Cyprus and Crete, which was published in Greek (PAPASAVVAS 2001). Parts of this article, especially the discussion of the technology, have also been discussed in Papasavvas *in print*.

as the examples from Cyprus, they evince important structural peculiarities that separate them from the Cypriot works and attest to the existence of other Mediterranean traditions in stand manufacturing, following the leading Cypriot workshops.

Cypriot rod tripods (fig. 1) and especially four-sided stands (figs. 2-6) are frequently mentioned in the archaeological bibliography as some of the greatest masterpieces produced in the Mediterranean. They are considered to form the "...greatest technical masterpieces of bronzework of any period during the Late Bronze Age in the East Mediterranean" (CATLING 1984, 88), and to "....represent some of the most impressive bronzes produced in the ancient world during the second half of the second millennium BC" (MUHLY 1996, 54). Stands from Cyprus, as well as stands from Crete have been discussed by H. W. Catling, B. Schweitzer, Cl. Rolley and H. Matthäus, and in a large number of articles concerning Late Bronge Age and Early Iron Age Cyprus, but only as part of a much larger corpus of bronzes. Problems of technique, use and provenance of the two types and the identification of workshops have only been touched upon briefly or not at all. Chronological evidence provided by the stands themselves has been overlooked, while the transmission of the stands from Cyprus to other production centres remains essentially unexplored. This article examines issues of the manufacture, chronology, typology and function of the stands in order to approach the central questions of how, when and where their transmission from Cyprus to other areas was effected.

The rod tripods and four-sided stands found in Cyprus, at sites such as Enkomi, Kourion, and Palaepaphos, the Syro-Palestinian coast, such as Megiddo, Beth-Shan and Tel Nami, and various places in the Aegean, especially on Crete but also on Thera, Rhodes, Samos, Tiryns, the Pnyx and Delphi comprise to a corpus of 63, possibly 65 examples, preserved intact or in fragments. Regardless of provenance, 38 out of 63 stands (PAPASAVVAS 2001, nos 1-34, 59, 64-65, perhaps 67) are to be connected with the Cypriot and 23 with the Aegean, more specifically Cretan, tradition (PAPASAVVAS 2001, nos 37-58, 66). Two closely related ring-stands from Cyprus (PAPASAVVAS 2001, nos 35-36) complete the catalogue, augmented by two probable bronze stand fragments (PAPASAVVAS 2001, nos 60-61) and two moulds (PAPASAVVAS 2001, nos 62-63), used in stand production. Four of the above are too fragmentary to be ascribed with any certainty to a particular stand type (PAPASAVVAS 2001, nos 32-34, 59), while 23 are rod tripods (PAPASAVVAS 2001, nos 1-21, perhaps also nos 65 and 67) and 11 are four-sided stands (PAPASAVVAS 2001, nos 22-31, 64). At least five of the four-sided stands are wheeled (PAPASAVVAS 2001, nos 27-31), while the others rest on feet. They come from tombs, sanctuaries and hoards, and their contexts span the Late Cypriot IIC to Cypro-Geometric II periods. It must be emphasised, however, that a great many have no known provenance.

Any discussion of dating problems must take into account the stands of Cypriot type found in the Aegean (e.g. fig. 18). Of the 29 rod tripods and four-sided stands found at Aegean sites, 23 are products of Cretan workshops (PAPASAVVAS 2001, nos 37-58, 66), while the remainder (PAPASAVVAS 2001, nos 8-9, 26, 32, possibly also nos 18 and 67) are Cypriot exports to the Aegean. Twelve of the Cretan examples are rod tripods, while the rest belong to the four-sided type. Immediately noticeable is the great concentration of finds on Crete, where ten of the 12 rod tripods and five of 11 four-sided stands have been found (PAPASAVVAS 2001, nos 37-39, 41-45, 47 and 48-50, 54, 56; see also the entries in MATTHÄUS 1985, 304-306 and Rolley 1977, 115-119). At least four of the remaining six four-sided stands from the Aegean (five from Delphi, one from Rhodes; see PAPASAVVAS 2001, nos 51-53, 55, 57-58) can be definitively attributed to Cretan bronzeworkers due to morphological peculiarities, as compared to the Cypriot examples, as well as to iconographic and stylistic affinities. Stands from Crete and other Aegean sites occur in tombs (PAPASAVVAS 2001, nos 9, 37, 39-41, 44-46, 49 and the Cypriot no. 26), with a concentration in the Knossos area, and also at sanctuaries (Syme Viannou, the Idaean Cave, the sanctuaries of Zeus at Amnisos and Palaikastro, Delphi, the sanctuary of Athena at Ialysos and the Samian Heraion; PAPASAVVAS 2001, nos 38, 42-43, 47-48, 50-58, 66-67). Contexts, wherever available, indicate a date in the Early Iron Age (see PAPASAVVAS 2001, Maps 2-3 and Table 2). Although typologically dependent on the Cypriot works, the Cretan stands are also distinguished by several features, consistently repeated, which are unparalleled in the examples from Cyprus, thus leaving no doubt that the former do originate in Aegean workshops (SCHWEITZER 1969, 174-180; ROLLEY 1977, 131-132; MATTHÄUS 1985, 308, 328-329, 347; PAPASAVVAS 2001, 158-205). There are, however, some notable exceptions, such as the Tiryns and Pnyx (fig. 1) rod tripods (CATLING 1964, 194, 195, nos 6, 10, pl. 28a-b; PAPASAVVAS 2001, nos 8-9) and the four-sided stand from Tomb 201 at Knossos North Cemetery (COLDSTREAM, CATLING, eds., 1996, 194, 517-518, pl. 276; PAPASAVVAS 2001, no. 26).

The stands found at the Syro-Palestinian coast are examined in connection to the Cypriot ones and counted with them, not only because some, such as the stand from Tel Nami (PAPASAVVAS 2001, no. 5), are undoubtedly Cypriot products, but also because they stand very close to the Cypriot tradition, to the point that, in some cases, such as the case of the stand from Bet Shean (PAPASAVVAS 2001, no. 19; see also nos 24, 31), there can be no definite conclusion whether they were locally cast or imported from Cyprus. On the other hand, the stands from Sardinia, although typologically and technologically depended to the Cypriot examples, stand clearly apart from them, due to their morphological divergence. Thus, they are not included in the enumeration above and should be considered as a closed group (see below).

Typology and function of the stands

Common function and other similarities, such as in technology, as well as structural, iconographic and stylistic interconnections, and their expansion

from Cyprus across the Mediterranean, indicate that rod tripod and four-sided stands should be discussed jointly. Rod tripods are simpler than four-sided stands, with three feet of various forms supporting a ring, which can be decorated with elaborate scenes or simple motives, such as ridges, spirals etc. Four-sided stands are composed of a rectangular part, constructed of horizontal, vertical and diagonal struts, mounted on feet or wheels and crowned by a ring. The construction results in an open, box-shaped rectangle with free fields that accommodate an elaborate decoration. These fields are usually decorated with figures, almost always executed *à jour*, which can depict such complex scenes as processions with gift-bearers and musicians, chariots, fights between lions, bulls and griffins, or isolated figures such as lions and sphinxes (figs. 2-4, 6, 11, 13-14).

The use of the stands is defined by their ring, whose form leaves no doubt that vases were intended to be placed upon it. Vases, which were placed upon stands either because they did not possess bases of their own, or because they (or their contents) had to be elevated, literally as well as metaphorically. In fact, the elaborate appearance of the stands and their technological superiority transformed them from mere utensils to prestigious masterpieces and their development on Cyprus testifies not only to the abundance of the metal but also to the innovative creativity of Cypriot smiths and to an extremely well-mastered technology. While their name reveals their practical, accessory role in the support of other objects, their impressive appearance and time-consuming production suggest that they were not appreciated purely for their functional role. As luxurious products and as carriers of elaborate scenes, some of which seem to contain a cultic meaning, they must have been charged with a special significance, dictated by the circumstances in which they were used, including religious or social activities. The relatively large number of stands without provenance and the particular circumstances of the recovery of many of them (PAPASAVVAS 2001, 329-330 Table 2), represent a serious impediment in trying to specify further these activities. It must be stressed that most of them come from tombs or hoards, while none was found in a clearly cultic context. This is not to deny that stands were used in cult, on the contrary. The particular contexts of each stand mark only a specific point in the history of each one of them, that tended to be treasured over long periods of time. The stand found in a tomb at Pnyx (fig. 1; PAPASAVVAS 2001, no. 9), for example, dated by the ceramic offerings around the middle of the 8th century, is in fact a product of the Late Bronze Age of Cyprus, as close morphological similarities with Cypriot stands show (cf. CATLING 1964, nos 10, 12, 35, 45). Its last use in an Athenian Geometric grave erased all other use or uses it might have had in the time and space elapsed between Late Bronze Age Cyprus and Late Geometric Athens. As to the types of vessels involved, none of the very few stands that have been excavated scientifically has been found with a vase. In tombs, though, stands are often associated with bronze *phialae*, which are suitable for such supports and at the same time comprise one of the most common categories of Cypriot bronzes. The main question, however, does not address the function of the stands, since every ring would accommodate any kind of vase, but what the contents of such a vase would be. Stands by their nature permit a great variety of uses, since the vases they supported were separate units, totally independent. Their contents need not remain the same and could vary, from place to place and even from period to period: liquids, such as water or wine or burning incense. Consistent contents would determine the type of vessel placed upon the stand (PAPASAVVAS 2001, 125-135).

Rod tripods and four-sided stands are works of Cypriot inspiration. The former are the Cypriot version of a type of tripodic supports circulating in the Near East in the second millennium BC. Tripods of various types, some structurally similar to Cypriot rod tripods, existed in many places and times other than Late Bronze Age Cyprus. The earliest examples close to the Cypriot type are 19th century clay tripods from Karum Kanesh (Kültepe) and Hattusha and a bronze example from Alalakh (Tell Atchana), from a stratum dating between the 16th and 14th centuries. However, the earliest contexts producing Cypriot stands are of the 13th century. The great chronological and geographical dispersion reveals the wide routes that the tripod followed before being introduced to Cyprus, where it was enriched with new characteristics and frequently reproduced. While the type had a long history in the Near East, it is only on Cyprus that it was consolidated in a specific medium and form and acquired certain features consistently present in every example, resulting in the local version of the tripod, involving many workshops and establishing a new tradition that was to affect the traditions of other cultures (PAPASAVVAS 2001, 135-140).

Four-sided stands have no typological precursors in the bronzeworking of Cyprus or of any other region. They are rather the transformation in bronze of luxurious furniture pieces, that is ivory-decorated tables with similar rich, cut-out figures, such as beds, chairs, stools and tables. Many structural details of the stands replicate those of wooden furniture, including some pieces used as vase-supports or tables. Vertical and horizontal struts connecting at right angles recall the practices of carpentry, while the diagonal struts between the legs, the trapezoidal form of some stands (e.g. PAPASAVVAS 2001, no. 28) or the box-shaped rectangle (e.g. PAPASAVVAS 2001, no. 25), reflect structural peculiarities in pieces of furniture. Even *ajourée* decoration evinces influence from furniture decorated with cut-out ivory reliefs. Although no such furniture has survived complete on Cyprus or in the Aegean, its existence is proved by the ivory fragments provided with tenons to be fitted into wooden parts and by references in the Linear B tablets (VENTRIS, CHADWICK 1959, 240-246; POURSAT 1977, 257-261; for Cyprus see KARAGEORGHIS 1985). A wooden table decorated with ivory scenes would not differ greatly in structure and appearance from a bronze four-sided stand (figs. 2-4; PAPASAVVAS 2001, nos 27-29). This resemblance also explains the much discussed relationship between ivories and the *ajourée* decoration of stands (CATLING 1964, 209; POURSAT

1977, 240; ACHILLES 1981, 278; PAPASAVVAS 2001, 49, PAPASAVVAS 2001, 140-151).

Wheeled stands are often assumed to be miniature originals of much larger prototypes, which would needed wheels in order to be moved around. This assumption is based on the obscure and philologically dubious references of the Bible on large wheeled constructions carrying vases and standing in the Temple of Salomon in Jerusalem. However, neither the typological analysis nor the technological issues of the Cypriot stands support this association (PAPASAVVAS 2001, 146-149). Wheels are not necessarily consequent to large dimensions, since the transport of even a medium-sized object is greatly facilitated through their addition. As stands have no handles or other means to facilitate carrying, it would have been much easier and safer to move them on wheels, especially when they were loaded with a vase brimming with liquid or burning material. Thus, even if there are indications that there existed stands of greater size than those surviving (PAPASAVVAS 2001, no. 27 is the tallest preserved from Cyprus, measuring *ca* 0,40m in height, while a Cretan stand (PAPASAVVAS 2001, no. 48) must have stood around 0,75m), it does not mean that there were also examples of monumental scale. Even the smallest stands (e.g. PAPASAVVAS 2001, no. 30), where wheels are of no use, have also acquired this feature from larger, although not necessarily monumental, stands, for matters of typological consequence.

The Chronology of Cypriot Stands and problems of workshop attributions

Since stands serve as a starting point for scholars assessing the high standard of metalworking achieved in Cyprus in the Late Bronze Age, the chronological definition of the material is part of the endeavour to analyse Cypriot bronze industry as a whole. Although it is not entirely possible to reconstruct a complete history for the stands on the basis of the known material, the introduction of these technologically and typologically advanced artifacts in Cyprus is a landmark in the island's metalworking tradition. The surviving examples reveal the two types in an already established form, since all demonstrate the same structural features. Because of the peculiarities to be mentioned below, their chronology will focus on a period by which they were already an established tradition in the local workshops, and not on their inception, a period for which we can only suggest a broad *terminus ante quem*.

During the Early and Middle Bronze Ages, Cypriot bronzeworkers were following the lead of Syro-Palestinian workshops, producing a rather conservative and typologically limited metalwork (PHILIP 1991, esp. 87-96). Change set in by Late Cypriot I and was well underway by Late Cypriot II. Therefore, the appearance of the stands during Late Cypriot IIC, as it will be argued below, has to be considered as the peak of a longterm process, identified by a flourishing production and, subsequently, by a greater number of preserved examples. It should be taken as granted that the technological virtuosity demonstrated by the stands, as well as by some other Cypriot bronzes, such as the Ingot God and the Horned God from Enkomi (MUHLY 1980), could not have been achieved without phases of experimentation and of resolution of casting problems. These masterpieces do not reflect a technology in its infancy, but rather one well-mastered. However, the fact that a great part of our knowledge on Cypriot metalworking relies upon hoards, that is on heterogeneous collections consisting primarily of damaged bronze artifacts removed from the environment of manufacture and use, should warn us that any picture that we have formed of this branch of Cypriot art must remain open to revision.

Many of the stands are deprived of any provenance data, while even the excavated examples have some particular chronological problems (PAPASAVVAS 2001, 94-114). Pottery found with stands in tombs or settlements has influenced their dating. The upper chronological limit was fixed around 1200 BC on the basis of associated late Late Cypriot IIC or early Late Cypriot IIIA ceramics (mostly *Mycenaean IIIC1:b* pottery). This is why stands are usually dated either to the 13/early 12th cent. BC, to the late 13th/early 12th cent. BC, to the 12th cent. BC alone, or, simply, to Late Cypriot IIC- Late Cypriot IIIA (see ACHILLES 1981; CATLING 1984, 78-82; MATTHÄUS 1985, 321, 327; LAGARCE, LAGARCE 1986, 94; MUHLY 1996, 54). At the other end, stands found in tombs dated by ceramic finds to the 11/10th centuries were interpreted either as the continuation of the tradition into the Early Iron Age or as Bronze Age heirlooms (see CATLING 1984). This discrepancy demonstrates for that matter the inappropriate use of pottery for dating stands, since, on one hand, it is considered a reliable criterion for pinpointing the upper chronological limit of their production, while, on the other, it is excluded from dating the examples with Early Iron Age contexts. It has to be remembered, that pottery and bronzes are categories with different technique, use, durability and grade of tendency to be treasured. Moreover, no stand said to be related by its context to *Mycenaean IIIC1:b* pottery has ever been found in *close* association with pottery of this type. Some have actually been found on sites *abandoned* at this time, and the date of the abandonment is often transcribed as the date of the stands, although it only marks a pause in their use and circulation. In any case, the stands with contexts dating to this period actually represent a small fraction of the corpus. Of the 38 examples found on Cyprus (PAPASAVVAS 2001, nos 1, 3-4, 6-7, 10-17, 20, 22-23, 25, 27, 30, 59, including the ring-stands nos 35-36), or of those that can be related through structural analysis to Cypriot workshops (PAPASAVVAS 2001, nos 2, 8-9, 11, 18-19, 21, 26, 28-29, 32, 35-36, 64, perhaps also 66-67), even if they have been found off-island or are of unknown provenance, only eleven derive from a context that can be loosely associated with the end of Late Cypriot IIC and the beginning of Late Cypriot IIIA (PAPASAVVAS 2001, nos 4-6, 11, 16-17, 22, 33-36). Of these, only three rod tripods (PAPASAVVAS 2001, nos 4, 16-17), one four-sided stand (PAPASAVVAS 2001, no. 22) and the ring stands (PAPASAVVAS 2001, nos 35-36), have survived complete or substantially so, supporting the suggestion that they were cast or

used at this time. If the appearance of *Mycenaean IIIC1:b* pottery on the island would also mark the introduction of the stands, we should expect that the stands belonging to this phase would appear in context and in good state of preservation, that would imply they were in use during the same period. Even in the case of these examples, the associated pottery was not found in close proximity to the stands, but in the tombs or settlements where the stands were found, where it corresponded to the last period of habitation or use.

Several stands come from hoards (PAPASAVVAS 2001, nos 5-6, 11, 103-110), notorious in their difficulty of dating (KNAPP, MUHLY, MUHLY 1988). This provenance is often used as a criterion for dating, as there has been a tendency, not always substantiated, to date these collections of bronzes to ca 1200 BC. Very often, the arguments for dating the hoards and the stands are circular, since hoards are also dated by associated pottery or through association to contemporary disasters. Moreover, it must be emphasised once again that the date of manufacture of a bronze artifact does not coincide with that of its final use or deposition in a hoard. The latter only provides a *terminus ante quem* for the contents of a hoard, since some time of unknown length must have elapsed between their production, use, destruction and/or deposition (cf. MORRIS 1989).

The correlation of the years *ca.* 1200 with *Mycenaean IIIC1:b* pottery, considered in earlier bibliography as an innovation of the Late Cypriot IIIA period, and with hoards, engendered a historical approach to this period that was extended to include stands. The abandonment of some Cypriot settlements around this period seemed to be connected to the recession of Cypriot wares of long standing, such as White Slip and Base-Ring. The introduction of stands to the repertoire of Cypriot bronzeworkshops was thus considered a related phenomenon and their chronology relied on this assumption. Aegean type *IIIC1:b* pottery marked a turning point, leading to the belief that the Aegean was the most probable source of the stands, in type and technology, though it was recognised that once introduced, the tradition flourished in Cypriot hands. As early as 1965, Desborough cast doubts on this reconstruction, In the last two or three decades, and after long discussions on the date of the *Mycenaean IIIC1:b* pottery, a general consensus has been reached, according to which this type of pottery started to be produced before the abandonment of the Late Cypriot IIC sites and is to not to be connected with them and not exclusively with the years after *ca*. 1200 BC (KLING 1989). Since the dating of the stands depended largely on the dating of this pottery, the immediate response to this agreement was to date them a little higher, that is the concluding decades of the 13th cent. BC (see ACHILLES 1981; MATTHÄUS 1985, 346). This, in fact, is not a contribution of any importance to the problem, as it only alters insignificantly the chronological range of the stands. Although pottery cannot altogether be dismissed as a chronological anchor for dating the stands, it can only provide a *terminus ante* or *ad quem* for the stands use, not for their manufacture. At the same time, the technological superiority and the typological complexity of these works leave no doubt that their production cannot only be a matter of some decades, but should be seen as a process including phases of experimentation and crystallization, leading to the establishment of a tradition and overlapping more than just one generation.

As aknowledged already in 1980 by Muhly, the floruit of Cypriot metalworking reflected directly the abilities of the Cypriot metalworkers themselves. The suggestion that the tradition of stands was inaugurated under strong influence of Mycenaean bronzeworkers is disproved, and the issue of an indigenous thriving Cypriot bronze industry and of experienced bronzeworkers capable of producing whatever they wanted has been brought forward. In fact the stands owe very little, if anything, to the Aegean bronze industry, since neither the type, nor the technology were present there, while the iconographic similarities are only due to the participation of the smiths in the so called *International Spirit* (cf. CROWLEY 1989).

A firmer chronological basis is secured through iconographic and, mainly, stylistic comparison of the stands' reliefs and the scenes on Cypriot seals, especially the cylinder-seals of the *broad shouldered group* dating to the 13th century (fig. 16; PORADA 1981, 19; WEBB, FRANKEL 1994, 12-13; see also below), as well as on Cypriot pithoi with relief bands (PAPASAVVAS 2001, 119-124). Seals are no easier to date than the stands, as they also tend to be treasured for centuries. However, the seal group to which the stands show the closest similarities, the *broad-shouldered group*, is dated by specialists to the 13th cent. BC (PORADA 1973, 264; 1981, 19), thus providing a good reference for the date of the stands as well. Similar dating problems prevail in the case of the pithoi with relief bands, but sherds of this type are often associated with contexts of the late 13th/early 12th cent. BC (fig. 17; WEBB, FRANKEL 1994, 12-13), a fact that should allow at least the 13th century as the period for their manufacture and use, before they would be broken and discarded later in that century or the following (for the seemingly strange connection of stands, seals and pithoi, see below).

Concerning chronology, two more problems are apparent: first, the longevity of the stands in the Cypriot workshops, and second, the date of the transmission of their types and technology beyond Cyprus. The lower chronological boundaries of the stands are not less difficult to define. Five rod tripods found in the cemeteries of *Skales* at Palaepaphos and *Kaloriziki* at Kourion (PAPASAVVAS 2001, nos 3, 7, 12, 14-15) are associated with contexts of the Early Iron Age, spanning the period from Late Cypriot IIIB to Cypro-Geometric II. This concentration in a geographically confined region, in just four tombs from two cemeteries, is somewhat curious and could be attributed to special circumstances, perhaps connected to looted earlier tombs. Moreover, at least three were manufactured at a much earlier date prior to their deposition (PAPASAVVAS 2001, 78-80, 110-111). One of these (PAPASAVVAS 2001, no. 3), found with pottery dated to the Cypro-Geometric I period, was in fact produced in a workshop active in the 13th

cent. BC. A second one (fig. 10; PAPASAVVAS 2001, no. 7), dated by the ceramic finds of the tomb to the Late Cypriot IIIB period, has its counterpart in a tomb with finds of the Late Cypriot IIIA at the latest (fig. 5; PAPASAVVAS 2001, no. 22). A third example (PAPASAVVAS 2001, no. 12), associated with Cypro-Geometric I pottery, but heavily repaired in Antiquity, was probably in circulation long before its final deposition.

Although from a methodological point of view there is no good reason for using these examples as strong arguments for the continuation of the manufacture of stands on Cyprus in the early 1st millennium, this is not meant to deny the continuation of the manufacture of stands in the Cypriot Early Iron Age. The claim that the Cypriot bronze workshops ceased to flou- rish after the middle of the 12th cent. BC is strongly attacked (see CATLING 1984 and cf. MUHLY 1980; 1988, 333-336; 1996; also BAURAIN 1980, 578-579), and there seems to be no obvious reason why the Cypriots would be deprived of such an attractive artifact. Cypriots were the inventors of the stands and since the island's tradition in bronzeworking did not wane during the transition from the Bronze to the Iron Age and continued to flourish even after the 12th cent. BC and in the Cypro-Geometric period (KARAGEORGHIS 1982), it should be acknowledged that they themselves and not just their Cretan colleagues, continued to practice their skills after the Bronze Age (PAPASAVVAS 2001, 91-93, 190-205). Most of the surviving material seems to relate to the Late Bronze Age, which then must be the period of the *floruit* of the stands, but this does not imply that they ceased to be produced after that period. In this respect, it must also be emphasized that, our information on Cypriot settlements of the Early Iron Age, a potential source of stands, remains minimal. Future excavations could drastically change this picture.

As concerns as the relative chronology of the stands and attributions to workshops, a comparison of the known examples leads to some conclusions, although no single criterion results in valid groupings. It is only the convergence of several in some stands that makes them a reliable basis for the stands' relative chronology. Thus, it is possible that stands with figural relief decoration and composite components belong to a more advanced group in comparison to stands with plainer, rod-like parts. The proportions of the stands could also be used as a criterion for a relative chronology, on the assumption that smaller stands could, in general, be earlier than those of greater dimensions, which required a higher level of technical expertise. Stands that combine plain, rod-like, legs with small size tend to have other common traits, most probably of chronological significance. For example, their outer struts are connected to the legs at a rather low point, having, in other words, almost the same length and importance as the legs themselves. In the larger stands with composite legs and rings, the outer struts are thinner and attached at a higher point, and thus less important to the structure as a whole. Low contact points between legs and outer struts drastically influence the overall proportions of the stands. Thus, the vertical axis of a stand with plain legs and strong outer struts compared with its horizontal dimension, is hardly, if at all, emphasised. Examples of greater size, however, with composite legs and rings and less pronounced outer struts, are of a more elongated form. It is not the size of the stands that distingui-shes them, but rather the relative proportions of ring diameter to total height, that is, the ratio between the vertical and horizontal axes. Statistically, by exa-mining the dimensions of many stands, two corres-ponding series can be established with diameter: height ratios of 1:1 and 2:3 (PAPASAVVAS 2001, 74-93).

The stylistic and iconographic affinities of the stands' relief decoration do not provide adequate criteria for workshop attributions, since they do not relate to the stands' artisans but rather to the seal workshops, where the moulds for these decorations were prepared (see below). Moreover, many stands are composed of rods and bands in various combinations, in themselves not bearing any close morphological identity, and thus obscuring any workshop relationships. A much safer basis for distinguishing workshops is the similarity in the technique of the stands structure and construction, as well as in their proportions. These criteria lead to the identification of at least seven Cypriot workshops producing stands (see PAPASAVVAS 2001, Table 1). In at least two of these, but most probably in all of them, rod tripods were produced alongside four-sided stands. The location of these workshops cannot be ascertained at present, since, although we know the provenances of some stands, these do not necessarily coincide with the places of their manufacture, especially in the case of finds from tombs. Rod tripods nos 3-4 were made in the same workshop (PAPASAVVAS 2001, 78-79), but were found in Palaepaphos-*Skales* and Enkomi respectively. Enkomi must have been one of the most active centres of production, since this is the find place of the only Cypriot four-sided stand with known provenance (PAPASAVVAS 2001, no. 22), of five rod tripods (PAPASAVVAS 2001, nos 4, 6, 10, 16, most probably also 59), of two more pieces (PAPASAVVAS 2001, no. 33-34), too fragmentary to be attributed with any certainty to rod tripods or four-sided stands, and a wheel (PAPASAVVAS 2001, no. 60) possibly belonging to a wheeled stand. One of the two stone moulds used for the manufacture of stands (PAPASAVVAS 2001, no. 62) was also found at Enkomi. The recovery of the second mould (PAPASAVVAS 2001, no. 63) from Hala Sultan Tekke is an even stronger argument for the location of a workshop at that site.

The existing evidence suggests a period of thriving production of stands, centered in several very active workshops, whose products survived over long periods. One of the recognized workshops (PAPASAVVAS 2001, 80-82) produced seven known examples found in temporally diverse contexts. A fragmentary stand (PAPASAVVAS 2001, no. 5) derives from a 13th century context. Two others from 13/12th century contexts (PAPASAVVAS 2001, nos 4 and 6, the last in fragments) and another from a context of the 11/10th century BC (PAPASAVVAS 2001, no. 3), are all products of

another workshop (PAPASAVVAS 2001, 78-89).

The casting technology of the stands

The same technology used to produce the Cypriot stands was duplicated for the manufacture of the rod tripods and four-sided stands produced in the Syro-Palestinian coast, the Aegean and Sardinia. Although of paramount importance for assessing these objects, the technological issues of the stands have not received the attention they deserve, and remain a peripheral subject in most of the studies discussing these works. Only passing references, if at all, have been made in the, otherwise, well documented works of Catling (1964) and Matthäus (1985), and in a number of articles concerning Cypriot metalwork in general, although two more specialised, archaeometallurgical, articles on some stands have been published (see below).

There is no doubt that stands were produced with the lost wax technique, the only appropriate for casting such complex artifacts (for the method, STEINBERG 1968, 10-11). This method would require the manufacture of wax models for every different part of a stand (e.g. ring, legs etc.), exactly in the shape that they should have in the finished work. Unanimity ends, however, when it comes to the description of the exact procedures followed for assembling these different parts in order to produce a stand. This matter is of major importance, since it is directly connected to the technological achievements of the Cypriot smiths.

Two possibilities come into question for reconstructing the procedure used for the manufacture of a stand: The first is piece casting, which would necessitate the separate casting of all parts of a stand, such as the legs, ring, struts etc. with the use of the lost wax method. The bronze parts would then have to be metallurgically joined to each other to form the final product. This is the method preferred in most studies on stands (e.g. CATLING 1964, 190, 192, 203; MATTHÄUS 1985, 300, 301 nos 681, 326). The second possibility also presupposes the making of wax models of all different parts. It differs in that, these parts, instead of being separately cast, would be assembled to form literally a wax stand, exactly in the shape that the final artifact should have. The composite wax model thus prepared was cast in one piece, that is in a single operation. This method is represented only rarely in the bibliography, and even then mostly in order to be rejected with no further discussion, the reason being that casting in one piece is considered as an extremely difficult procedure that would have demanded a highly advanced technology (see, however, MACNAMARA 1984, 3; *eadem* 1985, 36-39 n. 38; MACNAMARA, MEEKS 1987, 60).

Studies favouring piece casting prefer to emphasize that the particularly complex structure of the stands would make casting in one a difficult procedure, demanding a highly advanced technology. They, nevertheless, fail to take into account another aspect of their complex structure, namely the large number of contacting points between the many parts of a stand, that would have multiplied the number of the necessary metallurgical joints. For this matter, piece casting would have rather caused more problems than it could solve. As it will be shown below, it is precisely this method that would have demanded a much more advanced technology than casting in one piece, since it actually requires more technological assistance that the lost wax method offers, that is the application of metallurgical joining. In fact, the application of the lost wax method is not in itself exactly a matter of advanced technology, but a procedure whose success depended on the smith's experience. The alloying of copper, the addition of jets for casting and vents, together with the investment of the wax model with clay, that kept the shape of the desired object in its interior after the wax was lost, are essential to any application of this method, whether for simple or complex objects. In this respect, the necessary technology for casting in one piece even elaborate bronze artifacts with the lost wax method was underway in the Eastern Mediterranean as soon as the Chalcolithic period (see, for instance, the bronzes from Nahal Mishmar in LEVY AND SHALEV 1989, 358).

Piece casting would have been extremely demanding for the smith, who would have to cast separately not just every single part of a stand, but also every component of this part (e.g. each single spiral decorating the ring of stands PAPASAVVAS 2001, nos 7 and 22; figs. 10, 5), then cut off all the jets and vents of these components, solder them or fuse them with each other in many places to produce the main parts, and finally join these parts to each other to form the final product. This needed to be done in a way that would provide absolute contact of all parts, strength and durability, without causing any damages on the joining areas, despite the application of extreme temperatures required for metallurgical joining. That the stands were assembled in a way that offered them strength, is proven by the fact that in fragments of stands combining two different parts, such as the ring and legs, breaking has in no case occurred on the joint itself (e.g. PAPASAVVAS 2001, nos 11, 18 figs 18, 30). At the same time, care should be taken so that each part was joined in its right position and angle in relation to its adjacent parts. As metallurgical joints cool down immediately, any wrong positioning, not unexpected in so many different components, could only be corrected by either disconnecting or deforming the joined parts. On the contrary, the assemblage of separate wax models to form a composite one is undoubtedly much easier. Any mistakes in assembling could be easily corrected due to the elastic properties of the wax used for the models (*cf.* MARYON 1949, 103-105; STEINBERG 1968, 11). Thus, if the grade of difficulty is the only criterion for the identification of the method used for the stands, it is clear from the beginning that piece casting was not offering a better alternative.

There are other difficulties in accepting the use of piece casting for the stands, that become apparent as soon as one tries to describe the exact way of how to join metallurgically two parts. Metallurgical joining is based on the presence of molten metal on the joints of the two parts and is the result of an, at least, superficial fusion of the contacting metallic

surfaces. Such joining would have been effected either by soft soldering, hard soldering, also called brazing, or fusion welding. The first two require the application of a soldering alloy on the joints, also composed of copper and tin or lead, that has a lower melting point than the parts to be joined (MARYON 1949, 107-110, 113; COGHLAN 1951, 96-98). In soft soldering, the alloy has a much lower melting point, and it must be excluded from the beginning, since it would not provide the joints with the necessary strength. Although hard soldering results in stronger joints, depending on the closeness of the melting point of the solder to that of the bronze parts to be joined, the soldering alloy still has a lower melting point, and only adheres to these parts without fusing them. This means that, it could not wet sufficiently the metallic surfaces in order to unite them metallurgically. Hard soldering is actually connected with so many problems, that some scholars argue that it was not used at all before the Iron Age (see HAYNES 1992, 98).

For even stronger joints, the melting point of the alloy used for joining should be higher than of the alloy used to cast the bronze parts, so as to wet the joints and weld them. This is the method called *fusion welding*. Another version of this method does not require the use of a soldering alloy, but the application of extensive heat on the joints, with the same result (MARYON 1949, 104-105; STEINBERG 1968, 11). The success of this method would be secured only if it was feasible to retain a continuous flow of the soldering alloy or a continuous emission of heat on the joints.

As this brief description shows, both hard soldering and fusion welding cannot but leave traces of their application, since they involve the use of intense heat and the melting of metals. These traces would appear on the joints in the form of, however small, irregular overflows of the soldering alloy, or damages of the outlines and of the metallic surfaces. Such traces are missing from the stands, and this cannot be explained by assuming that their surfaces were polished after joining, since the outlines of the joints and their adjacent surfaces would also have been affected by polishing.

There are further practical problems connected with metallurgical joining and its assumed use for the stands. For example, it is not clear how it would have been possible for an ancient smith to apply the soldering alloy on the fine joints of these works at a sufficient temperature and for a prolonged period of time. Metallurgical joining cannot be instantly effected, because of the high melting point of bronze, while any alloy would rapidly cool if not continuously heated. Moreover, the hot bronze surfaces have the tendency to oxidize rapidly, preventing other alloys from fusing with bronze, or to draw away from each other when they fuse, as the thinner parts melt first (MARYON 1949, 103-105). Although some of these problems could be overcome with the use of fluxes, they still were making metallurgical joints a very difficult task. Furthermore, since the extent of the joints of the stands is very limited, the amount of the soldering alloy that could be applied between them would be equally restricted and would not suffice to produce a strong metallurgical joint. And yet, had the stands been soldered together from various parts, this time-consuming procedure would produce only one joint per time and would have had to be repeated many times, as many as the joints of a stand. In casting in one piece, however, even the finest joints would be very strong, since then they would form a continuous metallic mass.

Some archaeometallurgical researches of stands conducted in the past brought some evidence in favour of casting in one piece. Their results were rather ignored, probably because they only tested a small number of stands. Six Cypriot and four Cretan rod tripods and four-sided stands have been archaeometallurgically tested up to now in six different projects, plus two *cast tripods* (see below for this term; for the projects, see PAPASAVVAS 2001, 43-45 and add SCHORSCH, HENDRIX 2003). The method of manufacture was investigated in only two of these researches. Seminal to this archaeometallurgical investigation were the analyses of two rod tripods and two four-sided stands from Cyprus (PAPASAVVAS 2001, nos 4, 16, 23 and 28) undertaken in the British Museum (MACNAMARA, MEEKS 1987). For the first three, results were inconclusive, due to heavy corrosion and because no samples were taken for metallurgical analysis. Samples from two joints were, however, taken from a four-sided stand (fig. 2; PAPASAVVAS 2001, no. 28). Examination showed that no different alloy was present in these joints._

This testimony is very important, but is weakened by the fact that the samples were not taken from critical parts, but from the double tire of one of the wheels of this stand, that was undoubtedly cast in one piece, and from one of the frames of a decorated panel, where a wavy band meets a straight one. While this analysis leaves no doubt that there are no metallurgical joints involved in these areas, it could be still possible that the larger, different parts of this stand, such as the frames with their wavy and straight bands, were cast in one piece and then joined to the others.

Although metallurgical or metallographic analyses can contribute in identifying the method used to produce the stands, because of the small number analysed so far, the following approach of this issue departs from the empirical observation of the artifacts, and is based on visual examination of most of them. It is mainly concentrated on the most critical parts of the stands, that is the joints. The research will be divided in two parts, one for rod tripods and one for four-sided stands, only for the matter of convenience, since there is no doubt that both types were produced with the same technique and in the same workshops (PAPASAVVAS 2001, 79-80). A third type of stands produced on Cyprus and the Levantine coast, the so called *cast tripods* (CATLING 1964, 199-201; MATTHÄUS 1985, 309), is not included in this discussion, although it must be stated that they were cast with the exact same method as the rod tripods, and every single argument that will be presented below in favour of casting in one piece, holds true also for them. A problem of terminology that refers to technological issues is actually involved here. The name of these tripods implies that, they, in contrast to rod tripods and four-sided stands, are taken to

be cast in one piece. This is probably because they are smaller, with a height reaching from ca. 0,065 to 0,12m. Nevertheless, if their size is the reason for accepting that they could be cast in one piece, it must be remembered that, although rod tripods and four-sided stands tend to be larger, there are some examples that are as small as some of the *cast tripods*. For example, the stand from Pyla (PAPASAVVAS 2001, no. 17 fig. 29), is only 0,076m in height, whereas it is also less elaborate than most cast tripods (see the examples in CATLING 1964, pl. 31-32). There also some four-sided stands (see PAPASAVVAS 2001, nos 23 and 25) that measure ca. 0,12 m and 0,11 m in height. As it will be shown below, the term *cast tripods* is not accurate since all stands were cast (for a fuller discussion, PAPASAVVAS 2001, 12-42).

Rod tripods

The basic components of the rod tripods, regardless of the exact procedure followed for their manufacture, were wax rods and bands of various forms and in different combinations. They could be single or multiple, plain or alternating with others decorated with rope patterns, or could form wavy bands or other cut out patterns, such as spirals (figs. 1, 7). The more elaborate examples carry rings decorated with reliefs showing animals and men in various scenes (e.g. PAPASAVVAS 2001, nos 20-21). Scholars arguing that stands were cast in pieces, believe that each one of these composite parts were also made of separately cast components.

Catling distinguished three groups of rod tripods according to the plain or composite form and the technology of their rings. In his group A I he included stands with rings shaped as plain, circular rods, while stands with rings of composite, band-shaped form, considered by him to be soldered of different components, were included in group A II (CATLING 1964, 192-199). However, the distinction of a third group (A III), that accommodates stands with undoubtedly cast, relief rings, undermines the distinction of group A II. If it was feasible, that is, to cast the relief rings in one piece, it would be equally possible to cast the band-shaped legs and rings in one piece, too. The same holds true for the circular rods that enclose the bands of the rings (as in PAPASAVVAS 2001, nos 3-5, 18, 20-21), usually considered as soldered to each other (CATLING 1964, 194 no. 7; see also the rings in PAPASAVVAS 2001, nos 6, 28, 32, 36). The addition of two plain circular rods on the upper and lower part of a band would not have made casting more difficult, since it would only insignificantly augment the cavity that the molten metal should fill. There is, furthermore, no reason to deny that casting a flat band enclosed by two rods was among the abilities of the Cypriot smiths, who at the same time were able to produce the flat, cast rims and handles of the Cypriot amphoroid craters (CATLING 1993, 81-96). Similar observations can be made for the composite legs of the stands, as on rod tripods (PAPASAVVAS 2001, nos 8, 9 and 20; *contra* CATLING 1964, 195-198).

A major criterion for identifying the technology of the stands is the fact that working on wax, the raw material of the models in the lost wax technique, leaves easily identifiable traces on the bronze works themselves, since the form of the wax model is exactly duplicated in bronze. This results to the appearance on the bronze works of some features totally alien to the nature of metal, but perfectly aligned with the elastic properties of wax. This phenomenon is produced when two elastic, flexible parts are pressed upon each other in order to be temporarily connected, and can be traced in many stands, where it was indirectly transferred as a feature of their wax models. On some stands (e.g. PAPASAVVAS 2001, nos 3-4; fig. 7), the volutes of the legs have forced the ring to withdraw slightly in their adjoining areas and are slightly inserted there. This is a remnant of the flexibility that the different parts of the stand had during their assemblage, and shows clearly that the craftsman was assembling wax models. This is also the case of another rod tripod (PAPASAVVAS 2001, no. 21 fig. 36), where the slightly bent spacers between the legs and ring give a superficial impression of elasticity, mirroring the actual elasticity of their wax models. The pressure to connect two wax parts had a different result on some other rod tripods (PAPASAVVAS 2001, nos 8-9 and 15; figs. 8-9), where it produced a slight displacing of the volutes and an extension of their outlines over the adjacent area of the ring.

This phenomenon is also the reason why another method, suggested by A. Thouvenin (1986) for some European Bronze Age stands of different type, and brought into the discussion by Magou, Philippakis and Rolley (1986, 131 n. 23) cannot have been applied for Cypriot stands (see PAPASAVVAS 2001, 200 n. 49). This method presupposes that each separately cast piece is temporarily joined to each other with a soft alloy. The structure thus produced is then invested with clay and fired in high temperatures, to melt the metal and make it circulate, and thus turn it into a compact metallic mass. As concerns as the Cypriot stands, most of the features already discussed and others to be presented below, speak against this suggestion.

Further examples prove that metallurgical joining would have been practically impossible for the stands. The rings of the rod tripod from Kaloriziki, Tomb 40 and of the four-sided stand from Enkomi, Tomb 97 (figs. 10, 5), that originated in the same workshop (PAPASAVVAS 2001, nos 7 and 22 figs 13, 39), are shaped by a row of S-spirals among two double circular rods. Each S-spiral would have had to be connected with two others to form a chain, and all of them had be connected to the two double rods above and below them. Every spiral comes thus into contact with the rods in four places and with its two adjacent spirals in two more. Not only do the fine joints of the components of these rings make it impossible to imagine that any molten metal or extensive heat was involved there, but there is also no imaginable way to solve the problem of the simultaneous application of extensive heat or of a soldering alloy in such a number of joints at the same time and for a considerable time. Since the points of contact

are, despite their number, very restricted in their size, the amount of the soldering alloy should be as small as possible. Thus, it would cool rapidly, before it could adhere to the surfaces and wet them. It can be shown, moreover, that these rings had taken their circular shape before casting. The fact that the spirals are following exactly the curvature of the ring, can only be attributed to the elasticity of the composite wax model. If spirals had been metallurgically joined to each other and then forged to a circular shape, the very restricted joints could not have resisted the hammering, since soldered or welded parts are not at all flexible. The same argument applies to all rings, and especially the ones with relief decoration (see PAPASAVVAS 2001, nos 20, 21, and the four-sided nos 28, 32; fig. 2), where the extensive hammering would have severely damaged the reliefs themselves (*contra* CATLING 1964, 196-197 no. 14; MATTHÄUS 1985, 303-304 no. 693).

The section of the double rods of the two rings discussed above is flattened, because of the pressure on their wax models during their assemblage. The spirals, considered to be made by bronze coil and soldered to each other and to the rods (CATLING 1964, 193, 204 nos 5, 32; MATTHÄUS 1985, 302, 314 nos 687, 703) are indeed compact, originally made by twisting wax coils around a thin stick. Because of the pressure to connect the wax models with each other, the double rods drew slightly back in the places where they touch the spirals, allowing them to insert in the slight recessions thus created (figs. 5, 10). This is one of the many cases, where the properties of the wax models, transferred with no alteration onto the final bronze work, can be recognized. The same phenomenon appears on the ring of another rod tripod (PAPASAVVAS 2001, no. 15 fig. 22). There, the original purpose of the smith to create an *ajourée* ring with S-spirals among two circular rods failed, and the spirals and rods formed a massive body, as the small triangular intervals that should exist between them are covered by metal. This means that the clay investment did not make it through the wax model all over, allowing the molten metal to occupy these places.

These observations confirm that the composite parts of the stands are not assembled by separately cast components, but had acquired their form before casting. However, this does not necessarily prove that stands as a whole were cast in one piece. Other observations, regarding mainly the joints between ring and legs, offer important information on this matter. Transition between these elements in their contacts is extremely sharp and not obscured by the presence of any soldering material or deformations. A characteristic example is the rod tripod from Pyla (PAPASAVVAS 2001, no. 17 fig. 29). Distinction between the ring and volutes of the legs is extremely acute, their outlines undisturbed and their contact close, without any space where a soldering alloy would have been applied. However, since any observations regarding the presence or absence of traces of metallurgical joints could be considered as insufficient, on the grounds that these are now invisible due to corrosion, it is better to use this specific evidence very carefully and try to enhance it with other arguments.

Even in larger examples, as in rod tripod from Kaloriziki (PAPASAVVAS 2001, no. 14 fig. 25), whose weight would suffice to weaken any metallurgical joints, ring and legs were cast after being attached to each other. Not only is the ring characterized by the absolute contact of its three circular rods, with their transitions marked very clearly as thin grooves, but, also, there is an absolute condensation at the transitions between the ring, the spacers and the volutes of the legs, that create a succession of clearly defined, superimposed levels and give the appearance of a unite, massive metal body, due to the connection of these parts while they were still in their state of wax. An even more decisive proof for the casting of this stand in one piece is provided by the small, irregular cavities on the ring's rear (PAPASAVVAS 2001, fig. 26), that acquire a meaning as soon as it becomes apparent that they are located in exactly the points where the ring is attached to the legs and to the outer struts. These cavities, that correspond to the form of fingertips, are the result of the pressure exercised by the fingers on the wax models during their assemblage. Inner and outer struts of this stand were also included in the composite wax model prepared for casting in one piece. If there were any metallurgical joints in the places where these struts meet with the legs, their traces would have been very intense, since on the same, rather restricted, area, three different joints would have been needed.

According to these observations, the manufacture of a stand can be described as following: All different parts were made out of wax, in the exact form they should have in the final product. They were then assembled by pressure on the joints or alternatively by slightly heating the relevant areas or by using small amounts of heated wax in between, if needed. A wax stand was thus produced, a twin of the desired bronze work. This composite wax model was wrapped with clay, the first layers of which should be composed of finer material in order to duplicate all the details in negative, while the outer layers could be made out of coarser clay (ZIMMER 1990, 133-139). The size of the stand and consequently the amount of the metal would determine the thickness of the layers, that should be able to withstand the thermal shock caused by the molten metal. Each layer had to be let to dry slowly, so as to prevent any cracks, and then the whole should be fired. During firing, the wax was lost, and the clay investment was now retaining in its interior the form of the stand in negative. Casting was better to follow immediately or soon after firing, when the investment was still hot, in order to minimize the danger of breaks when the molten metal was poured in.

Before the wax model was invested, provision for casting jets and runners should be made. Their number and size depended on the size and type of stand (cf. ZIMMER 1990, 22). Certain features on the resting surfaces of the legs show that the casting gates were attached on these places, as to keep the clay mould in an upright position and make the molten metal to reach first the ring and subsequently rise to the legs. In two rod tripods, for example (PAPASAVVAS 2001, nos 3-4 figs 3-4), one of the legs shows a slight

protrusion on its base, the second is of larger diameter and rougher surface on its lower part, while the third is not presenting any of these features. This peculiarity is exactly duplicated in both stands, that were actually produced in the same workshop (PAPASAVVAS 2001, 78-79). The small protrusion can be explained as a remain of a casting gate that was cut off, while its smaller diameter is probably due to the fact that this gate was used as a vent. The leg with the larger diameter had been probably used for the casting jet, and the continuous flow of the molten metal would have damaged the relevant parts of the mould, resulting to a rougher surface. The fact that in both stands the third leg does not show any similar features, probably means that no casting gate was attached to it. Similar remains of jets and vents in all three legs can be observed on the rod tripod from Pyla (PAPASAVVAS 2001, no. 17 fig. 29), where they actually have been transformed into resting surfaces. Since all these had to be removed after the metal cooled down and the mould was broken, there are in some cases no traces of them left behind (e.g. PAPASAVVAS 2001, nos 1, 7, 14-15).

Four-sided stands

Rod tripods and four-sided stands, wheeled or not, were made in the same workshops, as their close functional, typological, chronological, iconographic and technological associations prove. The manufacture of a four-sided stand presented the same problems and needed the same solutions applied by smiths for the rod tripods. In fact, four-sided stands provide more proves that these works, even the more complex and large ones (e.g. PAPASAVVAS 2001, nos 22 and 27-29; figs. 2-5) were cast in one piece.

As in rod tripods, many joints of the four-sided stands retain the elastic character of their initial raw material. Thus, the wavy band of the ring of a stand (PAPASAVVAS 2001, no. 23 figs. 42-45; fig. 6), mentioned in bibliography as assembled by many different parts soldered together (CATLING 1964, 205-206 no. 34; MATTHÄUS 1985, 314-315 no. 704), seems to preserve the flexibility of wax, while the slight recessions and flattened areas of the joints between this band and the circular rods that enclose it, show that these parts were connected to each other as wax models. In another stand (PAPASAVVAS 2001, no. 30 fig. 84), the perfect contact of all parts to each other and the subtlety of the joints convey a compact metallic mass with no metallurgical joining. Even if it was possible to forge a bronze band to such a perfect ring, and solder its edges together, it would not have been feasible to eliminate the juncture between the fine ridges that decorate it. This ring could, instead, be easily shaped by bending a wax band over a cylinder, whereas the vertical joint could be eliminated by smoothing the wax with the fingertips.

Another stand from Enkomi (PAPASAVVAS 2001, no. 22 figs. 39-41; fig. 5) presents a particularly sophisticated structure, carrying on each side a window with two openings, through which two female heads appear. The twisted or plain rods and S-spirals in various combinations that shape the frames of these windows and protomes are set in a very tight composition. The metallurgical joining of the 150 separate pieces that Catling (1964, 205 no. 32) has counted on this stand, even if possible, would have been a much more burdensome work than casting in one piece. The separate casting and soldering of so many parts, where any mistake could only be corrected by detaching and re-joining, would rather create than solve problems. The many points of contact, theoretically a negative feature for casting in one piece, could alternatively work as a positive one, since, despite the *ajourée* decoration, the surfaces covered by metal are more extensive than the void ones. Thus, without being compact, this stand offered broad spaces for the circulation of the molten metal in the mould.

Even the ridges of the frames of another stand (PAPASAVVAS 2001, no. 27 fig. 55) have been described as separately cast and soldered together (MATTHÄUS 1985, 318 no. 718), despite their thinness. Any metallurgical joints there would have left clear marks, while **c**asting many thin ridges to form bands, would not only be extremely difficult and time-consuming, but also pointless, since, even if stands were not cast in one piece, at least casting a ridged, narrow band would not present any problems for a smith.

The elaborate *ajourée* decoration of this stand, with spirals and sphinxes, the naturalistic rendering of the birds on the four corners and its size contrast with the rough, irregular joints, the ancient deformations and damages on the spirals of the ring and on the sphinxes or the asymmetries of the four-sided part, produce a mixture of sophistication and, at the same time, careless work. The irregular joints are due to corrections following damages and were made in a later period with the casting on technique (for this method see DRESCHER 1958), rather than immediately after casting by the same smith, since their quality is much inferior compared to the rest of the work. Whatever the case, they provide arguments that this stand was cast in one piece.

An important observation is that the craftsmen of the stands were able to adjust the positions of the various parts during assembling. This ability has produced certain peculiarities on some examples. On this stand, some irregularities of the construction led to an uneven level of contact between the ring and the box-shaped part. A few changes had thus to be made during assemblage. One of the upper horizontal frames of the box-shaped part was placed lower than initially at one of its ends, to accommodate the ring. Above the new joint thus created, one can clearly see the straight section of the initial joint (PAPASAVVAS 2001, figs 56-57; fig. 12), a fact which proves that these adjustments were made before casting. The same problem was overcome with a different way on another side of the same stand, where the upper frame, instead of being displaced, was heavily pressed during the addition of the ring, so that it was bent and acquired a wavy, elastic appearance (fig. 12). A si-milar phenomenon is evident on the four-sided stand from Enkomi (PAPASAVVAS 2001, no. 22; fig. 5), where an intense curvature is produced on the points between the ring and all four sides, and on another four-sided stand (PAPASAVVAS 2001, no. 28

figs. 68-71; fig. 2). On two of the sides of the latter, the parts of the ring resting on the spacers are not curved but straight, while on the remaining two the ring is resting only on a recessed area of the central part of the spacer, whose corners are on a higher level. The latter feature is the reaction of the wax parts to the pressure exercised for their connection, while the former is due to the ductility of the wax ring while it was connected to the spacers. The spacers themselves are inserting in small recessions of the rectangular part in two sides, producing a wavy joint as the result of an unequal pressure on the wax. It is clear that, since the ring was attached to the spacers and the spacers to the rectangular part in their state of wax, then the whole stand could only be cast in one piece.

The different parts of another stand (PAPASAVVAS 2001, no. 30 figs. 83-85), ring, spacers and frames of panels on each side, have the form of ridged bands that enclose *ajourée* scenes showing animals in combat. The rear of these scenes is totally flat, despite the sharp distinctions of the various components in the front view. The total flatness and the complete absence of joints leave no doubt that this stand was cast in one piece. Particularly revealing for the technique of this stand is the way that the birds are attached on the four corners of the rectangular part. Their rear is totally flat and not at all differentiated from the rest of the stand, while their bodies cover small parts of their resting surfaces on the front. Because of this, and since the wings of each one are spreading on two adjacent sides, it is reasonable to conclude that the stand had taken its final form from wax components. A similar phenomenon is observed on the birds perching on the corners of the stand discussed above (PAPASAVVAS 2001, no. 28 figs. 76-77). In some points, parts of the corners interject deeply into their bodies, while in others the corners seem to draw back under the weight of the birds. It is clear that, since each bird covers parts of two adjacent sides, the rectangular part as a whole had been shaped before the addition of the wax models of the birds, that is before casting. The same can be observed on the surviving bird of a third stand (PAPASAVVAS 2001, no. 29; fig. 3-4).

Important information is also provided by the observation of the joints between the relief figures that decorate the stands and the frames that enclose them. Just above the ingot-bearer of a stand said to be from Kourion (PAPASAVVAS 2001, no. 23 figs. 45-46; fig. 6), a slight semicircular swelling is to be observed on the frame, produced by the pressure exercised on the wax models during assemblage. Moreover, the part of the lower frame where the feet of the same figure rest, is placed on a higher level than the remaining. Between these two parts, a "seam" can be clearly seen. This change of level reveals the different phases of the wax models assemblage. First, the rectangular part was constructed of wax bars and then the figures were placed between them. The tree opposite the figure was placed first, and the human figure second. For a better hold, part of his head was pressed upon the upper frame and was thus slightly expanded. Because of this, the figure lost the necessary height to span the two horizontal frames, and part of the lower one had to be cut off and placed somewhat higher.

On a panel of another stand (PAPASAVVAS 2001, no. 28 figs. 62, 67) depicting a lion, many features reveal the effort of the craftsman to adjust the animal between the frames. The tips of its ear and muzzle are displaced and slightly expanded on the frames, while its front right leg is inorganically bent to reach the frame. Its front left paw is not depicted, in contrast to the other three that are naturalistically rendered. It seems that during the adjustment of the animal in the panel, this paw was not fitting in and had to be cut off. Also, one of the vertical frames diverts from its axis in order to follow the line of the animal's rear left leg. Similar features appear on the sphinx of the same stand (fig. 14). Such is the slight inclination of the figure forwards and downwards, that raised the rear part of the creature in order to connect the wing to the upper frame. The paws of the sphinx are again either slightly inserted on their resting surface or partially cut off.

In the chariot scene of this same stand, a figure is floating in a horizontal position above the horses, in front of the charioteer (fig. 13). This has been interpreted as an iconographic convention due to the lack of enough space for a proper depiction of the figure. The restricted space of the panel is indeed to be accounted for the strange position of the man, but this was not an original feature of the design. It was created during the assemblage of the wax models. The floating figure is an archer, although his bow is not the curved feature underneath him (MATTHÄUS 1985, 317-318; CATLING 1993, 90), but the one resting on his shoulder. The other feature is actually the whip of the charioteer, while the surface behind this figure are indeed parts of the torso and left arm of the archer. The archer was thus originally perceived as standing on the chariot, behind the charioteer. The panel did not offer enough space for the scene as it came out of the mould, and the archer had to be cut off, as well as a part of the chariot's wheel. In order to preserve the number of two passengers on the chariot, the craftsman, who was not responsible for the artistic appearance of the scene after all, as he was not the carver of the mould, did not remove this figure altogether, but gave it a new, albeit unhappy, position.

On the panel with the musicians of the same stand (fig. 2), the effort to adjust the figures in the frames is evident in the slight movement backwards of the vase-bearer, whose feet have also been partially cut off (a small part is preserved in a recession of the lower frame). A relevant feature is the extensive joint of the right arm of this figure and the frame, that forms a straight, fine groove from the shoulder of the man to the base of the jug. No kind of metallurgical joint could have produced such a perfect contact and such a sharp joint.

A great effort was always given in the stands to connect the figures to their frames in as many places as possible, that is to augment the number of joints (figs. 2-3, 13-14). In metallurgical joining, extensive joints would require much effort without adding much

to the strength of the stand. The connection between the two harps and the cylix on the scene with the musicians would have had nothing to offer in this respect, while the voluted element that connects the fish to the frame on the lower panel of the same side would have been meaningless, since the fish is already connected to the frames in five other places. Had these figures been soldered, the smith would probably have tried to minimize the number of joints, not augment them. In casting in one piece, these joints would create a network of communicating parts that would help the circulation of the molten metal, while they would also keep the wax models in place as long as needed. Similar features appear on other stands (e.g. PAPASAVVAS 2001, no. 29; figs. 3-4).

Some particular features of a few stands could be misleading. On one of them (PAPASAVVAS 2001, no. 22; fig. 5), the twisted rods around the windows seem to have been detached from the spirals, as if this was the result of an unsuccessful metallurgical joint. A better observation, however, reveals that the cause of these breaks is a different one and actually is in favour of casting in one piece. On the detached joints, one can clearly see not only the small recessions that the spirals were once occupying, but also the slight imprints of these. There is no possibility at all, that the joint of two metal parts would have such an effect. It rather seems that the long procedure required for assembling the composite wax model of this stand weakened the temporary joints of the wax components. Some of them were thus detached, possibly while investing with clay, where they could no longer be detected and repaired. A similar explanation can be given for the detachment of a rod on another stand (PAPASAVVAS 2001, no. 28 fig. 63).

Some peculiarities of another stand (PAPASAVVAS 2001, no. 25 figs. 49-52) offer the chance to test these results. These are some casting problems, the most apparent of which appears on the ring. Whereas the craftsman intended to form an *ajourée*, running spiral, some of the spaces designed to be void are full with metal. These are clearly no remains of a soldering alloy, since the filled in spaces appear only on one fraction of the ring, while the remaining is cut out, as originally designed. Apparently, the metal occupied by mistake places that were supposed to remain free. The problem appeared during the investment of the wax model with clay, which did not make it through the wax spirals everywhere. This mistake was repeated on the same side, at the joint of the ring to the rectangular part of the stand. There, the areas left and right of the spacer, that were also designed to be free of metal, are totally covered by bronze. It follows that, when the clay was applied (that is, definitely before casting), the ring and the rectangular part of the stand were already attached to each other.

The result of these observations, that stands were cast in one piece, does not mean to imply that this was an easy task. On the contrary, it required great experience and acquaintance with casting problems, while there must have also been many unfortunate castings. The entrustment of curving the moulds to seal carvers, witnesses an advanced production scale, and a high degree of expertise and specialization (PAPASAVVAS 2001, 46-73).

The technique of the stands' relief decoration

Stands are composed of rod- or band-shaped components in various numbers and combinations (figs. 1, 5-11). The most elaborate carry cut-out decoration with spirals and volutes or wavy bands between rods. Wavy bands were free-hand modelled, by bending a wax rod or by cutting small triangular parts on a wax band (PAPASAVVAS 2001, nos 23, 28 figs 42, 61 and nos 1-2 figs 1-2). Spirals were shaped by thin wax coils, while rope patterns were shaped either by twisting two or three wax coils, or by linear engravings on the wax (PAPASAVVAS 2001, nos 7, 9, 13, 15, 22, 25, 27, 35 and nos 3, 5-6, 8, 19, 30).

Besides these free-hand modelled components, stands were also composed of parts reproduced with moulds. This applies specifically to the relief decoration showing various scenes with men and animals. The reliefs fall under two categories: cut-out decoration (figs. 2-4, 6), common on four-sided stands, and compact relief, mainly for rings of both rod tripods and four sided-stands (fig. 2). In both cases, the making of the bronze reliefs presupposed the manufacture of wax models, that is of wax reliefs. This means that, in manufacturing a stand, besides the purely metallurgical skills of the smiths, a different kind of ability was also required for making the high quality reliefs, that give the stands their fascinating appearance.

The transformation of the wax model into a bronze work through the lost wax technique, that completely destroys the original model, obscures an important element. The initial workmanship of the craftsman is not directly applied on the metal, but on wax. While the reliefs of stands are called *cut-out*, this term is strictly conventional. As actual cutting-out could not be applied on the metal itself, it actually refers to the wax models and only indirectly to the bronze work. Although this observation might sound self-evident, it is, nevertheless, of some importance for understanding this aspect of the stands manufacture, as it concentrates the argument on the original, wax models, that is on the first steps of making a stand.

The rings of five stands are formed as relief bands with scenes showing animals and men that are repeated more than once over the ring's circumference. This repetition was possible through the use of a mould, a different one for each stand. Thus, in ring from Myrtou-Pighades (PAPASAVVAS 2001, no. 36 figs 90-91), four animals chasing each other form a basic entity, twice repeated. Another entity with four animals is repeated three times on a rod tripod, while the ring of a four-sided stand is decorated with a com-position of three animal groups and one man (fig. 2; PAPASAVVAS 2001, nos. 20 and 28 figs. 34, 68-71). Only half of this composition is repeated on the last ring. The ring of another rod tripod (PAPASAVVAS 2001, no. 21 figs. 36-38) is also decorated with the same two scenes alternating in panels. Two more examples are too fragmentary or corroded to recognize any repeated scenes (PAPASAVVAS 2001,

nos. 18 and 32).

The wax models of these rings would have had exactly the same form as the rings now have, that is they would carry positive reliefs, while the moulds used to produce them would be negative. According to Catling, these rings were cast in clay moulds, upon which figures had been printed with stamps, as were also the rims and handles of the Cypriot bronze craters (CATLING 1964, 159; *idem* 1993, 82). Such moulds would actually be suitable for the manufacture of wax models, not for casting bronzes. Wax would be pressed or poured in the cavities to produce wax reliefs, and this procedure would have been repeated as many times as the diameter of the ring and the size of the mould would require. The separate wax models would then be connected to form a continuous band, that would then be bent to take the form of the ring. The parts of any wax model that were exceeding the desired length/diameter would be easily cut off. The ability to produce the wax models so easily would allow the, otherwise inexplicable, mutilation of the high quality scenes observed on some stands (e.g. PAPASAVVAS 2001, nos 20, 28 figs 34, 71).

It must be noted, in this respect, that, it makes no justice to the Cypriot smiths, who were "capable of doing whatever caught their fancy" (MUHLY 1998, 335), to characterise their works as of "poor workmanship", "unrefined execution", "lack of self-consciousness", and, worst, of "technical mediocrity", or to accuse them for not planning their work and call them "sloppy", as a recent study does (SCHORSCH, HENDRIX 2003; the results of the two stands analysed for this study, however, support the analysis presented here). Casting would never have succeeded, if all these characterisations were true. The success of the Cypriot smiths in casting such elaborate artifacts should lead us to admire their superior skills, regardless of their care or negligence for aesthetics, which they had actually entrusted to the carvers of the moulds (see below). To judge by their products, some stand manufacturers seem indeed to be better than others, but each smith capable of casting a stand was undoubtedly a real master in his expertise. We should judge them as bronze casters, unsurpassed in the technological excellence of their products, and not as artists in the modern sense of the word. Whatever their visual standards, they were fulfilled by the technological and typological sophistication of their products.

The manufacture of moulds, especially of stone ones, required totally different experience and skills than bronzeworking. The expertise involved in casting the stands, on the one hand, and in making the moulds with their high artistic quality witnessed by their reproductions in bronze, on the other, suggests that different craftsmen were responsible for the two tasks. The employment of other craftsmen for the moulds would have relieved the smiths from the need to care for the decoration and would have offered them elaborate scenes with almost no effort. Two stone moulds used for wax models of stands, found in Enkomi and Hala Sultan Tekke, are excellent illustrations of this distribution of labour.

The mould from Enkomi (PAPASAVVAS 2001, no. 62 fig. 102), that bears the *intaglio* figures of a bull and a boar, stands in close connection with the reliefs of the stands and more specifically with the relief ring from Myrtou-Pighades (COURTOIS, WEBB 1979, 151-158; CATLING 1984, 82; PAPASAVVAS 2001, no. 36). The absolute similarity of the boars on the two objects leaves no doubt about this. The small depth of the cavities (0,006m at the most) shows that this was an open mould and not part of a double one, as also suggested by the lack of any holes for the attachment of a second part (*cf.* MATTHÄUS 1985, 320 no. 712).

The transformation of the negative figures into positive with the use of a mould, would be feasible in two ways: Either by directly casting metal in the mould, or by filling it with wax to produce wax models. The Enkomi mould does not preserve any signs of contact with molten metal. Moreover, casting metal in such restricted cavities, in depth and size, would have caused some irregularities in the profiles of the figures. Their removal would not have been impossible but still time-consuming, while it contained the danger of breaking some particularly thin parts, as the legs of the animals. The second possibility, that is of using the moulds to produce wax models would present the craftsmen with many advantages, as it would provide them the necessary number of high quality reliefs in a minimum time.

Despite their positioning in two different levels, the height of the figures on the Enkomi mould coincides. This suggests that the wax models were designed for the same composition, but clearly not in the same position as on the mould. The figures thus produced would be cut-out and flat on their rears, while they would have to be attached to some frames that would hold them in place. These features clearly associate the figures to the only cut-out Cypriot bronze works that we know, the four-sided stands. The difference with the Myrtou ring, is that the mould used for it would have all its figures in the same level and in close relation to each other, and would produce a compact, not a cut-out relief.

The Enkomi mould was curved by a skilled master, since the high quality and naturalistic rendering of the figures demanded familiarity with the material and the technique of curving in stone, definitely not a skill expected to be owned by a smith. The curving of *intaglio* figures in stone recalls the art in negative *par excellence*, seal curving. Consequently, the seal cutters would have been the best qualified craftsmen for such a work (see already ACHILLES 1981, 277-278). This possibility brings forward another dimension of the technology of the stands.

Seals and moulds for stands appear to be closely associated, despite their differences. Their size is different, and at least the cylinder seals have convex surfaces, not flat as the moulds should have; the figures of the moulds are more naturalistically rendered, whereas these of the seals are usually more conventionally depicted. It must be emphasized, however, that it is precisely the necessarily larger size of the figures on the moulds and the chance to work on a flat surface that would have favoured their more

naturalistic depiction.

Stylistic and iconographic affinities between seals, the Enkomi mould and stands provide strong arguments for their association. For instance, the bull of the Enkomi mould finds a close parallel on a cylinder seal, probably also from Enkomi (PORADA 1986, 296 pl. XX:4); animals chasing each other as shown on the Myrtou ring also appear on cylinder seals (PORADA 1986, pl. XX:1, 5 and pl. XVIII:3; Courtois and Webb 1987, pl. 3:8), in various compositions and styles; motives, such as the projections of the legs on the bodies of other animals, are also known from seals (PORADA 1986, 294-297 pl. XX:1 and XX:4). Although most of these features are common in figures curved both in positive and in negative, there are others that appear only on the latter. Seals, for example, offer the only parallel of the rare scene showing lions attacking a man, as it appears on the ring of a four-sided stand (PAPASAVVAS 2001, no. 28 fig 68; PORADA 1981, 22 fig. c). The rendering of the deer's eye on the Myrtou ring, with a shallow, almond-shaped cavity enclosing a small, circular bump on its centre is very common on seals - or, rather, on their imprints (PAPASAVVAS 2001, figs 104, 108; PORADA 1973, pl. XXXII:1; pl. XXXII:3).

Even closer are the affinities of the stands with another category of Cypriot art, the pithoi decorated with relief bands (fig. 97; KESWANI 1989, 13-18; SMITH 1997, 234-304). These have been found in fragments in several Cypriot sites and date, according to their contexts, to the end of Late Cypriot IIC/beginning of Late Cypriot IIIA. The reliefs, usually depicting scenes with men and animals, are applied either directly on the pithoi or on bands of finer clay. The repetition of the same scenes on each pithos makes clear that cylinder seals were used for their reproduction. The height of the bands, reaching 0,05m and the length of each scene, that can be easily isolated in its constant recurrence, are, however, much larger than those of the known cylinder seals. Kenna (1960, 122-123) has thus suggested that the seals used for these pithoi were made of wood, and have not survived.

Iconographic and stylistic similarities of the pithoi reliefs, seals and the rings have already led to the association of these groups (CATLING 1993, 89, 92; KARAGEORGHIS 1989, 445; PORADA 1988, 304; ACHILLES 1981, 271-273, 277-278). The lion on a sherd from Alassa (PAPASAVVAS 2001, fig. 99) is closely associated with the lion attacking a man on the ring of a four-sided stand (PAPASAVVAS 2001, no. 28 fig. 68), while the almost circular profiles of the thighs of some animals on pithoi fragments found in Alassa and Analiondas (PAPASAVVAS 2001, figs. 98-100) or the two thin ridges depicting the legs of animals on pithoi sherds from Maa (PAPASAVVAS 2001, fig. 101) are repeated on the animals on the ring of a four-sided stand and on the Myrtou ring (PAPASAVVAS 2001, nos. 28 and 36 figs. 70-71, 90), as well as on some seals (PORADA 1986, pl. XIX:3, XX:4). All these interrelations in style, iconography and technique are due to the fact that they all represent four aspects of the same art, namely seal carving.

Cut-out relief appears on eight four-sided stands (PAPASAVVAS 2001, nos 23-24, 26-30, 64). Although no stand bears the same decoration as any other, the use of moulds for making wax models for the cut-out reliefs is easily proven in two stands (PAPASAVVAS 2001, nos. 27 and 30 figs. 55, 83; figs. 11-12), where the same three scenes appears on all four sides with no differences. The flat rear of the sides of the latter stand, and the exact repetition not only of the scenes, but also of some minor details of the frames that enclose them, show that the whole arrangement of an entire side came out of a mould as a composite wax model (PAPASAVVAS 2001, 65-66). That the sphinxes flanking a column decorating each side of the former stand are reproductions is shown not only by the presence of fine ridges following the contours of the creatures on their rear and the shallow cavities created by pressing the wax in the moulds, also observed on another stand (PAPASAVVAS 2001, no. 28 figs. 58, 72-75), but also by the repetition on all sides of even some minor details, including a damage on the tip of the wing of the right sphinx (PAPASAVVAS 2001, figs. 56-57). The eight figures of this stand were thus produced with only two moulds, one for the sphinx on the left and one for the sphinx on the right of the column. The sphinx of another stand from Knossos North Cemetery Tomb 201 was probably also produced with one of these moulds (PAPASAVVAS 2001, 82-84 no. 26 fig. 54).

One of the most elaborate stands (figs. 3-4; PAPASAVVAS 2001, no. 29), is decorated with two superimposing panels on each of its two preserved sides. The lower ones, which are smaller, are decora-ted with birds flanking a voluted element. One of the upper panels bears a procession scene moving leftwards, while the other accommodates a pair of confronting sphinxes. Achilles, who published this stand, has already pointed to the iconographic and stylistic affinities with the scenes on some seals (ACHILLES 1981, 277-278). The elongated proportions, thin waists and broad shoulders that form a triangular torso and the broad cheeks of the figures on the stand seem to be exact copies of the figures on some seals belonging to a group called the *broad-shouldered group* by E. Porada, found in the Aegean, the East and on Cyprus, where they date to Late Cypriot II (fig. 16; PORADA 1973, 264-268 pl. XXXII:3; *eadem,* 1981, 16-19 no. 4). Similar are also the long and plain, belted robes that are stretched at their lower part as a result of the broad stepping. Based on these features, Achilles has already suggested that seal cutters were responsible for curving the moulds used for stands. Even the way that the feasts of the gift bearers are depicted as a semicircular surface, has its closest parallels in seal curving (PORADA 1981, 17). From a technological point of view these characteristics are due to the use of drills of different sizes for curving the parts of the bodies and heads. For instance, a drill with a broad head would suffice for the broad cheeks, and a smaller one for the small cavity of the eye (PORADA 1973, 264; *eadem,* 1981, 17; COLLON 1987, 73).

An important find associated with the manufacture of wax models for stands is a small mould made of gypsum, found at Hala Sultan Tekke and depicting three *intaglio* figures (fig. 15; PAPASAVVAS 2001, no. 63 figs 95-96). Two are entangled in a combat, while

the third, placed upside down for a better exploitation of the space available, carries two vases. In probably comes from Tomb IV, dated by the Late Helladic IIIA and IIIB pottery it contained to Late Cypriot IIB or IIC (BAILEY 1976, 11, pl. VII). Karageorghis (1989) suggested, on the basis of the Enkomi mould and some iconographic similarities of the vase-bearer on the mould and a similar figure on a four-sided stand (PAPASAVVAS 2001, no. 28 figs 64 and 96), that the Hala Sultan Tekke mould was used for the cut-out wax models of a stand. The procedure would be fast, the models would be easily removed and the irregularities of the profiles would be easily corrected with a sharp tool.

The figures of this mould and of the above mentioned four-sided stand (figs. 2, 13; PAPASAVVAS 2001, no. 28) share the same elongated proportions with a narrow torso and an even narrower waist. The broad areas of the shoulders and chest on the mould, which are very distinct from the rest of the torso, are shaped by two adjacent, relatively deep and almost circular depressions enclosed by the especially long arms. On the figures of the stand, shoulders are rendered in the same way, with their curves meeting in the centre of the chest, where the neck is inserted as a wedge. This feature is repeated in the figures of the seated musician, the vase-bearer and the charioteer of the stand. Moreover, on both the mould and the stand, the torso is diminishing in width towards the waist, while legs are depicted in a broad stepping. The depiction of their lower robe is thus based on a reversal of the trapezoidal shape of the upper torso. They also share the naturalistic rendering of the legs profiles, with sharp distinctions for the knees and double curvatures reaching from the thigh to the ankles (*cf.* COLLON 1987, 72 no. 323).

All these features are again present on seals of the *broad shouldered group* (fig. 16; PORADA 1973, 264-268; *eadem,* 1974, 166; COLLON 1987, 72 no. 324; PAPASAVVAS 2001, figs 106-108) as well as on the pithoi reliefs. The characteristic rendering of the vase-bearer's face on the stand, with the broad cheek and a convex area of the eye between the cheek and the hair, is reflected on the seals. The depiction of the shoulders of the seated musician of the stand in a 3/4 view, and of the neck as a wedge among the two broad parts of the chest, appears on the figu-re of a pithos fragment from Enkomi (fig. 17; see PAPASAVVAS 2001, figs. 64, 95, 97). This figure also wears the same type of garment worn by the seated musician of the stand, with flat, wide folded sleeves. An even stronger similarity appears on the garments with the oblique, parallel folds of the musician on the stand and on a figure of another pithos from Alassa (PAPASAVVAS 2001, fig. 100). The charioteer on the same pithos bears the somewhat protruding chin, ending under the nose with no mouth depicted in between, which is unified with the broad cheek, as on the musician and on the figures of the broad shouldered group (PORADA 1973, pl. XXXII:2, 3). The schematised and flat rendering of the charioteer's eye on the stand, repeated on the face of the sphinx on the same stand, is also known from seals (DIKAIOS 1969a, 19 pl. 184 and 187), while the anatomical details of the lion's head on the same stand (PAPASAVVAS 2001, fig. 67), are also to be found on lions of the broad shouldered group (PORADA 1973, pl. XXXII:3; *eadem*, 1986, pl. XIX:3 and XX: 1,5).

The need for fast and easy reproductions of wax models and the use of moulds led to the development of another technique, recognizable on two four-sided stands (PAPASAVVAS 2001, nos. 23 and 29 figs. 42-45, 81-82). The decoration of the former shows a procession scene (fig. 6), with three men approaching a seated musician. Despite the segmentation of this scene in the four sides of the stand, its context is easily discernible. All three men are rendered with the same iconographic conventions, but, in general, the resemblance is larger than could be explained by a simple iconographic and stylistic similarity. The flat bodies and the voluminous heads of the figures, their rounded shoulders and thin torsos, the rounded widening of the garments just below the thin, belted waists, the type of the garments and their relation to the legs, the structure of the face and the type of the hair, are present in all three of them without the slightest alteration and with the repetition of even the smallest details. They only differ from each other in the gifts they are bearing, and, consequently, in the position of their arms.

The multiple similarities of these figures are not to be expected in free-hand modelled figures. Instead, they are totally understood if we consider them coming from the same mould. This suggestion seems at first to be totally out of place, because of the difference of their arm positioning. The fact, however, that this is their only difference, occasioned by the different offerings they are carrying, asks for further analysis.

The craftsman of this stand was able to create an elaborate, multi-figured procession scene by producing three identical wax models and then making a few changes on them. The parts of the arms below the elbows, that is from the point that their position was determined, were removed and then replaced at a new angle on the wax originals, adjusted to the offerings that were added separately as wax models. The variations could be multiplied for a larger stand. The slight differences, as in the axis of the head or its distance from the shoulders are to be explained as a result of working on the soft material of the models.

This procedure is confirmed by an irregular groove at the level of the elbows of two out of the three figures, exactly at the point where the lower arms depart from the body. The rendering of the arms beyond these grooves is clumsy and their length reduced in rela-tion to the size of the figures, whereas above them, shoulders and arms are more voluminous. These groo-ves represent the "seams" produced by removing the relevant parts of the arms and then replacing them in a different position. On the third figure, the ingot-bearer, these grooves are absent, while the arms are organically related to the body in all their length. This difference probably suggests that the mould used for these wax models was bearing a figure with outstretched arms, as the ones of the ingot-bearer (fig. 6). As evident on the rear view, the

ingot was modelled separately and then added on the wax model of the bearer, giving a false impression of depth. The arms of the figure were bent to reach the ingot, which was cut in two pieces, added with some distance in between, in order to extend its length. Larger changes had to be done on the hanging arms of the figure with the fishes or bags (PAPASAVVAS 2001, fig. 44), both of which had to be added on the wax model at a new position, so that they are clearly distinguished from the rest of the body even on the flat rear. All these adjustments were feasible because of the flexible properties of wax.

The same method of using only one mould and the variations of identical wax models is traced on a second stand (PAPASAVVAS 2001, no. 29 fig. 82), which is also decorated with a procession scene (figs. 3-4). At first, the differences between these figures are more than their similarities. Besides the different offerings they bear and the accordingly different positions of their arms, there are also differences in the axis of their heads and the decoration of their garments, even some slighter ones in their dimensions and profiles.

The three better preserved figures of his stand, and most probably the fourth one, too, belong to the same type, with elongated proportions, their upper torso shown in front view and the lower one, as well as the head, in profile. The garments, reaching just below the knees, are belted around the thin waists with a triple band, and bear in their front a long, narrow, triangular part. The upper torso with the broad shoulders has the shape of an upside down trapezoid, while the lower body repeats the same shape, reversed and more elongated. Identical is also the rendering of the face and hair. The greater difference is found again, as in the case of the previous stand, in the position of the arms.

The ingot-bearer and the goat-bearer keep their arms in the same position, since in both cases the offerings are spreading left and right of their shoulders. The right arm of the goat-bearer is more clumsily rendered and with a wider spreading compared to the ingot-bearer. Although the ingot and the goat had to be hold in the same way, the animal is wider than the ingot. The outstretching of the arms had, consequently, to be different in these two figures - an easy task because of the flexibility of the wax models. The goat itself was produced with a separate mould, since its legs are shown to be moving with a positioning suitable for a running animal. The difficulty in connecting the left hand of the goat-bearer with the back legs of the animal shown in motion, resulted in the presence of a metallic surface in the area, that was supposed to be cut-out. The large width of the goat also resulted to a larger distance between the goat- and the ingot-bearer, and to the addition of a bird between them. Slight differences are also observed in the outlines of the bodies and heads of these two figures. The waist of the goat-bearer is placed somewhat higher than of the ingot-bearer, whose garment is also narrower at its lower part. Given the coarser texture of the bronze surface at these different parts, it is apparent that these are due either to different reaction of the clay investment to the heat of the molten metal at these places, or to the procedure of assembling the wax models.

Similar observations can be made for the third figure of this procession, that is represented with legs and torso in profile, bearing a jug and a cylix with his arms bent forwards. The effort to give the impression of some depth to this figure is not convincing and, despite the projection of the left arm on the torso and the disappearance of the right one behind it, this torso has also the same reversed, triangular shape as those of the other two figures. The part of the torso above the right arm, that stands there for the shoulder, resembles more closely a part of a chest than of a shoulder. His arms are disproportionately smaller than the rest of the figure, as well as in relation to the arms of the other figures. It is evident, that the wax model of this figure also came from the same mould, but it had to be significantly altered to accommodate different types of offerings. The arms were cut off at the shoulders and parts of wax were added to indicate the arms in different positions. This is confirmed by the fact that, although the upper torso of this figure is higher than of the others, the dimensions of their lower part coincide. This difference must then be the result of the pressure of the "new" wax arms upon the torso of the figure, that made it broader. The difference in the decoration of the garments is easily explained as part of reworking the wax models after their removal from the mould.

All six birds on the two preserved sides of this stand are advancing towards the same direction, even in the lower panels where the presence of a schematic floral element in the middle would favour a symmetrical depiction (fig. 3). On first inspection they seem to differ a lot, in the rendering of their feathers, the height of their legs and the curvature of their necks. They all present, however, the same piriform body with a fan-shaped tail, and a high, circular head that transcends at a right angle over the long beak. Although these common features could at first be explained as part of a stylistic identity, they are actually the result of the use of just one mould for all birds, just as in the case of the men. The different grooved decoration of their bodies, that helped varying them, was accomplished on the wax models, while the differences on the legs and necks are the result of the adjustment of the birds in the panels. This explains also the extensive bent of the bird's neck under the goat-bearer.

The rich decoration of this four-sided stand was thus effected with a minimum number of moulds and a maximum amount of variations of identical wax models. It is conceivable that groups of moulds with various figures, designed for the same stand, would exist in the workshops of stands. For example, despite the different scale of men, sphinxes and lions on some stands (e.g. PAPASAVVAS 2001, nos 28 and 29; figs. 2-3), the figures of each stand are designed to fit exactly in the panels as they have the same height. There would have been many combinations of figures coming from such moulds, and the scenes could differ from stand to stand, even if the same moulds were used.

Stands in broader perspective

No research of Cypriot stands can be complete unless it includes the stands of Cypriot types found out of Cyprus, especially in the Aegean and on Sardinia (figs. 18-20). Although all examples found in the Aegean are provenanced, there still exist difficulties in dating them. The reason is that most of them derive either from open-air sanctuaries (on Crete or at Delphi) with mixed stratigraphy, or from Cretan tombs used for multiple burials over longer periods. The fact that the stands on Cyprus are associated with contexts spanning the late 13th to the 10th cent. BC, while the contexts of the stands from Crete and the Aegean range from the 11th to the 8th cent. BC, has led to different approaches by different scholars. Catling (1984) insists on the *heirloom* theory, concluding that no stands were produced on Cyprus after the middle of the 12th cent. BC, and that the examples from Aegean sites or from Iron Age Cypriot sites are treasured Cypriot products of the Late Bronze Age. Others, like Rolley (1977, 131-132), Matthäus (1985, 328-329) and Muhly (1988, 333-335), argue in favour of the continuation of the manufacture of stands even after the 12th cent. and of the existence of an Aegean tradition of stands.

That the concentration of finds on Crete (fig. 18) is not due to a coincidence determined by heirlooms, is evident from the observation that, if all the stands with Iron Age contexts were Cypriot heirlooms, then it would only be natural to assume that there must have been more stands in Cyprus itself to be treasured than on Crete. This is clearly not the case, as there are only five examples with Late Cypriot IIIB-Cypro-Geometric II contexts on Cyprus to compare with the 22 stands in the Aegean dated by their context or style of the decoration in the Early Iron Age (PAPASAVVAS 2001, 91-93, 158-185). On the other hand, the heirlooms theory cannot be rejected as a whole. It is valid, for example, in the case of the four-sided stand with the earliest context found in Crete, excavated in the Subminoan Tomb 201 at Knossos North Cemetery (COLDSTREAM, CATLING (eds) 1996, 194, 517-518, pl. 276). Although in a very poor state of preservation, as a result of its exposure to the funeral pyre, this stand is a Late Bronze Age Cypriot artifact, as shown by its morphological and technological analogies to some Cypriot stands (PAPASAVVAS 2001, no. 26, pp. 82-84).

As already emphasized, Crete is not the western most limit of the expansion of these artifacts beyond Cyprus, since stands of Cypriot types were not only imported, but also locally produced, as far west as in Sardinia (PAPASAVVAS 2001, 206-211, 212-229, 334 figs 175-179). As in the case of the Syro-Palestinian coast and of Crete, stands were not just imitated there, but also incorporated into the local bronzeworking tradition, functioning as bridges for the transmission of types and techniques from the Late Bronze to the Early Iron Age. This phenomenon is one of the most interesting in the ancient history of Cyprus and enlightens the nature and extent of the Cypriot bronze industry and trade.

There are at least nine published examples from Sardinia and Italy, and fragments of more are reported (MACNAMARA 1985; PAPASAVVAS 2001, 206-211). While cast with the same methods as the examples from Cyprus and Crete, they evince important structural peculiarities that separate them from the Cypriot and Cretan works and attest to the existence of yet another Mediterranean tradition in stand manufacturing. Their contexts are in most cases rather vague, and can actually be used for any dating between the 12th-8th cent. BC. This does not make them unimportant for the study of stands, since they are relevant to the questions of how, where, when and why Cypriot- type stands began to be cast in workshops outside Cyprus.

Cyprus seems again to have played a major role in the dispersion of types and technologies in the Mediterranean, since, apart from the stands, other types of metal artifacts with Cypriot affinities made their appearance in this part of the Mediterranean in the Early Nuragic period (LO SCHIAVO 1986, 242). However, things are complicated by the fact that this area knew a second wave of influences from the Eastern Mediterranean in the 8th and 7th cent. BC (MUHLY 1985, 180 n. 12-13 with references), also connected with metalworking. This has led to various datings for the same artifact, as in the case of the rod tripod from Santadi (MACNAMARA 1985, fig. 15:1), which some date to the late 9th/early 8th cent. while others date it to the 12th/11th cent. BC (LILLIU 1973; RIDGWAY 1986; LO SCHIAVO, USAI 1995). Recent attempts (e.g. CRIELAARD 1998, esp. 196-199) to place the introduction of the stands in Sardinia in the 11th cent. are not convincing, since it is difficult to disassociate the presence of these artifacts in the Western Mediterranean from their *floruit* on Cyprus itself and from the Cypriot commercial expansion of the Late Bronze Age (see below). The Cypriot examples used to support this dating are actually works of the Late Bronze Age (PAPASAVVAS 2001, 210).

The structural peculiarities of the Sardinian examples (PAPASAVVAS 2001, 206-208), in combination with their typological dependency on the Cypriot ones, suggest that the type, after been introduced from Cyprus, was developed independently on Sardinia and subsequently a local tradition was created, which was no longer reliant on the developments on Cyprus itself. This is a situation exactly paralleled on Crete. What we have from the Western Mediterranean are most probably the products of an already established tradition there, that did not depend on Cypriot impulse anymore. An idiosyncratic four-sided stand found in a tomb in Bisenzio, Etruria, dating in the late 8th cent. BC (WOYTOWITSCH 1978, 56-62 pl. 24:127) and another one excavated in a settlement in Portugal (Nossa Senhora da Guia, Baiões; MEDEROS, HARRISON 1996) and dated by its excavators around 1150-1050 BC, should be considered under this light. The morphology of these examples is distantly related to that of the Cypriot ones, and in general they present more differences than similarities with them. For example, whereas in the Cypriot examples the stand and the vase they were carrying are totally independent from each other, in the example from Portugal the two are attached to each other. These differences suggest that there is no direct connection

between them and the Cypriot works, but perhaps only an indirect one, probably transmitted through Sardinia.

A new find from Spain (RAFEL 2002) illustrates of the expansion of the Cypriot-type stands as far west as the Iberian Peninsula, which now seems to cover the entire length of the Mediterranean. Two small fragments of a ring, decorated with two alternating plain, rectangular-sectioned rods and zick-zack patterns (cf. PAPASAVVAS 2001, figs 1-2, 176-177) were found in a tomb at La Clota, Calaceite, dating in the 7th-6th cent. BC. It cannot be argued with any certainty whether this is a direct influence from Cyprus, or, most probably, if this got there indirectly through Sardinia (either as a finished product or as an impulse for the local workshops). The poor state of preservation of the fragments and their relatively simple decoration, that bears no distinct geographic identity, do not allow any close comparison with Cypriot or Sardinian works, although its structure (but not its decoration) is similar to that of the ring of the stand from Santa Maria in Paulis, Sardinia (fig. 20). Its context is much later than those of the Cypriot, Cretan or Sardinian examples, hence the excavator discusses the possibility of it being an heirloom. Particularly revealing for the importance and esteem of these artifacts is the fact that, wherever these artifacts are found, in Cyprus, Sardinia or the Iberian Peninsula, and in whatever condition, they are taken in most studies to be signifying the existence of a local elite society (cf. RAFEL 2002).

The typological and technological complexity of Cypriot stands, unparalleled in Crete or in Sardinia, would allow the copying of the types on these islands only if the necessary technology had been mastered beforehand. While it cannot be disputed that some Cypriot stands were exported to the Aegean (PAPASAVVAS 2001, nos 8-9, 26) and possibly to Sardinia, too, it must be seriously doubted that imported works could lead directly to the adoption of their particular type in local workshops. Imports alone would not be sufficient to stimulate a tradition in Crete that was to last to the early seventh century. Moreover, the technological aspects of an artifact, especially one of metal, are not assimilated so easily as its type. In the case of bronzes of a simpler form, such as tools or weapons, which are cast in moulds or by the lost-wax method and did not change much over time, a new type could have been easily adopted by a foreign metalworker. Stands, however, represent a technologically and typologically new concept in bronzeworking, relying upon a unique combination of several techniques. These techniques, including casting with a composite wax-model, composed of many rod- or band-shaped parts and relief-figures in different combinations, and the use of moulds for the relief decoration, demanded great experience. Even on Cyprus, they were never combined for the casting of bronzes other than stands. Consequently, the adoption of these Cypriot-type stands outside Cyprus is mainly a matter of technology and not one of a typological imitation, as it necessitates the transmission of the knowledge of how to make them.

Only extreme scepticism could consider these three separate centres of stand production outside Cyprus as isolated and independent phenomena. It cannot be empasized enough that the stands characterize the bronzework of three important islands of the Mediterranean, Cyprus, Crete, and Sardinia, which were most heavily involved in the circulation of copper in the Mediterranean network. Instead of postulating that bronzeworkers from Crete, Sardinia and the Syro-Palestinian coast arrived on Cyprus, independently chose to imitate two particular types of stands and then carried them back to their respective countries where they were successful in establishing a new tradition that survived well into the Iron Age, it makes better sense to consider this expansion as a single phenomenon and, consequently, to ascribe it to a Cypriot initiative. In the beginning of this expansion, the supply of Cypriot copper to many non-Cypriot bronzeworking centers would have offered Cypriot metalworkers access to a broad spectrum of typologies and technologies from different areas. At the same time, direct access to the raw material gave them the opportunity to develop a highly advanced technology and relieve Cypriot bronzeworking of its earlier monotony. The change is apparent in the production of bronzes of new and particular types, produced with advanced techniques, reaching an *apogee* with the stands (PAPASAVVAS 2001, 212-229).

The transmission of the stands technology has to be connected to the metallurgical expansion on Cyprus, especially in the Late Cypriot IIC period, that coincides with the focusing of the island towards the production and distribution of copper. The developments on Cyprus discernible in the establishment of flourishing settlements in close proximity to copper mines during the same period, did not remain without ramifications in the relations of the island to other regions (MUHLY 1989). The importance of Cypriot copper is reflected in the presence of Cypriot ceramics at various sites in the Mediterranean accompanied by the presence of the raw material that formed one of the foundations of the network - copper in the form of oxhide ingots (LIVERANI 1987, 68; SHERRATT, SHERRATT 1991).

The spread of Cypriot commercial activities to the West is not to be connected solely with the demand for Cypriot copper abroad. In order to support the thriving bronze industry on the island, tin was as important as copper. Since this metal does not occur on the island, Cypriots had to obtain it from other sources (be they eastern or western), also involved in the Mediterranean copper trade. While not neglecting the written evidence that tin from Eastern sources reached as far west as the Aegean by the early 2nd millenium, some scholars have argued that an impetus to the Aegean bronzeworking was provided by tin imported from Northwestern Europe, as early as the end of the Middle Helladic period. Muhly (1973, 271-278) suggests that some of the tin entering the Aegean from the West could have reached Cyprus in exchange for copper. This hypothesis, in combination with the fact that Cypriots were supplying copper to the Aegean smiths, suggests that western sources of tin would have been accessible to the Cypriots.

Sardinia's inclusion in the Mediterranean *koine* in

metallurgy and metalworking (VAGNETTI 1968) can be understood, if we consider this centrally located Mediterranean island a centre of re-distribution for metals to the East and the West, primarily tin from Northwestern Europe. For such a distribution, there would be a need for partners to co-operate in a wide network, with the Cypriots playing a major role. Copper had already opened the routes, promoting the building of ships for its handling, the establishment of relations with vassals and partners (such as trading agreements, access to markets and clients), and most importantly, by offering a major exchange product in vast quantities. These circumstances would have offered Cypriots the possibility of participating in the tin trade, not only as clients but as suppliers, distributing both basic metals —their own copper and tin acquired from the West. The quantity of copper and tin in the cargo of the Uluburun shipwreck alone (PULAK 1997), which might well be of Cypriot origin, implies the existence of a well-organized distribution of metals conducted on a grand scale (VAGNETTI, LO SCHIAVO 1987).

The transmission of the technology of the stands, together with the transportation of their raw material, fits well into this scenario. The Cypriot technological experience would travel as the smiths presumably did, like the one on the Cape Gelidonya ship together with his equipment (BASS 1967, 117). On this ship, copper and tin ingots were accompanied by quantities of scrap-metal for recycling, stone moulds, and metallurgical tools, apparently belonging to a metalworker's toolkit. These denote the presence of a travelling craftsman on board, who docked at emporia practicing his skills, without the need to settle down. He would provide, along with his tools, his technological expertise while having direct access to the raw materials on board. All these attributes enabled him to act as the best medium for transmitting typology and technology. A group of metallurgical tools from various sites on Sardinia, primarily shovels with twisted handles, points in the same direction. Their appearance on Sardinia cannot be separated from the presence of the same type on Cyprus, where they are also rather rare. Their occurrence in the central Mediterranean could very well betray the identity of the metalworkers practising there (LO SCHIAVO, MACNAMARA, VAGNETTI 1985, 22-30).

Conclusion

The date of the transmission process of the stands technology is of great importance for the evaluation of Cypriot bronzeworking in general (PAPASAVVAS 2001, 223-229). The date of the Sardinian stands is an extremely difficult problem, as they come from hoards or settlements spanning the 12th-8th centuries (MACNAMARA 1985). An indication for an early date for the appearance of stands on Crete is supplied by the clay four-sided stand from Karphi, that closely resembles a bronze four-sided stand (BOARDMAN 1961, 133-134). Despite the difference in material (that is, in technique) and in structural details, the resemblance is apparent, though not absolute, since the Karphi stand is not an exact copy of a metal prototype. It combines the form of a Cypriot four-sided stand to some Minoan, circular clay stands with cut-out decoration (e.g. EVANS 1928, 133). The date of the Karphi stand depends on its painted decoration and the chronology of the settlement, which place it at an early phase of Late Minoan IIIC at the earliest (NOWICKI 1987, 236-237; RUTKOWSKI 1987, 263-264; see also DESBOROUGH 1972, 57-63, 120-129). It seems that its Cypriot prototypes were not only known on Crete at least from this period, but were also making a strong impression (see PAPASAVVAS 2001, 185-189 for the discussion of some other finds from Palaikastro, unconvincingly claimed to be associated with bronze stands of Cypriot type). This indication, in combination with the evidence of the Cypriot metalworking developments and the expansion of the Cypriot commercial activities as presented above, suggests that these phenomena are closely interrelated with the adoption of the Cypriot technology for stand manufacturing.

Although the undeniable fact, that ancient Cypriot economy was based upon copper, documented by the approximately 4 million tons of slag on the island, would have directed Cypriot production and exchange activity towards the handling of the raw metal, and much less towards the export of manufactured metal artifacts, such as stands, it cannot be overlooked that, in this network of raw materials, stands, the products *par excellence* of the Cypriot bronze industry, circulated along the same routes and reached the same destinations as did copper. It may well be an exceptional case that the elaborate Cypriot stands, together with their technology, were widely exported so that they could be manufactured outside the island in a deliberately formulated policy to increase the demand for raw material abroad, on which Cypriot commerce depended. As Cypriot stands must have been readily recognized as such in antiquity, their circulation within the Mediterranean would soon have led to the identification of their place of origin with the source of the raw material, which in turn would have promoted the distribution of the raw material itself (cf. SHERRATT 1994).

Since Cypriot-type stands would not have been imitated just for their function, which could have been filled by much plainer utensils, their broad distribution must have been the result of their technological superiority and the high quality of their metal. The vivid impression that they make even today and the potential of using them in a myriad of circumstances, enabled Cypriots to exploit them as the best representative of their commercial activity, and as a decisive factor in the penetration of international markets. Towards this end, it was necessary to distribute not just the raw material and the stand types, but also the technology used in their production.

The specialised production of bronze masterpieces such as these stands gave Cyprus the opportunity to open new markets or to keep active the old ones in the aftermath of the instabilities of the late 13th and early 12th centuries. If the Pastoral Style reflects the ability of Cypriots to fill the market vacuum of the second half of 13th century left by Aegean-type ceramics in

the Eastern Mediterranean, the same need was met in bronzeworking by the stands - and, perhaps later, by iron implements (SHERRATT 1994). These two last categories, present in many Mediterranean regions, display the same characteristic: Cypriot imports to a given region are followed by the introduction of their types in the local bronzeworking traditions. In both cases, production required specialised technology distributed from Cyprus, the island called "...the proto-Silicon valley of the Mediterranean world, a small area specializing in technological innovation..." (MUHLY 1996, 53), the same island that was responsible for transmitting many traditions in metallurgy and metalworking in the Mediterranean from the late second into the early first millenium.

Although several stands were probably, soon or later, broken and recycled (cf. KARAGEORGHIS, KASSIANIDOU 1999), there must be still many stands awaiting discovery in Cypriot sites, that will help to write more about them.

George Papasavvas
University of Cyprus,
Archaeological Research Unit

Fig. 1. Rod tripod from from Pnyx, Athens. National Museum, Athens (DAI Phtoarchiv, Neg. Nr.: NM 1696).

Fig. 2. Four-sided stand from Cyprus, British Museum (Reg. No. 1946/10-17/1) (British Museum Photo-archive, by permission of the British Museum).

Fig. 3. Four-sided stand from Cyprus. Bible Lands Museum, Jerusalem (Inv. No. 862) (Photo-archive of the Bible Lands Museum, Jerusalem, BLMJ no. 862/File no. B26/Neg. no. 79LBF 26/Photo credit: Bill Robertson).

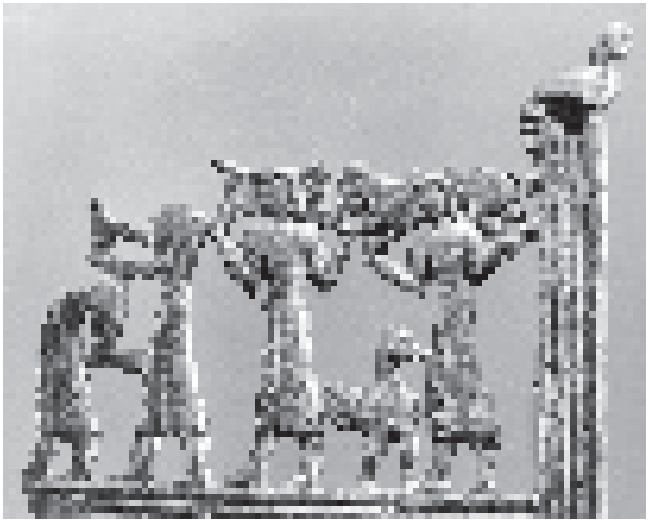

Fig. 4. Same as fig. 3, detail.

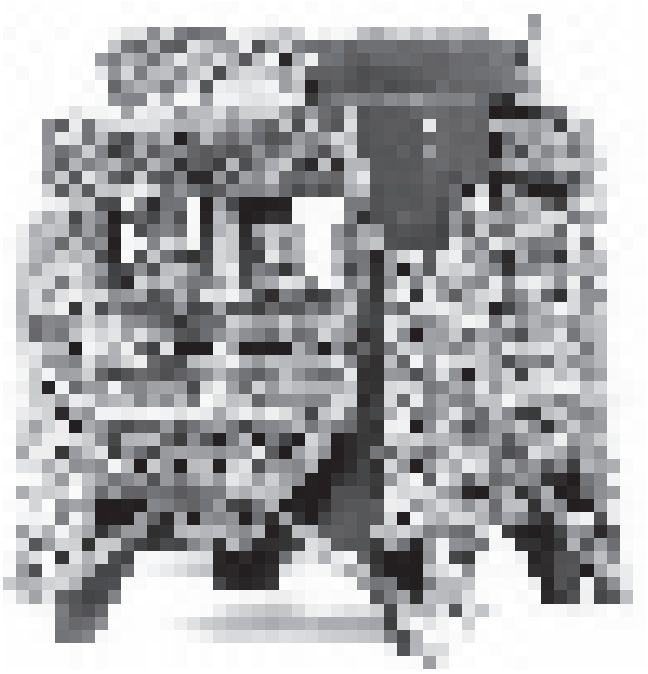

Fig. 5. Four-sided stand from Enkomi, Tomb 97. British Museum (Reg. No. 1897/4-1/1296) (British Museum Photo-archive, by permission of the British Museum).

Fig. 6. Four-sided stand from Kourion(?). British Museum (Reg. No. 1920/12-20/1).

Fig. 7. Detail of the rod tripod from Palaepaphos-Skales, Tomb 58. Cyprus Museum, Nicosia .

Fig. 8. Detail of the rod tripod from Tiryns. National Museum, Athens (Inv. No. 6225).

Fig. 9. Detail of the rod tripod from Pnyx. National Museum, Athens (Inv. No. 7940).

Fig. 10. Detail of the rod tripod from Kourion-Kaloriziki, Tomb 40. Cyprus Museum, Nicosia (Met. 299).

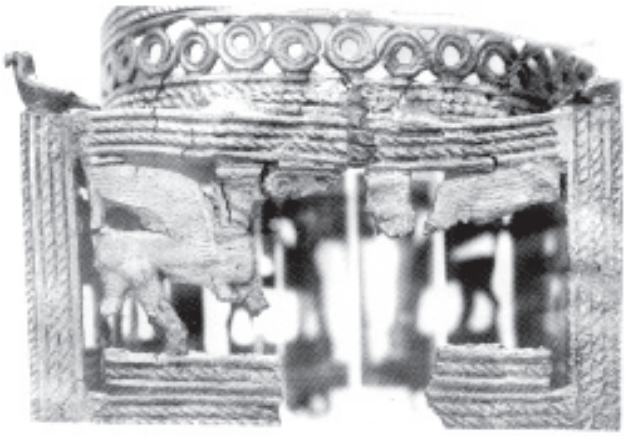

Fig. 11. Detail of four-sided stand from Cyprus. Pergamon Museum, Berlin (Inv. No. 8947).

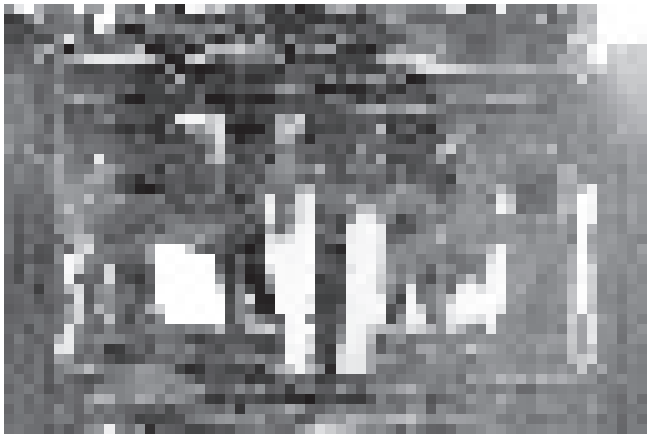

Fig. 12. Another side of the same four-sided stand as in fig.

Fig. 13. Detail of the four-sided stand from Cyprus. British Museum (Reg. No. 1946/10-17/1).

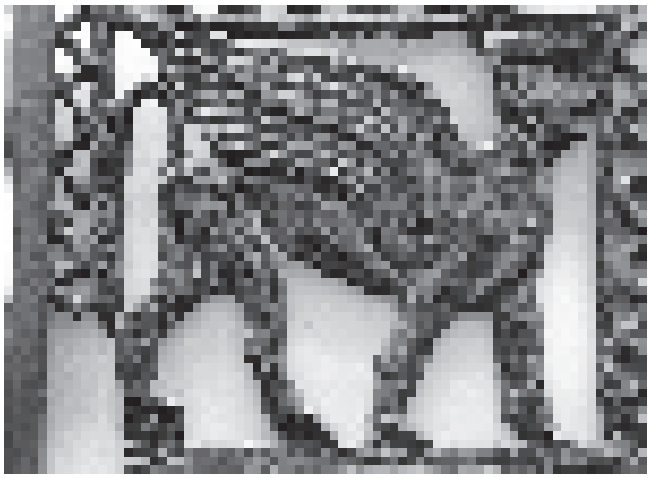

Fig. 14. Another side of the same four-sided stand as in fig.

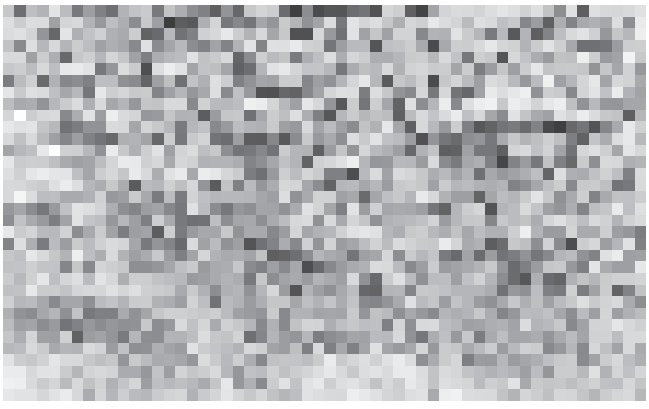

Fig. 15. Cast of the mould from Hala Sultan Tekke. British Museum, Department of Greek and Roman Antiquities.

Fig. 16. Imprint of the cylinder seal from Thebes. Archaeological

Fig. 17. Fragment of a pithos from Enkomi, Cyprus Museum, Nicosia (Cyprus Museum Photo-archive, by permission of the Director of the Department of Antiquities, Cyprus and of the Cyprus Museum, Nicosia).

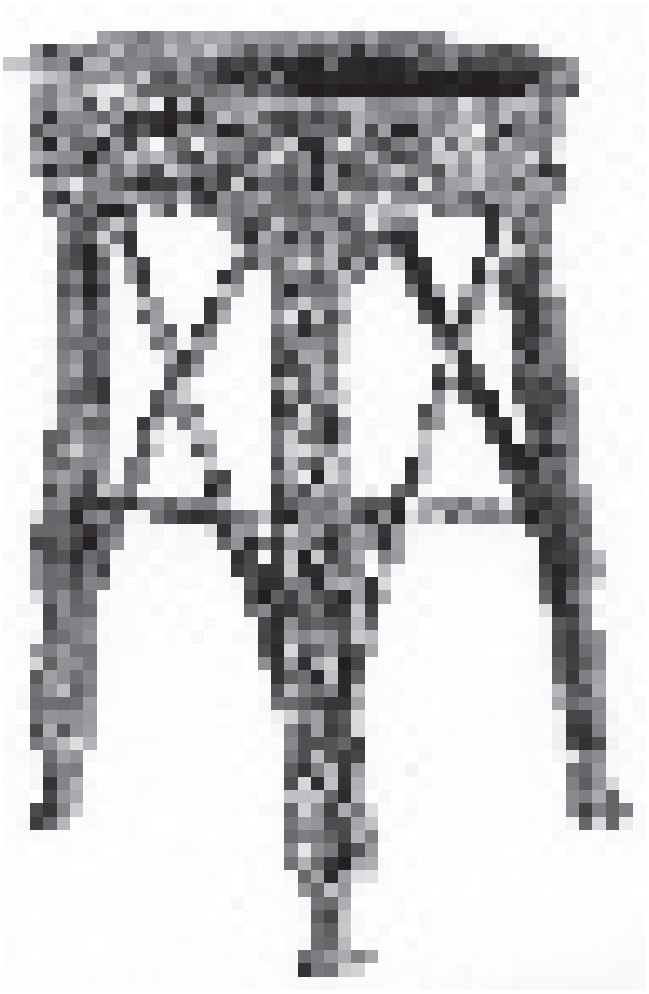

Fig. 18. Rod tripod from Fortetsa, Crete. Archaeological Museum of Heraklion (photo: G. Papadakis).

Fig. 19. Rod tripod of Oristano (photo and drawing after MacNamara 1985, pl. IIa fig14:2, by permission of Fulvia Lo Schiavo).

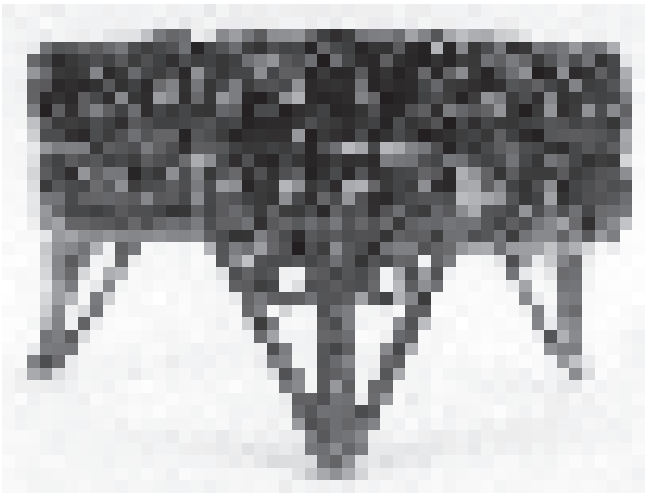

Fig. 20. Rod tripod from Santa Maria in Paulis. British

References

Achilles 1981
D. Achilles, "Fragmentary four-sided openwork stand", in O. W. Muscarella (ed.), *Ladders to Heaven: Art Treasures from Lands of the Bible*, 254-260 (Toronto).

Bailey 1976
D. M. Bailey, "The British Museum Excavations at Hala Sultan Tekke in 1897 and 1898. The material in the British Museum", in P. Aström, D. M. Bailey and V. Karageorghis, *Hala Sultan Tekke I. Excavations 1897-1971. SIMA* 45:1, Göteborg, 1-32.

Bass 1967
G. Bass, *Cape Gelidonya: A Bronze Age shipwreck. Transamerican Philosophical Society, New Series, vol. 57 Part 8*, Philadelphia.

Baurain 1980
C. Baurain, "Chypre et le monde égéen", *BCH CIV*, II, 565-580.

Boardman 1961
J. Boardman, *The Cretan Collection in Oxford*, Oxford.

Catling 1964
H. W. Catling, *Cypriot Bronzework in the Mycenaean world*, Oxford.

Catling 1984
H. W. Catling, "Workshops and heirloom: prehistoric bronze stands in the Eastern Mediterranean", *Report of the Department of Antiquities, Cyprus*, 69-91.

Catling 1993
H. W. Catling, "The bronze amphora and burial urn", in M. R. Popham, P. G. Calligas and L. H. Sackett (eds.), *Lefkandi II. The Protogeometric building at Toumba, Part 2: The excavation, architecture and find*. The British School of Archaeology at Athens, London, 81-96.

Coldstream, Catling 1996
J. N. Coldstream and H. W. Catling (eds): *Knossos North Cemetery. Early Greek tombs. Published by the British School at Athens, Suppl. vol. No. 28 (vols. I-IV)*, London.

Coghlan 1951
H. H. Coghlan, *Notes on the prehistoric metallurgy of copper and bronze in the old world*, Oxford.

Collon 1987
D. Collon, *First impressions: cylinder seals in the ancient Near East*, Chicago.

Courtois, Webb 1979
J.-C. Courtois and J. Webb: "A steatite relief mould from Enkomi", *Report of the Department of Antiquities, Cyprus*, 151-158.

Crielaard 1998
J. P. Crielaard, "Surfing on the Mediterranean web: Cypriot long-distance communications during the eleventh and tenth centuries BC", in V. Karageorghis and N. Stampolides (eds.), *Eastern Mediterranean: Cyprus-Dodecanese-Crete. Proceedings of the international symposium, Rethymnon 13-16 May 1997*, Athens, 187-206.

Crowley 1989
J. L. Crowley, *The Aegean and the Near East. An*

investigation into the transference of artistic motifs between the Aegean, Egypt, and the Near East in the Bronze Age. SIMA Pocket-book 51, Jonsered.

Desborough 1965
V. R. d'A. Desborough, *Review of Catling 1964*. *JHS* 85, 233-235.

Desborough 1972
V. R. d'A. Desborough, *The Greek Dark Ages*, London.

Dikaios 1969
P. Dikaios, *Enkomi. Excavations 1948-1958, Vol. I. The architectural remains/The tombs*, Mainz am Rhein.

Drescher 1958
H. Drescher, *Der Überfangguß. Ein Beitrag zur vorgeschichtlichen Metalltechnik*, Mainz.

Evans 1928
Sir A. Evans, *The Palace of Minos, vol. II. A comparative account of the succesive stages of the early Cretan civili-zation as illustrated by the discoveries at Knossos*, London.

Haynes 1992
D. Haynes, *The Technique of Greek Bronze Statuary*, Mainz am Rhein.

Karageorghis 1989
V. Karageorghis, "A Bronze Age stone mould from Hala Sultan Tekke", *Bulletin de Correspondance Hellénique* CXIII:II, 439-46.

Karageorghis, Kassianidou 1999
V. Karageorghis and V. Kassianidou, "Metalworking and recycling in Late Bronze Age Cyprus. The evidence from Kition", *Oxford Journal of Archaeology* 18 No. 2, 171-188.

Karageorghis, Papasavvas 2001
V. Karageorghis and G. Papasavvas, "A Bronze Ingot-bearer from Cyprus", *Oxford Journal of Archaeology* 20.4, 339-354.

Kenna 1960
V. E. G. Kenna, "Technique: Technique into style", in H. W. Catling and V. Karageorghis, Minoica in Cyprus, *Annual of the British School at Athens* 55, 1960, 109-127 (122-123).

Keswani-Schuster 1989
P. Keswani-Schuster, "The pithoi and other plain ware vessels", in A. K. South, P. J. Russel and P. Schuster-Keswani (eds), *Kalavasos-Ayios Dhimitrios, vol. II: Ceramics, objects, tombs, specialist studies. Vasilikos Valley Project, vol. 3. SIMA 71:3*, Göteborg, 12-21.

Kling 1989
B. Kling, *Mycenaean IIIC:1b and related pottery in Cyprus, SIMA* 87, Göteborg.

Levy, Shalev 1989
T. E. Levy and S. Shalev, "Prehistoric metalworking in the southern Levant: archaeometallurgical and social perspectives", *World Archaeology 20:3: Archaeometallurgy*, 352-372.

Lilliu 1973
G. Lilliu, "Tripode bronzeo di tradizione cipriota dalla grotta Pirosu-Su Benatzu di Santadi (Cagliari)", in *Estudios dedicados a Luis Pericot*, Barcelona, 283-307.

Liverani 1987
M. Liverani, "The collapse of the Near Eastern regional system at the end of the Bronze Age: the case of Syria", in M. Rowlands, M. Larsen, K. Kristiansen (eds.), *Centre and periphery in the ancient world. New directions in Archaeology*, Cambridge University Press, 66-73.

Lo Schiavo 1986
F. Lo Schiavo, "Sardinian metallurgy: the archaeological background", in M. S. Balmuth (ed.), *Sardinia in the Mediterranean. Studies in Sardinian Archaeology, vol. II*. Ann Arbor, The University of the Michigan, 231-250.

Lo Schiavo, Macnamara, Vagnetti 1985
F. Lo Schiavo, E. MacNamara and L. Vagnetti, "Late Cypriot imports to Italy and their influence on local bronzework", *Annual of the British Scholl at Rome*, LIII New Series, vol. XI, 1-71.

Lo Schiavo, Usai 1995
F. Lo Schiavo and L. Usai, "Testimonianze cultuali di età nuragica: la grotta Pirosu in località su Benatzu di Santadi", in V. Santoni (ed.), *Carbonia e il Sulcis-Archaeologia e territorio*, Oristano, 147-186.

Macnamara, Ridgway, Ridgway 1984
E. MacNamara, D. Ridgway and F. R. Ridgway: *The bronze hoard from Santa Maria in Paulis, Sardinia. British Museum Occasional Paper No. 45*, London.

Macnamara 1985
E. MacNamara, "Tripod stands", in F. Lo Schiavo, E. MacNamara and L. Vagnetti, Late Cypriot imports to Italy and their influence on local bronzework, *Annual of the British School at Rome* LIII, New Series, vol. XI, 1-71 (35-51).

Macnamara, Meeks 1987
E. MacNamara and N. Meeks, "The metallurgical examination of four Late Cypriot III stands now in the British Museum", *Report of the Department of Antiquities, Cyprus*, 57-60.

Magou, Philippakis, Rolley 1986
E. Magou, S. Philippakis and C. Rolley, "Trépieds géométriques de bronze. Analyses complémentaires", *Bulletin de Correspondance Hellénique*, CX: I, 120-136.

Maryon 1949
H. Maryon, "Metal working in the ancient world", *American Journal of Archaeology* 53, 93-125.

MATTHÄUS 1985
H. Matthäus, "Metallgefäße und Gefäßuntersätze der Bronzezeit, der geometrischen und archaischen Periode auf Cypern, mit einem Anhang der bronzezeitlichen Schwertfunde auf Cypern", Prähistorische Bronzefunde II:8, München.

MEDEROS, HARRISON 1996
A. Mederos and R. J. Harrison, "«Placer de dioses». Incenarios en soportes con ruedas del Bronce Final de la peninsula ibérica", *Complutum Extra* 6:1, 237-253.

MORRIS 1989
I. Morris, "Circulation, deposition and the formation of the Greek Iron Age", *MAN* 24: 3, 502-519.

MUHLY 1973
J. D. Muhly, *Copper and Tin. The distribution of mineral resources and the nature of the metals trade in the Bronze Age. Transactions published by the Connecticut Academy of Arts and Sciences*, New Haven, Connecticut.

MUHLY 1980
J. D. Muhly, "Bronze figurines and Near Eastern metalwork", *Israel Exploration Journal* 30, Nos 3-4, 148-161.

MUHLY 1982
J. D. Muhly, "The nature of trade in the LBA Eastern Mediterranean: the organisation of the metals' tra-de and the role of Cyprus", in J. D. Muhly, R. Mad-din and V. Karageorghis (eds.), *Early Metallurgy in Cyprus, 4000-500 BC Acta of the international archaeological symposium, Larnaca 1981*, Nicosia, 251-270.

MUHLY 1985
J. D. Muhly, "Phoenicia and the Phoenicians", in J. Amitai (ed.), *Biblical Archaeology today. Proceedings of the international congress on Biblical Archaeology, Jerusalem 1984*, Jerusalem, 177-191.

MUHLY 1988
J. D. Muhly, "Concluding remarks", in J. Curtis (ed.), *Bronzeworking centres of Western Asia, c. 1000- 539 BC Colloquium held in the British Museum, July 1986*, London, 329-322.

MUHLY 1989
J. D. Muhly, "The organisation of the copper industry in Late Bronze Age Cyprus", in E. Peltenburg (ed.), *Early Society in Cyprus*, Edinburgh, 298-314.

MUHLY 1996
J. D. Muhly, "The significance of metals in the Late Bronze Age economy of Cyprus", in V. Karageorghis and D. Michaelides (eds.), *The development of the Cypriot economy: From the prehistoric period to the present day*, Nicosia, 45-60.

NOWICKI 1987
K. Nowicki, "The history and setting of the town at Karphi", *Studi micenei ed egeo-anatolici* XXVI, 235-256.

PAPASAVVAS 2001
G. Papasavvas, *Soportes de bronce de Chipre y Creta* (en griego), Nicosia.

PAPASAVVAS (i.p.)
G. Papasavvas (*in print)*, "Cypriot casting technology I: The stands", *Report of the Department of Antiquities, Cyprus,* 2003.

PHILIP 1991
Gr. Philip, "Cypriot bronzework in the Levantine world: conservatism, innovation and social change", *Journal of Mediterranean Archaeology*, 4:1, 59-108.

PORADA 1973
E. Porada, "On the complexity of style and iconography in some groups of cylinder seals from Cyprus", in S. Marinatos *et al.* (eds.), *The Mycenaeans in the Eastern Mediterranean. Acts of the international archaeological symposium, Nicosia 1972*, Nicosia, 260-273.

PORADA 1974
E. Porada, "Two cylinder seals from Tomb 9 at Kition", in V. Karageorghis, *Excavations at Kition I. The tombs. Appendix V*, Nicosia, 163-166.

PORADA 1981
E. Porada, "The cylinder seals found at Thebes in Boeotia", *Archiv für Orientforschungen*, 28, 1-78.

PORADA 1986
E. Porada, "Late Cypriot cylinder seals between East and West", in V. Karageorghis (ed.), *Cyprus between the Orient and Occident. Acts of the international archaeological symposium, Nicosia 8-14 September 1985*, Nicosia, 289-299.

PORADA 1988
E. Porada, "Relief friezes and seals from from Maa-Palaeokastro", in V. Karageorghis and M. Demas, *Excavations at Maa-Palaeokastro, 1979-1986, Appendix I*, Nicosia, 301-313.

PULAK 1997
C. Pulak, "The Uluburun shipwreck", in S. Swiny, R. L. Hohlfelder and H. Wylde Swiny (eds.), *Res Maritimae. Cyprus and the Eastern Mediterranean from Prehistory to Late Antiquity. Proceedings of the Second International Symposiun "Cities on the Sea", Nicosia Oct. 18-22, 1994. CAARI Monograph Series, vol. 1*, Atlanta, Georgia, 233-262.

RAFEL 2002
N. Rafel, "Un tripode de tipo chipriota procedente de la Clota (Calaceite, Teruel)", *Complutum*, 13, 77-83.

RIDGWAY 1986
D. Ridgway, "Sardinia and the first western Greeks", in M. S. Balmuth (ed.), *Sardinia in the Mediterranean. Studies in Sardinian Archaeology*, vol. II, Ann Arbor, The Univerity of the Michigan, 173-185.

ROLLEY 1977
C. Rolley, *Les trépieds à couve clouée, Fouilles de Delphes V*, París, 3.

Rutkowski 1985
B. Rutkowski, "The Temple at Karphi", *Studi micenei ed egeo-anatolici*, XXVI, 257-280.

Schorsch, Hendrix 2003
D. Schorsch and E. Hendrix, "The production of relief ornament on Cypriot bronze castings of the Late Bronze Age", in *Proceedings of the International conference "Archaeometallurgy in Europe, 24-26 September*, vol. 2, Milan, 47-56**.**

Schweitzer 1969
B. Schweitzer, *Die geometrische Kunst Griechenlands*, Köln.

Sherratt 1994
E. S. Sherratt, "Commerce, iron and ideology: metallurgical innovation in 12th-11th century Cyprus", in V. Karageorghis (ed.), *Cyprus in the 11th century BC Proceedings of the international symposium, Nicosia 1993*, Nicosia, 59-108.

Sherratt, Sherratt 1991
A. Sherratt and E. S. Sherratt, "From luxuries to com-modities: the nature of Mediterranean Bronze Age trade", in N. H. Gale (ed.), *Bronze Age trade in the Mediterranean. Papers presented at the conference held at Rewley House Oxford, December 1989. SIMA XC*, Jonsered, 351-386.

Smith 1997
J. S. Smith, *Seals for sealing in the late Cypriot period*, Bryn Mawr College 1994, UMI Dissertation Services, Ann Arbor Michigan.

Steinberg 1968
A. Steinberg, "Techniques in bronze working", in D. G. Mitten and S. F. Doeringer (eds.), *Master Bronzes from the Classical world*, Mainz am Rhein, 9-15.

Thouvenin 1986
A. Thouvenin, "Sur la technique de fabrication de certains bronzes ouvragés", *Revue archéologique de l'Est et du Centre-Est*, 37, 109-118.

Vagnetti 1968
L. Vagnetti, "I bacili di bronzo di Caldare sono ciprioti?", *Incunabula Graeca*, vol. 28, *Studi Micevei ed Egeo-Anatolici*, 7, 129-138.

Vagnetti, Lo Schiavo 1987
L. Vagnetti and F. Lo Schiavo, "Late Bronze Age long distance trade in the Mediterranean: The role of the Cypriots", in E. Peltenburg (ed.), *Early Society in Cyprus*, Edinburgh, 217-243.

Webb, Frankel 1994
J. Webb and D. Frankel, "Making an impression: storage and surplus finance in Late Bronze Age Cy-prus", *Journal of Mediterranean Archaeology*, 7:1, 5-26.