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Egyptian Gold in Prepalatial Crete? A Consideration of the Evidence

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Abstract

This study analyzes the evidence for the origin of gold found in secure prepalatial contexts in Crete. As there are no natural gold sources on Crete, extra-island interaction was required to procure this raw material. Information regarding the origin of prepalatial gold may, therefore, throw light on Crete's interactions during this formative period. Unfortunately, there are many difficulties in sourcing ancient gold, which make it impossible to know with certainty where the gold used in the production of prepalatial objects originated. However, careful analysis of the contexts of prepalatial gold objects, which demonstrates the frequent co-occurrence of gold with hippopotamus ivory, and the distribution of gold products and gold working technologies in the Aegean and Eastern Mediterranean, provide intriguing evidence to make a strong case for Egypt as a principal source of gold arriving in Crete during the prepalatial period, likely via the port city of Byblos on the Levantine coast.

This article aims to address a question which, at the present time, cannot be answered with certainty. Did gold found in secure prepalatial contexts in Crete originate in Egypt? There are a variety of reasons why the answer to this question is elusive, not the least of which is the difficulty of sourcing gold. Why, then, attempt to answer a question that is seemingly unanswerable. It seems that scholars have asked the question, and proposed a variety of possible answers, often enough to warrant a careful study of the available evidence, and yet this has not been undertaken. Indeed, when analyzed more thoroughly, the archaeological record provides intriguing evidence to suggest that an Egyptian origin for prepalatial gold, arriving indirectly to Crete via the Levant, is more than just plausible, it is likely. This information is significant as it provides information regarding Crete's extra-island interconnections and offers yet another lens through which we may gain insight into the nuances of Cretan society during this formative period in Cretan prehistory. (Figure 1)

Problems with Sourcing Gold

Since there is no evidence to suggest that natural gold sources ever existed in Crete, we must look elsewhere for the source of prepalatial gold. One approach to sourcing gold is through scientific analysis of the compositional elements within gold samples. While analytical techniques such as the determination of specific gravity (DSG), X-ray fluorescence (XRF), atomic absorption spectrometry (AAS), particle induced X-ray emission (PIXE), particle induced γ-ray emission (PIGE) and laser induced breakdown spectroscopy (LIBS) can be used to examine the elemental composition of gold objects in order to determine provenance, or to group items made from gold that originated from the same source,[1] these techniques are not without problem. For example, AAS and LIBS require removal of a small sample of metal, so these techniques are not generally used on gold objects. While DSG and XRF are non-destructive, they are not as dependable as AAS. DSG is reliable only if the sample contains no more than two elements. XRF measures the proportion of gold, but only of the surface of the object, which is highly problematic when testing excavated gold objects, as leaching often occurs when gold objects are buried for a long period of time.[2] PIXE is also a near-surface technique, which poses some problems. A recent study that experimented with a large number of ancient gold objects suggests a combination of methods, including PIXE, PIGE and PIXE-XRF, to obtain initial information on a set of gold objects in order to

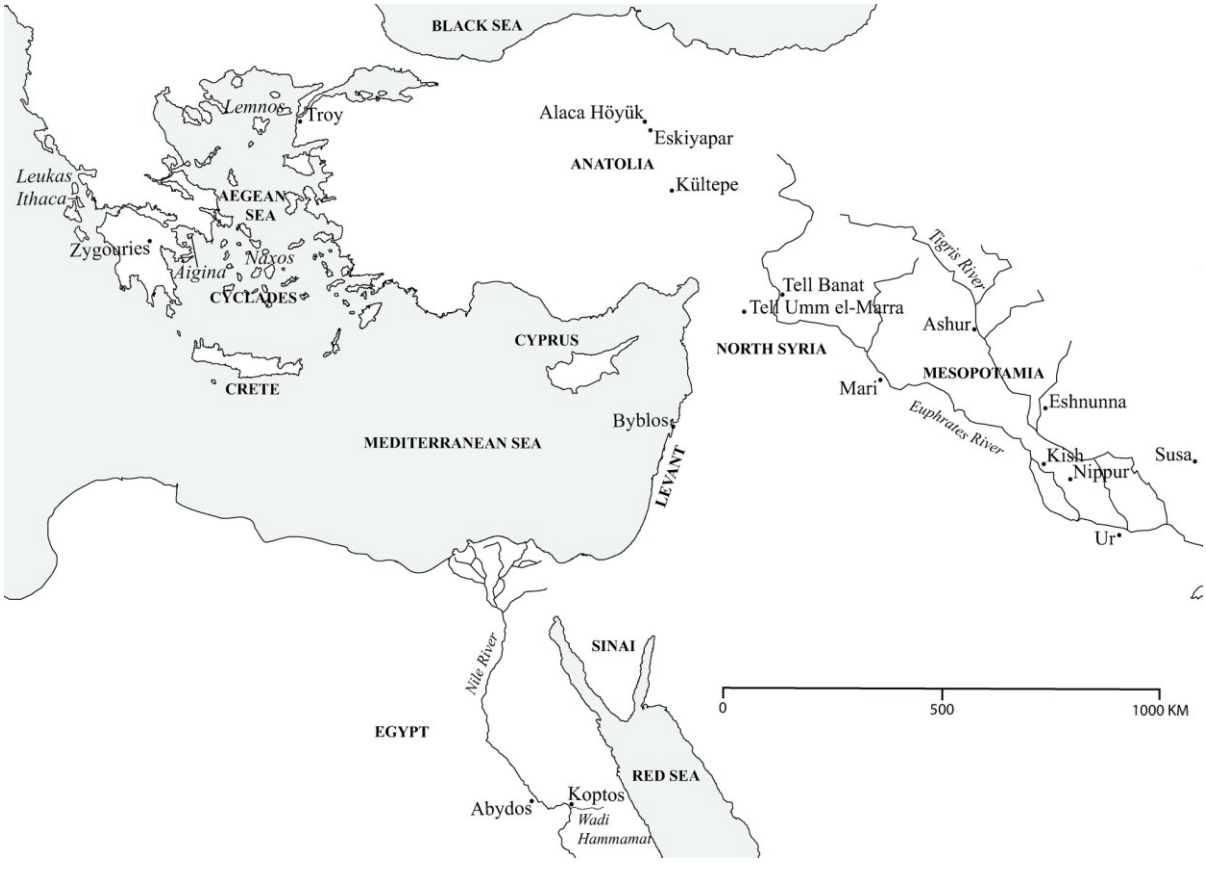

Figure 1: Map of the Aegean, Near East, and Egypt indicating sites mentioned

overcome some of the limitations of individual analytical techniques.[3]

While great strides have been made in determining the elemental compositions of gold, these methods are still unlikely to provide a definitive source for prepalatial gold for a number of reasons.[4] First, we are unaware of all of the gold mines and placer deposits that were known and exploited in the Early Bronze Age, and often of the elemental composition of the gold from those sources that are known.[5] Second, it is possible that the gold imported to Crete and worked locally came from different sources and was then melted together, and even gold samples from a single source can have different elemental compositions.[6] Third, given the rarity and value of gold in prepalatial Crete, as well as its non-destructible nature, it may have been recycled during the prepalatial period, which would make it even more difficult to source using the methods described above. Finally, since the technology to create alloys of gold and other metals existed in the Bronze Age,[7] if practiced, the original elemental composition of the gold would have been lost, making it difficult to source scientifically. Since gold is both soft and rare, the creation of alloys to make it stronger and stretch farther would be desirable and is, therefore, highly likely. The absence of textual sources from Crete during this early period adds to our lack of information regarding the origins of Crete's prepalatial imports, particularly those arriving as raw materials, such as gold.

Gold in Prepalatial Crete

Gold appears in secure prepalatial contexts in north-central Crete at the Phourni necropolis at Archanes, Krasi, and Pyrgos Cave; in the north-east at Maronia Cave, Mochlos, Pseira, and Sphoungaras; and in the south at Platanos, Lebena, and Koumasa. (Figure 2) The earliest deposits of goldwork found in Crete come from mixed Early Minoan I-II mortuary contexts at the Pyrgos Cave and Krasi tholos tomb in north-central Crete.[8] However, given that all other examples of prepalatial gold date no earlier than Early Minoan IIA, it is probable that gold first arrived in Crete during this period. Examples of gold objects from Early Minoan IIA contexts were found at Archanes in Tholos Tombs Γ and E, and at Koumasa in Tholos Tomb A. Goldwork continued in Crete in the subsequent Early Minoan III and Middle Minoan IA periods as attested at sites such as Mochlos and Archanes.

All prepalatial gold objects discovered thus far are from mortuary contexts, with the exception of a recent find by

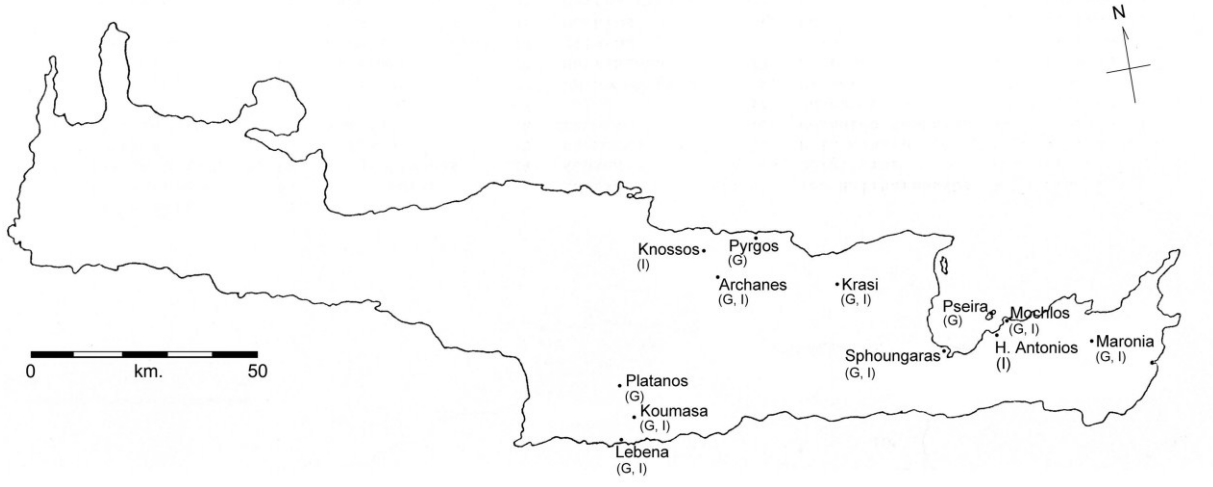

Figure 2: Map of Crete showing sites where gold (G) and ivory (I) have been found in secure prepalatial contexts

Soles at Mochlos. In his 2009 excavations, a fragment of a strip of gold sheet metal was discovered in a prepalatial obsidian blade workshop under the remains of a Late Minoan I building in the settlement. Other finds in the workshop included a small crucible that may have been used for pouring small amounts of precious metal, and two small bronze tools, one of which could have been used to decorate gold jewelry with dot repoussé, a technique used frequently on the jewelry found in the tombs of the prepalatial cemetery. Based on these finds, Soles suggests that the production of the gold jewelry found in the prepalatial tombs may have occurred here.[9]

While some of the early gold objects found in Crete are similar in form to examples from the north-east Aegean and Near East – such as sheet-gold diadems made of hammered gold, usually with repoussé decoration and holes at each end for fastening around the head,[10] gold flowers and leaves, perhaps

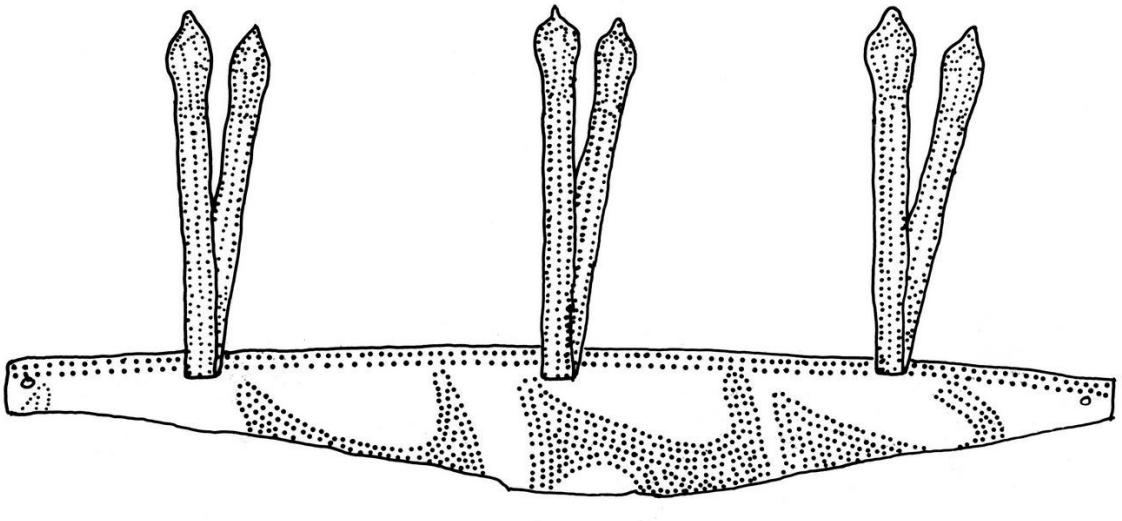

Figure 3: Drawing of gold diadem from cemetery at Mochlos (after Davaras 1975, fig. 3)

used as hair ornaments or attached to the diadems, and loop in loop chains[11] – the manufacturing techniques in Crete were far simpler, suggesting local craftsmanship and perhaps even distinct regional centers of production in Crete.[12] It is, therefore, clear that most of the gold that reached Crete in the Prepalatial period arrived as raw material.

It is also clear that gold objects, specifically jewelry, adorned the bodies of the living before their deposition in tombs. As early as 1912, Seager suggested that the diadems found at Mochlos showed evidence of wear from use during the life of the owners.[13] Davaras, in his publication of the hoard of jewelry found during the 1970s cleaning of the prepalatial cemetery with Soles, also suggests that the diadem found was not made explicitly for the grave, since the antennae attachments were ripped off, and the bottom of the diadem was removed before its placement in the tomb.[14] (Figure 3) Hickman's recent analysis of gold from prepalatial contexts in Crete provides detailed and conclusive evidence that gold jewelry from Crete was indeed used rather extensively in life before being deposited in the tombs.[15]

Suggested Sources for Prepalatial Gold

Without textual evidence it is impossible to know with any certainty all of the gold sources available in the Early Bronze Age, sometimes referred to as the "Early Gold Age" due to the sudden prevalence of gold items across a wide geographical area,[16] although Egypt, Asia Minor, Syria, and Macedonia have all been suggested as possible source locations.[17] As stated by Branigan, since gold occurs principally as surface deposits, "one cannot tell for certain whether local sources have been found, exploited, and eventually exhausted."[18] Hickman notes that "cave-ins and the growth of vegetation can obscure mine entrances and tunnels,"[19] further complicating the discovery of prehistoric gold mines. Even when gold sources are located, it is nearly impossible to know the date of their exploitation.

Notwithstanding these difficulties, numerous scholars have proposed potential sources for the gold reaching Crete in the prepalatial period. For example, in his original 1961 publication of *Greek and Roman Jewellery*, Higgins states that in the prepalatial period it is "perfectly possible" that gold reached Crete from Egypt, via their control of Nubian mines. He goes on to state that the rarity of Cretan contacts with Anatolia at this time "would appear to exclude Anatolian gold."[20] But in his later 1980 edition of this publication, Higgins suggests North Syria as the original source for the gold found in prepalatial contexts in Crete, specifically an alluvial deposit in the Melas valley in the vicinity of Antioch.[21] In making this suggestion, Higgins cites Maxwell-Hyslop, who mentions the presence of gold near Al Mina in the Melas valley, as well as some evidence for the extraction of gold.[22] Branigan suggests that Macedonia and northwest Anatolia were the most likely sources for the gold reaching Crete in Early Minoan II, and that it was not until the end of the third millennium B.C. that Minoan contacts with Cyprus and Syria began in any significant way.[23] Branigan also states that the Minoans are unlikely to have obtained gold from Egypt until the end of the Early Bronze Age. Warren instead suggests that the gold reaching Crete in the prepalatial period may have come from Egypt, citing the lack of gold in the Cyclades as a strong argument against northwest Anatolian/northeast Aegean or north Aegean sources.[24] Geological surveys in Egypt have revealed extensive mining of gold in the Eastern Desert from Predynastic times,[25] and there is evidence that mines with "Koptos gold," which was named by the ancient Egyptians after the nearby trading center on the Nile near the Wadi Hammamat, were exploited in the Old Kingdom.[26]

A Consideration of the Evidence

While the question of the origin of gold arriving in prepalatial Crete has generated much interest, there has been little detailed discussion or analysis to support or refute proposed sources. This is not surprising given the difficulties of sourcing gold already discussed above. However, careful analysis of the contexts of prepalatial gold objects, specifically its co-occurrence with hippopotamus ivory (Table 1), which had to be imported from Egypt or Syria,[27] and the distribution of gold products and gold working technologies and styles in the Aegean and Eastern Mediterranean, point to Egypt as a principal source.

Both gold and hippopotamus ivory, the only ivory reaching Crete in the prepalatial period,[28] appear in Crete by the Early Minoan IIA period.[29] For example, gold and ivory were represented in Early Minoan IIA contexts at Archanes in the lower burial strata of Tholos Γ and Tholos E, and at Koumasa in Tholos Tomb A.[30] Gold alone was discovered in Early Minoan I-II contexts at Pyrgos,[31] and in the lower level of Tholos A at Platanos, which dates to Early Minoan II.[32] At Knossos, a small piece of hippopotamus tusk, which Krzyszkowska identifies as workers' waste, was discovered in an Early Minoan IIA context.[33] When examined holistically, this evidence provides us with a *terminus ante quem* of Early Minoan IIA for the first arrival of gold and ivory on Crete, as no examples of gold or ivory have been found in secure contexts that predate this period.

In addition to their simultaneous Early Minoan IIA appearance in Crete, gold and ivory are often found at the same prepalatial sites, frequently in the same or close contexts. Interestingly, silver is rarely found with gold and ivory, and it is much rarer than gold in prepalatial Crete. Indeed, as early as 1924, Xanthoudides observed "that silver is a rare metal in the Minoan civilization, while gold is common," and that "in the

SITES BY REGION IN CRETE	DATE	GOLD	IVORY	SILVER
North-Central				
ARCHANES, Tholos Tomb C (Γ), lower burial stratum	EM IIA	√	√	√
ARCHANES, Tholos Tomb E, lower burial stratum	EM IIA	√	√	
ARCHANES, Tholos B Tomb Complex, MM IA deposits	MM IA	√	√	
ARCHANES, Burial Building 3, lower burial stratum of south rooms	MM IA		√[2]	
ARCHANES, Burial Building 7	MM IA	√	√[2]	
ARCHANES, Burial Building 8, MM IA burial stratum	MM IA	√		
ARCHANES, Burial Building 12	MM IA	√	√[2]	
ARCHANES, Burial Building 13	MM IA	√	√[2]	
ARCHANES, Burial Building 16	MM IA		√[2]	
ARCHANES, Burial Building 18, three south rooms	EM III-MM IA		√[2]	
ARCHANES, Burial Building 19, burial stratum 1	MM IA		√[2]	
KRASI	EM I-II	√	√[2]	√
PYRGOS	EM I-II	√		
North-East				
HAGIOS ANTONIOS	EM II-III		√[2]	√
HAGIA PHOTIA	EM I-IIA			√
MARONIA	EM II-III	√	√[1]	
MOCHLOS, Tomb I/II/III	EM IIA-III	√	√	√
MOCHLOS, Tomb IV/V/VI	EM II-III	√	√	√
MOCHLOS, Tomb XVI	EM II-MM IA	√		
MOCHLOS, Tomb XIX	EM II-III	√		
MOCHLOS, Tomb XXI	EM II-III	√		
MOCHLOS, Tomb XXIII	EM II-III	√		
PSEIRA	EM IIB	√		
SPHOUNGARAS	EM II-III	√	√	
South-Central/Mesara				
KOUMASA, Tholos Tomb A	EM IIA	√	√	
KOUMASA, Tholos Tomb B	EM IA-MM IA	√	√	
KOUMASA, Tomb Γ	EM IIA			√
LEBENA, Tomb I (Papoura)	EM II-MM IA	√	√	
LEBENA, Tomb II (Gerokampos)	EM II-MM IA	√	√	
LEBENA, Tomb III (Zervou), lower stratum	EM II	√		
PLATANOS, Tholos A, lower stratum	EM II	√		√

[1] Indicates objects that are identified as ivory in earlier publications, and upon more recent examination demonstrate characteristics that are typical of ivory, but the identification as ivory has not been definitively confirmed.
[2] Indicates objects that are identified as ivory in earlier publications, but the identification as ivory has not been confirmed.

Table 1: Sites where gold, ivory, and silver were found in prepalatial contexts

Cyclades the reverse is the case."[34] Based on lead isotope analysis, most of the silver reaching Crete in the prepalatial period is believed to have come from the Cycladic island of Siphnos, and from Lavrion in Attica, both of which are north of Crete.[35] Thus, the presence of silver in a given context or at a given site provides some evidence of trade in raw materials with areas north of Crete. The rarity with which silver occurs in the same contexts as gold and/or ivory is rather telling. If gold were indeed imported along the same northern trade routes, one might expect it to appear more frequently with silver.[36]

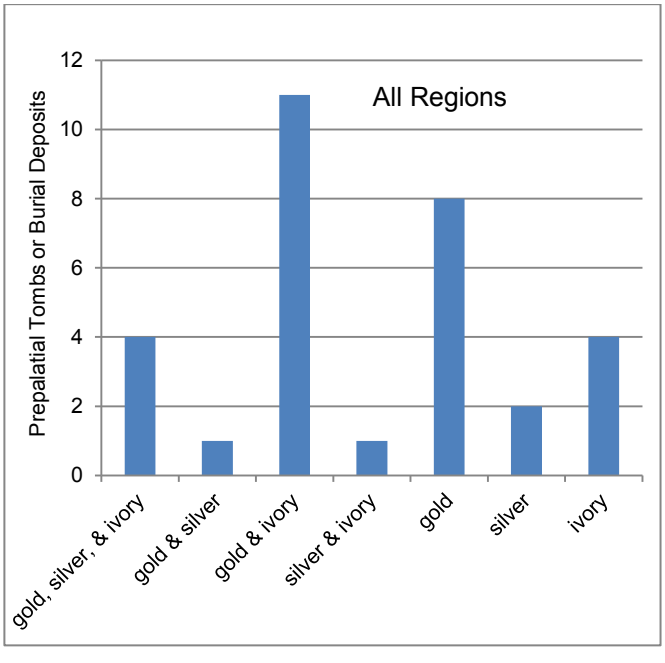

Figure 4: Graph showing frequency with which gold, ivory, and silver appear together and separate in prepalatial contexts in Crete

Table 1 and graphs 1, 2, 3, and 4 depict the frequency with which gold, ivory, and silver appear together and separate in prepalatial mortuary contexts at sites in Crete. Graph 1 (Figure 4) covers sites from the entire island, while graphs 2, 3, and 4 (Figures 5, 6, and 7) break down the information into regions: South-Central/Mesara, North-Central, and North-East. Looking at the island as a whole in Graph 1, it is clear that the most common combination is gold and ivory, which appear together and without silver in 11 prepalatial tombs or deposits, often in the same or close burial contexts, at 6 different sites.[37] Notably, the least common are gold and silver only, and ivory and silver only. These combinations appear in secure Prepalatial contexts only once throughout the island during the Early Bronze Age. The single co-occurrence of silver and ivory without gold was in Hagios Antonios, in the northeastern part of the island, which is closer to silver sources in the Cyclades and on the Greek Mainland. It should be noted, however, that the "ivory" from Hagios Antonios has not been confirmed. In the south of Crete, where there are very few silver objects, gold and ivory were discovered in the same tombs most often, and silver and ivory were never found together.[38] In the north-central region of Crete, gold and ivory once again appear most commonly together, and the combinations of silver and ivory, and silver and gold, are not represented. In the northeastern part of the island, which is dominated by the discoveries at the prepalatial cemetery at Mochlos, gold appears most commonly on its own, with the combinations of gold and ivory, and gold, ivory, and silver tying for a distant second.

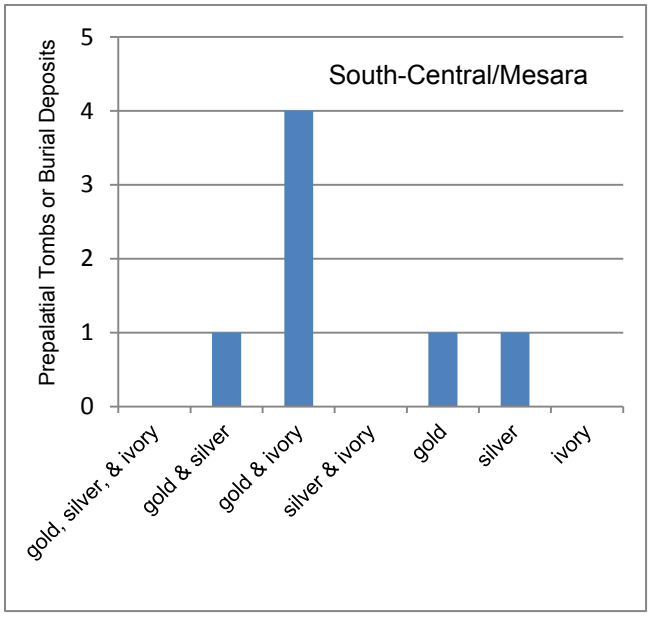

Figure 5: Graph showing frequency with which gold, ivory, and silver appear together and separate in South-Central Crete/Mesara

We must keep in mind that the evidence we have to work with is far from complete. For instance, there are many objects of gold, silver, and ivory that are excluded from this study due to their discovery in mixed pre- and protopalatial deposits.[39] In addition, silver is not as durable as gold, and so some examples of silver objects may have disappeared over the millennia. Notwithstanding these complications, an interesting pattern emerges when looking at the graphs. Ivory and gold are most often found in the same or close contexts. This is the case across the island, although it is least prevalent in the northeastern part of Crete. The variation that we see in north-east Crete reminds us of the possibility of regional distinctions when it comes to Crete's extra-island interactions. Indeed, it makes sense that we would see fewer silver objects in southern Crete, as it is farther from the Cyclades, where silver objects are fairly common and

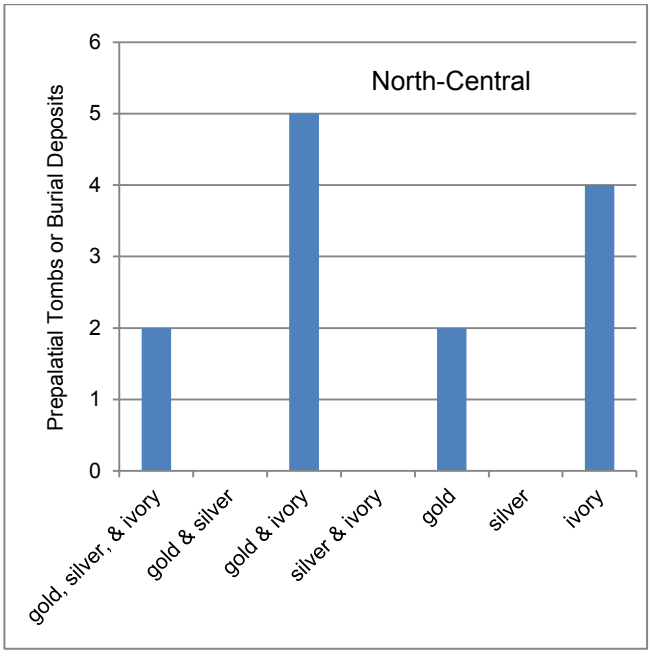

Figure 6: Graph showing frequency with which gold, ivory, and silver appear together and separate in North-Central Crete

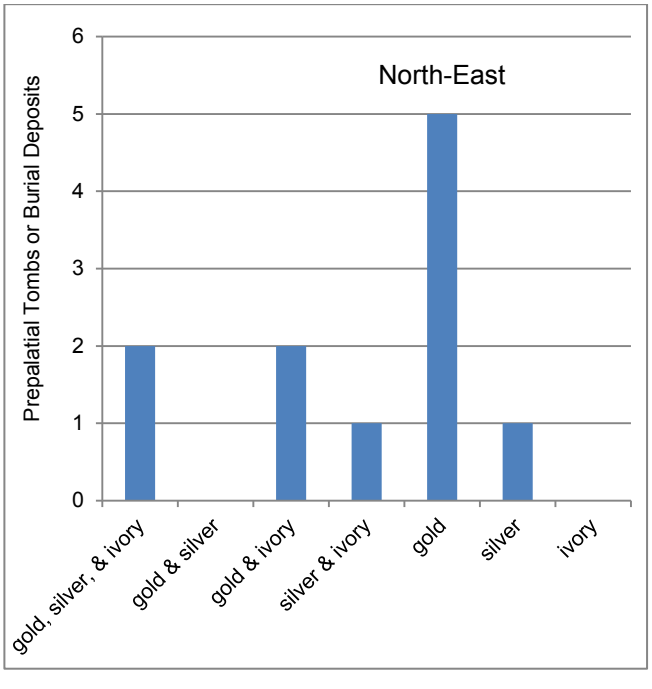

Figure 7: Graph showing frequency with which gold, ivory, and silver appear together and separate in North-East Crete

gold is all but absent. Since ivory was necessarily imported to Crete from Egypt or Syria, whether directly or indirectly, the frequent co-occurrence of gold and ivory in prepalatial contexts provides some evidence that both raw materials were imported to Crete from these regions, and not from the north.

The rather sporadic distribution of gold products in the Early Bronze Age Aegean is also interesting because it contradicts the picture on Crete where gold appears at numerous prepalatial sites shortly after its first appearance on the island. While excavations may reveal further examples of gold north of Crete, the paucity of gold products after over a century of excavation is somewhat surprising, especially if the source of gold is indeed in the north. This seems to suggest the relative inaccessibility of this prestige metal north of Crete.[40] The situation in the Cyclades is especially telling. Though many Early Bronze Age Cycladic sites have been excavated, only a single gold item, a bead from Phyrrhoyes on Naxos, was found in a secure Early Bronze Age Cycladic context.[41] Gold items have also been found in Early Bronze Age contexts in the Peloponnese at Zygouries,[42] in the Saronic Gulf at Kolonna on Aegina,[43] and at two sites in the Ionian islands off the western coast of Greece: Steno on Levkas,[44] and Pelikata on Ithaca.[45] The Thyreatis Hoard, now in the Antikensammlung, Berlin, is believed to be from Thyreatis, in Kynouria in the Peloponnese.[46] (Figure 1)

A brief comparison of metal working technologies and styles in Crete, the Greek mainland and nearby islands, the northeast Aegean, Anatolia, the Near East, and Egypt provides information regarding trade routes for prestige goods and technologies in the Early Bronze Age, and offers provocative evidence for the gold sources supplying prepalatial Crete. Though a few gold items from prepalatial Crete were cast from molten gold, most were created from hammered sheet gold of a variety of thicknesses. These items were then decorated using simple techniques, such as repoussé, wireworking, and chasing.[47] Gold items incorporating the more complex prestige technologies of granulation and filigree did not appear in Crete until the very end of the prepalatial period, around 2000 to 1900 BC. These first examples were likely imports.

Though generally different in style from prepalatial Cretan gold jewelry, most of the gold objects found sporadically in Early Bronze Age contexts at sites on the Greek Mainland or nearby islands were also produced using simple techniques, again alluding to local production. A notable exception to this, however, is the Early Helladic II hoard from Kolonna on Aegina discovered beneath an Early Helladic III house.[48] Among the finds from this hoard are a pendant with filigree, an etched carnelian bead, and flat, gold disk beads with tubular mid-rib string-holes. These items were likely imported to Aegina as finished products from the Near East or Anatolia rather than crafted locally, as they represent specific styles and technologies found in the Near East but not yet common in the Aegean. The presence of these items at Kolonna at this early date secures

Aegina's position as the westernmost satellite, at least discovered thus far, in what appear to be long distance Early Bronze Age exchange networks running from the Indus to Mesopotamia, North Syria, Anatolia, the northeast Aegean, and beyond.[49]

Figure 8: Biconical gold bead with filigree from Ur, c. 2600-2500 B.C. © The Trustees of the British Museum

Indeed, some of the specific styles and technologies present in the Early Bronze Age Aegina "treasure" are also present in Early Bronze Age contexts at numerous sites across this broad geographical region,[50] though completely absent from Crete. For example, the prestige technologies of granulation and/or filigree are represented at Kolonna on Aegina, Poliochni on Lemnos, Troy, Eskiyapar, Kültepe, Tell Umm el-Marra, Tell Banat, Tell Asmar, and Ur.[51] (Figure 8) Gold or silver flat disk beads with tubular mid-rib string holes have been found in Early Bronze Age contexts at Kolonna, Troy, Eskiyapar, Tell Umm el-Marra, Tell Brak, Ur, and farther afield in Iran, the Indus, and Central Asia.[52] Quadruple spiral beads have been discovered at Poliochni, Troy, Alaca Höyük, Eskiyapar, Tell Brak, Ashur, Ur, and beyond, and crescent earrings have been found at Poliochni, Troy, Mari, Ur, and sites in Iran and the Caucasus.[53] Etched carnelian beads (Figure 9), such as those found at Susa, Ur, Nippur, Kish, Eshnunna, and Kolonna, and elongated biconical carnelian beads (Figure 10), found at a number of sites, including Troy, probably originated in the Indus, and appear to have traveled much the same routes as these other prestige goods, from the Indus to Mesopotamia, Anatolia, the northeast Aegean, and out to Aegina.[54] While it is beyond the scope of this article to speak of the function and value of this exchange in prestige objects, styles, and technologies in each of these societies, their presence at the sites mentioned suggests a level of sustained, if indirect, intercultural exchange among distinct civilizations that extended from the Indus through Mesopotamia, North Syria, and Anatolia, to the Troad and farther afield.[55]

Figure 9: String of etched carnelian, lapis lazuli, and gold beads from Ur. Courtesy of the Penn Museum, image #152146

The picture along the Levantine coast, as suggested by the archaeological evidence from Byblos and elsewhere, is in stark contrast to what we see in Mesopotamia, North Syria, Anatolia, and the Troad. Examples of granulation and filigree are not found in Byblos until around 2000 BC, not long before Egypt begins to exploit these prestige technologies in the Twelfth Dynasty, very early in the second millennium B.C.[56] This is also more or less contemporary with the first appearance of beads or pendants with granulation and filigree in Crete. Also, as in Crete, the other types of prestige objects and styles discussed above are absent from Byblos and Egypt, suggesting that the Levantine coast and Egypt lay somewhat outside the scope of the well-trodden Mesopotamian overland trade routes through North Syria and Anatolia during the second half of the third millennium. This absence is somewhat surprising, since, as Allen notes, "the birth of pharaonic civilization itself, shortly

before the beginning of the third millennium BC, was marked by the appearance of new motifs in art and architecture that had direct antecedents in archaic Susa and the Uruk culture of Mesopotamia," with direct trade evidenced by Mesopotamian cylinder seals discovered in Egypt.[57] Allen also remarks, however, that "Mesopotamian motifs and objects disappeared from the Egyptian archaeological record in the middle of the First Dynasty, contemporary with Early Bronze Age II."[58] Yet at this time there is continued evidence for interrelations between Egypt and the southern Levant, such as Egyptian pottery at Levantine sites, some inscribed with the names of Egyptian rulers. Most of these exchanges originally took place via an overland trade route from the eastern Delta through the northern Sinai,[59] but at the end of Early Bronze Age II (late in Egypt's Second Dynasty, c. 2650 B.C.), Egypt's trade with southern Palestine decreased dramatically, while maritime trade between Egypt and the port of Byblos became prevalent.[60]

Figure 10: Brim from Ur showing biconical carnelian beads. Courtesy of the Penn Museum, image #152118

Based on an inscription on the Palermo Stone from the reign of the Fourth Dynasty pharaoh, Sneferu (c. 2575-2551), it seems that the principal motivation for trade between Egypt and Byblos was the acquisition of Lebanese cedar wood, which was necessary for large building projects, especially the production of ships.[61] It is, therefore, not surprising that the first iconographical evidence in Egypt for seagoing ships, which was found in the mortuary temple of the Fifth Dynasty pharaoh, Sahure, who ruled around 2450 B.C., dates to shortly after this inscription.[62] Though we cannot be certain where the ships originated since both Egyptians and Asiatics are represented on board,[63] the depiction of seagoing ships demonstrates new long distance overseas sailing capabilities that could bring Egyptian and Levantine raw materials, finished products, and ideas to Crete.

Although Crete's absolute chronology, especially for the prepalatial period, is less than precise,[64] it is around the time of the ascendancy of maritime trade between Egypt and Byblos that we see the first examples of gold imported to Crete in Early Minoan IIA, c. 2500 B.C. While this may be coincidental, there is additional evidence to suggest interconnections between Crete and the Levant at this time. For example, Aruz proposes that the numerous cylindrical stamp seals discovered in Crete "may indicate an essential connection with the Levant."[65] The discovery of a silver cylinder seal from an Early Minoan II-III context in Compartment I of Tomb I/II/III at Mochlos, identified by Aruz as a Levantine import, provides some confirmation for connections between the Levant and Crete.[66] Notably, both gold and ivory objects were found in the same tomb as the silver cylinder seal.[67]

The contents of the Montet jar, discovered in Byblos by Pierre Montet, coupled with Egyptian imports to Crete and Egyptianizing objects manufactured in Crete, such as scarabs and stone vessels,[68] provide additional evidence for interconnections between Crete, Byblos, and Egypt in the late prepalatial period. Ben-Tor's dating of the Egyptian scarabs in this jar to the early Twelfth Dynasty, the beginning of the second millennium B.C., allows us to analyze the contents of the jar in relation to similar finds from prepalatial Crete, such as Egyptian scarabs from Early Minoan III to Middle Minoan I contexts.[69] While these scarabs date somewhat later than the first appearance of gold in Crete in Early Minoan II, they still suggest contacts between Crete and Egypt indirectly via Byblos during the late prepalatial period. It should be emphasized that the types of Egyptian objects that made their way to Crete during this period are also found in the Levant, making clear that contacts between Crete and Egypt were not necessarily direct. Lacking, however, are clear Cretan exports to Egypt and the Levant during the prepalatial period. Although some scholars have suggested that Cretan exports during the prepalatial period may have included textiles or other items that would no longer be extant,[70] the absence of any recognizably Cretan products in the Levant and Egypt is still surprising. The discovery of an Early Minoan III-Middle Minoan IA white-on-dark ware vase in Lapithos on the north coast of Cyprus, however, provides clear evidence of contact between Crete and the Eastern Mediterranean at this time, albeit only as far as Cyprus.[71]

One last intriguing piece of evidence for the role of the Levant as an intermediary for the exchange of gold between Egypt and Crete was pointed out years ago by Higgins. The Greek word for gold, *chrysos*, which occurs as early as the Minoan period, derives from the Semitic language family.[72]

While Higgins made this point to support his claim that the gold reaching Crete in the Bronze Age may have come from Syria, it may also be used to support the argument that gold arrived to Crete from Egypt via Byblos, where a Semitic language was also used.

Conclusions

The idea that gold may have reached Crete from Egypt in the prepalatial period is not new, however, the evidence that exists to support this claim has not been thoroughly analyzed. While no single class of evidence provides definitive proof for Egypt as the origin of gold discovered in prepalatial Crete, this article has sought to make a compelling argument through a more comprehensive analysis that takes into consideration a variety of evidence types. First, an analysis of the archaeological context of gold objects from prepalatial Crete, which provides quantitative evidence for a strong correlation between the presence of ivory and gold, suggests a Syrian or Egyptian origin for the gold reaching Crete, since hippopotamus ivory was available only from these regions. Notably, silver, which according to lead isotope analysis comes from areas north of Crete, is rarely found with gold and ivory, and gold is all but absent in the Cyclades and found only sporadically on the Greek mainland and surrounding islands. Second, study of the gold working styles and technologies throughout the Aegean, Near East, and Egypt in the second half of the third millennium B.C. demonstrates that Crete, the Levant, and Egypt were outside the exchange systems that connected Mesopotamia with North Syria, Anatolia, and the northeast Aegean. While different regions can certainly develop distinct local styles even when in contact with one another, one would still expect to see the transfer of at least some technologies and/or styles, as is the case between Mesopotamia, Anatolia, the Troad, and Aegina at this time. Finally, the earliest examples of gold in Crete appeared at around the same time that Egypt developed close overseas trading relations with Byblos, and Crete received other imports from Egypt and the Levant, which likely included ivory.

It is, of course, possible, and even likely that not all of the gold reaching Crete at this time came from a single source. The evidence analyzed here, however, suggests that Egypt was probably a principle source for gold that reached Crete during the prepalatial period. Knowledge of the source of Crete's prepalatial gold may throw some light on Crete's extra-island interconnections during the so-called "Early Gold Age." There is, however, much work to be done to better understand the role of these objects in prepalatial Crete – whether symbolic, ritual, political, economic, etc. – in order to gain a more nuanced understanding of their value to the prepalatial inhabitants of the island during this formative, yet elusive, period in Crete's prehistory. If the importance of gold in Egypt or other parts of the ancient world is any indication of the significance of gold in prepalatial Crete, future study in this area will likely be fruitful.

Notes

[1] For a discussion of analytical techniques used to determine the compositional elements of gold samples, see Thea Politis, "Gold and Granulation: Exploring the Social Implications of a Prestige Technology in the Bronze Age Mediterranean," in Andrew J. Shortland (ed.), *The Social Context of Technological Change: Egypt and the Near East* (Oxford: Oxbow, 2001), 169-170; Maria Filomena Guerra and Thomas Calligaro, "Gold traces to trace gold," *Journal of Archaeological Science* 31 (2004): 1199-1208; Jane Hickman, "Gold Before the Palaces: Crafting Jewelry and Social Identity in Minoan Crete" (Ph.D. Diss., University of Pennsylvania, 2008), 90-93.

[2] J. Riederer, "Analysis of Gold Objects," in W.H. Kal (ed.), *Precious Metals in Early South East Asia: Proceedings of the Second Seminar on Gold Studies* (Amsterdam: Royal Tropical Institute, 1999), 66. See also Hickman 2008, 91-92.

[3] Guerra and Calligaro 2004, 1199-1208.

[4] For a general discussion of some of the difficulties with sourcing gold, see Hans-Gert Bachmann, *The Lure of Gold: An Artistic and Cultural History* (New York: Abbeville Press, 2006), 35.

[5] Politis 2001, 169.

[6] Hickman 2008, 94.

[7] Keith Branigan, *Aegean Metalwork of the Early and Middle Bronze Age* (Oxford: Clarendon press, 1974), 90; Hickman 2008, 94.

[8] Stephanos Xanthoudides, "Megas protominoikos taphos Pyrgou," *ArchDelt* 4 (1918): 166; Spyridon Marinatos, "Protominoikos tholotos taphos para to chorion Krasi Pediados," *ArchDelt* 12 (1929): 121.

[9] Jeffrey Soles, "2009 Greek-American Excavation at Mochlos," *Kentro* 12 (2009): 9-10.

[10] L.R. McCallum, "Aegean and Near Eastern Gold Jewelry in the Early Bronze Age," in P. Betancourt (ed.) *Gold in the Aegean Bronze Age* 8 (1983): 21-31.

[11] McCallum 1983, 21.

[12] McCallum 1983; Hickman 2008, 163.

[13] Richard Seager, *Explorations in the Island of Mocholos* (Boston and New York: American School of Classical Studies at Athens, 1912), 27.

[14] C. Davaras, "Early Minoan Jewellery from Mochlos," *Annual of the British School at Athens* 70 (1975): 101-114.

[15] Hickman 2008, 212.

[16] George F. Bass, "Troy and Ur: Gold Links Between Two Ancient Capitals," *Expedition* 8, 4 (Summer 1966): 26; see also G. F. BASS, "A Hoard of Trojan and Sumerian Jewelry," *American Journal of Archaeology* 74, 4 (1970): 340.

[17] For a list of areas that supplied the Classical world with gold, see Higgins, 1980, 8-10. For sources of gold in Egypt, see Carol Andrews, *Ancient Egyptian Jewelry* (New York: Harry N. Abrams, Inc., 1990), 53-54; and Jack Ogden, "Metals," in Paul T. Nicholson and Ian Shaw (eds.), *Ancient Egyptian Materials and Technology* (Cambridge: Cambridge University Press, 2000), 161-162. For sources in the Near East, see P.R.S. Moorey, *Ancient Mesopotamian Materials and Industries: The Archaeological Evidence* (Oxford: Clarendon Press, 1994), 219-220. For an argument for Macedonia and Northwest Anatolia as sources for the gold found in prepalatial Crete, see Branigan, 1974, 63.

[18] Branigan 1974, 63.

[19] Hickman 2008, 94.

[20] Reynold A. Higgins, *Greek and Roman Jewellery,* first edition (London: Methuen and Co LTD, 1961), 56.

[21] Reynold A. Higgins, *Greek and Roman Jewellery*, second edition (Berkeley and Los Angeles: University of California Press, 1980), 54. See also 9-10; Reynold A. Higgins, *Minoan and Mycenean Art* (New York: Thames and Hudson, 1992), 44.

[22] K.R. Maxwell-Hyslop, *Western Asiatic Jewellery c. 3000-612 BC* (London: Methuen, 1971), 230.

[23] Branigan 1974, 63.

[24] Peter Warren, "Minoan Crete and Pharaonic Egypt," in W.V. Davies and L. Schofield (eds.), *Egypt, the Aegean and the Levant: Interconnections in the Second Millennium BC* (London: British Museum Press, 1995), 1.

[25] R. Klemm and D.D. Klemm, Chronologischer Abriss der antiken Goldgewinnung in der Ostwüste Ägyptens. *Mitteilungen des Deutschen Archäologischen Instituts* 50 (1994): 189-222. See also Ogden 2000, 161.

[26] Ogden 2000, 161. See also Andrews 1990, 53-54.

[27] See, for example, David Reese, "Appendix III: A Hippopotamus Tooth from Hala Sultan Tekke," in *Hala Sultan Tekke* 10 (Göteborg: Paul Åströms Förlag, 1998), 140-142. Krzyszkowska and Morkot suggest that Egypt is "the most probable source of hippopotamus ivory used in Minoan Crete during the third and second millennia BC." Olga Krzyszkowska and Robert Morkot, "Ivory and Related Materials," in Paul T. Nicholson and Ian Shaw (eds.), *Ancient Egyptian Materials and Technology* (Cambridge: Cambridge University Press, 2000), 321.

[28] Olga Krzyszkowska, *Aegean Seals: An Introduction* (London: Institute of Classical Studies, School of Advanced Study,

University of London, 2005), 63.

[29] Krzyszkowska has demonstrated that before the 1980's, some bone artifacts were erroneously identified as ivory, and some ivory artifacts were erroneously identified as bone. However, she has also confirmed many examples of hippopotamus ivory in prepalatial contexts, and more recent publications identify the materials more accurately. Olga Krzyszkowska 2005, 59, 63-68. In this study, I strove to take into account the corrections available in the scholarship on ivory. It must be noted, however, that the raw material of some examples used here has not yet been confirmed. This is indicated in Table 1. I would like to extend my deepest thanks to Olga Krzyszkowska for her very kind assistance in verifying the material of many of the "ivory" objects discussed in this paper.

[30] Yiannis Papadatos, *Tholos Tomb Gamma: A Prepalatial Tholos Tomb at Phourni, Archanes* (Philadelphia: INSTAP Academic Press, 2005); Yannis Sakellarakis and Efi Sapouna-Sakellaraki, *Archanes: Minoan Crete in a New Light* (Ammos Publications, 1997), 187; Stephanos Xanthoudides, *The Vaulted Tombs of Mesara* (London: University Press of Liverpool, 1924/71), 48. Xanthoudides, who discusses the finds from Tholoi A, E, and Γ at Koumasa together, mentions 5 ivory seals, but states that they are all "practically destroyed," and he does not mention which of the tombs they came from. In *Corpus der Minoischen und Mykenischen Siegel* (*CMS*) II 1, however, five seals identified as ivory are said to come from Tholos A at Koumasa (Nos. 138, 140-141, 144, and 161). Nikolaos Platon, ed. *CMS* II 1: *Iraklion Archäologisches Museum, Die Siegel der Vorpalastzeit* (Berlin: Gebr. Mann Verlag, 1969). Krzyszkowska has already reidentified No. 144 as bone rather than ivory. Olga Krzyszkowska, *Aegean Seals: An Introduction* (London: Institute of Classical Studies: School of Advanced Study, University of London, 2005), 62, Fig. 100, and 385, No. 100.

[31] Xanthoudides 1918.

[32] Xanthoudides 1924/71, 89, 110-111.

[33] Krzyszkowska 2005, 63.

[34] Xanthoudides 1924/1971, 47.

[35] One important exception comes from the rectangular Tomb Γ at Koumasa, where three long silver daggers were found in a closed Early Minoan IIA context. Xanthoudides 1924/1971, 47; Jeffrey S. Soles, *The Prepalatial Cemeteries at Mochlos and Gournia and the House Tombs of Bronze Age Crete* (Princeton, NJ: American School of Classical Studies at Athens, 1992), 157. Lead-isotope analysis on the silver fell between the Siphnian and Lavrian fields, which may suggest a mixing of metals or a completely different source for the silver. See Zofia Stos-Gale, "Lead and Silver Sources for Bronze Age Crete," in *Proceedings of the 5th Cretological Congress: Agios Nikolaos, 25 September-1 October 1981* (Herakleion: 1985), 368, 371. With the exception of the Koumasa daggers, which based on weight alone constitute a large proportion of the silver found in prepalatial contexts in Crete, silver is extremely rare in south Crete. This may suggest distinct regional trade patterns in Crete during the prepalatial period, though this can't be confirmed at this time.

[36] While one might argue that the co-occurrence of gold and ivory in Crete is based exclusively on their common role as prestige materials rather than as a result of related trade connections, the rarity and archaeological contexts of silver in prepalatial Crete suggests that silver should also be viewed as a luxury item. Thus, if access to all of these materials were equal, one would expect to see silver appear more frequently in the same contexts as gold and/or ivory. For a discussion of the social implications of imports to prepalatial Crete, see Cynthia S. Colburn, "Exotica and the Early Minoan Elite: Eastern Imports in Prepalatial Crete," *American Journal of Archaeology* 112.2 (2008): 203-224.

[37] Lebena Tomb I (Papoura) and Lebena Tomb II (Gerokampos) are treated as two different sites.

[38] Interestingly, the port of Kommos in southern Crete shows very close trading connections with the Levant, although later in time.

[39] Moni Odigitria provides a perfect example. Gold, ivory, and silver objects were found in the sieving of the looter's soil from Tholos B. However, since a few items that date to the early Protopalatial period were discovered in the soil, the gold finds from this tomb are not included in this study. See Andonis Vasilakis and Keith Branigan, *Moni Odigitria: A Prepalatial Cemetery and Its Environs in the Asterousia, Southern Crete* (Philadelphia: INSTAP Academic Publishing, 2010), 48, 129-130, 193-194.

[40] Notable exceptions to this are Troy and Poliochni in the northeast Aegean. However, based on trade patterns, I will argue below that these regions were not in close contact with Crete during the Early Bronze Age.

[41] George Papathanassopoulos, *Neolithic and Cycladic Civilization* (Athens: Melissa Publishing House, 1981), 136, #63.

[42] Carl Blegen, *Zygouries: A Prehistoric Settlement in the Valley of Cleonae* (Cambridge, Mass: Harvard University Press, 1928).

[43] For the complete publication of this hoard, see Claus Reinholdt, *Der frühbronzezeitliche Schmuckhortfund von Kap Kolonna: Ägina und die Ägäis im Goldzeitalter des 3. Jahrtausends v. Chr.* (*Contributions to the Chronology of the Eastern Mediterranean* XV, 2008). See also Claus Reinholdt, "The Early Bronze Age Jewelry Hoard from Kolonna, Aigina," in J. Aruz with R. Wallenfels (eds.), *Art of the First Cities: The Third Millennium B.C. from the Mediterranean to the Indus* (New York: The Metropolitan Museum of Art, 2003), 260-261; and Florens Felten, "Aigina-Kolonna in the Early and

Middle Bronze Age," in J. Lesley Fitton (ed.), *The Aigina Treasure: Aegean Bronze Age Jewellery and a Mystery Revisited* (London: The British Museum Press, 2009), 32-35.

[44] Wilhelm Dörpfeld, *Alt-Ithaka* (München-Gräfelfing: Verlag Richard uhde, 1927).

[45] W.A. Heurtley, "Excavations in Ithaca, II," *Annual of the British School at Athens* 35 (1934-35): 1-44.

[46] Claus Reinholdt, "Der Thyreatis-hortfund in Berlin," *Jahrbuch des Deutschen Archäologischen Instituts* 108 (1993), 1-41.

[47] For a detailed discussion of the gold working techniques found in Crete, see Hickman 2008, 103-120. See also McCallum 1983, 21.

[48] Reinholdt 2003, 260.

[49] See Joan Aruz, "Art and Interconnections in the Third Millennium B.C.," in Joan Aruz with Ronald Wallenfels (eds.), *Art of the First Cities: The Third Millennium B.C. from the Mediterranean to the Indus* (New York: The Metropolitan Museum of Art, 2003), 239-250.

[50] Aruz 2003.

[51] For a discussion of granulation technologies, specifically the distinctions between proto-granulation, pseudo-granulation, and true granulation, see Politis 2001, 161-194. Politis also makes clear that the ultimate goal of each of these techniques is to maximize the light reflective quality of gold.

[52] Aruz 2003, 243 and Fig. 72.

[53] Aruz 2003, 243-244 and Fig. 73

[54] Aruz 2003, 243 and Fig. 74.

[55] Aruz 2003, 239.

[56] Andrews 1990, 88, 98; See also Ogden 2000, 165, who states that granulation in Egypt "was almost certainly an imported idea."

[57] James P. Allen, "Egypt and the Near East in the Third Millennium B.C.," in Joan Aruz with Ronald Wallenfels (eds.), *Art of the First Cities: The Third Millennium B.C. from the Mediterranean to the Indus* (New York: The Metropolitan Museum of Art, 2003), 251.

[58] Allen 2003, 251.

[59] Allen 2003, 251. For a more detailed discussion of Egypt's relations with southern Palestine, see Toby A.H. Wilkinson, *Early Dynastic Egypt* (New York: Routledge, 1999), 151-160.

[60] Allen 2003, 251; Wilkinson 1999, 160.

[61] Nina Jidejian, *Byblos through the Ages* (Beirut: Dar el-Machreq Publishers, 1971), 17. See also Wilkinson 1999, 160-162. For the inscription, see James B. Pritchard, ed. *Ancient Near Eastern Texts Relating to the Old Testament*, 3rd edition (Princeton, 1968), 227; Also cited in Shelley Wachsmann, *Seagoing Ships and Seamanship in the Bronze Age Levant* (College Station: Texas A&M University Press, 1998, 9); and Jidejian 1971, 17.

[62] These vessels are considered to be seagoing ships because they have a heavy rope truss to keep the ends from sagging in the open sea.

[63] Shelley Wachsmann states that the ships are "undeniably Egyptian," suggesting that the Asiatics on board are human tribute for the pharaoh, however, he does not mention what makes these ships Egyptian. *Seagoing Ships and Seamanship in the Bronze Age Levant* (College Station: Texas A&M University Press, 1998), 9.

[64] John Cherry, "Sorting Out Crete's Prepalatial Off-Island Interactions," in Willam A. Parkinson and Michael L. Galaty (eds.), *Archaic State Interaction: The Eastern Mediterranean in the Bronze Age* (Santa Fe, NM: School for Advanced Research Press, 2010), 112; Sturt W. Manning, *The Absolute Chronology of the Aegean Early Bronze Age: Archaeology, History, and Radiocarbon* (Sheffield: Sheffield Academic Press, 1995).

[65] Aruz 2003, 247. See also Joan Aruz, *Marks of Distinction: Seals and Cultural Exchange Between the Aegean and the Orient (ca. 2600-1360 B.C.)* (Mainz am Rhein: Verlag Philipp von Zabern, 2008), 40-41.

[66] Aruz 2003, 248; Joan Aruz, "The Silver Cylinder Seal from Mochlos," *Kadmos* 23 (1984): 187.

[67] Seager 1912, 18-40.

[68] For stone vessels, see Andrew Bevan, *Stone Vessels and Values in the Bronze Age Mediterranean* (Cambridge: Cambridge University Press, 2007), 62-99.

[69] Daphna Ben-Tor, "The Absolute Date of the Montet Jar Scarabs," in L.H. Lesko (ed.), *Ancient Egyptian and Mediterranean Studies in Memory of William A. Ward* (Providence, RI: Brown University, 1998), 1-17; "Chronological and Historical Implications of the Early Egyptian Scarabs on Crete," in E. Czerny, I. Hein, H. Hunger, D. Melman, and A. Schwab (eds.), *Timelines: Studies in Honour of Manfred Bietak* (Leuven: Peeters, 2006), 77-86. Though some of the scarabs imported to Crete from Egypt are from mixed pre- to protopalatial contexts, some can be securely dated to the late prepalatial period, such as examples from Lebena tombs I and IIA, which date from Early Minoan III to Middle Minoan IA. Krsyzkowska 2005, 73.

[70] See, for example, Susan Sherratt, "The Aegean and the Wider World: Some Thoughts on a World-Systems Perspective," in Willam A. Parkinson and Michael L. Galaty (eds.), *Archaic State Interaction: The Eastern Mediterranean in the Bronze Age* (Santa Fe, NM: School for Advanced Research Press, 2010), 93-94.

[71] Virginia Grace, "A Cypriote Tomb and Minoan Evidence for Its Date," *American Journal of Archaeology* 44 (1940): 24-29.

[72] Higgins 1980, 9.