A Golden Embrace: Early Bronze Age Connection between Eastern Crete and Uruk?

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Abstract *The excavation of the Early and Middle Minoan necropolis of Petras in eastern Crete continues to reveal new and interesting information about the people who were buried there before the foundation of the palace at the same site. In 2018, an EM II A primary female burial was excavated in a lower level beneath House Tomb 2, founded in Middle Minoan I B. The woman wore a necklace of various types of jewels including a very small cast gold pendant. The iconography of the piece depicts two male bearded figures in an embrace with specific hand and arm gestures as they kneel and face each other. The imagery of the figures, which measure only 1.75 cm in height and show a level of naturalism not normally seen at this time, is quite unique for Early Minoan Crete and for the Aegean region during the Early Bronze Age. The kneeling embrace of two men is an enigmatic motif among the cultures around the eastern Mediterranean during the Early and Middle Bronze Age. Nevertheless, iconographic features and metallurgical technology among other indicators point farther afield to Uruk or the Sumerian region of Mesopotamia as the origin of the gold pendant. The meaning of the pendant is explored, and it sheds light on the customs and beliefs of an elite or noble woman from Petras before the palace was built.*

Introduction to Petras

The excavation of the Early and Middle Minoan necropolis of Petras in eastern Crete has shown that the people who used the sacred precinct had knowledge of novel metallurgical techniques, which, in turn, have revolutionized our understanding of the culture and burial practices on the island before the foundation of the palaces (Brogan and Giumlia-Mair 2017; Giumlia-Mair et al. 2017, 2020, 2021; Giumlia-Mair, Betancourt, and Ferrence 2018). The necropolis is one part of a complex multi-phased site of three settlements – Final Neolithic and EM I A, EM II A to LM I B, and LM III A–III C – a palace (which housed a hieroglyphic archive), and a cemetery of the 12th to 13th centuries AD (Papadatos 2007; Rupp 2017; Tsipopoulou and Hallager 2010; Tsipopoulou 2016, 2021; Tsipopoulou, ed., 2012; Rupp and Tsipopoulou, forthcoming). The necropolis, which dates to EM I B to MM II B, contains many different structures: twenty-seven house tombs, eleven burial structures, twenty-five non-burial architectural features, and a burial rock shelter. They represent seven phases of stratigraphy (for a series of preliminary reports about the necropolis, see Tsipopoulou, ed., 2017; see also Tsipopoulou and Rupp 2019).

The necropolis was unlooted, and the modern methods of excavation allowed for the collection of practically 100 % of the material culture in burial contexts: the water-sieving programme has retrieved a vast assemblage of metal burial objects, including the tiniest beads down to the size of one millimetre in diameter (Giumlia-Mair et al. 2017, 2020). This unprecedented level of recovery has expanded our knowledge of Cretan society before the palaces and during the Protopalatial period. The number of Bronze Age silver objects on the island has greatly increased due to the excavation of this one necropolis since Antonis Vasilakis updated his work on the subject (Vasilakis 2008; Brogan and Giumlia-Mair 2017; Giumlia-Mair et al. 2017, 2020). One of the silver items, a signet-ring from House Tomb 9 dating to MM II made of a special polymetallic al-

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loy, depicts an eight-pointed star and a Minoan hieroglyphic sign, and it demonstrates a strong connection with the ancient Near East (Ferrence, Betancourt, and Muhly 2020). Now we present another unique and very early metal piece of jewellery that was discovered in a stratified Early Bronze Age context.

A primary female burial (PTSK18-1407) was excavated in 2017 and 2018 in a lower level under House Tomb 2, founded in MM I B. A roughly rectangular pit, Burial Structure 25, had been dug into the colluvium of a ravine during the EM II A period (during the early to middle part of the 3rd millennium BC). A young adult female was laid in a cist-like pit with a bench and small offering pit (for more details about the context, see Rupp and Tsipopoulou, forthcoming; see also Tsipopoulou and Rupp 2019). The body was laid on the back in a semi-extended position with the legs folded. Her right forearm and hand were placed on the chest, and her left arm extended down her side. The skeletal remains of the woman were articulated (Tsipopoulou and Rupp 2019, 82; Dierckx, forthcoming, fig. 8; Rupp and Tsipopoulou, forthcoming, fig. 3. A). She was buried with items placed in the offering pit next to her: an EM II A collar-neck spouted jar (PTSK17-1862+1922) with a shallow bowl (PTSK17-1877) as a lid and containing an obsidian blade (PTSK17-1953) in the style of those found at the nearby EM I B – II A cemetery of Agia Photia (Tsipopoulou and Rupp 2019, 82, pls. XXIX, XXX:a; see also Rupp and Tsipopoulou, forthcoming). The body was completely covered with a layer of sediment and small stones. Then, approximately in the area between her legs, a large veined travertine bowl with a ring base (PTSK17-1797) was set vertically on its rim and held in place with some small stones, perhaps as an internal grave marker (Tsipopoulou and Rupp 2019, 82, pl. XXX:a; see also Rupp and Tsipopoulou, forthcoming). Next, the pit was filled with another layer of sediment and small stones to its uppermost level. Lastly, a quadrangular structure of large unworked stones was laid in three rough courses on top of the burial cist as a monument to her memory (Tsipopoulou and Rupp 2019, 82; Rupp and Tsipopoulou, forthcoming). The primary interment of this woman in a cist-like pit and the construction of a substantial monument over it were innovative developments at Petras in light of the prevalent contemporary mortuary practices of secondary burials in communal house tombs.

Cast Gold and Silver Pendant and Beads

The young woman buried in Burial Structure 25 wore jewellery consisting of one or more necklaces of various types of beads, gold bands, and disks. Her necklaces included different ornaments, and in particular a very small gold pendant (Fig. 1): cast, finished with fine chisels, and finally polished. Autoptic analysis under magnification (*e.g.* 50×, 100×) identified ancient manufacturing practices via traces of metalworking. The piece is a superbly detailed three-dimensional image of two bearded men embracing each other as they kneel together. We explore here the meaning of the tiny enigmatic pendant that some might call an amulet.

The young woman was also buried with stone beads of steatite and calcite and many other metal jewellery items, including a distinctive tiny gold bead shaped like a feline head (Fig. 1), twelve incised cylindrical beads of gold sheet, fifteen tiny gold annular beads, a cross-hatched band of gold sheet, many strips and fragments of gold foil including a few pieces with incised linear decoration, and a cast silver biconical bead (Fig. 1).

The silver bead is decorated with three bands of rope pattern. It was cleaned of the thicker layers of corrosion, which allowed for improved results from analysis by X-ray fluorescence to detect the metallurgical composition (for scientific methodology, see Giumlia-Mair et al. 2017, 204). An interesting silver alloy containing a very high percentage of gold was identified (Table 1; see also Ferrence et al., forthcoming). Due to the corrosion with presence of bromine, precise assessment of the composition was not possible, and the amounts of 85 % silver, 10 % gold, and 0.5 % copper are indicative only. The original amount of copper when the piece was manufactured was probably higher. The presence of these metals in the silver alloy made the bead easier to work and more resistant to corrosion. The XRF results of the pendant with two embracing men identified a

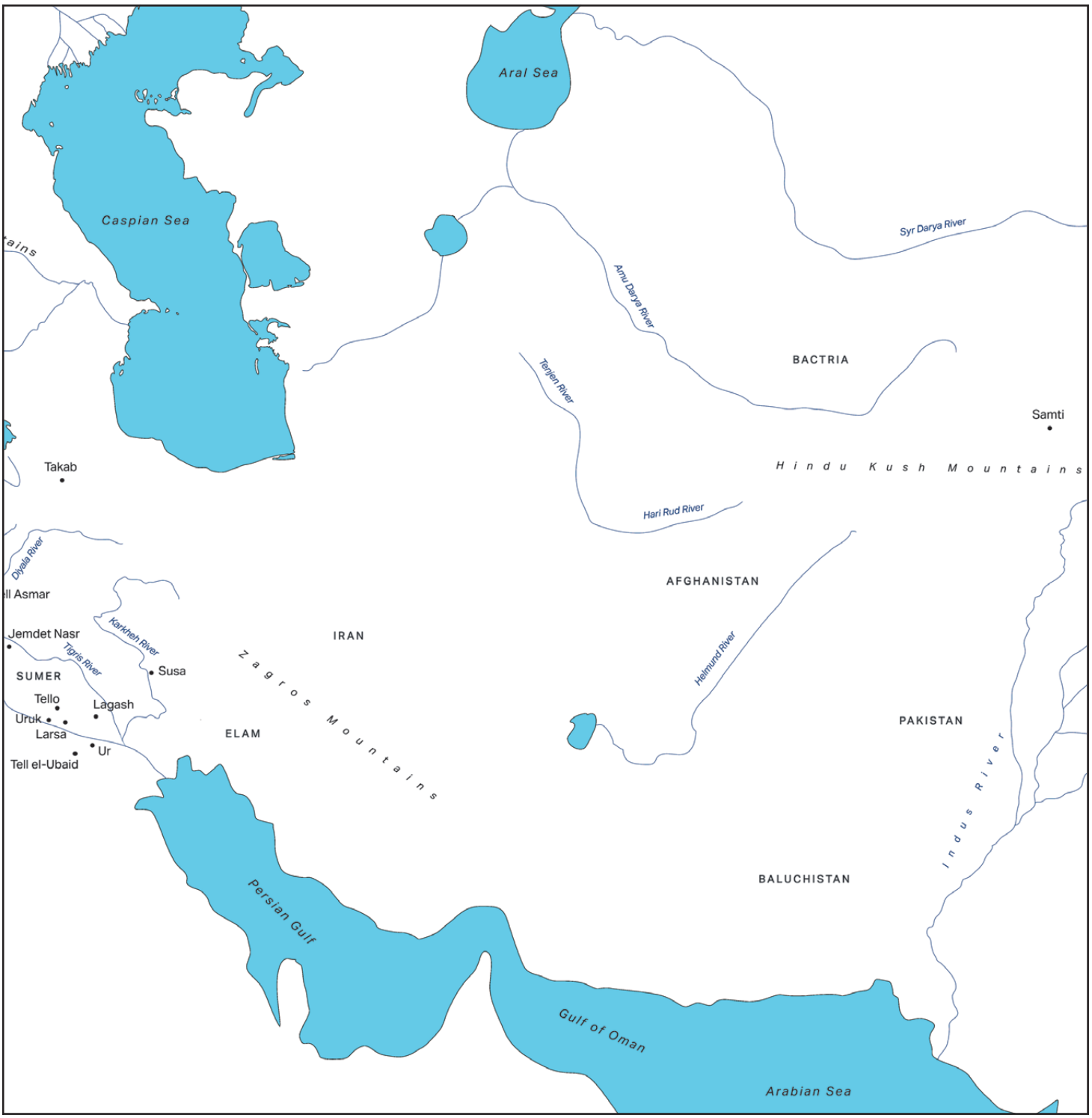
Fig. 1: Gold pendant of two embracing men (PTSK18–1437A, three views at left), gold feline bead (PTSK18–855; three views at upper right), and silver biconical bead (PTSK18–1437B; lower right) all worn by the female in EM II A Burial Structure 25 at Petras in eastern Crete (photos S. Ferrence, C. Papanikolopoulos, and A. Giumlia-Mair).

gold alloy containing around 6 % silver. Possibly the silver content was originally higher, but part of it corroded away (see Table 1). The addition of silver to gold makes this alloy harder and therefore less easily damaged, and it lowers the melting point of gold thus facilitating the casting.

Most of the metal and stone jewellery pieces buried with the woman appear to be Cretan in origin and typical of Prepalatial burial accoutrements, as parallels exist from the house tombs of Mochlos and other Early Minoan tombs such as Lebena (Seager 1912, fig. 8; Alexiou and Warren 2004, pl. 115; see also Evely 2000, vol. 2, 418–421). The gold figural pendant, gold feline bead, and silver biconical bead, however, stand out from the rest of the woman's jewellery because they are cast objects, which were a rare occurrence in Crete at that early time (Branigan 1983, 15). Only about a dozen cast metal jewellery pieces have been identified from Prepalatial burial sites (Hickman 2008): Tholos Tomb Gamma at Archanes (Papadatos 2005, 36, 41, figs. 23, 25, pl. 20), Agios Onouphrios (Branigan 1974, 192), Maronia Cave (Platon 1954, 511, EM II B or EM III date), Tomb 2 at Mochlos (Seager 1912, fig. 10, II.22; Soles 1992, 49, EM II A date), Agia Photia (Davaras and Betancourt 2004, 181–182, EM I B), Koumasa (Xanthoudides 1924, 29, pl. 4: 386), and Krasi (Marinatos 1929, 120–121, figs. 14: 38, 16). Early examples of objects cast in precious metals come from sites very far from the Aegean region (Hickman 2008, 104), such as a silver bull's head from the Royal Cemetery at Ur in Sumer, Mesopotamia (ca. 2600 BC; Hansen 1998, 52, no. 2), and gold and silver bulls from a chieftain's tomb at Maikop in what is now southern Russia (ca. late 4th– early 3rd millennium BC; Artamonov 1974, 156, pl. 21; Hunt 1980, 66; Aruz, ed., 2003, 291, no. 191). For Crete and the Aegean, a detailed account of early metallurgy situates the Final Neolithic to EM III copper-smelting site of Chrysokamino in eastern Crete chronologically and regionally among Balkan, Anatolian, and Near Eastern developments over the course of several millennia (Muhly 2006).

The iconography of the three cast jewellery pieces worn by the young woman in Burial Structure 25 is detailed and naturalistic, especially considering the tiny size of the figural pendant and feline bead. The pendant depicts in miniature two men with their heads positioned cheek to cheek and their faces in profile as they kneel on both knees with their bodies facing each other and wrap their arms around each other in a close embrace. They mirror each other as if they were twin brothers. They both wear kilts or skirts distinctively depicted with a cross-hatched motif and a hatched hemline, which could be perhaps a fringed embellishment. Their

Fig. 2: Map of selected sites and regions around the eastern Mediterranean and in southwestern Asia mentioned in the text (image J. Papit, H. Sperling, and D. Evitts).


Aral Sea
Caspian Sea
Syr Darya River
Amu Darya River
BACTRIA
Tenjen River
Samti
Takab
Hindu Kush Mountains
Hari Rud River
Diyala River
AFGHANISTAN
Jemdet Nasr
Karkheh River
IRAN
Tigris River
Susa
Zagros Mountains
SUMER
Tello
Lagash
Uruk
Larsa
Ur
Tell el-Ubaid
ELAM
Helmund River
PAKISTAN
Indus River
BALUCHISTAN
Persian Gulf
Gulf of Oman
Arabian Sea

idiosyncratic embrace consists of each man's right arm wrapped around the waist of his partner and their left arms angled upward at the elbow such that their left fists rest on the back of the other's right shoulder. Evidence of worn surfaces on the fist of one man and the kilt of the other man suggests that the pendant had been in use for quite a while. Both men are depicted with detailed hairlines, beards, and eyes. Despite the intricate and generally exemplary rendition of the figures, their right legs face the wrong direction, making them anatomically incorrect. The cylindrical gold bead shaped like a feline head is a masterwork of craftsmanship because it was actually cast as *two* heads of a feline with different sets of incised facial details of eyes, ears, whiskers, and collar. The two heads face opposite directions, and as the cylinder turns on its string or chain, one can always see the animal correctly. The bead also has tiny areas of silver visible on the surface that clearly imitate the pattern of a leopard's or panther's fur coat (XRF results show a gold alloy with 2.6 % silver [see Table 1], but the silver percentage increases noticeably when the small silvery spots are measured; their tiny size however makes it impossible to obtain precise measurement by XRF [SEM-EDS would be the optimal method of analysis]).

The three cast jewellery items not only stand out in Prepalatial Crete for their advanced level of manufacture, but they also are unique in the execution of their iconography. The two men and the feline head are very naturalistically rendered, which is the opposite of figural representations in the Aegean during the Early Bronze Age because they tend to have abstracted forms, *i.e.* EC II folded-arm figurines and the EM II Goddess of Myrtos (for surveys of Prepalatial figural art, see Immerwahr 1990, 21–34, figs. 6–11 and Cosmopoulos 1992; see also Ferrence 2017). Kneeling figures are very rare in Minoan iconography. The few examples come from later time periods where they are usually depicted as worshipping at a baetyl (Warren 1990; see also a LM III A ivory plaque showing two embracing men, Godart and Tzedakis 1992, 59–60, pl. LVI: 1, 2). In Minoan iconography there is no contemporary iconographic parallel yet discovered for the gold pendant from Petras.

Iconographic Connections with Uruk and Elsewhere in Western Asia

The naturalistic rendering of human and animal iconography occurs at early time periods in Mesopotamia. Hence, the quest for iconographic parallels took us to the Near East where the advanced metallurgical technology and artistic execution of the human form favorably compare to that of the gold pendant from Petras. As an obvious starting point, the famous Royal Cemetery of Ur (mid 3rd millennium BC) was filled with precious burial goods – many of them gold and silver – and many of them also naturalistically depict people and animals (see Hansen 1998, esp. 51–53, 58, 61, 64, nos. 1–4, 8, 10). The Standard of Ur is a box from tomb PG 779 covered in shell mosaic with one panel that depicts a battle and another panel illustrates a banquet, and both scenes include the ruler in their top registers (Hansen 1998, 45–46, fig. 36a–b). The soldiers and banqueters wear wooly fleece skirts, and the ruler's garment is flounced and layered; none of these clothing styles, however, are the type depicted on the Petras pendant.

The net skirt that each man of the golden pendant is wearing is the key to unlocking its origin in the Near East, especially when discussing the art of Uruk in Sumer (we thank Bernice Jones for pointing us in this direction; Moortgat 1967, 13; Schmandt-Besserat 1993, 204, 206–208; Collon 1995, 48; Algaze 2001, 34; Bahrani 2002, 18; Hansen 2003, 23, 39, 40, nos. 10a–b; Green 2019, 184–186, fig. 8.2), a major urban city near the Euphrates River, which flourished in the fourth and third millennia BC (Fig. 2), well before the time of the Royal Cemetery of Ur. Uruk was one of the first cities in the world and initiated state formation during the Late Uruk period (ca. 3400–3000 BC; Rothman 2001, 7, table 1.1; Nissen 2003; Liverani 2006, 2, 13; Ataç 2019, 514; Potts 2019, 2). During this time, the territory of Uruk was enlarged with the foundation of possible colonies, which helped to spread the influence and material culture of Uruk from eastern Anatolia to eastern Iran (Pittman 1992a, 1992b; Collon 1995, 48; Schwartz 2001, 248; Algaze 2013, 82–86; Butterlin 2019, 185, fig. 34.2; Potts 2019, 4). Economic factors drove the expansion: Uruk needed goods such as timber, copper, silver, gold, and decorative

and semiprecious stones to build, embellish, and defend its temples and cities (Stech and Pigott 1986, 41; Algaze 1993; Pollock 1999, 9; Butterlin 2019, 186; Potts 2019, 4) and presumably traded primarily its textiles (Pollock 1999, 9; Potts 2019, 4; Völling 2019, 242). Some scholars dispute the theory of colonialization because the influx of Uruk styles into northern Mesopotamian sites "may have occurred over a much longer period of time than previously thought …" (Pollock 1999, 114, with bibliography; see also Rothman 2002, 18, 150, with bibliography).

The net skirts on the gold pendant from Petras stylistically date to the Jemdet Nasr period (3100–2900 BC; Pollock 1999, 2, table 1.1), which overlaps with the end of the Late Uruk period. During this time, "considerable change and reorganization" meant an increase in regionalism, yet "widespread contacts with areas as distant as Egypt, Iran, and Afghanistan were maintained" (Pollock 1999, 6). A cylinder seal dated to ca. 3000 BC depicts the Great Man of Uruk (also called a priest-king or Dumuzi, the shepherd god, in the scholarship; Hansen 2003, 40; Collins 2019, 265) wearing a longer net skirt and accompanied by an attendant wearing the exact same skirt as that shown on the pendant from Petras (Fig. 3a; Moortgat 1967, pl. A: 6; Orthmann 1975, 224, no. 126b; Vogel 2019, 124, fig. 20.5; see also other examples noted by Moortgat 1967, pl. A: 5; Schmandt-Besserat 1993, 204–207, 213, 216, fig. 15; Hansen 2003, 39–40, nos. 10a–b). The Great Man is an archetype ruler who embodied strength, power, and virility among other impressive qualities (in Sumerian *lugal* means king, literally "big man"; Vogel 2019). In this scene, they are bringing offerings to the goddess Inanna whose cult is represented by the two reed bundles at right (see also Blocher 2019, 63–64; Zgoll 2019, 51–52). Sometimes the Great Man is depicted in a shorter net skirt like on a cylinder seal from the end of the 4th millennium BC (Fig. 3b; Orthmann 1975, 224, no. 126a; Feller 2019, 138, fig. 24.1), which is quite like the skirts worn by the men of the Petras pendant. The latter men, however, do not wear the same style of distinctive hat, hair, and beard that set the Great Man of Uruk apart from other male figures (Collon 1995, 48; Vogel 2019, 119, 121). Another cylinder seal from Tell Billa, however, does depict exactly like the Petras pendant the head and net skirt of one of the three men in attendance at a ceremony outside a temple (Fig. 3c; Speiser 1933, pl. IV; Frankfort 1954, 15–17, pl. 8D; Orthmann 1975, 224, no. 126d).

When the Great Man is shown wearing the net skirt, he is also occasionally depicted in the same scene with a female who has been interpreted variously as Inanna – she was the supreme goddess of Uruk – or as a priestess of the cult of Inanna. It is possible that she could also represent the Great Man's wife; wives and daughters of male rulers in Mesopotamia in the 3rd millennium BC figured prominently in religious activities (Vogel 2019, 123). The famous Uruk Vase, dated to the Late Uruk period in the second half of the 4th millennium BC (or possibly the Jemdat Nasr period), also depicts a man wearing the same style of skirt as on the Petras pendant, except the skirt does not have the net pattern (Fig. 3d; Pollock 1999, 189; Zgoll 2019, 51–52, fig. 9.9). Here the man is an attendant to another male figure who has been interpreted as a priest-king (he wears a longer net skirt), the ruler of Uruk, or the shepherd god Dumuzi who was the husband of the great goddess Inanna; in the scene the men are presenting gifts to her, and it possibly represents their Sacred Marriage (Moortgat 1967, 11–13, pls. 19–21; Frankfort 1988, 25–27; Bahrani 2002, 18; Green 2019, 184–186, fig. 8.2; Selz 2019, 216; Zgoll 2019, 52, 57, fig. 9.9). Inanna was the most important deity of Uruk (Blocher 2019, 66). By the 3rd millennium BC Inanna/Ishtar was depicted with lions because the animal became one of her symbols (Zgoll 2019, 55; Ataç 2019, 517). Lions and leopards also greatly figured into the iconography of the priest-king, and they were associated with divine worship (Mallowan 1965, 42); the famous Lion Hunt Stele of the Late Uruk (or possibly Jemdet Nasr) period certainly suggests the power of the Great Man to subdue such wild beasts and to symbolically conquer chaos (Frankfort 1988, 33–34, fig. 24; Collon 1995, 50; Pollock 1999, 184–185, fig. 7.6; Hansen 2003, 22–23, fig. 5; Pongratz-Leisten 2019, 289–290, fig. 12.1). On this stele, his garment has been called a net skirt (Pollock 1999, 184). At Uruk, the skeletal remains of a leopard and a lion were found buried in a mudbrick box under one corner of the White Temple, which was built during the Jem-

Fig. 3: Images of men wearing the net skirt, ca. 3000 BC: (a) four views in order of a procession scene on a magnesite cylinder seal, h. 4.7 cm, no. ZV 2996 (© Skulpturensammlung, Staatliche Kunstsammlungen Dresden, photo Elke Estel/Hans-Peter Klut); (b) impression of cylinder seal, h. 5.4 cm, no. VA 10537, National Museums in Berlin, Museum of the Near East / Olaf M. Teßmer (CC BY-NC-ND 4.0); (c) impression of cylinder seal from Tell Billa, h. 4.3 cm, Baghdad, Iraq Museum no. IM 11953, exc. no. 2766, image no. 43006 (courtesy of Penn Museum, Philadelphia, PA, USA); (d) reconstruction drawing of the top frieze on the Uruk Vase, h. 92 cm, Baghdad, Iraq Museum no. IM 19606, Zgoll 2019, fig. 9.9, drawing by P. Müller, with additions by H. Kosak (courtesy German Archaeological Institute, Orient Department).

det Nasr period (Mallowan 1965, 42). A leaded bronze statuette of a lion also comes from the Jemdet Nasr period at Uruk (Fig. 4; Pedde 2019, fig. 50.2). Its rendering in cast metal is quite naturalistic, and the head compares well to the rendering of the feline bead from Petras. At Tell Uqair the tripartite temple was decorated with wall paintings, which have been reconstructed with spotted animals, probably leopards (Crawford 1991, 62–63, fig. 4.11).

Fig. 4: Leaded bronze lion statuette, h. 3.26 cm, Uruk, ca. 3000 BC, no. VA 11033, National Museums in Berlin, Museum of the Near East / Olaf M. Teßmer (CC BY-NC-ND 4.0).

The priest-king sometimes is depicted with fists clenched and positioned in front of his chest. It is not known exactly what the gesture meant except that it was symbolic and "probably loaded with great significance" (Schmandt-Besserat 1993, 202–203, 212–213, figs. 1, 2). About thirty artefacts depicting the priest-king exist from the Late Uruk and Jemdet Nasr periods (Schmandt-Besserat 1993, 201), and none of them show him kneeling and embracing his twin like the two men in the pendant from Petras. From a later context, there is an alabaster statue of a priest or king who is kneeling and seated on his feet as opposed to the upright kneeling stance of the two men in the pendant from Petras; it comes from the "square temple" at Tell Asmar, and it dates to the Early Dynastic II period (ca. 2750 BC; Mallowan 1965, 104, fig. 117 [Institute for the Study of Ancient Cultures, University of Chicago]). It was found in a group of "worshipper" statuettes – the tallest being 30 inches – whose photograph from the University of Chicago is widely known (Mallowan 1965, 45, fig. 33). He has a long beard, and he wears only a large hat and wide belt. During the Jemdet Nasr period, however, there seems to be no doubt that the unique net skirt was a signifier for the powerful leader of Uruk.

Fig. 5: Proto-Elamite iconography: (a) silver bull figurine, h. 16.4 cm, southwestern Iran, ca. 3000 BC, New York, Metropolitan Museum of Art, no. 66.173 (CC0 1.0); (b) chlorite box depicting a mythological scene, h. 11.4 cm, Khafaje, Iraq, ca. 3000 BC, British Museum, no. 128887 (©The Trustees of the British Museum [CC BY-NC-SA 4.0]).

Kneeling male figures are rare in the iconography around the EBA eastern Mediterranean. Farther afield, two glyptic Akkadian examples (ca. 2200 BC) show individuals only half kneeling, not on both legs (Porada 1995, 23, 46, figs. 1 [from Ur], 28). In the discussion of a Proto-Elamite silver figurine (ca. 3000 BC) from northwestern Iran showing a kneeling bull holding a cup in the collection of the Metropolitan Museum of Art (Fig. 5a), it is said that the kneeling pose is first found in Iran on stamp seals from Susa B, dating to the Uruk period (Hansen, Lefferts, and Alexander 1970, 6, 8, n. 5, fig. 1). During this early time, the kneeling pose was fairly popular in Elamite iconography (Hansen, Lefferts, and Alexander 1970, 8; see also Aruz 2003b, 330). The Elamites also depicted a mythological scene on a chlorite box (ca. 3000) in which a long-haired man wearing a net skirt strangles snakes and subdues other animals (Fig. 5b; he has been called a master of animals, and he is possibly related to the 'man in a net skirt' from the Uruk culture as discussed above; Strommenger 1964, 388, pl. 38; Aruz 2003b, 330–331, no. 227, fig. 85). Another stone box, this time from the Shamash temple at Mari (Proto-dynastic period, ca. 3000 BC), depicts a bald man kneeling next to a plant and trunk of a palm tree (Strommenger 1964, 388, pl. 39). His skirt is diagonally striped, perhaps a variation on the net skirt motif. None of these early examples of kneeling figures is exactly like the golden pair from Petras. There thus are no exact iconographic parallels from the same general time period for the kneeling embracing men of the EM II A gold pendant from Petras.

Gold in the Late Uruk Period

Gold artefacts from the Late Uruk and Jemdet Nasr periods are few and far between, presumably because of the dearth of mortuary data (Algaze 2001, 50) and due to recycling of metals (Pollock 1999, 186–187). Additionally, gold appears together with tin in the archaeological record: "There is very little gold before 3000 B.C., just as there is little or no tin bronze. After 3000 B.C. both gold and tin bronze appear together at a number of sites over a wide geographical area, from the Aegean to southern Mesopotamia" (Muhly 1977, 76). Ore sources in Iran were exploited as early as the 5th millennium BC (Stech and Pigott 1986, 42). Afghanistan has been suggested as a likely source for many raw minerals (Stech and Pigott 1986, 40, 44).

During the late 4th millennium BC, settlements in northern Syria and southeastern Anatolia were more advanced metallurgically due to their locations closer to ore deposits and longer history of manufacture (Stech and Pigott 1986, 42; Algaze 2001, 52; Wright 2001, 134; Saltzmann 2019, 29, 32, figs. 5.1, 6.1). Arslantepe is a prime example because it had easy access to copper (at Ergani; Fig. 2), lead, and silver deposits during its period VII (Late Chalcolithic) before the Uruk expansion (Burney 1993, 314; Palmieri, Sertok, and Chernykh 1993; Stein 2001, 267; Saltzmann 2019, 29, 32, figs. 5.1, 6.1). In period VI A (late 4th millennium BC; Early Bronze I A), a hoard of swords and spears and a metal workshop were discovered (Burney 1993, 314; Palmieri, Sertok, and Chernykh 1993, 574). A royal tomb at Arslantepe (ca. 3000 BC) yielded some gold jewellery, but no pieces resemble the pendant from Petras (Frangipane et al. 2001, 117, figs. 19, 25).

Metals were imported to Uruk according to the Archaic Texts (Nissen 2001, 173). Smiths worked with arsenical copper, gold, silver, lead, tin, and iron and made advances in smelting, casting, and finishing technology (Charvát 2002, 125; Moorey 1982, 22; Müller-Karpe 1991, 110). By the time of the burials in the famous Early Dynastic cemetery of Ur, bronze was in regular use (Müller-Karpe 1991, 111; Müller-Karpe, Pászthory, and Pernicka 1993, 269–270; Charvát 2002, 172, 188; Hauptmann and Pernicka, eds., 2004, xi).

During the Late Uruk period, only Tepe Gawra (near Mosul, Iraq) is known for gold artefacts (including rosettes and studs), which come from burials (Tobler 1950, 90–92, pls. LV–LIX; Maxwell-Hyslop 1971, 1; Charvát 2002, 125). One piece in particular is a tour de force of craftsmanship on a minute scale: an electrum wolf's head (Fig. 6), only 3 cm in length and dated to ca. 3200 BC (tomb 114 in level X), would have been attached to a small sceptre made of a now decomposed material (Tobler 1950, 92, pl. LIX:b; Mallowan 1965, 79–81, fig. 85;

Rothman 2002, 285). The open mouth displays teeth of gold wire; the jaw and ears were attached with copper and electrum pins; bitumen remains where the eyes would have been depicted with stones (Tobler 1950, 92, pl. LIX:b; Mallowan 1965, 79, fig. 85).

Fig. 6: Electrum wolf head from tomb 114 in level X at Tepe Gawra, length 3.0 cm, ca. 3200 BC; Tobler 1950, pl. LIX:b; image no. 44567 (courtesy of the Penn Museum, Philadelphia, PA, USA).

Despite the rich tombs at Tepe Gawra, gold finds from the Late Uruk time are relatively rare. According to Lloyd Weeks (2012, 297): "The earliest evidence for gold/electrum use in the Near East comes from late Ubaid Mesopotamia, at Ur and Tepe Gawra, where a handful of small artefacts (wire and beads) has been recovered. Tepe Gawra shows continued use of gold/electrum up to the Early Dynastic period (early/mid 3rd millennium BC), and the later prehistoric levels from Uruk have also produced rare gold artefacts (Moorey 1994: 221–2)." The gold and electrum artefacts found in Israel in the early 4th millennium BC cave site of Nahal Qaneh may have been imported from Egypt (Gopher et al. 1990; Gopher and Tsuk 1996; Genz and Hauptmann 2002: 151). Few examples of gold come from Iran in the late 4th millennium BC, notably from Susa (Tallon 1987; Benoit 2004). "Even in later periods, the relatively limited amount of gold in circulation and its continual recycling mean that it is rare in the archaeological record of the ancient Near East" (Weeks 2012, 297).

Nevertheless, gold supposedly was used prodigiously, for example, especially for religious purposes as described in the ancient texts that say wooden cult statues of temple deities were covered with gold (Pollock 1999, 187). The interpretation of ancient Near Eastern texts is debatable because covering a wooden statue with gold could perhaps mean simply using foil, *i.e.* a small amount of metal, much like it seems the Minoans did by the Late Bronze Age. Gold was apparently in short supply in Crete because the metallurgists used what they had in very economical ways, quite unlike the Mycenaeans on the mainland of Greece (Davis 2015, 457).

Scientific Analyses of Metal Artefacts

Regarding the scientific analyses of metal artefacts from the ancient Near East, a group of researchers from the Penn Museum in Philadelphia undertook the Mesopotamian Metals Project in the 1980s (Stech and Pigott 1986). They strongly suggested Afghanistan was a likely source of tin for 3rd millennium BC Sumer because of its rich geology that also includes gold, silver, and lapis lazuli, precious materials found in great quantities in the Royal Cemetery at Ur (Stech and Pigott 1986, 47–48, 56). They also considered southern Anatolia as a good source of silver in the Taurus Mountains for Sumer (Stech and Pigott 1986, 50). Recent analyses now show that ore sources in the Taurus Mountains and also in Uzbekistan and Tajikistan provided the tin for the ingots on the LBA Uluburun shipwreck "after extensive exploitation in the Early Bronze Age" (Powell et al. 2022).

In the 1990s, a very large systematic program was undertaken by a German team from the University of Heidelberg and the Max Plank Institute (Hauptmann and Pernicka, eds., 2004). They carried out almost 3000 analyses (the vast majority being X-ray fluorescence) on 2615 objects dated from the 5th to the 2nd millennium BC from 68 archaeological sites housed in the collections of several European museums and most importantly the Iraq Museum in Baghdad (Hauptmann and Pernicka, eds. 2004, xii). The vast majority of the objects were made of copper or copper alloys. The Royal Cemetery of Ur is well represented in the study, which includes a small number of gold and electrum objects from four sites: Ubaid (2 artefacts), Ur (36 artefacts),

Context	ID Number	Object Type	Cu %	Ag %	Au %	Pb %	Fe %	Co %	Ni %	Zn %	As %	Sn %	Sb %	Remarks
Petras necropolis, Burial Structure 25 (EM IIA)	PTSK18-1437A	Pendant, two men	Tr.	5.6	94		0.2							
	PTSK18-1437B	Biconical bead	0.5	85	10									High Br, Ca
	PTSK18-0855	Feline head bead	2.6	97		0.2								
				2.7	97									
				8.9	91									
Ur	1480b	Fitting on dagger	0.58	3.6	95		0.08				0.06	0.21	0.03	Metallic surface
Ur, Royal Cem., tomb PG.580 (Early Dyn. IIIa)	1525	Lance tip	4.5	58	38	0.20							0.04	Metallic surface
Ur, Royal Cem., tomb PG.626	1909	Earring	6.7	85	7.1	1.05		0.04	0.04	0.03		0.06	0.03	Mixture of metal (drilling chips) and corroded material (patina powder)

Table 1. XRF analyses of metal jewellery pieces from the cemeteries of Petras and Ur. Results from Ur by Lutz 2004, 132–133, 139. Italicized data means the object is corroded, and the results must be considered indicative only. Tr. = trace amount identified. Empty cells mean the element was not identified.

Larsa (4 artefacts), and Mari (3 artefacts) (Lutz 2004, 123–130, 132, 134, 136, 138, 141, 144, 149). Unfortunately, no gold objects from Tepe Gawra were analyzed among the 66 copper and copper-alloy pieces selected from the site (Lutz 2004, 113–114, pls. 16–19). A total of 169 silver items were analyzed in the XRF program, and they come from nine sites: Tell Asmar (2 artefacts), Ashur (2 artefacts), Tell Billa (1 artefact), Hafagi (1 artifact), Kish (2 artefacts), Tell as-Sulaima (1 artefact), Ur (157 artefacts), Larsa (1 artifact), Tello (1 artefact), and one unprovenanced piece. Of the silver objects, only two analyzed pieces – a lance tip and an earring, both from the Royal Cemetery of Ur – have XRF results that are somewhat close to the silver alloy of the biconical bead from the Petras burial (Table 1; Lutz 2004, 133, 139, no. 1525 [lance tip: 58 % Ag, 38 % Au, 4.5 % Cu], no. 1909 [earring: 85 % Ag, 7.1% Au, 6.7 % Cu]). Of the gold analyzed objects, only one piece – the gold fitting on a bronze dagger from Ur – has XRF results that are close to the gold alloys of the Petras pendant (5.6 % silver) and bead in the shape of a feline head (2.6 % silver) (Lutz 2004, 132, no. 1480b [95 % Au, 3.6 % Ag, 0.58 % Cu]).

Recent analytical studies of Early Bronze copper, silver, and gold artefacts from Ur shed much needed light on the composition of the metal and possible sources for it (Jansen, Hauptmann, and Klein 2016; Jansen et al. 2016; Hauptmann et al. 2018; Jansen 2019; Salzmann 2019). Previously, it had been known that gold deposits are located on the periphery of the Near Eastern heartland: Egypt, Nubia, Anatolia, Iran, and Bactria (Maxwell-Hyslop 1971, lxiv; Moorey 1994, 219–221; Weeks 2012, 297). The recent studies use various types of analyses and isotopes to geochemically define the gold used to make the artefacts and then draw correlations with possible ore sources (Jansen, Hauptmann, and Klein 2016, 98; see also Saltzmann 2019, 29, fig. 5.1). For the gold artefacts from Ur (dating to Early Dynastic III and Akkadian/Ur III), through an impressive process of elimination and correlation regarding results of the analyses of the artefacts and known characteristics of ore sources from Egypt to Afghanistan, the source of the gold was narrowed down to "two locations that are potential candidates: the placer deposits found at Takab in Iran and at Samti in Afghanistan" (Jansen, Hauptmann, and Klein 2016, 105; see also Jansen et al. 2016, 20–21, fig. 6). Considering the gold artefacts from the Royal Cemetery of Ur were excavated together with innumerable lapis lazuli and carnelian beads, gems known to come from Afghanistan and farther east, it would be common sense to trade all three precious materials from the same general region. Furthermore, Hauptmann and colleagues (2018) analyzed gold and silver objects from the Royal Cemetery of Ur in the collection of the Penn Museum. Their detailed study also includes textual evidence for Sumerian sourcing of gold in the later 3rd millennium BC (Hauptmann et al. 2018, 118, with additional references): "The Statue B of Gudea [of Lagaš from the 22nd century BC] registers 'gold in its dust came down

from the Ḫaḫum mountain (…) Gold in its dust came down from the land Meluḫḫa'. Meluḫḫa is located within the region of the Indus civilization, *e.g.* from the seacoast of western Baluchistan and Gujarat to northeastern Afghanistan and Pakistan's northwestern Frontier Province. [Heimpel 1993; Laursen/Steinkeller 2017, 84 and *passim*] From this region, gold and many precious stones found their way to Mesopotamia. The Ḫaḫum mountain on the other hand is identified as the Ḫaḫum city/region, which Barjamovic (2011, 87–107) localizes in the mountain region on the northwest bend of the Euphrates (on the border between modern Syria and Turkey) according to the Old Assyrian texts. According to Hauptmann (2011) and Jansen et al. (2016) the Sumerian 'gold in its dust' of Gudea and the administrative records from the 21st century BC from Ur represent a significant indication of the trading of fine-grained placer gold … The Sumerian textual sources – even though younger than the metal objects from the Royal Tombs – are well in agreement with analytical and mineralogical observations when dealing with gold dust."

Discussion

Correlating the analyses of gold and silver artefacts from Ur dated to the mid to late 3rd millennium BC and Sumerian textual evidence with the three gold and silver cast jewellery pieces from the Petras burial in Crete, dated to the early to mid 3rd millennium BC, might at first seem hazardous, but considering the existence and quality of 4th millennium BC gold artefacts from Tepe Gawra, the metallurgy of sites like Arslantepe, the geology of western and central Asia (see Salzmann 2019, 110, fig. 15.1; Powell et al. 2022), the iconography of the Great Man of Uruk, and the early kneeling iconography from as far afield as Elam, we must conclude that the three precious items from Petras originated from a very distant land to the east of Crete and probably somewhere in Mesopotamia that had relations with Elam. "…[A]rt produced in Elam during the Proto-Elamite or Jamdat Nasr period was closely related to the classic Sumerian art of southern Mesopotamia proper … the Jamdat Nasr period in Elam and probably also in Mesopotamia was an era of great artistic creativity, a continuation of the achievements of the preceding Uruk period" (Hansen, Lefferts, and Alexander 1970, 14).

Furthermore, the woman who was buried with the foreign jewellery in Burial Structure 25 at Petras was interred in such an unusual manner compared to other Early Minoan burials that one wonders if she herself could have traveled such a long distance as well, and her loved ones in Crete knew she required special mortuary dispensation due to her possible foreign identity. Her intriguing jewellery and method of entombment beg many questions about her origin and how she fit into the Early Minoan elite society of Petras. The iconography of the very worn pendant with two men in net skirts from the Jemdat Nasr period of Sumer means that the woman's cast jewellery pieces were heirlooms or antiques by up to a few centuries when they were buried with her.

A few other artefacts of Near Eastern origin have been found in Early and Middle Minoan Cretan contexts, including three cylinder seals from burials at Mochlos and Platanos that testify to the existence of long distance contacts: a silver tubular seal from House Tomb I at Mochlos in an EM II context (Pini 1982; Aruz 1984; 1995, 3; 2008, 40–41), a hematite cylinder seal from Tomb Lambda at Mochlos from a mixed context of EM II–MM IB date (Davaras and Soles 1995), and the famous "Hammurabi" cylinder seal made of hematite from Tholos B at Platanos dated to about 2000 BC (Xanthoudides 1924, 117; found with polychrome pottery dated to MM I–II and Middle Kingdom scarabs [Aruz 2008, 90]). Special methods of burial were not identified in these cases.

There are also two unusual beads from the Early Minoan cemetery at Livari Skiadi in southeastern Crete (Papadatos 2015, 104–105, nos. J71, J72, fig. 47, pl. 35). The silver disk-shaped bead with midribs has parallels at several sites from the Aegean, across Mesopotamia, and over to southeastern Iran and the Indus region (Aruz 2003a, 242, fig. 72). The composite beads made of rolled sheet of arsenical copper with stone discs to close both ends also have parallels in the Near East (Ferrence et al. 2022, 25).

Fig. 7: Limestone basin from Temple N at Ebla, Syria, length 1.38 m, ca. 1850–1750 BC; Matthiae 2018, 130, fig. 7, no. TM.72.N.468 (© Missione Archeologica Italiana in Siria).

Regarding the iconography of the kneeling embrace of two men, it is an enigmatic motif among all the cultures around the eastern Mediterranean and Near East during the Early and Middle Bronze Age. No text from the early time of the Petras burial has been found to explain the meaning. A later piece of cult furniture does help to elucidate matters. Dating between the end of Middle Bronze I B and the beginning of Middle Bronze II A (late 19th to early 18th century BC), a limestone basin found at Ebla in Syria depicts embracing men (Fig. 7; Matthiae 2013, 101–102, fig. 6; 2018; 2019). It was excavated in Temple N of the Lower Town. The relief carving on the back side shows two pairs of men standing and embracing in the center and at right and another pair at left grasping a sacred tree between them (Matthiae 2018, 130, fig. 7; 2019, fig. 3). There are lesser goddesses on either side of the basin. The excavator said, "the ritual acts of the officials are interpreted as a commemoration of an important political alliance, where the goddesses represent the guarantee of the divine approval of the alliance" (Matthiae 2018, 109). Iconographic details point to Aleppo as the partner of Ebla in the alliance, probably during the reign of Yarim-Lim I of Aleppo (Matthiae 2018, 109, 113). The men's garments with a fringe at the bottom resemble the kilts from the gold pendant. Their hair and beards are delineated, which is also the case on the jewel. Unfortunately, they are not kneeling, and the date is much later than our piece from Petras. Frances Pinnock, an expert on Ebla, mentioned that the "gesture of embracing each other is really rare in the third millennium" (pers. comm., Dec. 1, 2019; see also Matthiae 2018, 115–116). And she cautioned that the embracing figures on the basin from Ebla actually display a peculiar stance whereby one man in each couple brings a hand to the throat of the other man, indicating a political meaning (F. Pinnock, pers. comm., Dec. 1, 2019; see also Matthiae 2018, 112, 116). Matthiae calls them kings who enter into a political alliance by taking an oath symbolized in the iconography by "touching the throat," which is a precise term loaded with meaning in Old Babylonian texts (Matthiae 2018, 116).

Furthermore, from the Late Bronze Age (14th century BC) in Egypt, a great deal of textual evidence describes alliances among kings. Letters found at Amarna were written to the pharaoh from his 'brothers', or allies or vassals. Many times, they write with flattery when asking for gold or complaining of the low quality of their shipment (Moran 1992, 19; Marinatos 2010, 8). They need it to decorate their palaces and increase their status. The 'brothers' or allies state how plentiful gold is in Egypt, so it should be easy to share it (Moran 1992, 39). An Amarna letter from Burna-Buriaš, the king of Babylon, to Amenhotep IV demonstrates that gold was sometimes sealed to verify its weight and purity. The king of Babylon says to the Pharaoh: "*My brother* should make a [personal] check, then *my brother* should seal and send it to me. Certainly *my brother* did not check the earlier (shipment of) gold that *my brother* sent to me. It was only a deputy of *my brother* who sealed it and sent it to me. When I pu[t] the 40 minas of gold that were brought to me in a kiln [or cupel], not [even] [10, I sw]ear, appear[ed]" (EA 7: 63–72).

Conclusion

Perhaps the pendant from the Prepalatial primary female burial at Petras signifies an agreement or some sort of a royal relationship, perhaps between 'brother-kings' from somewhere in Mesopotamia from a time long before the woman was interred in Burial Structure 25. Or did the antique pieces of jewellery take on a new meaning to signify an agreement between a king in the East and a big man at Petras? As the iconography of the pendant shows the two men identically,

they must be equals. And what was the relationship of the woman in Burial Structure 25 to the elite men who perhaps undertook the agreement? Was she a wife or daughter or descendent of one of them? Was she a priestess of Inanna/Ishtar? Perhaps she was a younger daughter of a king in the East who was sent off with the precious heirlooms to marry a Minoan ruler in order to seal an alliance between her father and her new husband. We will never know the full story. Of course, strontium isotope analyses of the woman's bones could be very useful in defining whether she was local to Crete or was born and raised in another region.

Or, as Costis Davaras and Jeffrey Soles noted about seals from the Near East that have been found in Crete, "they were surely valued as objects of art, souvenirs, or powerful amulets. Their tiny pictures of the glyptic world would have impressed their foreign beholders deeply, and to a certain degree they would have influenced the glyptic and iconography of the country of arrival" (Davaras and Soles 1995, 45). In the case of the three jewellery pieces from Petras discussed here, however, they do not seem to have influenced the art of Early Minoan Crete. The woman was fairly young when she died, and the pieces were buried with her. It is possible that they were present in Crete for only a few years before their deposition in the ground. The tiny size of the pendant and feline bead also would have inhibited others from noticing the importance of the iconography, especially if the jewellery was not worn on a regular basis. Nevertheless, the woman from Petras who was elaborately buried under a monument and who wore the gold pendant and other impressive jewels was assuredly a person of elite, noble, or even royal status during the Prepalatial period.

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