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[47] *Minoan-Mycenaean Sealstones: Understanding
Chronology and Function*

Facilitated by the volumes of the *Corpus der minoischen und mykenischen Siegel* (Berlin 1960-2009), scholars studying Minoan and Mycenaean sealstones and sealings of the Aegean Bronze Age (ca. 2300-1300 BCE) have worked in two major areas: chronology and function. Chronology is now well understood through a process of creating a stylistic typology for seals that can be fixed in time through seals from stratigraphic excavations. Understanding the function of seals relies on a detailed typology of sealings and their role in administration as witnessed by documents written in the three major Aegean scripts, Cretan Pictographic and Linear A and B.

Aegean Bronze Age Sealstones and Fingerrings: Chronology and Functions*

Introduction

(**Fig. 1**) This paper concerns the engraved sealstones and fingerrings of the cultures of southern Greece and the island of Crete (**Fig. 2**) in the Neolithic (ca. 6500-3000 BCE) and Bronze Age (ca. 3000-1100). While Aegean seals have long been prized for their aesthetic value, the stones being beautifully polished and shaped and their motifs richly engraved (especially in the Late Bronze Age, ca. 1700-1100), this paper attempts a more functional analysis, focusing on the administrative uses of seals.

In the Neolithic period, mainland Greece participated in a larger cultural community that extended north into central and eastern Europe while Crete was colonized late (ca. 4000 BCE) apparently by people from southwest Anatolia. Through much of the Bronze Age, the two regions had somewhat separate trajectories with more or less engagement at various times; soon after the start of the Late Bronze Age, however, the Minoans exerted great influence over the Aegean basin, including the mainland Mycenaeans who eventually took political control of the island (ca. 1550).

For general information on the Neolithic and Bronze Age cultures in Greece, see Cullen 2001 and Shelmerdine 2008. For general information on seals and rings, see Krzyszkowska 2005, and for seals and sealings Weingarten 2010 and Younger 2010. For the Bronze Age, in southern Greece, the culture is termed "Helladic" after the Greek word for Greece, *Hellas*; for Crete,

however, the culture is termed "Minoan" after the legendary king of Knossos, Minos. Thus the Early Bronze Age in Crete is Early Minoan (EM), the Middle Bronze Age in Crete is Middle Minoan (MM), and the Late Bronze Age mainland is Late Helladic (LH). Most periods are subdivided into I, II, III (thus EM I, EM II, EM III) and several are further subdivided (e.g., MM IIB, LH III A:2).

In the Neolithic period, there is some evidence for seals being used to imprint designs on cloth and pots, but beginning in the Early Bronze Age (ca. 2200 BCE) seals were used on the Greek mainland to impress clay nodules over string that sealed boxes, presumably containing goods produced in outlying regions and brought into administrative centers as taxes. Within 400 years, this administrative function of seals had shifted to Crete where writing was invented (ca. 1800) to clarify who paid what taxes that had been assessed them.

Up to now, seals were made of soft materials, clay, dentines (bone and tusk), and steatites. But beginning about 1800 BCE, much harder stones (at first, breccias, then silicates like agate and cornelian) were introduced. Many of these harder stones were imported and required new drilling techniques to fashion their intaglio motifs. It is surmised here that it was the palaces in Crete that imported these stones and supported the specialist workshops to engrave sealstones which were dispensed to the top administrators in the island and, later, on the Greek mainland. When the sealstone engravers acquired a mastery over technique, they concentrated on genre scenes, mainly of animals in various poses, but engraved in richly modeled styles well known for their anatomical precision and subtlety.

After major destructions by fire (ca. 1800 BCE), Knossos stood alone as the main administrative center in Crete, but with its fall (ca. 1300), fine sealstone engraving came to an end. To be sure, soft-stone beads in steatite were made as jewelry and ethnic markers for Mycenaeans, but the Mycenaeans in the palaces used heirloom Minoan seals for their administrative work.

A Summary Chronology (Fig. 3)

Since this paper focuses on a specific class of object, sealstones and fingerrings, within the context of prehistoric Greek society and administration, a good sense of their chronology will be necessary. I give this chronology in two parts, a summary first, and then in detail (dates follow a modified high chronology).

In the Neolithic period clay and stone stamps with deeply incised, bold geometric designs ("pintaderas") are found throughout mainland Greece but not at all in Crete (Makky 1984, 2005; Younger 1987a). The shapes and designs are found commonly along a wide crescent that stretches from central Europe into the Levant. From color preserved in some incisions, it is likely that these stamps were used to imprint geometric designs on cloth and perhaps the skin. And from impressed designs on Late Neolithic pottery, pintaderas also impressed pots.

In Early Helladic II (ca. 2200 BCE), stamp seals of clay, stone, or wood incised primarily with weave designs impressed clay sealings in an early administration system that included "great houses" (Corridor Houses like that at Lerna in the Argolid) and taxation involving commodities prepared in outlying areas and brought to the Great House primarily in small chests and jars. The Great Houses of this early civilization were all destroyed by fire, ca. 2100, apparently by new

people (Greeks? Haley and Blegen 1928) who brought with them new pottery and house forms but did not continue the administrative practices of the earlier culture, including the use of seals. A high civilization on the mainland did not develop, therefore, until the end of the MH period, ca. 1700.

In Crete, a sophisticated culture had arisen in Early Minoan II (ca. 2200 BCE), but the seals there, mostly of stone or dentine (bone or ivory), seem to have functioned more as personal objects than as administrative tools; sealings are very few (e.g., *CMS V*, no. 20 from Myrtos) and while there was a contemporary set of conflagrations ca. 2100, there was no discontinuity and the culture continued to develop into the early Middle Minoan period.

In MM IB (ca. 1925 BCE, beginning the Protopalatial period), large administration buildings ("palaces") were constructed in Crete at a few sites (e.g., Knossos in the north central region; Phaistos in the fertile Mesara plain in the south center of the island; and Malia on the north coast east of Knossos). Some activities in these palaces concerned the collection of taxes, which was authenticated by clay sealings impressed by seals, some of which carried early Pictographic writing ("Cretan Hieroglyphic"; Godart and Olivier 1996). The invention of writing may have actually occurred just before the erection of these first palaces (Younger 2005).

Within a short time, however, these early palaces were destroyed by fire (end of MM IIB, ca. 1825 BCE) and new and bigger palaces were erected in their place (MM III-LM I: the Neopalatial period). By this time, a simplified and abstracted version of Pictographic writing had emerged, Linear A (Godart and Olivier 1976-1985; Younger 2000a). The two scripts ran

concurrently for a time at least at Knossos and Phaistos. It is not known why two scripts were used simultaneously in Crete; apart from some transaction terms (Younger 2003), there are few overlaps in vocabulary — perhaps they recorded different kinds of taxes for different purposes. By the end of the MM III (ca. 1725), only Linear A remained in use. Although the language of Linear A remains undeciphered, it does not seem to have been either Indo-European or Semitic.

Just before the conflagrations that destroyed the early palaces, sealstone makers were experimenting with a new tool, the horizontal bow lathe which allowed them to engrave imported hard stones (4.5-7.5 on the Mohs scale) like agate, cornelian, and amethyst (Younger 1981a, 1993).

The Neopalatial Minoan culture spread into the Aegean basin, establishing outposts or colonies in the islands like Kea, Melos, and Thera, and at Miletos on the south western coast of Anatolia. Neopalatial stamped sealings have been found as far north as Samothrace. Influenced by this spreading Minoan culture, the mainland also developed quickly (the so-called "Shaft Grave" period, ca. 1750-1650 BCE).

The cataclysmic volcanic eruption of the island of Thera (ca. 1625 BCE), however, caught everyone's attention. Soon afterward, almost every Neopalatial site in Crete was destroyed by fire, perhaps by invaders from the Mainland, perhaps in revolution. At Knossos, the palace itself was spared, but the surrounding town was not. When we see the palace functioning again (ca. 1550-1490), new people are in charge: Mycenaeans from the Greek mainland. Seals change slightly in style, with animals becoming sleeker, and in iconography with the introduction of new

motifs like the Minotaur (Younger 1985, 1987b); there is also a new script, Linear B, developed from Linear A, and it is writing Greek (Ventris and Chadwick 1973).

We have only glimpses of the early administrations on the Greek mainland, but the Mycenaean administrators were being buried with seals made in Crete and probably using them for administrative purposes (Rehak and Younger 2000; Younger 2011: 423-424; Younger 2012). We do see the Mycenaean administration of Knossos; for much of its final phase, it is the only administrative center on Crete, but it too is finally destroyed by fire at the transition from LM IIIA to IIIB, ca. 1300 BCE, and with it the production of seals is also lost (Younger 1981b). Thereafter, the Mycenaeans both on the mainland and in the island retain in use the Minoan seals made before the destruction of Knossos (e.g., using heirloom seals to impress late LM/LH III B sealings at Khania [Hallager, Vlasakis, and Hallager 1992: 70-72] and Pylos [CMS I, nos. 302-382]). By ca. 1200, however, the Mycenaean palaces on the mainland are also burnt and abandoned, and, soon after, the Aegean basin succumbs to the disruptions that also topple the Assyrian and Egyptian empires.

General Principles of Aegean Glyptic

For me, a seal is a shape. Many scholars define seals sphragistically: to impress clay sealings fixed to commodities brought into the central administration as taxes. But not all, not even the majority, of Aegean seals were used that way. It has been estimated that some 200,000 seal types might have been produced in the Aegean Bronze Age, of which some 5% have survived (Krzyszowska 2005: 1; cf. Betts and Younger 1982: 115-117, who calculate some 75,000 originally for the Late Bronze Age alone). Of the surviving 10,000 seal types, seal impressions

account for some 20%. Most seal use, therefore, would have been personal, using seals as identity markers, jewelry, and amulets, as well as sphragistically in the home.

Aegean seals are small, almost never bigger than one's thumb nail (*CMS I*, no. 5 is probably the smallest seal, D. 1.0 cm, and *CMS I*, no. 185 largest, D. 4.0; *CMS II* 3, no. 103 may be the smallest gold ring, 1.0 x 1.7 cm, *CMS I*, no. 179 the largest, 3.5 x 5.7; **Fig. 4**). Seals are usually made of stone, ivory, bone, or baked clay (the latter three materials are common in the EM and EH-MH periods: Younger 1992); and occasionally precious metals, especially gold for rings — most metal rings date to the early part of the LM period. Seals usually have one prepared face, although bi-facial seals are common in EM and multi-facial seals with three and four faces, occasionally more, are common in MM II-III. The designs are almost always carved into the object (that is, in intaglio); seals with designs in relief are very rare (cf. *CMS V*, no. 462).

By the sophisticated Late Bronze Age (ca. 1700-1100 BCE), the great civilizations of the eastern Mediterranean each developed its own distinctive seal shape: the scarab for Egypt, the cylinder long in use for the people of Mesopotamia, the stalk stamp for the Hittites of central Anatolia, and biconvex forms for the Aegean (the lentoid, circular in plan, and the less common amygdaloid, elliptical in plan). A seal's shape thus identified its wearer culturally.

Throughout the Aegean Bronze Age seals were made of common, soft materials (2-3 on the Mohs scale), such as ivory, bone, clay, steatite, and serpentine. From ca. 1725 BCE, the Minoan palaces imported harder stones (Mohs 4-5): cornelian from the east via Mesopotamia, amethyst and rock crystal from Egypt, and a rich brown agate from an unknown source (Younger 1979b).

Few workshops have been excavated (Younger 1979a, 2011: 8; Dimopoulou 2000) but some exotic stones have been found hoarded in the palaces. At Knossos, for instance, large blocks of *lapis lacedaemonius* were stored (Evans 1930: 269-270), a dark green basalt that occurs only south of Sparta; out of this material sealstones were made for the officials working in the Mycenaean administration during the early years of the Final Palace period at Knossos (ca. 1490-1410 BCE; Younger 2000b). The palaces therefore would have had seals made from these and other hard stones and given to administrators who used them to impress the sealings found in the palaces.

Conversely, the soft stones, steatite and serpentine (1.5-2.5 on the Mohs scale), are common in the Aegean, and seals made of these materials could have been carved by anyone with bronze tools (Pini 2010). While many clay sealings were impressed by these soft stone seals, it is mainly the sealings impressed by hard stone seals and gold rings that also receive inscriptions in Pictographic, Linear A, or Linear B. Perhaps the soft stone seals were owned by people low in the palatial hierarchy or outside it. Thus, a second major purpose of a seal was to relate its wearer to the administration, either inside the palace (with hard stone seals and gold rings) or outside (with seals made of easily carved materials).

Some seal motifs are more common on local stones and others are more common on exotic materials. On soft stones we find bulls with averted heads (e.g., *CMS* VIII, no. 52), most birds (e.g., *CMS* XII, no. 255), and monsters unique to the Zakros sealings (e.g., *CMS* II 7, nos. 109-205). If such local materials conveyed lower status, it would seem these motifs probably did too.

High status might therefore be conveyed by the religious scenes that generally appear on gold rings, by Minotaurs on the distinctive Spartan basalt from the mainland, by recumbent bulls on banded agates, and by griffins on cornelian. There are exceptions, of course: griffins first appear on seals before the invention of the horizontal bow drill (e.g., CMS II 5, nos. 317-319), a recumbent bull appears occasionally on soft stone seals (e.g., CMS V Supp. 3, no. 247), and a type of female Minotaur occurs on sealings impressed by soft stone seals at Zakros (CMS II 8, nos. 145A & B, 146). Exotic materials by themselves conveyed high status and we should expect the special motifs on them also proclaimed high status — or at least laid claim to it.

Finally, Aegean administration can be reduced to a simplicity: "things come in [the palaces], things go out" (Schon 2011: 219). Or, in more detail (Halstead 2011; Lupack 2011; Nakassis, Parkinson, and Galaty 2011): palatial authorities assessed commodities to be produced by outlying villages and people and conveyed to the palace; raw materials could be distributed to those who prepared and finished these commodities, which could be redistributed back to those outlying villages and people where needed or where they could bestow palatial privilege. For example, palatial shepherds shipped wool to the administration for redistribution to individual women weavers to make into everyday clothing and to groups of specialized women and men to make bulk cloth that could be exported and traded, say, for bronze (like the recipe of 10 tons of copper and one ton of tin on the Uluburun wreck: Muhly 2009: 26).

Dating Aegean Seals (Figs. 1 & 3)

For dating Aegean seals, earlier scholars had relied on art historical notions of stylistic trends (Younger 2011). A catalogue of over 1100 seal types from stratified Late Bronze Age contexts (Younger 1973) provided the dataset for a formal analysis based on size, material, and iconography. In this dissertation, some patterns emerged: for instance, the largest seals dated to contexts just after the eruption of Thera, but no formal typology was chronologically diagnostic.

Appended to that dissertation was a stylistic analysis based on the principles developed by the 19th century scholar Giovanni Morelli (1880), whereby style is defined as technique. For seals, style would thus mean how a seal was carved — what tools were used and how, the softness or hardness of the materials, and the sculptural details that compose a design (Younger 1981a). For soft materials, the tools consisted of bronze knives and obsidian blades and the designs were simply cut or gouged. In hard stone seal engraving, the bow-drill employed solid drills to make dots and to model the interior surfaces of figures by passing the drill back and forth across the body. Hollow drills made circles and drilled the stringholes. A rotating wheel or pendulum saw created straight lines.

Groups of seals could then be characterized according to tool marks and placed in a technical progression according to the use of tools to define the figures. In the Late Bronze Age, 1) animals with richly modeled anatomy (veins, muscles) and almond-shaped eyes seem to give way to 2) animals with some muscles and simple dotted eyes, which in turn yield to 3) animals with few muscles and dotted eyes encircled by a ring, and finally to 4) animals with sausage-like bodies with no interior articulation and only tiny dots for hooves, joints, and eyes.

This stylistic progression turned out also to be chronological: each technical group of seals had members from contexts archaeologically dated by pottery and the earliest of these contexts could provide *termini ante quos non*, a date before which the group probably did not exist. In other words, no richly modeled animal (group 1, the Almond-Eye group, LM I-II, ca. 1700-1550 BCE) came from a context dated earlier than 1700, no animals with few muscles before 1550 (group 2, the Dot-Eye group, LM II), no animals with an encircled eye before 1490 (group 3, the Spectacle Eye group, LM III A:1), and no animals with sausage bodies before 1365 (group 4, Island Sanctuaries group, LM III A:2-B:1). Within these larger groups, smaller groups of seals sharing technical traits provided interior divisions in this general chronology.

Using similar methods, Paul Yule produced a chronology for seals dating 2200-1825 BCE (Yule 1979: Parading Lions/Spiral Complex, EM II-III; Border Leaf, MM I; Malia Workshop MM II). This left a gap (1825-1700) that was filled in by the identification of early Neopalatial seals dating to MM III (Younger 1993). Since then many seals have been excavated from dated contexts and they have confirmed the present dating schemes.

Functions of Seals

As already noted, Aegean seals functioned as culture and status markers. Only five seals impressed sealings in third millennium Crete (*CMS* V, no. 20, II 6 no. 239, II 8 no. 6, and two unpublished sealings from Knossos), so presumably a sealing bureaucracy had not yet been established there at that time. Instead, the almost infinite variety of seal shapes from this period and their most common find-spot, communal circular tombs, suggest they served as jewelry to identify individuals or clans.

On the mainland, however, the culture that created the Great Houses in EH II imported a system of administration from the eastern Mediterranean that relied on sealings (Ferioli and Fiandra 1994; Younger 1996). That system developed in the fifth and fourth millennia, by the end of which writing had been invented in both Mesopotamia and Egypt. The inscribed clay documents consisted of tablets, bullae, and envelopes, while the sealed objects were more numerous and varied, basically anything that could be tied up with cord: a lump of clay was put over the cord's knots, and the lump impressed with a seal. The most commonly sealed and impressed objects are clay jar stoppers and sealings over cloth coverings of jars, doors to storerooms and cupboards, and lids to chests and baskets. The purpose of these sealings was to assist in an audit of commodities brought into the administration: the number of sealings should correlate with the number of commodities as inventoried in the documents. After the audit, the sealings would be destroyed or melted to be used again.

Set against this rich administrative history of seals in the Near East, the first sealings in the Aegean appear late, in the late third millennium, but as in the Near East they do appear before writing. An obvious conclusion is that the early Aegean administrations were probably the first to be complex enough to need sealings to record transactions, but were not concerned with a system too vast that simple memory could not keep track of it. In other words, the names and duties of outlying officials were sufficiently known to the central administration that they could be easily memorized. If that is so, then the invention of writing is dependent on a critical mass of population: when the outlying purveyors of commodities and contributors of taxes get too numerous to be conveniently memorized, writing needed to be invented. And since our early


Aegean texts consist almost exclusively of lists of names and commodities, this hypothesis seems justified.

The EH II bureaucratic centers on the mainland are numerous and most, if not all, seem to share a conventional administration center, the so-called Corridor House, a two-storey building with a central suite of rooms flanked by two long staircases leading upstairs, each in a single flight, to outside balconies (Shaw 1987). Other Corridor Houses occur at other sites (Askitario near Kalamata, Kolonna on Aigina, Eutresis in Boeotia, and probably Mitrou in Phthiotis), but the best preserved Corridor House, the "House of the Tiles" at Lerna at the west end of the bay of Argos, is the type-site. Almost all these sites produced impressed sealings and impressed pottery.

At Lerna, slightly under 200 sealings were found impressed by slightly under 100 different seal faces (Heath 1958; Wiencke 1974; Weingarten 2000). Most of the sealings came from the House of the Tiles, room XI, one of two closet-sized rooms that communicate only with the exterior. It, or possibly the room above, had stored five different types of sealings which bear not only the impressions of stamp seals but also of the objects sealed: reed baskets and wood containers with some sort of door or lid with a projecting peg or pommel-like knob. Sealings over jars, some of which had been wrapped in reed mats probably for transport, were found in pithoi in casement rooms in the settlement's fortification wall. These jars must have contained comestibles (e.g., olive oil, wine, or grain) and were probably brought to the settlement by persons from outlying places. We can imagine officials stationed at the gate, receiving these jars, removing the sealings, inspecting their contents, and storing the sealings in the pithoi for an eventual audit. These would have been officials different from those within room XI of the House of the Tiles who

dealt with some bulky, lightweight commodity secured in airy reed baskets or pegged wood containers. The pegs imply that the containers could be closed tightly but opened easily and were therefore probably subject to repeated re-sealing — what they contained is unknown (cloth?) but the process smacks of concerns for security and auditing.

Many of the seal motifs impressed into sealings at Lerna find some parallels on contemporary Cretan seals, conoid in shape and in soft materials (steatite and dentine, usually hippopotamus ivory); a few such seals are bifacial stamp cylinders. We can imagine therefore that most of the seals used on the Lerna sealings were similar conoids, although few have survived, each probably belonging one to a person or household. Obviously, most of these people would be operating well outside the House of the Tiles in outlying areas; it would be difficult to imagine 80-90 people milling about the Corridor House, all engaged in stamping sealings there.

Although the EH II administrations of the Corridor Houses did not invent writing, writing was known. A seal impression on a hearth rim from Ayia Irini in Kea, CMS V, no. 478, carries imitation Egyptian hieroglyphs (**Fig. 5**). A sign resembling a *djed* column (Gardiner R11) divides the face into two panels: on the left, under a waterbird, a sun disk (*r^c*; Gardiner N5) and a hobble ('10'; Gardiner V20); and, on the right, a sickle (*m³*; Gardiner U1), and a vase-sign. But these are all parodies; the *djed* pillar is too thin, the sickle too spindly, and their association makes no sense. Especially wonderful is the vase-sign, which in Egyptian is the typical beer jug (Gardiner W22, ) but the typical pot at this time in the Aegean is the sauceboat and that is what is depicted here. This impression, the sole surviving one on a hearth rim fragment just large enough to preserve it, is our first direct evidence that someone in the Aegean, a Hellad

presumably, had been exposed to writing, now less than 1000 years old in Egypt.

By 1825, a similar sealing administration had been instituted in the proto-palaces in Crete. One room at Phaistos, *vano* 25, was found filled with fired sealings, documents inscribed in Linear A, uninscribed documents, and vessels (MM II) below a layer of cement. The uninscribed documents were all impressed by seals: at least one hanging nodule, seven *noduli* (unpierced nodules), three roundels (a clay disc with seal impressions on its rim), and over 6500 sealings (*CMS* II 5, entire volume).

Of the sealings from *vano* 25, 1544 could be easily studied. Approximately 9% of these had secured reed matting over jars; the rest, about 1400 sealings (91%), had sealed pegs or pommels. From the distinctive profiles of the pegs or from marks on the pegs themselves it is clear that approximately 1300 sealings had repeatedly sealed only 11 different pegs. Five pegs or pommels (A-E) were apparently being constantly sealed and unsealed. Surely these were the handles of storeroom doors.

These 1400 peg and pommel sealings had been stamped by 326 different seals, none of which has actually been found though similar seals have survived. While most of the seals were used at Phaistos to stamp only a few sealings, usually fewer than ten each, more than 25 other seals impressed more than ten sealings, with an average of 30. Two seals, both carrying weave patterns, stamped more than 100 sealings (*CMS* II 5, no. 168 impressed 107 sealings, and *CMS* II 5, no. 165 impressed 175 sealings).

Most of the seals that stamped with frequency specialized in stamping one of the major peg types, as if the owners of these seals had special access to the contents behind one door (i.e., the door to one magazine or the door to one coffer), but they often stamped other peg types as well, implying they could, on occasion, deal with the contents behind other doors.

If we equate seals with their owners then we can imagine, from the high number of seals used to impress these peg and pommel sealings, a large number of personnel in the administration having the requisite authority to inspect commodities behind various doors. We may also imagine these personnel in three ranks, those who conducted occasional inspections (those whose seals impressed fewer than 10 sealings); those who conducted routine inspections (those who impressed about 30 sealings each); and a few seal-owners who conducted constant inspections, especially of certain important areas. And since most seals specialized in stamping one type of peg or pommel sealing with an occasional visit to another door, we can imagine that these administrators either specialized in certain types of commodities that were stored separately (say, all figs in one magazine, all grains in another) or in certain sets of contributors whose contributions were stored separately (say, all the contributions from one region in one magazine). The latter, a storage area containing the contributions from different places within a single region, would correspond to those Linear A documents that list together contributions from more than one name, a place or person (like HT 9a that lists wine collected from seven names).

Contemporary with the Phaistos deposit (ca. 1800 BCE), a sealstone workshop at Malia specialized in three- or four-sided seals ("prisms") carved at first from steatite (Anastasiadou

2011); toward the end of the workshop's life (it was destroyed by fire along with the proto-palace at Malia), it was carving seals from much harder stones like conglomerate and breccia that needed the new tool, the horizontal bow-lathe to do so. Regardless of material, however, the prisms have been found concentrated around Malia and in the Lasithi plain just to the south, and in eastern Crete; very few Malia prisms have been found at Knossos or in the Mesara, presumably because the Malia state did not extend that far to the west.

Each Malia prism carries different designs on all three or four sides. The iconography is limited (people; dogs, spiders; pots; spirals, whorls -- all on the soft stone prisms; Pictographic inscriptions on many of the hard stone prisms). Of the more than 670 multi-facial seals made by this workshop, several carry similar motifs on two sides but only one pair of seals carries the exact same set of motifs on all three sides (*CMS* VI, no. 65 and XIII no. 1); from their publication dates (1897 and 1954 respectively) it is likely that the latter is a forgery based on the former. From the wide distribution of seals found in and about Malia, Lasithi, and east Crete, and from the (almost) complete lack of duplicated motifs, it is possible to imagine that the Malia seal engravers deliberately created unique seals conforming to the unique identities of individuals in the state of Malia. In other words, the Malia Workshop seals continued the earlier Minoan practice of demarcating individuals but now in a controlled, mass registration. Since Malia palace workshop seals did impress sealings accompanying commodities to the palace (e.g., *CMS* II 6, nos. 190-196), the seals must have identified outlying persons as members of the state "cleared" for paying their taxes. In other words, these prisms functioned as early identity cards.

Later (ca. 1725-1600 BCE), a large group of seals in serpentine comes exclusively from Crete and mostly from domestic contexts outside the palaces, the "Cretan Popular Group" (Younger 1983: 123-127; the term "popular" refers to the predominantly domestic contexts for these seals, "seals for the people," not to their "popularity"). Many members did impress sealings, suggesting their owners were expected to contribute commodities on a regular basis. Since serpentine is a common stone in Crete (Warren 1969: 138-140), these seals could have been created by non-palatial workshops for people outside the central administration, but the style of most Cretan Popular seals is uniform and fairly naturalistic – there are even hard stone versions of Cretan Popular seals (e.g., *CMS I*, nos. 13 and 500; Younger 1983: 120-121). It would seem likely therefore that there was at least one centralized place for manufacturing Cretan Popular seals (probably Knossos) or several workshops that shared in a single, uniform style -- no workshop, however, has been found.


There is a similarly large but even later group of seals (ca. 1400-1350 BCE) in steatite that have been found all over Greece and the Aegean basin, the "Mainland Popular Group" (Younger 1987a: 65-71; Dickers 2001). These mostly come from domestic and tomb contexts from central Greece and Crete, as usual, but also from Macedonia in the north, Acarnania and Achaia in the west, and the western shores of Anatolia. Two members of the group even come from the Uluburun shipwreck (*CMS V Suppl. 1B*, no. 273, *V Suppl. 3, 2*, no. 454; dendrochronological date, 1306) and must have been worn by their owners returning to the Aegean from a trading mission to the Levant. Only one seal in this group impressed a sealing (*CMS V Suppl. 3*, no. 373, from Thebes), so it is likely that these seals were not intended to function sphragistically but primarily as personal markers denoting cultural identity.

Seals are best known for authenticating transactions by impressing their designs into clay sealings that survived by being fired to pottery hardness during fire destructions. There are four main types of sealings in the Aegean (Weingarten 1986, 1988, 2010; Younger 2010): object sealings (pressed against doors, baskets, the mouths of jars); two-hole sealings around a knot of string that tied up bundles; one-hole sealings hung, necklace-like, from objects including inscribed papyrus rolls; and document sealings overlying small parchment sheets, presumably written documents, neatly folded and tied with thread. Object sealings are common in EH II on the mainland (e.g., at Lerna, *CMS* V, nos. 43-119 sealing pegs) but infrequent in Minoan Crete (*CMS* II 8, no. 475 from Knossos, object unknown). The other types of sealings are common from Neopalatial Crete, one-hole nodules especially at Ayia Triada.

There are also some unusual sealings from Minoan Crete. One sealed a large parchment document that had been bound with twine (**Fig. 6**, from House I, LM I context). Ten seals (*CMS* V Suppl. 1A, nos. 128-137) impressed the obverse in two parallel rows: seals 128 and 129 start the left row, followed by seals 130 and 131 — the iconography looks special, even religious; seal 132 (lion) ends the left row and starts the right row, followed by seals 134, 135, and 136 (all also with lions); seal 132 impressed the sealing again, between 135 and 136, perhaps prematurely. Two final seals, both rings, stamp below each row: 133 (man leading women on a leash; cf. *CMS* V, no. 173) and 137 (men milking sheep, a unique scene). From the placement of the impressions and the iconography of the seals, this complicated sealing seems to testify to some transaction involving perhaps two parties (with one person in common, the owner of seal 132) and overseen

by a third party (the ring owners). From the iconography of the rings, religious personnel may have been involved.

The Mycenaean palaces used seals to impress both object sealings (like a stirrup jar stopper from the House of the Oil Merchant at Mycenae, *CMS* I, no. 160) and two-hole sealings (like those from Pylos mentioned above), but not document sealings (one exception: *CMS* V Suppl. 3, no. 217). Mycenaean administrators also used seals less frequently to impress sealings and even then usually one seal per sealing; there are only some 250 separate seals that impressed sealings on the mainland. Apparently the Mycenaean administrators relied more on writing to identify transactions. One seal, however, has survived that impressed a surviving sealing: *CMS* XI, no. 27 said to be from Elis had impressed *CMS* I Suppl., no. 180 from Pylos, inscribed (Wr 1416) with the Linear B sign for “nanny,” apparently recording the shipment to the palace of female goats (from Elis?).

Since the parties to internal transactions within the Minoan and Mycenaean palaces were probably well known, sealings would not have been necessary. It would then seem logical that most sealings found in the Mycenaean palaces would be accompanying contributions and taxes from outlying regions where the contributors were not so well known. For instance, many sealings from the Arsenal at Mycenaean Knossos (Ws 1704, etc.) were found among the remains of two wooden boxes and hundreds of bronze points. Most of the sealings were inscribed by the same scribe with the appropriate logogram for spear point (Linear B *254, ) , apparently to identify the contents for delivery; three sealings had been impressed by a single lentoid (*CMS* II 8, no. 305), probably belonging to the armorer (or his scribe), who then wrote the logogram across the impressions.

Mycenae preserves similar delivery sealings. From the House of Sphinxes (LH III B context) come eight sealings, seven impressed by the same seal and all inscribed (*CMS I*, no. 163 in the Rhodian Hunt group, a subgroup of Island Sanctuaries, the last stylistic group of seals to be made); the reverse of an eighth sealing (*CMS V Suppl. 1*, no. 217, also in the Island Sanctuaries group) preserves the impressions of thick leather straps. These sealings were found clustered for discard in the doorway of room 1; the inscribed sealings (Wt 501-507) inventory a shipment of pots (possibly those found in that room) that are summarized on the obverse of Mycenae tablet Ue 611 found down the hall in archives room 6. The seals were presumably owned by the potter or the transporter (if they were not the same).

At Knossos, one sealing is impressed by a lentoid depicting a collared female dog (*CMS II 8*, no. 287); it is inscribed (Ws 8754) with a person's name, Kuwata, who worked in the bureau of Anuwiko. Kuwata undoubtedly provided the commodity that was sealed and may have been the scribe, Hand 101, who wrote the inscription.

Anuwiko was far more important; he may have been the military officer ("lawaketa") recorded on personnel tablets As 40+5093 and 1516 written by the same Hand 101; he would then be one of the most important officials at Knossos, second to the "wanax" (king) and more important than the "qasirewe" (classical "basileus") (Weingarten 1997). If the seal with the female dog is Anuwiko's (or his bureau's), it impressed sealings found in the west, south, and east wings of the palace. These sealings belong to the class known as "combination" sealings: a stringhole runs through them, and they were pressed up against a wicker basket, presumably the basket that held

the tablets recording the transactions (see *CMS* II 8, fig. 29a, for the wicker impression on the reverse of Anuwiko's sealing).

Obtaining Seals

Aegean scholars have assumed that palaces on both Crete and the mainland supported seal workshops (e.g., Betts and Younger 1982; Younger 1984; Krzyszkowska 2005: 10 and *passim*), but since hard stone seal engraving ceased with the destruction of Knossos in Crete (ca. 1300 BCE) mainland palaces probably had relied on Crete for their seals. No actual sealstone workshops have been excavated on the mainland, only one mould for fingerings has been found on the mainland, *CMS* V, no. 422 (from a tomb at Eleusis, not a workshop), and stylistically it is impossible to identify more than two groups of seals that could have been made on the mainland. The exceptions are the Mycenae-Vapheio Lion group, an impressive group of seals and other objects dated to LH I (Younger 1978, 1984), and the Mainland Popular group of soft stone seals which did not impress sealings (Younger 2011: 423-424).

If the Mycenaeans got their seals from Crete, how did they? The process may have been elaborate. Many Mycenaean tombs, especially the large, royal tholoi ("beehive" shaped) tombs contain one or more burials and several seals. Very often the collection of seals in each tomb are generally contemporary in style and break down into pairs or trios similar in iconography, material, or shape, and sometimes all three (Rehak and Younger 2000).

For example, Tragana tholos 2 (LH III A:2, ca. 1410 BCE) presents a small collection of five seals (*CMS* I, nos. 264-268). Two lentoids of dark conglomerate (nos. 265 and 267), two lentoids

of red stones (jasper and conglomerate, nos. 266 and 268, respectively), and a rare lentoid of rock crystal (no. 264). The style of the five lentoids is homogeneous: the angular and dotted shoulders, the ringed eyes, and the swollen cheeks (“mumps”) are all traits of the large Spectacle Eye group (LM III A:1, ca. 1490). In addition, the two dark conglomerate lentoids share similar bands that demonstrate they were cut from the same block of stone.

When such seal collections in tombs look contemporary, as if obtained at one time, they often include one older seal of blue amethyst or glass (Younger 2012). For example, the Ward collection of seals that was eventually repatriated to Greece and is now officially attributed to Aidonia Tomb 7 (*CMS V Suppl. 3, 2*, nos. 243-247) consists of two gold rings (nos. 243 and 244), two dark stone lentoids (nos. 246 and 247), and a recut amethyst scarab (no. 245). The date of the collection depends on the Dot-Eye animals of nos. 246 and 247 and the gold rings, all of which are no later than 1550 BCE. The amethyst scarab, however, is much earlier in style, no later than ca. 1725.

For the collection of seals from Tragana, there is also an amethyst seal (*CMS I*, no. 263), but it comes from the tholos next door, Tholos 1 (LH III A:1; ca. 1490 BCE). It carries the only scene with people in the entire collection of Tragana seals and is a hard stone seal within the larger soft stone Cretan Popular Group. Thus the seal should date LM I (ca. 1700), earlier than its context and much earlier than the seals in Tholos 2.

The presence of groups of seals that look contemporary in Mycenaean tombs, matched in color, iconography, and style, suggests that they were acquired "purpose-made"; the addition of a blue

heirloom seal suggests that this deliberate acquisition was also special. It might be possible to imagine mainland princes going to Crete to get "invested" with a collection of purpose-made seals plus a blue heirloom to imbue the transaction with historical significance.

If the Mycenaean "princes" thus acquired collections of Minoan seals, which they could, in turn, distribute individually to their lieutenants, then the practice of owning or using a seal on the mainland was, to a certain extent, ceremonial as well as functional. It may be this added historical connection to the older civilization of Crete that made the elite Mycenaeans, after the fall of Knossos had destroyed the last living workshop of seals, hold on to the seals they had to impress sealings for more than a century after. And it may have been the desire to connect to this shared cultural and historical identification that made the common Mycenaeans create the Mainland Popular group of steatite beads to wear and declare to all and sundry that they were Mycenaean — even when buried in the hinterlands of western Greece or on the far shores of Anatolia or went down with their trading ships that plied the eastern Mediterranean.

Conclusion

The legacy of Aegean seals has been long-lived. Their function, to authenticate the individuals in transactions, is, of course, similar to the functions of all seals — and for that purpose people continued to use seals throughout antiquity into the Medieval period and the Renaissance until well into the 19th century. In the 20th c. seal use began to die out, although officials still stamped official documents, cashiers stamped "paid" on bills, and governments still stamped passports and visas. One could, until recently, find stationery stores where one could buy stalk signets and

sealing wax to emboss formal invitations. But now there are other ways to certify one's signature and authenticate one's participation in transactions.

More specifically, however, Aegean seals invented an iconography that has remained fertile: their formal animal studies and occasional heads in profile, confined in the predominantly circular field of the lentoid seal, have influenced ancient and modern coins, medallions, stamps, and other insignia. Seal designs that first appeared in Aegean glyptic have been adapted to provide symbols for more modern states: the common cow suckling her calf (e.g., *CMS* VII, no. 236) for the ancient coins of several states, including Karystos and Epidamnos, and a pair of dolphins (*CMS* VI 182) for the coins of Thera (Santorini); a double-headed eagle (*CMS* II, 7, nos. 162-166) for the Byzantine empire; a displayed griffin (*CMS* II, 3, no. 219) for the city hall of Herakleion, Crete; and a recumbent cow (e.g., *CMS* I, no. 65) for the reverse of the US quarter (2004) for the state of Wisconsin and a bucranium (e.g., *CMS* VIII, no. 110a) for the state of Montana (2007) as well as the ancient state of Euboeia. In a real sense, the formal iconography that, on Minoan seals, denoted officialdom, whether Cretan or Mainland, has proven similarly effective for denoting other administrations and polities.

Thus, it would not be an exaggeration to say that Aegean glyptic, both in its formal iconography and its rich anatomical modeling, has provided impressive models for classical and modern art — the legacy of Aegean seals has endured indeed.

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Captions

Fig. 1: Chart of the main shapes and styles of Aegean seals in the Neolithic and Bronze Age.

Citations are to volumes and seals in the *CMS*.

Fig. 2: Map of the Aegean basin and Crete (adapted from a free-share map online:

<http://fivejs.com/outline-maps-ancient-egypt-and-greece/>).

Fig. 3: Chronological chart of seal groups, scripts, and palaces of the Aegean Neolithic and Bronze Age.

Fig. 4: Impressions of the smallest and largest Aegean seals and rings to scale (*CMS* I, nos. 5 and 185; II 3, no. 103 and I, no. 179, respectively; photographs courtesy of the *CMS*).

Fig. 5: *CMS* V, no. 478, impression on a EC II hearth rim (ca. 2200 BCE) from Ayia Irini, Kea (drawing courtesy of the *CMS*).

Fig. 6: Document sealing, Khania Museum 1449, from a cupboard in House I, LM I context (ca. 1650 BCE). The composite drawing (by the author, individual drawings courtesy of the

CMS) shows the layout of the individual impressions (numbers are those of the seals used, CMS V Suppl. 1A, nos. 128-137).

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An Aegean Seal in Greek Hands? Thoughts on the Perception of Aegean Seals in the Iron Age

(Maria Anastasiadou)

More than three thousand years separate us from the Aegean Bronze Age.¹ Despite this temporal distance, more than ten thousand examples of seals or their impressions on clay are known today. It has been suggested that this number constitutes ca. 5 % of the original output (Pini 1996, 1092; Krzyszkowska 2005, 1). This estimate would mean that the number of the seals that originally existed in the one thousand seven hundred years of the Bronze Age during which seals were produced and consumed superseded two hundred thousand pieces. This considerable quantity underlines the large importance of these objects in Aegean society.

With the end of the Aegean Bronze Age in the years towards the conclusion of the second millennium BC came also the end of seal production in the area of the Aegean (Boardman 1970, 107). However, the population of the following period, the so-called Dark Ages, would have certainly been familiar with these artifacts. Aegean seals would have been found in the fields during agricultural activities or even when plundering ancient sites. Some could perhaps have passed from one hand to another within families as old heirlooms. There is, however, no evidence for seal manufacture from the centuries following the end of the Bronze Age. It is only in the Geometric Period, at about 850 BC, that Greek seals start to be manufactured (Boardman 1970, 108-109).

¹ I am grateful to Despoina Chatzi Vallianou and Ingo Pini for allowing me to refer to the seal Heraklion Museum 2674. Ingo Pini kindly provided me the manuscript of the publication of the Sopata Kouse seals. Each figure is the courtesy of the publication cited under it.

NEOLITHIC EARLY BRONZE AGE

3500 2400

MIDDLE BRONZE AGE

1900 1800
PARADING LIONS BORDER LEAF MALIA WORKSHOP PALAIKASTRO LION

LATE BRONZE AGE

1600 1500 1400 1300
ALMOND-/DOT-EYE SPECTACLE EYE MP/ISLAND SANCT

REELS
DISKS
LENTOIDS
CUSHIONS
AMYGDALOIDS
GABLES PRISMS
RINGS
CYLINDERS
STAMPS

	X 12 	V 301 	II 1.268 	V 28a 	VIII 104 	I 289 	I 13 	V 751 	X 321 	V 512
						VII 35b 	I 293 	V 644 	V 297 	I 139
						V 430 	V 193 	V 645 	X 126 	I 26
				VII 17b 	VII 45c 	V 268c 	V 582 			
		LERNA 								
	X 24 	V 39 	II 1.159 							
	V 635 	V 120 								
	STAMP CYLINDERS V 21 		II 1.248 	II 1.37 						
	V 715 	V 36 				V 487 				
	STUMP SIGNET V 14 									
	BOTTLE V 286 		PETSCHAFTS X 43 	II 1.86 	VIII 131 	I 430 	VII 34 			
	X 4 	V 66 	II 1.249 							
		EPOMION EH II 	THERIOMORPH 		FOLIATE BACK X 51 		X 54 			

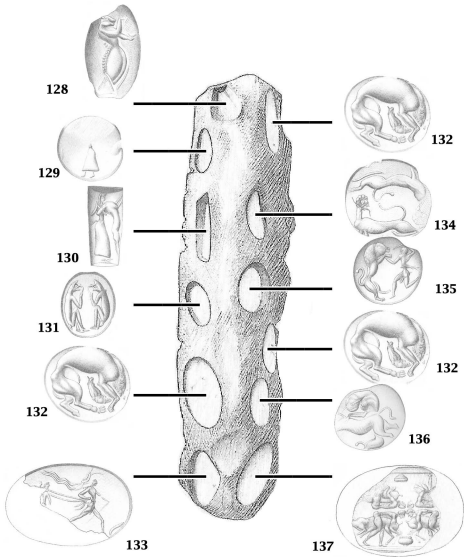


0 1 2 3 4 5 cm





0 1 2 3 cm



EN 6500					clay pintaderas & stamps		EN 6500
MN 5000					clay, stone pintaderas & stamps		MN 5000
LN 4000					pintaderas & cylinders in North stamps in South		LN 4000
EM I 3000	early stamps: linear designs				early stamps: linear designs		EH I 3000
EM II 2200	dentine stamps; bifacial cylinders				Proto-Administration, sealings bifacial cylinders? <u>fire destructions</u>		EH II 2200
EM III 2100	<u>Parading Lions terracotta conoids</u>				clay stamps		EH III 2100
MM IA 1900 (1975)	Pictographic Writing						MH 1900 (1975)
MM IB 1850 (1925)	<u>Border/Leaf</u>						
MM IIA 1800 (1875)	Linear A						
MM IIB 1725 (1825)	<u>Mallia Atelier</u>						
	<u>(MA+KN PH) fire dest</u>						
MM III 1650 (1725)	<u>CouchAg</u> NEOPALACES						
	<u>Kamil Goat</u>						
	<u>ChantPr+CP</u>						
LM IA 1550 (1700)					imported Minoan <u>ChantPr+Talismanics</u> <u>Myc-Vapheio Lion Workshop in ShGr</u>		LH I 1550 (1700)
					<u>Thera Explosion</u> (1628)		
LM IB 1500 (1610)	<u>Almond-Eye</u>				<u>Myc-Vaph School</u> <u>Almond-Eye</u>		LH IIA 1500 (1610)
					<u>fire dest</u>		
LM II 1450 (1550)	<u>Dot-Eye</u> ↓ ? KN survives Linear B <u>Dot-Eye</u>						LH IIB 1450 (1550)
	↓ ? ? MY I, SP						
	↓ ? ?						
LM III A1 1400 (1490)	<u>Spectacle-Eye</u> ↓ ? <u>Spectacle-Eye</u>						LH III A1 1400 (1490)
LM III A2 1375 (1410)	↓ ?						LH III A2 1375 (1410)
	<u>fire dest</u>						
	<u>Columbia Group</u> ↓ ? <u>Columbia Group</u>						
	<u>Island Sanctuaries MP</u> ↓ ? <u>Island Sanctuaries MP</u>						
LM III B early 1325 (1365)	<u>final fire dest</u> MY II						LH III B1 1325 (1365)
	Ulu Burun 1306						
	⊥						
LM III B late 1275 (1275)	?						LH III B2 1275 (1275)
	⊥ ?						
					⊥ PY, TI <u>dest</u>		
LH III C 1200 (1200)							LH III C 1200 (1200)

AEGEAN GLYPTIC CHRONOLOGY

seal groups, writing, PALACES; destructions; (conventional dates) **high dates**