Discussions of early Aegean seals invariably concentrate on items made of stone, bone or ivory. This is entirely reasonable since these were the three materials in which most, indeed almost all, Aegean seals were made before the Late Bronze Age. Even then, it is only the signet rings, normally of precious metal, which appear at all frequently in a material other than one of these three. Yet at least two, and probably three, other types of material were used for the manufacture of seals during the Early and Middle Bronze Age. Wooden seals must at present, and perhaps forever, remain hypothetical since none have survived and no trace of wood grain has yet been noticed on seal impressions. On the other hand, the Lerna sealings of EH.II constitute a large group of impressions for which it is very difficult to find corresponding parallels amongst extant and contemporary seals. The Early Minoan corpus of seals provides few parallels to the Lerna sealings and Heath's detailed analysis of the latter has suggested that there is no reason to identify the Lerna sealings as the impressions of Minoan seals of EM.II-III.  

Nowhere else in the Aegean during Early Bronze 2 do we yet know of any flourishing seal industry which might have produced the Lerna sealings. There thus exists a distinct possibility that the Lerna sealing were impressed with seals made of wood which have since rotted. The alternative is that they were made of one or other of the other two 'minority' materials — clay or metal. The former have a very long history in the Aegean if we accept the neolithic stamp seals as part of the tradition. In the earlier part of the Bronze Age they are known from Middle Helladic examples found at Asea and Middle Minoan ones

1 M. Heath “Early Helladic Clay Sealings from the House of the Tiles at Lerna” *Hesperia* 27 (1958), 81-121.
found at Gournia. One imagines the few that survive must almost certainly represent a very much larger number which have completely disintegrated over the course of three to four millennia. The surviving examples however are, for the most part, crude in the extreme and clay seals, on the present evidence, appear to be poor substitutes for those of other materials. For this reason it seems unlikely that the Lerna sealings, which carry impressions of some very fine seals indeed, were made with clay seals. There remains the evidence for the use of metal seals, and metal signet rings, during the Early and Middle Bronze Age in the Aegean. As we shall see, there is now some evidence to suggest a possible relationship between the Lerna sealings and the use of metal seals, but this short paper is devoted to examining the whole question of the early use of metal seals and signets.

**Shapes, Metals, Distribution.**

There are at present four (possibly five) metal seals of the Aegean EBA-MBA extant, and one ring which has a seal for a bezel (fig. 1). In addition there are fourteen other finger-rings with metal bezels which definitely or probably belong in this period, and may therefore be considered as the forerunners of the Late Bronze Age signet-rings. A catalogue of all these pieces is appended to this paper.

Of the seals, two are stamp seals and two are signets. There is a fifth

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2 E.J. Holmberg *The Swedish Excavations at Asea in Arcadia* (1944), 118, fig. 112. H. Boyd-Hawes *Gournia* (1908), fig. 28.5.
possible example, of cylindrical form, from tomb I on Mochlos. Most of the signet rings are of copper, or bronze, and the same material was used for the seal-ring and one of the seals. The relative scarcity of the rings, and even more so of the seals however, is perhaps underlined by the use of rarer metals for their manufacture. Three of the signet-rings and one of the seals (plus the dubious example from Mochlos) are of silver, and one of the signet-rings of bronze is silver-plated. The remaining two seals are of gold and lead respectively. The stamp seals are from Thermi and Naxos, and the seal-ring from Poliochni. Two of the signet-rings are from Ayios Stephanos (Laconia) and Corinth respectively. The remaining signet-rings and the two signet seals are all from Crete. Within Crete they fall into two main regional groups — eastern and southern — although two finds are from the north of the island.

The Dating of the Seals.

Four of the seals and seal-rings have some sort of dateable context, although the degree of precision and reliability varies. The earliest items, on the basis of associated material, are the seal ring from Poliochni and the seal from Naxos. The former was found in a deposit of the “Red” phase, which is generally agreed to be no later than EH.II and EM.II, and may well have come to an end at the same time as Troy IIg, EH.II in the Argolid and possibly EM.II in Crete. Its design, a multiple (or angle-filled) cross is known in EB.2 elsewhere in the Aegean from seals and from an important mould fragment to which we can return shortly. The seal from Naxos is said, in the brief report published, to have come from a Middle Cycladic grave, but the material illustrated contains nothing distinctively Middle Cycladic. On the other hand some of the pottery from the tomb is almost certainly EC.II, and this seems the likely date for this seal in view of the very close similarity between the design it carries and some of those amongst the Lerna sealings of EH.II. One of the seals without a closely dateable context may also, I think, be ascribed to EB.2. This is the small copper or bronze stamp seal from Thermi, which was an unstratified find. Certainly the vast majority of metal finds from Thermi came from the EB.1-2 settlement levels; finds of the Late Bronze Age were very few indeed. This seal belongs to the quite common

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5 Ergon 1970, fig. 157.
EB.2 Aegean type in which the cross forms the basis of the design.⁷ It is here crudely incised into the surface of the metal but it is clearly the same design as we see on examples from Mochlos, Gournia and Trapeza. The cross-design does of course persist beyond EB.2 in the Aegean, but most examples of the simple cross, and the angle-filled cross too, are probably to be placed in the EB.2-3 period.⁸ This is even more likely for cross-designs with four circular depressions bored into the face of the seal in the angles of the cross. At least five other examples of this particular design are known, in addition to the metal seal from Thermi. Two from Trapeza are probably of EB.2-3 date, and one from Myrtos (known from a sealing rather than a seal) is certainly of EB.2 date. All of these parallels suggest a date in EB.2-3 for the Thermi seal, and since EB.3 material is absent at Thermi, an EB.2 date may reasonably be ascribed.

The two signet-seals, assuming they are no earlier than their more numerous bone and ivory counterparts, we should expect to find in associations no earlier than MM.I. The silver signet from Mochlos was found in a tomb of MM.I date, which may have included some MM.III material.⁹ The design on its base is found on seal design 179 of the MM.Ib-IIa archives at Phaistos,¹⁰ and a date in MM.I-II for the Mochlos seal seems certain. The Mallia signet was a surface find with no context, and can only be dated by the design on its face. This comprises two “commas”, tails to the centre and heads to the side of the seal face. The “comma” is a well known motif on sealstones of MM.I-II¹¹ and again is represented in the Phaistos archives.¹² There is no reason to place this gold signet anywhere other than in MM.I-II, and on the whole a date in MM.I seems the more likely.¹³

The Origins of Metal Seals and Signets.

Until the discovery of the Lerna sealings it was axiomatic that Crete had introduced the use of sealstones to the rest of the Aegean. Only a few poor examples, of Middle Helladic date, were known from the mainland and the EH.II example from Agios Kosmas was, correctly I believe, seen as a Minoan

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⁷ K. Branigan The Foundations of Palatial Crete (1970), 137-9; Warren op. cit. n. 4.
⁸ The seals from Mochlos, Myrtos and Poliochni are certainly EB.2, and those from Siva, Agios Onouphrios, Trapeza, Gournia, and Krasi are probably EB.2-EB.3.
¹¹ e.g. S. Xanthoudides The Vaulted Tombs of Mesara (1924), pl. XIV, 1066;
¹² Levi op. cit. n. 10, designs No’s 222-224.
¹³ Simply on the grounds that the motif is commoner on MM.I seals than on later ones.
'export'. Even with the discovery of the Lerna sealings, it was still possible to argue that they were made by Minoan seals. 14 Heath's careful analysis of the Lerna sealings however has demonstrated that they are unlikely to have been made by seals from Crete. 15 The new lead seal from Naxos in fact provides the first close parallel we have to the Lerna sealings, with its design of close set 'clover' motifs (cf Lerna designs S50-55). We cannot confidently claim that the Lerna sealings were made with Cycladic seals, but a separate seal-making industry in the Cyclades and/or on the mainland of Greece may reasonably be postulated. At present the primary evidence for it comes exclusively from metal seals — namely those from Naxos and Thermi, and the seal-ring from Poliochni, all of which appear to belong in Early Bronze 2. These three items suggest that metal seals were first made in the Troad and perhaps quickly spread to the Cyclades, with which the Troad had close links during EB 2.

Paradoxically this theory is strengthened by the only possible evidence we have for the manufacture of metal seals in Crete during Early Minoan II. This is the fragment of a lead casting found near Iraklion with a lead figurine of a female. 16 The figurine is closely paralleled by one found by Schliemann in the debris of Troy IIg 17 and may be dated therefore to EB 2. The lead casting includes one complete roundel with multiple cross-design on it, and one incomplete square with an identical motif. This latter parallels the design on the Poliochni seal-ring, also of EB 2. Complete moulds for casting figurines and various trinkets including round and square bezels with multiple-cross decoration are known from Turkey and Syria, 18 and the similarities between them, and the Aegean finds, are so close that there can be no doubt that they are all roughly contemporary and belong to a single metal-working tradition. Both the style of the figurines produced in these moulds, and the distribution of the moulds themselves, suggests that their point of origin is in south-eastern Turkey or Syria. This is broadly the area from which the stamp-seal — so common in Early Minoan Crete and also the form adopted for the two EB 2 metal seals from Naxos and Thermi — is thought to have reached the Aegean. The stamp seal, and the use of metal to cast seal faces, may have reached the Aegean, through the Troad, from Syria-Cilicia in the period c. 2700-2400 BC.

The signet-ring on the other hand cannot be traced to the same origins. Its appearance in Crete, no later than MM I, is as early as its appearance

14 e.g. F. Schachermeyr Die minoische Kultur des alten Kreta (1964), 326, n. 1; M.S.F. Hood The Minoans (1971), 50-51.
15 Heath op. cit. n. 1.
16 A.J. Evans Cretan Pictographs (1895), 132, fig. 137.
17 H. Schliemann Ilios (1880), 337, fig. 226.
18 See S. Canby "Early Bronze 'Trinket' Moulds" IRAQ 27 (1965) 42-61.
anywhere in the Mediterranean. A concentration of eleven examples certainly or probably dated within MM.I-II might support the suggestion of a Cretan origin for the type, and it must be emphasised that the only contemporary signet-rings (of XIIth Dynasty Egypt) are basically different in having bezels of non-metallic materials. The signet-ring with metal bezel therefore is best understood as a Minoan invention of the MM.I period which owed nothing either to external influences or earlier Aegean ancestors. The only possible examples of the latter are the seal-ring from Poliochni and a small ring with overlapping ends beaten flat from Troy IIg. They are each unique finds at present and they are both separated from the appearance of signet-rings proper by at least two centuries and probably by as many as three or four centuries. It seems unlikely that they are in any way connected with the emergence of the signet-ring as a popular item in Middle Minoan Crete.

Seal Manufacture.

The five metal seals discussed in this paper show a remarkably wide range of manufacturing techniques. The most primitive is the Thermi seal, which could well have been made entirely by hammering a short bar of metal into the simple stamp shape required, and then very crudely decorated by cutting out the design with a graver. The Mallia gold seal was clearly hammered into shape from a thin ingot bar of gold, but the decorative design on its face was much more carefully incised, though still, one imagines, with a graver. The faces of the Poliochni and Naxos seals were cast, and we have earlier mentioned the existing moulds which could have been used to make bezels like that of the Poliochni seal-ring. The ring itself would have been hammered from a thin copper or bronze bar, and the bezel and ring would then have been joined — possibly by a primitive form of fusion welding, or by inserting the ready-fabricated ring into the back of the bezel casting the moment the metal was poured into the mould. The fifth seal, from Mochlos, looks very much as if it may have been cast in a closed cire-perdue mould, so that only a little smoothing and finishing would have been required. Although the technique was known in the Troad by the beginning of EB. 2, the earliest evidence for it in Crete is no earlier than EM.III and could be later. A date after EM.III however is quite in keeping with the design and the shape of this seal.

19 In Egypt the signet-ring, mainly in the form of a metal ring with a scarab, or scarab-like, bezel, first appears in the XII Dynasty. See Cairo Catalogue, Jewellery, No’s 52001-52639, pls. XXI-XXII.
20 C. Blegen Troy I (1950), fig. 358, 35-550.
Decorated Signet-Rings.

The signet-rings of the Late Bronze Age are well known for the elaborate decoration which they carry, usually in the form of a ritual or mythological scene. At what point the Minoan signets first began to be decorated in this manner is uncertain. No traces of decoration of any sort have been observed on any of the MM.I-II and MH signet-rings listed here, except for that from Agia Eirene. Xanthoudides could just make out the "figure of a quadruped" on the bezel of this ring. Unfortunately, although I have re-examined this piece I was unable to see any surviving traces of the design. Furthermore in this tomb there were some Late Minoan pieces in the covering soil in which the ring was found. The latest of the signet-rings listed below, those from Avgo, are unfortunately broken. In two cases the bezel has gone completely, but the method by which the bezels were fixed is a curious one for metal pieces. The ring has small prongs which project outwards and would have been fixed into the back of the bezel. On a third ring, the surviving oval of metal looks as if may not have been the bezel proper, but rather a metal mounting for a separate bezel. In the case of the three Avgo rings, the likelihood that the missing bezels were of bronze is suggested only by the existence of a fourth
ring, on which a metal bezel survives, held in place by two prongs which are inserted through it. In spite of this surviving example, one must stress that this is a most unusual method of manufacturing an all bronze signet-ring, and the method of joining ring and bezel is altogether more appropriate to the manufacture of rings with a bezel made of a non-metallic material. This practice, as we mentioned earlier, was known in Middle Kingdom Egypt and Middle Bronze Age Levant, where scarabs were mounted on rings. The Avgo rings cannot be earlier than MM.II, and the possibility that they owe something to Egyptian scarab-rings cannot therefore be ruled out, for Minoan contact with the east-Mediterranean grew rapidly in MM.II-III. Whether or not the idea of decorating the bezel, as well as one of the techniques of fixing it, was inspired from this direction is also open to question.

The fourth Avgo signet, which shows a tree flanked by two female figures (fig. 2), is clearly related to the fine Late Bronze Age signets, and Hastings, who published it, regarded it as a contemporary. There is very little in the little hoard of objects discovered at Avgo however to justify this date. The only items in the hoard which look as late as MM.III or possibly later are two rather plump figure-of-eight shield beads. An amygdaloid bead is not significant, for the shape is known by the end of EM.II. None of the metal objects — tweezers, hook-pins, scraper-pendant, knife-blade, razor — need be later than MM.I, and could be earlier. All on the other hand, could be of later date. The only two pieces in the hoard which can be dated with reasonable precision are the three-sided prism, which may be EM.III but is probably MM.I, and the small rock-crystal lentoid gem. This type, with ‘palace facade’ decoration of vertical and horizontal panels with a lattice-like centre panel, is well represented in the Phaistos archives of MM.III, and is reasonably well dated within this period. A date in MM.II-III for the Avgo hoard is therefore possible, if not probable, and the Avgo signet may be the earliest recognised example of the type which in the Late Bronze Age becomes such an important source of information on, and illustration of, Minoan and Mycenaean religion.

22 See Xanthoudides op. cit. pl. LVII, 476-477, and p. 111. These examples were found in the lower level of the tomb.
23 H.R. Hastings “A Bronze Age Pocket from Crete” AJA 9 (1905), figs. 3-5.
24 Hastings op. cit. n. 23, fig. 6, and p. 287.
Catalogue of Aegean Metal Seals and Signet-Rings of the Early and Middle Bronze Ages (measurements in cms).

Seals.

1. Silver signet seal, Mochlos Tomb XV. Ht: 1.7, Diam of face: 1.3. The face carries a design of an eight-petalled flower. R.B. Seager *Excavations on the Island of Mochlos* (1912) 66, fig. 35, XVh. Associations: MM.I-III?  

3. Bronze stamp seal, from Thermi. Ht: 2.2, Diam of face: 2.5. The face carries a design of a cross; in each quadrant is an irregular hole and three short incisions along the edge of the face. W. Lamb *Excavations at Thermi in Lesbos* (1936) 173, pl. XXV, fig. 50, No. 30.26. Associations: Unstratified.


5. Bronze seal-ring from insula XIV, Poliochni. Diameter of ring(int): 1.7, Face: 1.7 square. The face has a multiple, superimposed, cross-motif; as worn the arms of the cross would be vertical and horizontal, not diagonal. L.B. Brea *Poliochni, Città Preistorica nell’Isola di Lemnos* (1964) 663, pl. CLXX, 4 and CLXXV, 5. Associations: Poliochni ‘red’ phase: EB.2.


14. Silver ring from Krasi (N. Crete). No details of dimensions. An almost circular
bezel with no trace of decoration. S. Marinatos *Arch. Deltion* 12 (1929) 120-21, fig. 14,40. Associations: E.M.I-MM.I.

15. Bronze ring from Vorou, tomb A. No details of dimensions. An almost circular bezel with no trace of decoration. S. Marinatos *Arch. Deltion* 13 (1931), 165, fig. 27 top r. Associations: MM.I.

16. Bronze ring with sheet silver plating from Avgo. Diameter of ring(int): 1.4. The bezel has been lost, but was probably oval to judge from No's 18 and 19 below, and from the distance between the two points at which it was fixed to the ring. H.R. Hastings *AIA* 9 (1905), 279, pl. X, 14. Associations: MM.I-MM.III?

