

CANADIAN THESES ON MICROFICHE

I.S.B.N.

THESES CANADIENNES SUR MICROFICHE



National Library of Canada
Collections Development Branch

Canadian Theses on
Microfiche Service

Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada
Direction du développement des collections

Service des thèses canadiennes
sur microfiche

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C., 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage: Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS RECUE

A Catalogue of Ship Representations on
Seals and Sealings from the
Bronze Age Aegean

Mark B. Garrison
Department of Classical Studies
University of Ottawa

February 1981
Ottawa,
Ontario

Thesis presented to the School of Graduate Studies,
University of Ottawa in fulfillment of requirements
for a Master of Arts Degree.

© M.B. Garrison, Ottawa, Canada, 1982

Underlined provenience and date in the catalogue denote that this information is secured through a documented archaeological excavation.

ACKNOWLEDGEMENTS

I here take the opportunity to thank the many people who made this research possible. Dr. Edmund Bloedow kindly offered his services as thesis advisor for which I am grateful. Dr. Demitrios Schilardi provided valuable assistance while I was in Athens in the summer of 1980. So, too, while in Athens, the American School of Classical Studies kindly gave me permission to use their library. Paul Johnson at the University of Pennsylvania was very helpful in matters of ancient seafaring as a whole. The staff of the Inter-Library Loan at the University of Ottawa was most courteous, even when I taxed their services to the maximum. The students of the Department of Classical Studies at the University of Ottawa were a constant source of help and encouragement. I should like to thank especially James Gallagher, who assisted with some of the Italian material, and David and Susan Dorken, who opened their home to me in the latter stages of my stay in Ottawa. Joe Woelke kindly took time to assist in proof-reading the manuscript. For financial assistance I am greatly indebted to the Department of Classical Studies and to the School of Graduate Studies at the University of Ottawa and to the Government of Ontario. My deepest thanks go to my wife, Susan, who typed two drafts of the manuscript and who provided, even under difficult circumstances, enthusiastic support. The final draft of the manuscript was done by Mrs. Joan Drumright, for which I am very grateful.

ILLUSTRATION SOURCES

1. Marinatos (1933) pl. 15 (no. 32).
2. Marinatos (1933) pl. 15 (no. 31).
3. Marinatos (1933) pl. 15 (no. 29).
4. Marinatos (1933) pl. 15 (no. 30).
5. Gray (1974) 41, fig. 6 (d).
6. Gray (1974) 41, fig. 6 (c).
7. Marinatos (1933) pl. 15 (no. 36).
8. Gray (1974) 41, fig. 6 (h).
9. Demargne (1939) 122, fig. 1.
10. Marinatos (1933) pl. 15 (no. 28).
11. Marinatos (1933) pl. 15 (no. 34).
12. Gray (1974) 41, fig. 6 (i).
13. Platon et alii (1977) 130 (no. 100, a).
14. Gray (1974) 41, fig. 6 (j).
15. Reich (1968) 455, fig. 6 (right).
16. Platon et alii (1977) 220 (no. 163, c).
17. Platon et alii (1977) 240 (no. 177, b).
18. Platon et alii (1977) 267 (no. 195, c).
19. Marinatos (1933) 235 fig. 16.
20. By the author after Kenna (1960) pl. 4 (no. 66).
21. Kenna (1967) 318 (no. 254, a).
22. Gray (1974) 41, fig. 6 (m).
23. Marinatos (1933) pl. 15 (no. 35).
24. Marinatos (1933) pl. 15 (no. 37).
25. Casson (1971) fig. 48.
26. Evans (1935) 717, fig. 702.

27. Gray (1974) 42, fig. 7.
29. By Susan Garrison after Xénaki-Sakellariou (1958a) pl. 22 (no. 184).
30. Kenna and Thomas (1974) 16 (no. 14).
31. Kenna and Thomas (1974) 104 (no. 90, a).
32. Gray (1974) 41, fig. 6 (p).
34. Marinatos (1933) pl. 16 (no. 52).
35. Evans (1935) 952, fig. 920.
36. Brown (1978) 637, fig. 22.
37. Casson (1971) fig. 53.
38. Casson (1971) fig. 52.
39. Marinatos (1933) pl. 15 (no. 40).
40. Gray (1974) 41, fig. 6 (l).
41. Pini (1975) 142 (no. 184, b).
42. By Susan Garrison after Betts (1980) 201 (no. 227).
43. Gray (1974) 45, fig. 9 (e).
44. By Susan Garrison after Betts (1980) 125 (no. 100).
45. Gray (1974) 45, fig. 9 (h).
46. Marinatos (1933) pl. 16 (no. 45).
47. By the author after Kenna (1960) pl. 10 (no. 241).
48. By Susan Garrison after Xénaki-Sakellariou (1958a) pl. 27 (no. 339).
49. Marinatos (1933) pl. 16 (no. 44).
50. Kenna (1966) 191 (no. 139).
51. By Susan Garrison after Betts (1980) 132 (no. 110, b).
52. Kenna and Sakellarakis (1969) 258 (no. 227).
53. By Susan Garrison after Betts (1980) 124 (no. 99).
54. Casson (1971) fig. 45.

55. Kenna (1972) 318 (no. 224).
56. Marinatos (1933) pl. 15 (no. 43).
47. Marinatos (1933) pl. 16 (no. 47).
58. By the author after Kenna (1960) pl. 11 (no. 288).
59. By Susan Garrison after Xénaki-Sakellariou (1958a) pl. 27 (no. 340).
60. van Effenterre and van Effenterre (1972) 140 (no. 116).
61. Pini (1975) 137 (no. 177).
62. Pini (1975) 168 (no. 213, a).
63. By Susan Garrison after Betts (1980) 203 (no. 229, a).
64. Marinatos (1933) pl. 16 (no. 49).
65. Kenna and Thomas (1974) 68 (no. 66).
66. Marinatos (1933) pl. 16 (no. 50).
67. Casson (1971) fig. 44.
68. Marinatos (1933) pl. 16 (no. 46).
69. van Effenterre and van Effenterre (1972) 117 (no. 92).
70. By Susan Garrison after Betts (1980) 257 (no. 290).
71. Kenna and Sakellarakis (1969) 238 (no. 208).
72. Gray (1974) 45, fig. 9 (d).
73. Marinatos (1933) pl. 15 (no. 42).
74. Gray (1974) 45, fig. 9 (i).
76. Marinatos (1933) pl. 16 (no. 56).
77. Marinatos (1933) pl. 16 (no. 58).
- 78(?). By Susan Garrison after Xénaki-Sakellariou (1958a) pl. 18 (no. 79a).
- 79(?). Platon et alii (1977) 194 (no. 147, b).
- 80(?). Platon et alii (1977) 265 (no. 194, b).
- 81(?). Pini (1970) 207 (no. 245).

- 82(?). Evans (1909) 159 (no. P.49*, c).
- 83(?). Marinatos (1933) pl. 15 (no. 41).
- 84(?). Marinatos (1933) pl. 16 (no. 53).
- 85(?). van Effenterre and van Effenterre (1972) 110
(no. 88, c).
- 86(?). By Susan Garrison after Betts (1980) 247 (no. 276).
- 87(?). Kenna (1966) 74 (no. 55).
- 88(?). Kenna (1966) 84 (no. 64).
- 89(?). Kenna (1966) 95 (no. 74).
- 90(?). Marinatos (1933) pl. 16 (no. 48).
- 91(?). Betts (1973) 329, fig. 8.
- 92a(?). Betts (1968) pl. 61, fig. 3.
- 92b(?). Betts (1968) pl. 61, fig. 2.
- 92c(?). Betts (1968) pl. 61, fig. 1.
- (93). Kenna and Thomas (1974) 170 (no. 15D, a).
- (94). Casson (1971) fig. 51.

Bibliographical Abbreviations

All abbreviations for periodical titles used in the bibliography are taken from The American Journal of Archaeology 81, 1978, 3-10. Those which do not appear in AJA 81 or those which differ from that list are found below.

- AM: Mitteilungen des Deutschen Archaeologischen Instituts, Athenische Abteilung.
- CMS: Corpus der Minoischen und Mykenischen Siegel.
- CW: Classical World.
- IJNA: International Journal of Nautical Archaeology and Underwater Exploration.
- MM: Mariner's Mirror.

Technical Abbreviations

The measurements of seals are taken from the stone itself, not just the engraved surface.

- D.: the greatest measurement from the center of the engraved surface of the stone to a point directly opposite it.
- H.: height of the seal stone as measured along the vertical axis of the engraved surface.
- L.: length of the seal stone as measured along the horizontal axis of the engraved surface.
- SH.: diameter of the string hole.

Chronological Abbreviations

The following chronological divisions are not prejudiced as to absolute chronology.

Crete:

EM: Early Minoan
MM: Middle Minoan
LM: Late Minoan

Mainland Greece:

EH: Early Helladic
MH: Middle Helladic
LH: Late Helladic

x

TABLE OF CONTENTS

	Pages
Acknowledgements	ii
Illustration Sources	iii - vi
Abbreviations	vii - ix
Chapter I. Introduction.	1 - 14
Chapter II. Realistic Ship Representations.	15 - 79
Chapter III. Abstract Ship Representations.	80 - 129
Chapter IV. Summary and Conclusions.	130 - 140
Appendix I. Ship Representations on Rings.	141 - 144
Appendix II. Questionable Ship Representations.	145 - 159
Appendix III. <u>Gemmae Dubitandae</u>	160 - 162
Appendix IV. Concordance of Catalogue Numbers.	163 - 167
Appendix V. Seal Shapes (after Sakellarakis and Kenna [1969] 425).	168
Appendix VI. Nautical Terms.	169 - 171
Illustrations	172 - 184
Bibliography	185 - 195

Chapter I

Introduction

The aim of the present study is to provide a collection of the ship representations on seals and sealings from the Aegean Bronze Age. To achieve this end the material has been organized in a catalogue format, with discussions at the end of each of the two main catalogue sections: realistic ship representations and abstract ship representations (see below pp. 6-7). At the ends of these two catalogue sections the relevant material is presented in tabular form and analysed, in an attempt to discern major trends and conventions in the manner in which the Aegean Bronze Age gem engraver represented ships. The final chapter contains a brief discussion of possible relations between the two principal types of ship representations.

Ship representations on seals and sealings have been discussed in connection with the question of Aegean Bronze Age ship representations as presented in all media.¹ Two scholars have previously compiled catalogues of Bronze Age ship representations. The pioneer work of Marinatos (1933) contained many speculative reconstructions and much unsupported theory and is now almost fifty years out of date.²

1. Over one-third of the evidence is found on seals and sealings.

2. Marinatos (1933) 185-191, 212-221 (five classes of hull types), 186-188 (direction of writing rule), 194-195 (three types of decks), 198-200 (special place of ten-oared vessels, especially original arguments) and 204-205 (two "demi-voiles" preferred over one large sail).

The other catalogue, that of Gray (1974), was published ten years after the manuscript was written, resulting inevitably in obsolescence. The editors attempted to update the catalogue, but there are important omissions.³ Miss Gray's catalogue itself gives only the most limited information about each representation, and in most cases there is no description of the ship. The result is that the reader has no way of knowing details of the representation (or even general outlines) and is further hampered by the fact that Miss Gray made constant reference in her short text to material which she does not illustrate. Gray's brief treatment of the Bronze Age material was no doubt in part determined by the fact that it was subsidiary to the main thrust of her study, which was a discussion of the evidence of the Homeric poems.

Neither study gives much attention to the evidence of ship representatives on seals and sealings; certainly there is no detailed treatment in which the evidence is compiled and presented in a coherent form. This comment applies also to other works which have addressed the question of Bronze Age ship representations. More often scholars have treated this subject in a summary fashion, publishing only the standard illustrations and making widespread conclusions for the whole of the period. Scholars appear to have been concerned chiefly with the question of whether the higher end of the

3. The manuscript was written in 1964, published (unchanged) in 1974. The editors did add a few footnotes and updated the bibliography, but the new footnotes only added confusion, while the bibliography served only to point out the many important works published after 1964 and not referred to in the text.

ship representation is the prow or the stern of the ship. There is still no consensus on this matter.⁴

Two further works merit particular attention, since both address directly (although briefly) the question of ship representations on seals: Betts (1973) and van Effenterre (1978). Betts (1973) dealt chiefly with the so-called "talismanic" ship representations (the abstract catalogue section in this work). He classified these representations into two types, whole ship representations and half ship representations (i.e., those showing only one end of the ship).⁵ More important, he concluded that almost "all the ships occur on Middle Minoan I-II three-sided prisms (the "realistic" ships here) and on Middle Minoan III-Late Minoan I talismanic gems. Neither type had much sphragistic use. Both had an amuletic

4. Marinatos (1933) 191, accepted, for the most part, a high stern, although he did allow that the prow could be the higher end on some ships (see Marinatos [1973a] 290, for an apparent reversal). Gray (1974) 75-81, also opted for a high stern. Passing references to "high prow" or "high stern" can be found in many handbooks on the Aegean Bronze Age. Among the scholars who have devoted time to the subject of Aegean Bronze Age ship representations, the following have held the high stern theory: Köster (1923) 58-60; Miltner (1931) 906; Février (1935) 109-115; Kirk (1949) 125-127, 133, 134-135; Landström (1961) 26-27; Dumas (1971) 287-290; Morrison (1972) 230. Those holding the high prow theory include: Behn (1927-1928) 240; Cohen (1938) 489-490; Barnett (1958) 224; Casson (1971) 31, 41-42. Johnstone (1973) 6-10, concluded that no provable conclusion is possible based on the evidence as known.

5. Betts (1973) 331-334. This includes some possible interpretations of the objects above the hulls on the "talismanic" ship representations.

function" (parenthesis mine).⁶ This led to his final conclusion that almost all ship representations in Minoan art "have some kind of symbolic, semi-religious or occult significance."⁷ The evidence does not seem to support this conclusion.

The very brief work of van Effenterre (1978) was an attempt to correlate the ships found on the wall-paintings from Thera with ship representations on seals. Based on the Thera wall-paintings, van Effenterre interpreted the network design shown above the hull on many of the abstract ship representations (i.e., our Motifs 2, 2a and 2b, catalogue nos. 46-62) as a stern canopy.⁸ She further suggested that if only a part of the ship is shown, it is always the prow and it always has "three elements which seem to symbolize the whole ship in Minoan glyptic," i.e.: curved hull, high-hooked prow and a stern canopy.⁹ One wonders whether these three elements do in fact symbolize the whole ship in Minoan glyptic; certainly not all abstract half ship representations have all three features. An even more curious consideration is that if these half ship representations show the prow, why is the "canopy" shown suppose to be the stern?

6. Betts (1973) 334. See the discussion below on "talismanic" seals, pp. 6-7.

7. Betts (1973) 334.

8. van Effenterre (1978) 595-596.

9. van Effenterre (1978) 596.

There is no question that the ~~Thera~~ ships are by far the most detailed representations known of ships from the Bronze Age Aegean. There are, however, important problems affecting the interpretation of the Thera ship representations. The prows can be interpreted as higher than the sterns if one takes the bowsprits as part of the prow. Some scholars accept the bowsprit as part of the prow, others do not. The extreme slenderness of these "bowsprits" seems to this writer to make it virtually certain that they are ornamental, not structural; and that they are non-functional.¹⁰ Especially difficult to explain are the purpose of the extension on the sterns of some of the ships and the fact that some ships are being paddled (and awkwardly so), not rowed.

One must consider that the Thera ships are an isolated phenomenon. There are to date no other ships found in wall-paintings or other monumental art.¹¹ Until we have more representations that can appropriately be compared with the Thera material, it would seem safe not to rely on far-reaching conclusions based upon the Thera evidence concerning ship representations in other artistic media.

One is immediately struck by the difference in size

10. For a high prow see Casson (1975) 7-8; Brown (1977) 144; (1978) 632. For a high stern see Gillmer (1978) 128-129, figs. 1, 3; Marinatos (1973a) 290-291; (1974a) 145.

11. The possible ship on the famous sarcophagus from Agia Triada could be considered as an exception to this statement. Even if it is a ship, it most certainly is a model (a death gift?) and not a representation of a functional ship. For the sarcophagus from Agia Triada see (among many places) Marinatos and Hirmer (1960) 40, 61-62, pls. 17, 29 (A).

between the Thera ships and those found on seals and sealings. The one completely preserved craft of the larger Thera ships measures sixty-two centimeters in length. This in comparison to ships on seals whose size is often no bigger than a human fingernail. The inherent difficulties of engraving a design (with Bronze Age tools and technology) on such a small object are considerable: the actual process of engraving the stone and seeing what one was doing, without the aid of magnification, must have been extremely difficult.¹² The conventions forced upon the seal engraver by the small size of his gem cannot be the same as those used by the artist painting on a wall, at about sixty times the scale.

Our catalogue has been organized in the following manner. The representations have been divided into two categories: realistic and abstract. The classification of a representation into one category or the other has not been wholly arbitrary. Those representations collected under the abstract category are on those gems which have been classed by some scholars as "talismanic" in character.¹³ Although some of the representations in the realistic category are abstract (e.g., nos. 8, 22, 31), they have been kept in the realistic category because they do not exhibit the criteria set up by certain scholars for

12. See Boardman (1970) 382, for lack of magnification in the Bronze Age.

13. See especially Kenna (1960) 1-2, 44-45, 68-69, 113-116; (1969) 9-11, 26-33; Betts (1973) 330-331.

their "talismanic" group. These are specifically: (1) rare sphragistic use; (2) shape - the amygdaloid, along with three-sided prisms with amygdaloid faces; (3) material - red carnelian the most popular, with green jasper a distant second; (4) schematic motifs and perhaps even the consistent style of the engraving.

The division into two broad groups holds good, even though the assumptions underlying the adoption of the terms "talisman" and "talismanic" must be rejected. Both terms suggest that we know that certain seals were used for specific non-sphragistic applications; but there is no evidence to support this. Arguments from negative evidence (e.g., that very few seal impressions have been found from "talismanic" gems) are always dangerous.¹⁴ It is better simply to admit that these gems have abstract motifs, for which there is no better explanation at this time than that they are conventions used by the gem engraver and that they are at least in part due to the inherent limitations of the glyptic technique. This last point is especially important, for the small size of the gem limits what the gem engraver is able to do, and that in turn limits what interpretations we are able to draw today, both of a gem's motif and of its use.¹⁵

14. See Boardman (1970) 42, for the lack of seal impressions from "talismanic" gems.

15. For a balanced treatment of the "talismanic" gems, see Boardman (1970) 42-46.

Unfortunately, the dating of Aegean Bronze Age gems is still a major difficulty. Seals, unlike pottery, tend to remain in use over a long period. Pottery styles can change quickly and older vases can be quickly discarded, ensuring reasonable reliability of dating based on this criterion. This, unfortunately, is not the case for seals; the useful life of a seal can extend through several generations. Reasons for this are fairly practical. First is the cost factor: The engraving of gems is a specialized art, requiring years of training and specialized tools. It is natural to assume that the gem engraver did not work for nothing. Once the seal was acquired, it was then generally used for a specific purpose: to show ownership (but see pp. 6-7 for possible uses of "talismanic" seals). The idea of ownership suggests the second reason for the more permanent nature of seals. Once a person has acquired his "mark of ownership," it is not likely that he will abandon it. Third, as a result of this idea of ownership, the seal may acquire a special significance as the identification of the owner. It becomes a personal thing, an heirloom, which could be expected to be passed on in the family from generation to generation.

Because of these three considerations, a seal found even in a closely datable deposit may well be considerably older than its dated context. A securely documented and dated find context is rare, however, apart from recent excavations. A further hindrance to seal dating is their

9

size. The small size of the seal lends itself easily to transportation. This may explain partially why seals, probably more than any other type of artifact from antiquity, have become prized items for collectors, both ancient and modern, and dealers, both legitimate and illicit. Once a seal enters the antiquities market, its particulars (e.g., provenience, date, etc.) are usually forgotten and/or new ones fabricated.

Organization of Catalogue

All catalogue entries follow a uniform format: current location, provenience (these are conventional and self-explanatory) and date are the first three headings. The fourth heading is reserved for the CMS number. The Corpus der Minoischen und Mykenischen Siegel, a useful tool in the organization of Minoan and Mycenaean seals and sealings, is now approximately half complete. Eight volumes are complete; parts of two other volumes have been published. Five volumes have yet to appear.¹⁶ Unfortunately,

16. Complete CMS volumes: IV (Iraklion, Metaxas Collection), V:1 and 2 (Smaller Greek Collections), VII (English Museums except the Ashmolean), VIII (Private English Collections), IX (Bibliothèque Nationale Paris, Cabinet des Médailles), X (Swiss Collections), XII (New York, Metropolitan Museum of Art) and XIII (Smaller North American Collections). Incomplete CMS volumes: I (Athens, National Museum), II:1 (Iraklion, Archaeological Museum, Pre-Palatial seals), II:2 (Iraklion, Archaeological Museum, Old-Palatial seals) and II:5 (Iraklion, Archaeological Museum, seal impressions from Phaistos). Partial CMS volumes announced, not yet published: I: Suppl. (Athens, National Museum), II:3 (Iraklion, Archaeological Museum, Neo-Palatial Seals), II:4 (Iraklion, Archaeological Museum, Post-Palatial seals), II:6 (Iraklion, Archaeological Museum, seal impressions from Hagia Triada and Zakro) and

the volumes which have yet to be published contain the bulk of the material from the Archaeological Museum in Iraklion and all of the material from the Ashmolean Museum in Oxford. Each of these museums contains a large number of the ship representations on seals. One is thus forced to search for details concerning these seals in assorted publications, with all the problems that entails.

The three following catalogue headings are seal type (i.e., the seal shape and material; if the stone is damaged it is noted at this point in the catalogue); measurements (see p. viii) and bibliography. The references in the catalogue bibliographies to Marinatos (1933) and Gray (1974) are to the principal entries, i.e., those where the representation is catalogued and illustrated. Complete references to these two works for each catalogue entry and a concordance of the catalogue numbers found here and in those two studies are in Appendix IV.

Description contains a slightly different format in the two catalogue sections. It is convenient here to divide the two sections and discuss them separately to explain how the representations are arranged in each section, and to clarify differences in the descriptive format.

Realistic Ship Representations

The realistic ship representations are arranged

II:7 (Iraklion, Archaeological Museum, seal impressions from Knossos and the remaining Cretan sites). CMS volumes yet to be published: III (Iraklion, Giamalakis Collection), VI (Oxford, Ashmolean Museum), XI (Smaller European Collections), XIV (Cyprus and the Eastern Mediterranean) and XV (Typology).

chronologically. Because of the difficulties discussed above in relation to the dating of Bronze Age seals, it is not surprising that many gems can be dated only within a broad period. If a gem is dated within two periods (e.g., MM II-MM III), it is always catalogued with material from the later period. Those gems which can be dated only within a very broad period (e.g., MM or LM) are always placed at the end of the catalogue section covering that period.

Under the description heading there is given for each entry (except where the author has seen no illustration and no description is available) a detailed description of the ship representation. This is subdivided into six sub-headings: hull, terminal ornament, oars, mast, rigging and sail. A seventh division covers objects in the field. A few representations have another sub-heading for steering gear, which is placed after the sub-heading for oars. At the end of some of the catalogue entries which concern more complex ship representations, there is a short interpretative passage, where important features are noted and interpretations offered. Nautical vocabulary has been kept to a minimum, although the reader may find useful the nautical vocabulary in Appendix VI.

Abstract Ship Representations

For the abstract ship representations, the ordering of the catalogue entries is not chronological. All of the seals in this section are dated within part or all of the LM/LH .

periods. Many are dated within LMI or one of its subdivisions. Since the chronological span is relatively short, it seemed more informative to group these representations by their most noticeable feature: the objects above the hull. To this extent there are five motif groupings, with Motifs 2 and 3 having sub-groups (e.g., Motif 2a, 2b, etc.).

The abstract ship representations required additional sub-headings for the descriptive section: hull, hull decoration, terminal ornament, oars, mast, rigging, sail, above hull and field. Hull decoration is reserved for markings and longitudinal divisions on the hull. Above hull deals with the sometimes rather complex elements which appear to be standing above the hulls of some of the ships.

For all sections of the catalogue a broken line after the CMS number denotes that the seal or sealing has yet to be published in the CMS series. A broken line after any other heading in the catalogue denotes that the relevant information was not available.

Each drawing in the back of the text bears the number of the catalogue entry which it illustrates. If a ship representation is not illustrated (nos. 28, 33 and 75), an asterisk appears next to the catalogue number in the text. Most of the illustrations are line drawings taken from modern impressions of the seals. Eight are drawings taken from ancient impressions: no. 26, 35, 37, 38, 81(?), 84(?).

91(?) and 92(?).¹⁷ Four illustrations are modern line drawings of the engraving on the seal: nos. 15, 24, 28 and 74. This fact is noted for these four seals in the text and their illustration numbers are underlined in the illustrations. This is important, for the viewing of engraved gems, in antiquity and now, was normally from the impression, not the seal. This seems only natural, since this is what the artist intended to show. This assumes, however, that the artist, when copying his model, understood that to achieve an impression which was turned the same way as his model, he would have to engrave his object on the seal stone as a mirror reflection (i.e., reversed right to left on his gem). This does not seem unlikely, since the seal engraver, at an early experimental stage of the glyptic medium, would notice that to get his impression the right way around, his engraving on the seal had to be left-right reversed.¹⁸

It should be noted that the illustrations have not been reproduced to uniform scale.

17. The question marks in parenthesis after some of these catalogue numbers denotes that they are catalogued in Appendix II under those representations which some scholars have interpreted as ships, but which may not be ships.

18. See Boardman (1970) 10, 382. The right-handedness of an impression is not always easy to discern. The two gold rings with warrior scenes from the Shaft Graves at Mycenae may have left-handed warriors. It is difficult, however, to discern if the body trunks of the warriors are the back or the front. So, too, one wonders if these rings were seals, or rings in the sense as we today understand them. In addition, some artist may have been less competent than others.

At the end of each of the two main catalogue sections the evidence is examined (in tabular form) in an attempt to discern trends and conventions. The final chapter is devoted to a brief comparison of the two types of ship representations and suggestions for further research.

There are six appendices. The first catalogues the two ship representations on gold seal rings; the second is a catalogue of seals which some scholars have interpreted as showing ships, but which are so questionable they are better relegated to an appendix. The third appendix lists the ship representations on gems thought to be forgeries. There are three further appendices (see Contents p. x).

The student of nautical archaeology and early Aegean seafaring may find this catalogue useful. The lack of an even partially preserved ship from the Bronze Age Aegean forces one to turn to representations of ships in various artistic media.¹⁹ In this respect the ship representations on seals and sealings constitute the largest group of ship representations from the Bronze Age Aegean. While many of the ship representations are undeniably crude, they do give us a glimpse of possible details of hull outline and rigging; and some seals preserve surprisingly complex representations considering the small size of the seal.

19. The wood from the Cape Gelidonya wreck (probably not even Aegean) may not even be from the hull; see Bass (1967) 48-49.

Chapter II

Realistic Ship Representations

Middle Bronze Age

1.

Current location: Iraklion, Archaeological
Museum #588.

Provenience: Andromyloi. Platon et alii (1977)
369, 387, noted that the seal was bought in
Andromyloi (probably by Bosanquet), but that
the inventory book of the museum cites that
it came from the British School excavation
at Palaikastro.

Date: EM III-MM I.

CMS number: CMS II:2; no. 276 (b).

Seal type: three-sided prism of black steatite
with yellow spots. One edge is slightly
damaged.

Measurements: L.-1.7; H.-1.1 (each face).

Bibliography: Alexiou (1972) 91 n.1.
Brown (1978) 632, 635, fig. 11.
Casson (1971) 33, fig. 36.
Cohen (1938) 487.
Davaras (1976) 287, fig. 163.
Demargne (1964) ill. 144.
Eccles (1939-1940) 44 (no. 5),
45, fig. 12.
Février (1935) 111-112, 113, 114,
pl. 3 (no. 32).
(1949-1950) 129.
Gray (1974) 15 (no. A 7), 41,
fig. 6 (b).
Hutchinson (1962) 93-94, fig. 15
(left).
Kirk (1949) 126.
Laviosa (1969-1970) 17-18, fig. 10
(no. 32), 19.
Marinatos (1933) 176 (no. 32),
pls. 15 (no. 32), 17 (no. 32).
Mosso (1910) fig. 160 (no. 1).
Paglieri (1960) 213, fig. 3 (no. 32).
Platon et alii (1977) 369, 387,
410-411 (no. 276, b).
Renfrew (1972) 357.
Wachsmann (1977) 266-267.
Zervos (1956) 232, pl. 306 (b).

Description:

Hull: angular; horizontal amidships angling upwards at the left (at about forty-five degrees) for a short distance into a bifurcation. Right end angled upwards (between forty-five and sixty degrees) in a long extension, bifurcated at the top. One long, horizontal mark and four dots on the hull. Right end higher.

Terminal ornament: each end bifurcated. The left prong of the bifurcation on the right end is set perpendicular to the right prong.

Oars: five, pointing down towards the lower (left) end.

Mast: amidships. Top may be missing because of damage.

Rigging: three stays to the right and three stays to the left of the mast run down towards the hull (see below and n.1).

Sail: none.

Field: vegetation spray (?) to right of ship (cf. no. 24).

The three ridges on each side of the mast are probably stays.¹ Ridges in similar positions on the rest of the examples in this section of the catalogue will be taken as stays hereafter.

2.

Current location: Iraklion, Archaeological Museum
#566.

Provenience: Palaikastro, House B (in a mud
plaster wall), Courtyard B11.

Date: EM III-MM I.

CMS number: CMS II:2, no. 261 (b).

1. All commentators have taken them as such.

Seal type: three-sided prism of deep olive-green steatite. One corner of the seal is missing.

Measurements: L.-1.5; H-0.9 (each face).

Bibliography: Davaras (1976) 287, fig. 163.
 Demargne (1964) 113, fig. 144.
 Eccles (1939-1940) 44 (no. 4),
 45, fig. 1 (a).
 Février (1935) 111-112, 113.
 Gray (1974) 14 (no. A 6), 41, fig.
 6 (a).
 Kenna (1960) 21 n.4, 31.
 Laviosa (1969-1970) 17-18, fig. 10
 (no. 31), 19.
 Marinatos (1933) 175-176 (no. 31),
 pls. 15 (no. 31), 17 (no. 31).
 Mosso (1910) fig. 160 (no. 2).
 Paglieri (1960) 213, fig. 3 (no. 31).
 Platon et alii (1977) 377-378
 (no. 261, b).
 Zervos (1956) 178, fig. 207 (b).

Description:

Hull: left end missing because of damage to seal. Center of the hull fairly horizontal and deep. Right end curves upwards steeply into bifurcation.

Terminal ornament: right end bifurcated. Left may have a diagonal extension.

Oars: five, pointing down towards the left end.

Mast: amidships.

Rigging: two stays to the left and two stays to the right of the mast.

Field: below right end a vegetation spray (?) with fronds (?) emerging only to the right (cf. nos. 5 and 6). Above (perhaps on) the left end of the ship, a pointed object set point-down (cf. nos. 4 and 21).

3.

Current location: Oxford, Ashmolean Museum #1938.-
 757 (Evans Collection).

Provenience: East central Crete (cf. Evans [1921] 120-121. Note, however, that Buchholz and Karageorghis and also Gray said that the origin is unknown).

Date: EM III-MM(?).

CMS number: -----.

Seal type: three-sided prism of white steatite.

Measurements: L.-1.4; H.-1.0 (each face); SH.-0.3.

Bibliography: Betts (1973) 327.
 Buchholz and Karageorghis (1971) 113 (fig. 38, no. 1366), 114 (no. 1366).
 Buck (1962) 134.
 Casson (1971) 33, fig. 35.
 Cohen (1938) 486, 489 ns. 3 and 7.
 Evans (1921) 120-121, fig. 89 (b).
 _____ (1925) 8-9, fig. 6 (b).
 _____ (1928) 239-240, fig. 136(b).
 _____ (1935) 520, fig. 462 (b).
 Février (1935) 111-112, 113, pl. 3 (no. 29).
 Gray (1974) 15 (no. A 8), 41, fig. 6 (e).
 Hood (1971) 126, pl. 106.
 Kenna (1960) 94 (no. 50), pl. 3 (no. 50), ill. K50.
 Landström (1961) 26-27, figs. 45-46 (a reconstruction).
 Laviosa (1969-1970) 17-18 (fig. 10), 19.
 Marinatos (1933) 175 (no. 29), pl. 15 (no. 29).
 Paglieri (1960) 213, fig. 3 (no. 29).
 Sakellariou (1971) 13.

Description:

Hull: part of the hull to the left may not be preserved because of damage to the engraved surface. Top hull line curves upwards sharply to the left, then runs down vertically almost joining the bottom hull line. Bottom hull line appears to curve upwards slightly to the left into a projection. Hull to the right curves upwards abruptly into a point. Ends of equal heights.

Terminal ornament: left end pointed. Right end pointed; short extensions above and below right end making a trifoliate design.

Oars: none.

Mast: right of amidships.

Rigging: three stays to the right and three stays to the left of the mast.

Sail: none.

Field: one other ship (no. 4) below.

Comparanda: no. 4, perhaps no. 10.

4.

Current location: Oxford, Ashmolean Museum
#1938.757 (Evans Collection).

Provenience: East Central Crete? See on no. 3.

Date: EM III-MM (?).

CMS number: -----.

Seal type: three-sided prism of white steatite.

Measurements: L.-1.4; H.-1.0 (each face); SH.-0.3.

Bibliography: Betts (1973) 327.
Buchholz and Karageorghis (1971) 113-
(fig. 38, no. 1366), 114 (no. 1366).
Buck (1962) 134.
Casson (1971) 33, fig. 35.
Cohen (1938) 486, 489 ns. 3 and 7.
Evans (1921) 120-121, fig. 89 (b).
_____ (1925) 8-9, fig. 6 (b).
_____ (1928) 239-240, fig. 136 (b).
_____ (1935) 520, fig. 462 (b).
Février (1935) 111-112, 113, pl. 3
(no. 30).
Gray (1974) 15 (no. A 8), 41, fig. 6
(e).
Hood (1971) 126, pl. 106.
Kenna (1960) 94 (no. 50), pl. 3 (no.
50), ill. K50.
Landström (1961) 26-27, figs. 45-46
(a reconstruction).
Laviosa (1969-1970) 17-18 (fig. 10),
19.
Marinatos (1933) 175 (no. 30), pl. 15
(no. 30).
Paglieri (1960) 213, fig. 3 (no. 30).
Sakellariou (1971) 13.

Description:

Hull: top hull line to the left not preserved because of damage to the engraved surface. Bottom hull line curves upwards slightly to the left into a short projection. Vertical termination on left end. Right end curves upwards abruptly into a point. Right end higher.

Terminal ornament: left end not completely preserved. Right end pointed; short extensions above and below right end making a trifoliate design.

Oars: none.

Mast: right of amidships.

Rigging: two stays to the right and three to the left of the mast. The bottoms of the three stays to the left of the mast are defaced by a blemish in the stone.

Sail: none.

Field: one other ship (no. 3) above. Vertical mark above left end (cf. nos. 2 and 21[?]).

Comparanda: no. 3, perhaps no. 10.

5.

Current location: Iraklion, Giamalakis Collection
#3043.

Provenience: Mallia.

Date: EM III-MM I.

CMS number: -----.

Seal type: three-sided prism (oval faces) of steatite.

Measurements: L.-1.7; H.-1.0 (each face).

Bibliography: Casson (1971) 40.
Gray (1974) 15 (no. A 10), 41,
fig. 6 (d).
Laviosa (1969-1970) 19.
Xénaki-Sakellariou (1958a) 14 (no. 81a),
78-79, pl. 18 (no. 81a).

Description:

Hull: curved upwards slightly to the left into a bifurcation. Right end curved upwards more sharply into a point. Right end higher.

Terminal ornament: left end bifurcated. Right end pointed; short extensions above and below right end making a trifoliate design.

Oars: five, pointing down towards the lower (left) end.

Mast: amidships.

Rigging: three stays to the right and three (?) stays to the left of the mast.

Sail: none.

Field: scratches above and below hull. There may be a vegetation spray (?) with fronds (?) emerging only to the right below the right end (cf. nos. 2 and 6).

6.

Current location: Oxford, Ashmolean Museum
#1938.761.

Provenience: Mallia.

Date: EM-MM.

CMS number: -----.

Seal type: three-sided prism of white steatite. A line is engraved round the ends of the stone following the three faces. Kenna noted that the stone is fractured and appears to have been subjected to great heat. Boardman classified it among his "Archaic Prisms II."

Measurements: L.-1.7; H.-1.1 (each face); SH.-0.2.

Bibliography: Betts (1973) 327, fig. 3.
Boardman (1970) 28-29, pl. 11 (upper).
Gray (1974) 15 (no. A 9), 41, fig. 6
(c).
Kenna (1960) 94 (no. 49), pl. 3
(no. 49), ill. K49.

Description:

Hull: left end appears to be omitted. Hull evenly

curved amidships, curving upwards abruptly to the right into a point. Right end higher.

Terminal ornament: short extensions above and below the right end making a trifoliate design.

Oars: eight, pointing down towards the lower (left) end.

Mast: amidships.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: none.

Field: below right end a vegetation spray (?) with fronds (?) emerging only to right (cf. nos. 2 and 5).

7.

Current location: *Oxford, Ashmolean Museum
#1941.86.

Provenience: Mallia.

Date: EM-MM.

CMS number: -----.

Seal type: three-sided prism of black steatite.
Kenna remarked that the stone is badly worn, but that it has vestiges of a fine style.

Measurements: L.-1.4; H.-0.9 (each face);
SH.-0.3.

Bibliography: Behn (1927-1928) pl. 62c (a, right).
Buck (1962) 134.
Casson (1971) 40.
Cohen (1938) 487, 490, 491, fig. 7
(a, right).
Evans (1897) 334-335, fig. 2 (a).
 (1909) 150 (no. P** 4a),
 203-204 (no. 57a), 278.
 (1921) 283, fig. 215d
(a, right).
 (1925) 8-9, fig. 5 (a,
 right).
Février (1935) 111 n.5, 113, 114,
pl. 3 (no. 36).
Fimmen (1921) 117, fig. 110
(a, right).

- Gray (1974) 15 (no. A 12), 41,
fig. 6 (f).
Kenna (1960) 96 (no. 59), pl. 4
(no. 59), ill. 59.
Kirk (1949) 126.
Köster (1923) 60, 62 (fig. 15),
64 (fig. 16), 65-66.
Landström (1961) 26-27, figs. 45-46
(reconstruction).
____ (1969) 24, fig. 47.
Laviosa (1969-1970) 17-18, fig. 10
(no. 36), 19.
Marinatos (1933) 176 (no. 36),
pl. 15 (no. 36).
Miltner (1931) 907.
Paglieri (1960) 213, fig. 3 (no. 36).
Reich (1968) 456.
Toudouze et alii (1934) 36.
Vingiano (1955) pl. 7 (lower).

Description:

Hull: crescent-shaped. Ends of approximately equal heights.

Terminal ornament: left end runs to a point, with a long projection angling upwards from the top of the ship end. Right end bifurcated.

Oars: six (?) short marks under the hull (pointing down) could be oars.

Mast: amidships.

Rigging: four stays (?) to the right of the mast.

Sail: none.

Field: empty.

8.

Current location: Oxford, Ashmolean Museum
#1910.227.

Provenience: Mirabello Province (Kenna noted that this information was found on an old impression of the seal).

Date: EM-MM I.

CMS number: -----.

Seal type: three-sided prism (rectangular ends) of white steatite.

Measurements: L.-1.8; H.-1.0 (each face); SH.-0.2.

Bibliography: Betts (1973) 327.
 Gray (1974) 15 (no. B 1), 41, fig. 6 (h).
 Kenna (1960) 95 (no. 55), pl. 3 (no. 55), ill. K55.

Description:

Hull: left end curved upwards abruptly into a point. Right end curved upwards more gently into a point. Left end may be higher.

Terminal ornament: both ends pointed.

Oars: eleven, of various lengths, pointing down from the hull.

Mast: amidships.

Rigging: two stays to the left and two stays to the right of the mast. The lower left "stay" is depicted as running horizontally from the ship end to the mast.

Sail: none.

Field: empty.

9.

Current location: unknown.²

Provenience: Mallia.

Date: MM I.

CMS number: -----.

Seal type: flattened three-sided prism (quasi-rectangular faces) of green steatite. Boardman classified it as his "Archaic Prisms II."

2. Demargne said that the seal was shown to him by a peasant in the summer of 1932 and that at that time a drawing was made by F. Chapouthier, which was the one he published in 1939. It has yet to reappear as Demargne had hoped it would.

Measurements: L.-1.5; H.-1.5, 1.0, 1.0.

Bibliography: Boardman (1970) 28-29, fig. 31.
Demargne (1939) 121-122, fig. 1.
Gray (1974) 16 (no. B 8).

Description:

Hull: relatively deep and lies horizontally on the water. Left end curves upwards slightly to a point, while the right end is blunt and angular with a slight projection from the bottom of the hull. The ends are of roughly equal heights.

Terminal ornament: both ends pointed; the left more acute than the right.

Oars: perhaps five indicated on the hull, pointing down towards the right end.

Mast: none.

Rigging: none.

Sail: none.

Field: two human figures (turned to the left?) sit in the boat. Below are found six fish. Below the fish a curved mark with three diagonal projections on its right.

The unique nature of this ship representation is noteworthy. One of only five seals or sealings (nos. 9, 35, 36, 38 and 41) showing human figures, this scene appears to be fishermen out for their catch. Demargne's suggestion that the curved mark below the fish is another boat is speculative since so little is preserved.

10.

Current location: Iraklion, Archaeological Museum
#1079.

Provenience: Platanos, Tholos B.

Date: MM I.

CMS number: CMS II:1, no. 287 (b).

Seal type: three-sided prism (one circular and two oval faces) of ivory. The seal hole is triangular and quite large. In CMS it was noted that the seal was put together from fragments.

Measurements: L.-2.3; H.-1.2, 1.5, 2.3.

- Bibliography: Alexiou (1972) 92 n.1.
 Betts (1973) 325-326, figs. 1-2.
 Bonino (1965) 309, fig. 9 (B).
 Branigan (1970) 191, fig. 44 (d).
 Buck (1962) 134.
 Casson (1959) 25, 216, pl. 1 (c).
 _____ (1964) 28, fig. 25.
 _____ (1971) 33, 40, 41, fig. 34.
 Cohen (1938) 486, 488 (fig. 5), 489
 ns. 3 and 7.
 Davaras (1976) 287, fig. 163.
 Demargne (1939) 122 n.2.
 Evans (1921) 118, (fig. 87-7), 120-
 121.
 _____ (1925) 8-9, fig. 6 (c).
 _____ (1928) 289, fig. 136 (a).
 Février (1935) 111-112, 113.
 Gray (1974) 15 (no. B 2), 43, fig. 8
 (b).
 Herbig (1940) 61-62, fig. 2.
 Höckmann (1968) 1178.
 Kenna (1960) 26 n.10, 32 n.6.
 Köster (1923) 60, 64 (fig. 17), 65.
 Laviosa (1969-1970) 13.
 Marinatos (1930) 109, fig. 1.
 _____ (1933) 175 (no. 28), pl. 15
 (no. 28).
 Matz (1928) 25, pl. 8 (no. 7).
 Miltner (1931) col. 907.
 Paglieri (1960) 213, fig. 3 (no. 28).
 Pendlebury (1967) 88, fig. 12 (no. 4).
 Platon (1969) 330-331 (no. 287, b).
 Renfrew (1972) 95, fig. 6.7 (no. 7).
 Sakellariou (1971) 13.
 Warren (1966) 196.
 Xanthoudides (1924) 114-115 (no. 1079),
 pl. 14.
 Zervos (1956) 178, pl. 211 (b).

Description:

Hull: curved upwards sharply to the right, narrowing into a point; horizontal projection from the bottom of the left end, the very end of which is not preserved because of damage to the engraved surface. Above the projection the left end terminates vertically. Right end higher.

Terminal ornament: upper left end at right angle. Very short, thin extension (slightly curved) and a caret on the right end.

Oars: none.

Mast: amidships.

Rigging: two marks to the left and two marks to the right of the mast run down to a horizontal mark set slightly above the hull. Lifts (?). See below.

Sail: none.

Field: two fish under the hull and a four-pronged object to the right of the hull. A chip on the left face of the stone defaces the end of the projection on the left of the ship.

Comparanda: perhaps nos. 3 and 4.

One of the more important ship representations for the MM period. The rigging is probably lifts running down to a lowered yard. Köster's suggestion that this is a warship with a ram is unlikely. Most scholars have rejected this theory.³

11.

Current location: Oxford, Ashmolean Museum
#1938.762.

Provenience: Olous (Elunda).

Date: MM I.

CMS number: -----.

Seal type: three-sided prism of light brown or yellow steatite.

Measurements: L.-1.6; H.-0.8 (each face); SH.-0.3.

3. See especially Cohen (1938) 486, 489 ns. 3 and 7 and Betts (1973) 325-326.

- Bibliography: Behn (1927-1928) pl. 62 (c, middle).
 Buck (1962) 134.
 Casson (1971) 40.
 Cohen (1938) 487, 490, 491, fig. 7
 (c, middle).
 Evans (1897) 334-335, fig. 3 (a).
 (1909) 149 (no. P4a), 203-
 204 (no. 57a), 278, pl. 1 (no.
 P4a).
 (1921) 283, fig. 215d
 (a, middle).
 (1925) 8-9, fig. 5 (a,
 middle).
 (1928) 247.
 Février (1935) 111-112, 113.
 Fimmen (1921) 117, fig. 110 (a,
 middle).
 Gray (1974) 15 (no. B 3), 41, fig. 6
 (g).
 Höckmann (1968) 1178.
 Kenna (1960) 97 (no. 64), pl. 4
 (no. 64).
 Kirk (1949) 126.
 Köster (1923) 60, 62 (fig. 15); 65-
 66.
 Landström (1961) 26-27, figs. 45-46
 (reconstruction).
 (1969) 24, fig. 47.
 Laviosa (1969-1970) 17-18, fig. 10
 (no. 34), 19.
 Marinatos (1933) 176 (no. 34),
 pl. 15 (no. 34).
 Miltner (1931) col. 907.
 Paglieri (1960) 213, fig. 3 (no. 34).
 Reich (1968) 456.
 Toudouze et alii (1934) 36.
 Vingiano (1955) pl. 7 (lower).

Description:

Hull: upper hull line gently curved overall, rising to form short, broad hooked extension at left, at right rising to form a long projection. Lower hull line flat, possibly with an extension to the left; curves gently to right to form projecting ornament. Right end higher.

Terminal ornament: hooked extension at top of left end; bulging at bottom of left end. Extension on right end runs to a point with slight bulging just below the ship end.

Oars: none.

Mast: amidships.

Rigging: three stays to the left and three to the right of the mast.

Sail: none.

Field: circular object in upper right field appears to be attached to the right end of the ship by a thin, diagonal mark. Long diagonal mark in upper left field.

12.

Current location: Oxford, Ashmolean Museum
#1938.760.

Provenience: Crete.

Date: MM I.

CMS number: -----.

Seal type: elongated three-sided prism of black and white mottled steatite. Boardman classified it among his "Archaic Prisms II" and said that the color of the stone was grey-green.⁴

Measurements: L.-2.0; H.-1.0 (each face);
SH.-0.25.

Bibliography: Betts (1973) 327, fig. 4.
Boardman (1970) 28-29, pl. 12 (left).
Gray (1974) 16 (no. B 5), 41, fig. 6
(i):
Kenna (1960) 98 (no. 71), pl. 4
(no. 71).

Description:

Hull: crescent-shaped, deeper amidships. Ends approximately the same heights.

Terminal ornament: left end bifurcated. Right end an arrowhead.

Oars: five marks on the hull pointing down towards the right may be oars.

Mast: amidships.

4. Boardman (1970) 97.

Rigging: two stays to the left and two stays to the right of the mast. Short marks extending from the masttop could be indications of a third pair of stays.

Sail: none.

Field: curls are found in the field above the ship; one to the left and one to the right of the mast (cf. no. 25).

13.

Current location: Iraklion, Archaeological Museum
#1770 or 1779.5

Provenience: Mallia, Workshop "alpha."

Date: MM I.

CMS number: CMS II:2, no. 100 (a).

Seal type: three-sided prism (oval faces) of yellow-brown steatite. Two corners of the seal are missing.

Measurements: L.-2.1; H.-1.0 (each face).

Bibliography: Platon *et alii* (1977) 109, 130-131
(no. 100, a).
Reich (1968) 455-456, fig. 6 (left).

Description:

Hull: left end not preserved because of damage to the stone. Top hull line straight amidships; angles upwards to right (about forty-five degrees) into extension. Bottom hull line very shallow curve amidships, curving upwards abruptly to extension on right end.

5. There is some confusion affecting this seal and no. 14. CMS cites Gray (1974) 16 (no. B 6), but they are clearly not the same seal. The citation of Reich in CMS was correct; however, Reich gave the inventory number as 1779, while in CMS the inventory number was given as 1770. What seems to have happened is that Gray was incorrectly cited in CMS. I cannot, however, explain the different inventory numbers given in CMS and by Reich. Either one of the publications has the wrong inventory number or the number has changed between 1968 and 1977.

Terminal ornament: . long, diagonal extension surmounted by an arrowhead on the right end.

Oars: two "hooks" on bottom hull line could conceivably be interpreted as oars.

Mast: amidships.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: none.

Field: triangular object in upper left field.

14.

Current location: Iraklion, Archaeological Museum.

Provenience: Mallia, found in a large deposit with other seals in the habitation quarters.

Date: MM I.

QMS number: -----.

Seal type: three-sided prism.

Measurements: -----.

Bibliography: Daux (1957) 693, 696, fig. 11
(below right).
Gray (1974) 16 (no. B 6), 41, fig. 6
(j).

Description:

Hull: bottom hull line nearly flat, with projection (short, nearly horizontal) to left; rising to right into long projection. Hull top parallel with bottom to right, very shallow; short projection angled upwards to left from hull top. Ends of approximately equal heights.

Terminal ornament: left end pointed. Right end surmounted by four short, radiating extensions.

Oars: four; pointing down towards to left.

Steering gear: a broad, short mark (pointing towards the right) could be a steering oar.⁶

6. There are, however, no comparable structures on other ship representations. It may be an accidental chip.

Mast: amidships.

Rigging: two stays to the left and three stays to the right of the mast.

Sail: none.

Field: short, diagonal mark in upper field to left.

15.

Current location: Iraklion, Archaeological Museum
#3579.

Provenience: Mallia.

Date: MM I.

CMS number: -----.

Seal type: three-sided prism. From the illustration in Reich the seal seems to be very worn.

Measurements: -----.

Bibliography: Reich (1968) 455-456, fig. 6 (right).

Description:

(Note that in the seal impression, all elements would be reversed).

Hull: only the left side of the upper hull is preserved because of damage to the stone. Bottom hull line cannot be determined. Left end comes to a point.

Terminal ornament: long diagonal projection on left end. Short extensions above and below the end of the projection making a trifoliate design.

Oars: none preserved.

Mast: amidships (?).

Rigging: three stays to the left and two stays to the right of the mast.

Sail: none.

Field: empty.

16.

Current location: Iraklion, Archaeological Museum
#1835.

Provenience: Mallia, Workshop "epsilon."

Date: MM I.

CMS number: CMS II:2, no. 163 (c).

Seal type: three-sided prism (oval faces) of bright brown steatite with pink veins. The face with the ship representation is damaged.

Measurements: L.-1.7; H.-1.3 (each face).

Bibliography: Platon et alii (1977) 109, 219-220
(no. 163, c).

Description:

Hull: very deep, sharply curved upwards to the right into a point. The left end is not preserved because of damage to the stone. Two series of parallel, slanting marks decorate the hull. Both series contain six marks; however the upper ones are longer and spaced farther apart.

Terminal ornament: left end missing. Right end an arrowhead.

Oars: perhaps the lower series of six lines on the hull, pointing down towards the left.

Mast: amidships. Portion shown is short and thick.

Rigging: none.

Sail: a flattened heart-shaped object surmounting the mast could be a sail. Eleven diagonal marks decorate this object (no comparable examples).

Field: empty.

The highly stylized manner in which the possible sail is depicted renders it virtually unrecognizable.

17.

Current location: Iraklion, Archaeological Museum
#1849.

Provenience: Mallia, Workshop "eta."

Date: MM I.

CMS number: CMS II:2, no. 177 (b).

Seal type: three-sided prism (oval faces) of white-yellow steatite. Only about one half of the stone is preserved.

Measurements: Preserved L.-1.3; preserved H.-1.1.

Bibliography: Platon et alii (1977) 109, 240-241
(no. 177, b).

Description:

Hull: only the right end is preserved, amounting to less than half of the ship. Section preserved curves upwards to the right. Tip not preserved.

Terminal ornament: only a single, downward extension from the right end is preserved.

Oars: none.

Mast: none preserved.

Rigging: parts of three stays preserved.

Sail: none.

Field: empty.

18.

Current location: Iraklion, Archaeological Museum
#2467.

Provenience: Mallia, found in 1971.

Date: MM I.

CMS number: CMS II:2, no. 195 (c).

Seal type: three-sided prism (oval faces) of yellow-green steatite. Approximately one half of the seal is preserved.

Measurements: preserved.L.-1.1; preserved H.-0.7.

Bibliography: Platon et alii (1977) 266-267
(no. 195, c).

Description:

Hull: only the right end is preserved, amounting to less than half of the ship. This end is fairly deep, terminating at approximately a sixty degree angle.

Terminal ornament: long, upward projection on right end. This is decorated by an L-shaped object inboard and a diagonal, bifurcated mark outboard.

Oars: none preserved.

Mast: none preserved.

Rigging: parts of two stays preserved.

Sail: none.

Field: empty.

19.

Current location: -----.

Provenience: Mallia.

Date: MM I.

CMS number: -----.

Seal type: three-sided prism of yellow steatite with green veins.

Measurements: L.-2.2; H.-1.05, (each face).

Bibliography: Chapouthier (1932) 184-185 (no. 1),
fig. 1 (c), pl. 1 (1, c).
Cohen (1938) 486.
Février (1935) 111 n.5.
Gray (1974) 16 (no. B 7).
Laviosa (1969-1970) 13.
Marinatos (1933) 235, fig. 16.

Description:

Hull: top hull line a smooth curve to both ends. Bottom hull line slightly curved,

angling abruptly upwards to the right into a projection. Left end rises abruptly to form a bifurcated projection.. Right end higher.

Terminal ornament: left end bifurcated. Projection on right end surmounted by an arrow-head.

Oars: four, pointing straight down.

Mast: amidships.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: none.

Field: triangular objects in upper left and right field.

20.

Current location: Oxford, Ashmolean Museum
#1925.57.

Provenience: unknown; Kenna noted that it was acquired in Athens.

Date: MM I.

CMS number: -----.

Seal type: elongated three-sided prism of black steatite. The string hole is very large.

Measurements: L.-1.6; H.-0.7 (each face); SH.-0.35.

Bibliography: Gray (1974) 16 (no. B 4).
Kenna (1960) 97 (no. 66, b), pl. 4
(no. 66, middle).

Description:

Hull: very shallow; slight curvature to hull. Right end curves into a bifurcation with very short extensions. Left end higher.

Terminal ornament: left end pointed. Right end bifurcated.

Oars: four, pointing down towards the lower (right) end.

Mast: amidships.

Rigging: one stay to the left and one stay to the right of the mast.

Sail: none.

Field: two diagonal lines on each side of the mast between the stays. Small single dots in the upper right field and the lower left field.

21.

Current location: Liverpool, Liverpool City Museum #B211. (Bosanquet Collection).

Provenience: Crete.

Date: MM IIA.

CMS number: CMS VII, no. 254 (a).

Seal type: three-sided prism of serpentine.

Measurements: L.-1.7; H.-0.9 (each face); SH.-0.3.

Bibliography: Gray (1974) 16 (no. B 10).
Kenna (1967) 318-319 (no. 254, a).

Description:

Hull: shallow and crescent-shaped. A horizontal object attached to the right end of the ship could be an attempt to depict the upper hull line. Parts of the left end not preserved. Six short diagonal marks decorate the hull. Ends of approximately equal heights.

Terminal ornament: left end pointed (?). Right end extends upwards into a point.

Oars: perhaps the six diagonal marks on the hull.

Mast: amidships.

Rigging: two stays to the left and two stays to the right of the mast.

Sail: none.

Field: upper left field contains a diagonal mark and a J-shaped object. Crescent-shaped object in upper right field. Vertical mark with small diagonal mark (outboard) at its base appears to stand on the horizontal object attached to the

right end. Perhaps comparable to objects on the left ends of nos. 2 and 4.

22.

Current location: Oxford, Ashmolean Museum
#1938.960.

Provenience: Lyttos.

Date: MM II.

CMS number: -----.

Seal type: three-sided prism (elliptical faces)
of carnelian.

Measurements: L.-1.6; H.-1.2, 0.8, 0.8; SH-0.15.

Bibliography: Casson (1971) 40.
Gray (1974) 16 (no. B 12), 41,
fig. 6 (m).
Kenna (1960) 115 (no. 188), pl. 8
(no. 188).

Description:

Hull: appears to be very shallow; slightly curved amidships. Curves upwards to left into a projection; curves upwards vertically to the right into a projection. Ends of approximately equal heights.

Terminal ornament: long, pointed, diagonal projection on the left end; vertical, pointed projection on the right end.

Oars: the nine (or ten) diagonal marks pointing down towards the right under the hull could be oars.

Mast: amidships. Relatively thick.

Rigging: none clearly definable.

Sail: perhaps the rectangular structure on the upper half of the mast.

Field: above the hull the field appears to be scratched with light, diagonal marks.

23.

Current location: -----.

Provenience: Crete.

Date: MM II-MM, III.

CMS number: -----.

Seal type: three-sided prism (oval faces) of steatite.

Measurements: -----.

Bibliography: Behn (1927-1928) pl. 62 (c, left).
 Buck (1962) 134.
 Cohen (1938) 487, 490, 491, fig. 7 (a, left).
 De Cervin (1977) 150, fig. 1.
 Dussaud (1914) 416, fig. 306.
 Evans (1895) 23, fig. 28 (a).
 (1909) 149 (no. P4*a),
 203-204 (no. 57, a, left), 278.
 (1921) 283, fig. 215d (a, left).
 (1925) 8-9, fig. 5 (a, left).
 Février (1935) 111 n.5, 113.
 Fimmen (1921) 117, fig. 110 (a, left).
 Gray (1974) 16 (no. B 13).
 Hiller (1977) 399.
 Höckman (1968) 1178.
 Kirk (1949) 126.
 Köster (1923) 60, 62 (fig. 15), 65-66.
 Laviosa (1969-1970) 17-18 (fig. 10, no. 35), 19.
 Marinatos (1933) 176 (no. 35), pl. 15 (no. 35).
 Miltner (1931) col. 907.
 Paglieri (1960) 213, fig. 3 (no. 35).
 Toudouze et alii (1934) 36.
 Vingiano (1955) pl. 7 (below).

Description:

Hull: top hull line curves upwards slightly to the left into the terminal ornament; more sharply to the right into a blunt point. The bottom hull line follows the curvature of the top hull line to the left. To the right the bottom hull line straightens into a short, pointed extension, then continues (deepened) upwards to the right narrowing into a blunt point. Ends of approximately equal heights.

Terminal ornament: above left end two short, diagonal elements pointing inboard. There is a blemish in the stone at this point making further analysis difficult. Some have restored it as an animal head. Right end narrows into a blunt point.

Oars: five, pointing down towards the right end.

Mast: slightly right of amidships.

Rigging: two stays to the left and two stays to the right of the mast.

Sail: none.

Field: empty.

24.

Current location: Athens, National Museum.

Provenience: Crete.

Date: MM II-MM III.

CMS number: -----.

Seal type: four-sided bead seal (unusually long) of white steatite.

Measurements: -----.

Bibliography: Behn (1927-1928) pl. 62 (c, d).
 Cohen (1938) 487, 491, fig. 7 (d).
 Dumont (1871) 415-417.
 Evans (1909) 154 (no. P26a), 203-204 (no. 57d), 278, pl. 2 (no. P26a).
 _____ (1921) 283, fig. 215 (d, d).
 _____ (1925) 8-9, fig. 5 (d).
 _____ (1928) 247-248.
 Février (1935) 113.
 Fimmen (1921) 117, fig. 110 (d).
 Gray (1974) 16 (no. B 14), 41, fig. 6 (n).
 Kirk (1949) 126.
 Köster (1923) 60, 62 (fig. 15), 65-66.
 Laviosa (1969-1970) 17-19, fig. 10 (no. 37), 19.
 Marinatos (1933) 176 (no. 37) pl. 15 (no. 37).
 Miltner (1931) 907.
 Paglieri (1960) 213, fig. 3 (no. 37).
 Stawell (1924) pl. 5 (no. 14).

Toudouze et alii (1934) 36.
 Vingiano (1955) pl. 7 (below).

Description:

(Note that in the seal impression, all elements would be reversed).

Hull: curves upwards to the left into a bifurcation; upper prong deeper. Right end curves upwards more sharply into a bifurcation. Right end higher.

Terminal ornament: left end bifurcated. Two short, pointed extensions below the bifurcated right end.

Oars: none.

Mast: amidships.

Rigging: one stay to the left and two stays to the right of the mast.

Sail: none.

Field: vegetation spray (?) to the right of the ship (cf. no. 1). Hieroglyphic symbols (not shown in illustration) to the left of the ship.

25*

Current location: Berlin, Staatliche Museen
 Preussischer Kulturbesitz, Antikenabteilung
 #FG.56.

Provenience: Crete.

Date: MM II-MM III.

CMS number: -----.

Seal type: four-sided bead seal of yellow chalcidony.

Measurements: -----.

Bibliography: Alexiou (1972) 93.
 Behn (1927-1928) pl. 62 (c, d).
 Buck (1962) 134.
 Casson (1971) 33, fig. 48.
 (1975) 4.
 Cohen (1938) 487, 491, fig. 7 (b).
 Cook (1916) 567, fig. 122 (left).
 Davaras (1976) 287, fig. 163.

- Evans (1895) 27, fig. 34 (a).
 (1909) 155 (no. P27a),
 203-204 (no. 57b), pl. 2 (no.
 P27a).
 (1921) 283, fig. 215 (d,
 b).
 (1925) 8-9, fig. 5 (b).
 Février (1935) 111 n.5, 113, pl. 3
 (no. 38).
 Fimmen (1921) 117, fig. 110 (b).
 Gray (1974) 16 (no. B 15), 41, fig. 6
 (o).
 Köster (1923) 60, 62 (fig. 15),
 65-66.
 Landström (1961) 26-27, fig. 47.
 Laviosa (1969-1970) 15 n.5.
 Marinatos (1933) 176 (no. 38), pls.
 15 (no. 38), 17 (no. 38).
 Paglieri (1960) 213, fig. 3 (no. 38).
 Toudouze et alii (1934) 36.
 Vingiano (1955) pl. 7 (below).
 Zwierlein-Diehl (1969) 27 (no. 7),
 pl. 3.

Description:

Hull: crescent-shaped. Ends of equal heights.

Terminal ornament: left end bifurcated. Right end narrows to a point.

Oars: seven, pointing down towards the right.

Mast: amidships. Masttop is circular.

Rigging: three stays to the left and three stays to the right of the mast. From the circular masttop a single horizontal mark extends to the right and one to the left of the mast. Each of these horizontal lines is decorated by a small crescent on its end.

Sail: none.

Field: to the right of the ship, hieroglyphic symbols.

The horizontal lines with crescents may in fact have no connection with the rigging. They could, however, be yards with furlled sails, as suggested by Marinatos and Février.⁷

7. Marinatos (1933) 205; Février (1935) 111 n.5, 113. Cf.

26.

Current location: Iraklion, Archaeological Museum.Provenience: Knossos, Hieroglyphic Deposit.Date: MM II-MM III.CMS number: -----.

Seal type: seal impression, probably made from a stamp seal, stamped in connection with another hieroglyphic impression on an oblong lump of clay. The impression is somewhat worn.

Measurements: -----.

Bibliography: Behn (1927-1928) pl. 62 (c, c).
 Buck (1962) 134.
 Cohen (1938) 486, 487, 491, fig. 7 (c).
 Evans (1909) 161 (no. P63a. 1), 203-204 (no. 57c), pl. 3 (no P63a. 1) (1921) 281 (fig. 213), 2 (fig. 210, o), 283, fig. 215 (d, c).
 _____ (1925) 8-9, fig. 5 (c).
 _____ (1928) 247.
 _____ (1935) 717-718, fig. 702.
 Février (1935) 111 n.5.
 Fimmen (1921) 117, fig. 110 (c).
 Gray (1974) 16 (B 16), no. 41, fig. 6 (q).
 Hood (1971) 125, fig. 103.
 Kenna (1960) 38 n.4.
 Köster (1923) 60, 62 (fig. 15), 65-66.
 Marinatos (1933) 176 (no. 39); pl. 15 (no. 39).
 Paglieri (1960) 213, fig. 3 (no. 39).
 Schachermeyr (1964) 133, fig. 66 (c).
 Toudouze *et alii* (1934) 36.
 Vingiano (1955) pl. 7 (below).

Description:

Hull: crescent-shaped. Ends of approximately the same height.

Terminal ornament: left end bifurcated, the upper prong curving inboard. Right end narrows to a point.

the curls (in similar positions) of no. 12.

Oars: eleven, pointing straight down (or perhaps a little to the left).⁸ The two farthest left are off-set from the other nine.

Steering gear: the two oars farthest left could be steering oars.

Mast: amidships.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: none.

Field: four (?) vegetation sprays (?) above the ship.

27.

Current location: Iraklion, Archaeological Museum
#748.

Provenience: Mochlos, Tomb III.

Date: MM III.

CMS number: CMS II:2, no. 249.

Seal type: stamp seal of pale blue chalcedony.
Part of the edge of the seal face is damaged.

Measurements: L.-1.2; H.-1.3.

Bibliography: Cohen (1938) 487.
Cook (1916) 567, fig. 122 (right).
Davaras (1976) 287, fig. 163.
Dussaud (1914) 455, fig. 325.
Evans (1921) 277 (fig. 207, b),
279-280.
Février (1935) 111-112, 113.
Gray (1974) 16 (no. B 19), 42,
fig. 7.

8. Marinatos mistakenly published a drawing showing only nine oars. Of these seven point down towards the right end and two (off-set from the other seven) point down towards the left end. Gray appears to have reproduced Marinatos' drawing. Evans consistently published the entire clay fragment and not just the ship impression. In every case the number of oars is eleven.

- Karo (1926b) pl. 58 (b).
 Kenna (1960) 39, fig. 55.
 Kirk (1949) 126.
 Köster (1924) 24, fig. 4.
 Landström (1961) 26-27, figs. 45-46
 (reconstruction).
 (1969) 24, fig. 47.
 Laviosa (1969-1970) 17-18, fig. 10
 (no. 33), 19.
 Marinatos (1933) 176 (no. 33), pls. 15
 (no. 33), 17 (no. 33).
 Matz (1928) 18 (no. K213), 130, pl. 13
 (no. 9).
 Paglieri (1960) 213, fig. 3 (no. 33).
 Platon et alii (1977) 355-356 (no.
 249).
 Seager (1912) 39 (no. III, i), fig.
 14.
 Stawell (1924) 136-137, pl. 6.

Description:

Hull: deep amidships, curving upwards to the left into a bifurcation; curves upwards abruptly to the right, straightens and narrows into a point. Right end higher. Two pairs of vertical marks (one fore and one aft) decorate the hull.

Terminal ornament: left end bifurcated. Right end narrows to point. Two short marks project inboard from near top of the right end.

Oars: five, pointing down towards the lower (left) end.

Mast: amidships.

Rigging: two stays to the left and two to the right of the mast.

Sail: none.

Field: hieroglyphic symbols to the right and left of the ship; linked spirals above and below, in exergues.

28.*

Current location: -----.

Provenience: Archanes, Shrine of Anemospelies.

Date: MM III.

CMS number: -----.

Seal type: agate.

Measurements: -----.

Bibliography: Sakellarakis and Sapouna-Sakellaraki
(1981) 220-221.
Shaw (1980) 177 n.44.

Description:

(Note that in the seal impression, all elements would be reversed).

Hull: straight amidships, curving upwards gently to the left into a point; curving upwards more abruptly to the right into a bird's head. Right end higher.

Terminal ornament: left end narrows to a point; inturned caret on top hull line near the end. Right end in the shape of a bird's head turned inboard.

Oars: one paddle being used by a slim-waisted figure in the boat. Paddler at the beginning of his stroke.

Mast: none.

Rigging: none.

Sail: none.

Field: two triangular objects to the right of the paddler.

29.

Current location: Iraklion, Giamalakis Collection
#3498.

Provenience: Crete.

Date: MM.

CMS number: -----.

Seal type: scarab seal of steatite. The seal hole runs parallel to the short axis. The form and the engraving of the seal are very poor. A small chip is missing on the outer edge of the seal face.

Measurements: L.-1.7; H.-1.4.

Bibliography: Gray (1974) 17 (no. B 25).
Laviosa (1969-1970), 19.
Xénaki-Sakellariou (1958a) 30
(no. 184), 78-79, pl. 22
(no. 184).

Description:

Hull: crescent-shaped. Right end terminates bluntly with relatively long projection from the bottom of the hull. Right end higher.

Terminal ornament: left end bifurcated. Projection on right end narrows into a point.

Oars: perhaps the five marks to the left and the three marks to the right under the hull could be oars. The two farthest left point down towards the left, the next three to the right point straight down and the three farthest right point down towards the right.

Mast: amidships.

Rigging: two stays to the left and two stays to the right of the mast.

Sail: none.

Field: a horizontal S and a V above the ship. Inverted crescent below the right end.

30.

Current location: Boston, Boston Museum of Fine Arts #63.482.

Provenience: Crete.

Date: MM.

CMS number: CMS XIII, no. 14.

Seal type: amygdaloid of dark green marble.

Measurements: L.-2.4; H.-1.7; D.-1.0.

Bibliography: Humphreys (1977) 351 (Additions, no. 3).
Kenna and Thomas (1974) 16 (no. 14).

Description:

Hull: top hull line straight; bottom hull line curved upwards to the left into a diagonal projection; curved upwards abruptly to the right into a vertical projection. Ends of equal heights.

Terminal ornament: pointed, diagonal projection on left end. "Elbow" device on left end. Between "elbow" and hull a short, pointed extension. Vertical extension on the right end narrows into a point.

Oars: seventeen. All but the three farthest right point straight down. These three point down towards the right end. Nine very faint marks pointing down towards the left end may also be oars on the far side of the ship.

Mast: amidships.

Rigging: three curved marks are found on each side of the mast. These are all attached to the sail just above the boom and run down towards the hull.

Sail: top and bottom of sail straight; sides concave: Depicted on far-side of mast. Yard and boom shown. Diagonal network pattern on sail.

Field: empty.

Comparanda: perhaps no. 32, especially the rigging.

An important representation since it shows the earliest example (in the whole of Greek Bronze Age ship representations known to me) of a clearly recognizable sail. The three curved lines on each side of the mast attached to the sail are difficult to explain. They may be sheets, but there are too many and they are not attached to the ends of the boom where one would expect them. Most probably they are an unsuccessful attempt at stays. The nine faint marks below

the hull pointing down towards the left may be an attempt to show the far-side oars.

31.

Current location: Philadelphia, University Museum
#MS.4791.

Provenience: Crete.

Date: MM.

CMS number: CMS XIII, no. 90 (a).

Seal type: three-sided prism (edges slightly rounded) of dark green-brown steatite.

Measurements: L.-1.4; H.-0.9 (each face).

Bibliography: Humphreys (1977) 351 (Additions, no. 4).
Kenna and Thomas (1974) 104-105 (no. 90, a).

Description:

Hull: shallow and U-shaped. Ends of equal heights.

Terminal ornament: left end terminates bluntly; short, diagonal projection (pointing inboard) just below the tip of the left end. Right end narrows into a point.

Oars: six very short marks, pointing down, may be the oars.

Mast: amidships.

Rigging: one stay to the left and one stay to the right of the mast. Left stay continues downwards through the hull.

Sail: none.

Field: circular object in upper right field.

Late Bronze Age

32.

Current location: Oxford, Ashmolean Museum
#1938.965 (Evans Collection).

Provenience: environs of Knossos.

Date: MM II-LM I.

CMS number: -----.

Seal type: amygdaloid of black steatite. Evans (1935) said that the stone had red veins in it, whereas Kenna said that these veins were white and were in fact surface fractures on the stone which had filled with earth or chalk.

Measurements: L.-2.0; H.-1.5; SH.-0.2.

Bibliography: Alexiou (1972) 93-94.
 Betts (1968) 149.
 Brown (1978) 636 (fig. 16), 639.
 Buchholz and Karageorghis (1971) 115 (no. 1390), 117, fig. 39 (no. 1390).
 Casson (1971) 33-34, 40, fig. 39. (1975) 4, 6.
 Cohen (1938) 487.
 Evans (1935) 828, fig. 807.
 Gray (1974) 16 (no. B 17), 41, fig. 6 (p).
 Kenna (1960) 116 (no. 192), pl. 8 (no. 192).
 Laviosa (1969-1970) 19.
 Schachermeyr (1967) 61-62, pl. 62 (no. 228).

Description:

Hull: top hull line straight; bottom hull line curved. Deeper slightly right of amidships. Neither end clearly preserved because of damage to the stone.

Terminal ornament: not preserved.

Oars: damaged left end makes exact count difficult. There appear to be eleven or twelve (perhaps more) pointing down towards the right.

Mast: amidships.

Rigging: three curved marks to the left and three curved marks to the right of the mast connect hull and boom.

Sail: top and bottom of sail straight; sides concave. Depicted on far-side of mast. Yard and boom shown. Diagonal network pattern on sail.

Field: diagonal, ladder-like structure above (perhaps on ?) the right end.

Comparanda: perhaps no. 30, especially the rigging.

The three lines to the left and the right of the mast are again, as in no. 30, probably attempts to represent the stays.

33.*

Current location: Athens, National Museum
(Statkatos Collection #36).

Provenience: environs of Thebes.

Date: MM II-LM I.

CMS number: -----.

Seal type: -----.

Measurements: -----.

Bibliography: Amandry (1953) 25-26 (no. 36), pl. 9
(no. 36).
Gray (1974) 17 (no. C 2).

Description: not available.⁹

34.

Current location: Iraklion, Archaeological Museum
#I49.

Provenience: Mirabello Province.

Date: MM III-LM.

CMS number: -----.

Seal type: amygdaloid of carnelian of amber hue.

9. Gray (1974) 77, described both ends as terminating "mit einer Art Lilie. Bug links. Ruder sind heckwärts geneigt." She also noted that a steering oar is present, but gave no details.

Measurements: -----

- Bibliography: Assmann (1921) cols. 1049-1050.
 Casson (1971) 33-34, fig. 37.
 (1975) 4, 6.
 Davaras (1976) 287, fig. 163.
 Erlenmeyer and Zai-Boerlin (1961)
 17 (discussed in connection with
 their no. 45).
 Février (1935) 112, 113, 114, pl. 3
 (no. 52).
 Gray (1974) 16 (no. B 18), 43,
 fig. 8 (e).
 Kenna (1969) 14, pl. 13 (no. 1).
 Laviosa (1969-1970) 19.
 Marinatos (1933) 178 (no. 52),
 pl. 16 (no. 52).
 Mosso (1910) fig. 160 (no. 3).
 Paglieri (1960) 215, fig. 4 (no. 52).
 Xanthoudides (1907-1909) col. 178
 (no. 114), pl. 8 (no. 114).

Description:

Hull: shallow, gently curved. Neither end preserved because of damage to the stone.

Terminal ornament: not preserved.

Oars: none.

Mast: amidships.

Rigging: a single vertical mark on each side of the mast runs down from the boom to the hull. Three diagonal marks on the left side of the mast run upwards from the hull to the vertical mark parallel to the mast. Three diagonal marks on the right side of the mast run upwards from the hull. The lowest one appears to run to the vertical mark parallel to the mast; the other two appear to continue to the boom.

Sail: bottom of sail straight, sides concave. Boom shown. Top of sail continues upwards to the edge of the engraved surface, presumably omitting the very top of the sail. Diagonal network pattern on sail.

Field: nine pairs of diagonal lines intersect in a zig-zag pattern below the hull.

The two vertical lines, one on each side of the mast,

are in correct positions for halyards. The three diagonal lines on each side of the mast are probably stays.

35.

Current location: Iraklion, Archaeological Museum.

Provenience: Hagia Triada.

Date: LM I.

CMS number: -----

Seal type: a clay sealing (?).¹⁰

Measurements: -----

Bibliography: Brown (1978) 631, 634 (fig. 6), 638.
 Cohen (1938) 487.
 Davaras (1976) 287, fig. 163.
 Evans (1935) 952, fig. 920.
 Gray (1974) 18 (no. C. 28).
 Laviosa (1969-1970) 20.
 Levi (1925-1926) 126, fig. 134 (no. 118).
 Marinatos (1933) 179 (no. 57), pls. 16 (no. 57), 17 (no. 57).
 Paglieri (1960) 215, fig. 4 (no. 57).
 Persson (1942a) 84, 99, 180 (no. 28).
 Sakellarakis (1971) 209-213 (fig. 10), 218-219.

Description:

Hull: ends slightly raised. Slight bulging on upper hull slightly left of amidships. Ends of approximately equal heights.

Terminal ornament: left end an animal head turned inboard. Right end narrows to a bulb from which emerge three extensions.

10. There is some confusion over whether this is a sealing or a ring. Evans and Persson clearly stated that it is a ring, while others have called it a seal impression. From the illustrations published in Marinatos and Davaras, it appears to be an impression and not a ring.

Oars: perhaps one paddle (or oar) being worked by a figure in the boat. Paddle points down towards the left end.

Mast: none.

Rigging: none.

Sail: none.

Field: inverted crescents and diagonal marks under hull.

36.

Current location: Hagios Nikolaos, Hagios Nikolaos Museum #4653.

Provenience: Makrygialos.

Date: LM I (?).

CMS number: -----.

Seal type: amygdaloid (?).

Measurements: -----.

Bibliography: Brown (1978) 637 (fig. 22), 640.
Davaras (1976) 289, 326-327, fig. 189.

Description:

Hull: crescent-shaped; deeper amidships. Fourteen diagonal marks on hull pointing down towards the right. Right end higher.

Terminal ornament: both ends narrow into points.

Oars: perhaps the fourteen marks on the hull.

Mast: none.

Rigging: none.

Sail: none.

Field: to the right a female figure (presumably in the boat) dressed in a full skirt with her arms raised in the familiar position of Minoan votaries. To the left of her there is a crooked mark amidships with two short extensions at its

top; farther left an odd rectangular structure surmounted by a triangular object. Both apparently in the boat.

The marks on the hull could be thwarts (i.e., as if viewed from above), although oars seem more likely.

37.

Current location: Iraklion, Archaeological Museum, sealing #146.

Provenience: Knossos, Northern Entrance Deposit.

Date: LM II-LM IIIA.

CMS number: -----.

Seal type: clay sealing fragment, probably made by a lentoid.

Measurements: -----.

Bibliography: Betts (1973) 328-329, fig. 6
 Casson (1971) 34, fig. 53.
 Davaras (1976) 287, fig. 163.
 Evans (1928) 243-245, fig. 141 (b).
 (1935) 827, fig. 806.
 Février (1935) 112, 113.
 Gill (1965) 68 (no. J3).
 Gray (1974) 19 (no. C 37), 83,
 fig. 25 (b).
 Hood (1971) 127, fig. 107 (left).
 Humphreys (1977) 352.
 Kenna (1960) 12, fig. 15.
 Laviosa (1969-1970) 20.
 Marinatos (1933) 178-179 (no. 54),
 pl. 16 (no. 54).
 Paglieri (1960) 215, fig. 4 (no. 54).
 Schachermeyr (1964) 133, fig. 66 (b).

Description:

Hull: only a small part of a central section of the hull is preserved. At the bottom of the sealing a deep, undecorated section, its top nearly straight. Above this there is a structure consisting of ten short, vertical elements topped by a single, long, horizontal one.

Terminal ornament: not preserved.

Oars: none preserved.

Mast: partially preserved (its top missing), emerging from the long horizontal element.

Rigging: two curved marks to the left and two curved marks to the right of the mast. The two to the right of the mast appear to be attached to the lowered yard. The lower portions of the two to the left of the mast are not preserved.

Sail: perhaps represented furled on the lowered yard by a crescent to the left of the mast and two crescents to the right of the mast. A faint mark appears to run from between the two crescents to the right of the mast diagonally downwards through the ladder-like structure.

Field: not preserved.

An important ship representation for rigging details. The two lines on each side of the mast are most probably lifts (attached in the original to the masttop) running downwards to the lowered yard. In this writer's opinion, if the crescents below the possible lowered yard are part of the original, the artist has successfully rendered the furled sail on a lowered yard.¹¹

More difficult to interpret is the ladder-like structure. Evans (1935) described it as a deck shelter, Marinatos and Casson as a deck (so also Gray, after considering whether it might be a birdseye view of the thwarts from gunwale to gunwale) and Hood as a central deck or gangway. Marinatos also suggested that the areas between the

11. Betts rejected the crescents as a fanciful reconstruction. Without studying the sealing in the original, it is impossible to confirm this theory.

vertical supports could have been used to run the oars through, and then shut when they were not needed. A raised deck is not improbable, although a latticed railing or simple decoration on the hull (note that the mast apparently cannot be seen through the structure) is just as likely.

The faint line on the right of the sealing attached between the crescents has often been omitted in published reproductions.¹²

38.

Current location: Iraklion, Archaeological Museum, sealing #417.

Provenience: Knossos, Little Palace.

Date: LM II-LM IIIA.

CMS number: -----.

Seal type: clay sealing fragment, probably made by a large lentoid or oval bezel of a metal or stone ring.

Measurements: -----.

Bibliography: Behn (1927-1928) 242.
 Betts (1973) 329-330, fig. 7.
 Buchholz and Karageorghis (1971) 115
 (no. 1391), 117, fig. 39 (no. 1391).
 Casson (1971) 34, fig. 52.
 Davaras (1976) 287, fig. 163.
 Evans (1904-1905) 12-14, fig. 7.
 (1928) 243-244, fig. 141
 (a).
 (1935) 827, fig. 805.
 Février (1935) 112.
 Fimmen (1921) 115, fig. 113.

12. E.g., Marinatos (1933) pl. 16 (no. 54). Cf. the fanciful reconstruction of Evans (1935) 827, fig. 806, where another line is attached to the left of the mast.

- Gill (1965) 90 (no. U112).
 Glotz (1925) 194, fig. 28.
 Gray (1974) 19 (no. C 38), 83,
 fig. 25 (a).
 Hood (1971) 127, fig. 107 (right).
 Humphreys (1977) 352.
 Karo (1926b) pl. 72 (k).
 Kenna (1960) 58, fig. 121.
 (1964) 917-918, fig. 3.
 Laviosa (1969-1970) 20.
 Marinatos (1933) 179 (no. 55),
 pl. 16 (no. 55).
 Miltner (1931) cols. 907-908.
 Paglieri (1960) 215, fig. 4 (no. 55).
 Schachermeyr (1951) 723.
 (1964) 133, fig. 66 (a).
 Wiesner (1968) 36-37, fig. 5 (a).

Description:

Hull: only a small portion of a central section of the hull is preserved. This is straight. One longitudinal element is preserved on the hull. Upon this stands a large horse. Above this element there are the heads, long necks and upper shoulders of four rowers. They appear to be facing towards the left. Above their heads (and under the horse's belly) runs a horizontal mark.

Terminal ornament: not preserved.

Oars: three, pointing down towards the right.

Mast: partially preserved (the top missing) above the hind quarters of the horse.

Rigging: to the left of the mast there are two diagonal marks; above these there is a curved mark. All three appear to run to (or are covered by) the horse.

Sail: none preserved.

Field: the body, two back legs, one front leg and neck of the horse are preserved.

A difficult representation to interpret. A major problem is the drawing found in different publications.

Marinatos, Fimmen and Betts all concluded that there are only three oarsmen (omitting the one furthest left). More

complicated are the various reconstructions of the lines to the left of the mast. Evans (1935) interpreted the top line as curving to the neck of the horse, acting as a collar. The other two lines he interpreted as stays. Casson and Gray retained the curvature of the top line, but they did not connect it to the horse. Marinatos and Betts reproduced all three lines as straight diagonals. The problem of the lines would be lessened if, as suggested by Betts, the horse was carved onto the original engraving at a later date.

The engraving as it stands now can be interpreted in various ways. All three lines could be stays. One (or more) of the lines could be a stay and the other two lines lifts running down to a lowered yard. This last alternative is attractive, especially since one could interpret the horizontal object below the belly of the horse as the lowered yard.¹³

The position of the oarsmen, turned to the left, suggests that they are at the beginning of their stroke and thus facing the stern.¹⁴ This is significant, for it would allow

13. Most have interpreted this object as a deck or deck canopy. The lack of vertical supports would somewhat weaken this theory. Marinatos suggested that the lack of vertical supports was due to artistic neglect. Gray suggested that the artist omitted the supports so as to show the figures. See Marinatos (1933) 194-195; Gray (1974) 46-47. A lowered yard would seem to be an easier solution.

14. Betts (1973) 330, suggested that they may be turned to the prow, if they are in the act of beaching. This assumes that ships in the Bronze Age were beached stern to (as in later periods), that the crew reversed positions to do so and that the artist had the technical expertise to understand this. All three points would be difficult to prove.

us to identify (on this impression) the right end as the prow and to show that the oars point to the prow. Assuming a convention for oar direction, this would take on considerable importance.

39.

Current location: Oxford, Ashmolean Museum
#1938.958.

Provenience: Central Crete.

Date: LM IIIB.

CMS number: -----.

Seal type: elliptical lentoid of black steatite,
with a conical back.

Measurements: L.-2.0; H.-1.6; SH.-0.25 (bored
slightly off the true axis).

Bibliography: Alexiou (1972) 91, 92 n.1.
Assmann (1921) cols. 1049-1050.
Betts (1973) 328 (fig. 5), 337.
Boardman (1970) 60, 106, pl. 196.
Buck (1962) 134.
Casson (1959) 25, 216, pl. 1 (e).
_____ (1964) 28, fig. 26.
_____ (1971) 33-34, 40, fig. 47.
_____ (1975) 4.
Cohen (1938) 486.
Evans (1925) 8-9, fig. 6 (a).
_____ (1928) 242-243, fig. 139.
Février (1935) 111 n.5., 112, 113.
114, 124, pl. 3 (no. 40).
Gray (1974) 16 (no. B 9), 41, fig. 6
(k).
Herbig (1940) 61-62, fig. 3.
Hood (1971) 126-127, fig. 105.
Hutchinson (1962) 99.
Johnstone (1980) 68-69, fig. 7.1.
Kenna (1960) 102-103 (no. 106),
pl. 5 (no. 106).
Landström (1961) 26-27, fig. 47.
_____ (1969) 24, fig. 47.
Marinatos (1933) 176-177 (no. 40),
pl. 15 (no. 40).
Meirat (1964) 18.

Pagliari (1960) 213, fig. 3 (no. 40).
Schachermeyr (1964) 201-202, fig. 115.

Description:

Hull: crescent-shaped. Fourteen parallel, diagonal marks on the hull. Ends of equal heights.

Terminal ornament: both ends narrow into points.

Oars: seventeen. Fifteen point down towards the right end. The two farthest left point down towards the left end.

Steering gear: the two oars farthest left are probably steering oars, although they are shown shorter than the other oars.¹⁵

Mast: amidships. Top not preserved because of damage to the stone.

Rigging: two curved marks to the left and two curved marks to the right of the mast are attached to lowered yards. The tops of these curved marks are not preserved because of damage to the stone. On each side of the mast there is a lowered yard and a boom. None of the lowered yards or booms is actually attached to the mast.

Sail: none.

Field: three dots above the left side of the hull. Three dots above the lowered yard to the left. Seven dots above right side of the hull. Nine dots in upper right field. Nine ovals in upper left field.

The lines to the left and right of the mast are probably lifts running to lowered yards. The representation suggests that the sail would have been supported by two yards and two booms.

The two steering oars (if that is what they are) identify the right end as the prow.

15. Normally steering oars are not only longer, but also broader.

40.

Current location: Oxford, Ashmolean Museum
#1938.959.

Provenience: Crete.

Date: LM I-LM III.

CMS number: -----.

Seal type: elliptical lentoid of black steatite
with a carinated back.

Measurements: L.-1.7; H.-1.6; D.-0.5; SH.-0.2.

Bibliography: Betts (1973) 328.
Casson (1971) 40.
Gray (1974) 16 (no. B 11), 41,
fig. 6 (1).
Kenna (1960) 103 (no. 107), pl. 5
(no. 107).
Laviosa (1969-1970) 19.

Description:

Hull: top hull line fairly straight. Bottom hull line curves upwards abruptly at both ends into points. Ends of equal heights.

Terminal ornament: vertical extension on each end. Two carets, one above the other, on each vertical extension.

Oars: difficult to discern. Appears to show the oars on both sides of the vessel, ten or eleven for each side. The far-side oars point down towards the right end; the near-side oars up towards the right end.

Mast: amidships. Relatively short.

Rigging: three diagonal marks to the left of the mast and three diagonal marks to the right of the mast run down from above the mast to a horizontal object above the hull. The horizontal object may not extend out to the two outside diagonal lines to the right of the mast.

Sail: none.

Field: empty.

The three diagonal lines on each side of the mast may be lifts running down towards a lowered yard (the horizontal object). One or two of the diagonal lines may be stays. If the horizontal object is the far-side gunwale, they all could be stays.

41.

Current location: Athens, Numismatic Collection
(Tsivanopoulos Collection, no inventory number).

Provenience: unknown.

Date: LH.

CMS number: CMS V:1, no. 184 (b).

Seal type: lentoid of milk-grey sardonyx with white spots. The seal is engraved on both surfaces and placed in a modern gold setting. The stone is damaged, with approximately one third of it missing. A modern gold plate covers the fractured edge.

Measurements: L.-2.2; D -0.75.

Bibliography: Hiller (1977) 399.
Pini (1975) 142 (no. 184, b).
Svoronos (1915) 71, pl. 6 (no. 1).

Description:

Hull: at far right the very tip of the curved right end may be preserved (?).

Terminal ornament: left end not preserved.
Right end narrows into a point (?).

Oars: none preserved.

Steering gear: one steering oar to the left, being held in both hands by a figure in a sitting position. Steering oar appears to run through some type of square structure aft.

Mast: a section of the top part preserved to the left of the kneeling figure. Ends abruptly at the top of the engraved surface.

Rigging: two stays to the left of the mast.

Sail: none.

Field: besides the figure working the steering oar, there is a larger one (kneeling, to the right of the mast). One arm is bent at his side, the other stretched forward holding what appears to be a spear. To the right of this figure there is a bird.

In the following discussion and tables the evidence has been broken down on the basis of the chronological divisions of the Middle Bronze and Late Bronze periods. Of the total forty-one realistic ship representations, thirty-one (nos. 1-31) date to the Middle Bronze period, ten (nos. 32-41) to the Late Bronze period.

Middle Bronze Age

Seal shape and material:

The following list contains the catalogue number of the ship representation and the shape and material of the seal upon which it is engraved. (Note these abbreviations: 3-SP, for three-sided prism; 4-SB, for four-sided bead seal; elong., for elongated; flat., for flattened). A question mark denotes that the relevant information was unavailable.

<u>Cat. No.</u>	<u>Shape</u>	<u>Material</u>
1	3-SP	black steatite
2	3-SP	olive-green steatite
3	3-SP	white steatite
4	3-SP	white steatite
5	3-SP	steatite
6	3-SP	white steatite
7	3-SP	black steatite
8	3-SP	white steatite

<u>Cat. No.</u>	<u>Shape</u>	<u>Material</u>
9	flat. 3-SP	green steatite
10	3-SP	ivory
11	3-SP	yellow steatite
12	elong. 3-SP	black and white steatite
13	3-SP	yellow-brown steatite
14	3-SP	?
15	3-SP	?
16	3-SP	bright brown steatite
17	3-SP	white-yellow steatite
18	3-SP	yellow-green steatite
19	3-SP	yellow steatite
20	elong. 3-SP	black steatite
21	3-SP	serpentine
22	3-SP	carnelian
23	3-SP	steatite
24	4-SB	white steatite
25	4-SB	yellow chalcedony
26	"impression"	
27	stamp	pale blue chalcedony
28	?	agate
29	scarab	steatite
30	amygdaloid	dark green marble
31	3-SP	green-brown steatite

Of the thirty-one Middle Bronze ship representations, twenty-four are on three-sided prisms (or variants). Of these twenty-four seals, nineteen are in steatite (of various colors), one in ivory, one in serpentine and one in carnelian (the material of nos. 14 and 15 are unpublished). The other seven representations are found on the following stones: two four-sided bead seals (one in steatite, the other in chalcedony), one scarab (in steatite), one amygdaloid (in green marble) and one stamp seal (in chalcedony).¹⁶

Hull:

The wide variety of hull shapes makes any classification difficult. I have chosen three broad categories: purely angular hulls (i.e., the hull lines are straight),

16. No. 26 is preserved on an impression, perhaps from a stamp seal. The shape of no. 28 is not published.

purely curved hulls, and those hulls which have both straight and curved lines.¹⁷ Those under the ? category are not preserved enough to make a deduction. (Note these abbreviations: Ang., for purely angular; Curv., for purely curved; Curv.-Straight, for those hulls which have some curved and some straight lines.

<u>Ang.</u>	<u>Curv.</u>	<u>Curv.-Straight</u>	<u>?</u>
1	5	2	15
	6	3	16
	8	4	17
	20	7	18
	21	9	
	23	10	
	25	11	
	26	12	
	27	13	
	28	14	
		19	
		22	
		24	
		29	
		30	
		31	

The list below divides the representations into those with the left end higher, those with right end higher, those with ends of equal heights and those where this information is not preserved.¹⁸ An asterisk after a catalogue number

17. This three-fold division is not based upon Marinatos (1933) 185-191, 212-221. His "courbé-anguleux" was a transitional type between his earlier "les deux extrémités anguleuses" and his later "recourbé également aux deux extrémités." The division proposed here is not intended to show transition from angular hulls to curved hulls, but to differentiate those hulls which have no straight lines from those that do.

18. To discern which end is higher, an arbitrary line has been drawn across the horizontal axis of the engraved surface. The terminal ornament has been included as part of the ship, although we cannot normally discern if it may have been a structural feature of the hull.

denotes that a representation which has been described and illustrated in the text from the seal (i.e. nos. 15, 24 and 28) has been reversed for comparative purposes.

<u>Left</u>	<u>Right</u>	<u>Even</u>	<u>?</u>
8	1	5	2
20	4	7	13
24*	5	9	15*
28*	6	12	16
	10	14	17
	11	21	18
	19	22	
	27	23	
	29	25	
		26	
		30	
		31	

When the ends are of unequal heights, the right end is higher more often than the left (nine times versus four times). It is interesting to note that those representatives with the ends of equal height are almost the same in number (twelve) as those with either the left or right end higher (thirteen).

Terminal ornament:

The extremely wide range of types of terminal ornaments makes it difficult to break them down into tidy classifications. I have chosen the six classifications where the ornament occurs more than once, added an "odd" category for those that occur only once and an eighth category for those representations where the ends are not preserved. Each representation is classified twice; once for its left (L) end and once for its right (R) end. An asterisk again denotes that

the representation has been reversed for comparative purposes.

<u>Bifurcation</u>	<u>Pointed extension</u>	<u>Trifoliation</u>	<u>Arrowhead</u>
L1	L7	R3	R12
R1	L14	R4	R13
R2	L22	R5	R16
L5	R22	R6	R19
R7	R28*	R15*	
L12	R30		
R20			
R24*			
L25			
L26			
L27			
L29			

<u>Hull end at right angle</u>	<u>Hull narrows to point</u>	<u>Odd</u>	<u>?</u>
L10	L8	L3	L2
R29	R8	R10	L4
	L9	R11	L6
	R9	R14	L15
	L11	R18	L15*
	L20	L19	L16
	R21	L24*	L17
	R23	R27	R17
	R25	L28*	L18
	R26	L30	L21
	R31	L31	L23

Oars:

The following four lists contain (1) those ship representations on which oars are depicted, their number and direction in which they incline (pointing downwards); (2) those ship representations on which oars may be depicted, their number and the direction in which they incline (pointing downwards); (3) those ship representations on which oars are not depicted; (4) those ship representations which are not preserved fully enough to discern whether or not there

are oars (under the ? category). When the ends are of unequal heights on those representations on which it is certain that oars are preserved, it has been noted towards which end (the higher or the lower) they point down.

Definite oar representations

<u>Cat. no.</u>	<u>Oars</u>
1	5 (left; lower)
2	5 (left)
5	5 (left; lower)
6	8 (left; lower)
8	11 (both left and right)
14	4 (left)
19	4-5 (straight down)
20	4 (right; lower)
23	5 (right)
25	7 (right)
26	9 + 2 steering oars (?) (left?)
27	5 (left; lower)
28	1 paddle (?) (straight down)
30	17 (straight down and right); + 9 far-side oars (?) (left)
31	6 (straight down)

Possible oar representations

<u>Cat. no.</u>	<u>Oars</u>
7	5-6 (straight down)
9	5 (right)
12	5 (right)
16	6-7 (left)
22	9-10 (right)
29	5-8 (both left and right)

<u>No Oars</u>	<u>?</u>
3	15
4	17
10	18
11	21
13	
14	
24	

Oars can point downwards in either direction, although the left (seven examples) appear to be the more popular

direction (only three representations have oars pointing only to the right). When the ends are of unequal heights, and the oars incline in only one direction, they are never inclined down towards the higher end.

Mast:

Nos. 9 and 28 have no masts. All other ships have single masts, with the exception of nos. 17 and 18, both of which are damaged where their masts ought to be, but show rigging lines in the same positions as stays on ships with masts preserved.

Rigging:

The six lists below contain the various combinations of stays on each side of the mast (e.g. the list under "three stays" denotes that there are three stays on each side of the mast). The "odd" category lists those representations where the stays to the left (L) of the mast are different in number from those to the right (R) of the mast. The questionable (?) category lists those representations only partially preserved. An asterisk after a catalogue number denotes that the representation has been reversed for comparative purposes.

Same Fore and Aft

<u>Three stays</u>	<u>Two stays</u>	<u>One stay</u>
1 13	2 27	20
3 19	8 29	31
5 25	12	
6 26	21	
11	23	

<u>Odd</u>	<u>No stays</u>	<u>?</u>
4 (L3, R2)	9 (no mast)	17 (R3?)
7 (L0, R4)	10	18 (R2?)
14 (L2, R3)	16	22
15* (L2, R3)	28* (no mast)	30 (L3, R3?)
24* (L2, R1)		

Stays are normally depicted, and when they are, they are (with five exceptions) the same number on each side of the mast. The stays are usually straight, diagonal lines (those on nos. 8, 19 and 30 are curved), attached to various positions on the mast and on the hull. Most have been represented at fairly low positions on the mast.

No. 10, although apparently having no stays, is noteworthy, for it appears to have a lowered yard and two lifts on each side of the mast.

Sail:

The only clearly recognizable sail is on no. 30. The objects above the hulls of nos. 16 and 22 are where one would assume that a sail would be, but they are not very informative. The sail on no. 30, however, is quite clear. Both yard and boom are present; the sail is depicted on the far-side of the mast with concave sides so as, one would imagine, to give the impression of an inflated sail. On the sail there is a diagonal network pattern.

Late Bronze Age

Seal shape and material:

(See the abbreviations on p. 64).

<u>Cat. no.</u>	<u>Seal type</u>	<u>Material</u>
32	amygdaloid	black steatite
33	?	?
34	amygdaloid	carnelian
35	"impression"	----
36	?	?
37	"impression"	----
38	"impression"	----
39	elliptical lentoid	black steatite
40	elliptical lentoid	black steatite
41	lentoid	milk-grey sardonyx

The small number of Late Bronze Age realistic ship representations (only ten) and the fact that three of them are impressions and the information for two of them unavailable diminishes the relative value of examination of seal shapes and material.¹⁹ Of the two amygdaloids, one is in steatite, the other carnelian. Two of the three lentoids are in steatite, the remaining one in sardonyx.

Hull:

There are no examples from this period with purely angular lines, thus we are limited to three categories.²⁰

(See the abbreviations on p. 66).

<u>Curv.</u>	<u>Curv.-Straight</u>	<u>?</u>
35	32	34
36		37
39		38
40		41

19. Betts (1973) 329, suggested that no. 37 may have been made by a lentoid, no. 38 a lentoid or a signet ring:

20. No illustration of no. 33 was available, it has been omitted, for that reason, from the following discussions.

High ends:

<u>Left</u>	<u>Right</u>	<u>Even</u>	<u>?</u>
-----	36	35	32
		39	34
		40	37
			38
			41

The partially preserved state of five of the representations hinders any analysis.

Terminal Ornament:

(See the abbreviations on p. 67).

<u>Hull narrows to point</u>	<u>Vertical extension and two carets</u>	<u>Trifoliation</u>
L36	L40	R35
R36	R40	
L39		
R39		

<u>Odd</u>	<u>?</u>
L35	L32
	R32
	L34
	R34
	L37
	R37
	L38
	R38
	L41
	R41

Oars:

(See the discussion on p. 68-69).

Definite oar representations

<u>Cat. no.</u>	<u>Oars</u>
32	11-12 (right)
38	3 preserved (right)
39	15 + 2 steering oars (right)
40	10-11 (on each side of the hull?) (right)

Probable oar representations

<u>Cat. no.</u>	<u>Oars</u>
35	1. (perhaps a paddle) (left)
<u>No oars.</u>	<u>?</u>
34	37
36	41 (1 steering oar?)

The four representations which have oars preserved show them pointing to the right. No. 38 is a tantalizing fragment; one wishes that the ends of the ship had been preserved so that we could discern whether the ends were of unequal heights, and if so, to which end (i.e., the high or the low end) the oars point.

Mast:

All representations except nos. 35 and 36 have single masts.

Rigging:

(See the discussion on p. 70).

Same fore and aft

<u>Three stays</u>	<u>Two stays</u>	<u>One stay</u>
34	-----	-----
<u>Odd</u>	<u>No stays</u>	<u>?</u>
41 (L2, R0)	35 (no mast)	32 (L3, R3?)
	36 (no mast)	37
	39	38 (L1?)
		40 (L3, R3?)

The four representations in the questionable category can be interpreted in various ways. The three lines on each side of the mast on no. 32 are most probably stays, despite

their awkward position. No. 37 appears to have two lifts on each side of the mast running down towards a lowered yard (as does no. 39). No. 38 could show one of several alternatives (discussed in the catalogue); there is simply no way to determine the exact rigging. The same is true of no. 40. If the horizontal line on no. 40 is a lowered yard, then one or all of the three lines on each side of the mast could be lifts. No. 34 is by far the clearest and most informative example. Here we see three stays on each side of the mast and a rare example of halyards.

Sail:

Two representation (nos. 32 and 34) show sails. A yard and a boom are present on no. 32; the sail depicted on the far-side of the mast, with concave sides (as on no. 30, ^{attributed to} the MM period). On the sail there is a diagonal network pattern. The sail on no. 34 is somewhat similar. Here only a boom is present; the top of the sail is apparently omitted. The sides of the sail are concave and there is a diagonal network pattern on the sail; however, the sail is depicted on the near-side of the mast.

General Conclusions:

Realistic Ship Representations

In bringing together the material from the Middle Bronze and Late Bronze periods, one is severely restricted by

(1) the few examples from the Late Bronze period and (2) the poor state of preservation of three of the ten representations.²¹ The small number of ship representations from the Late Bronze period may be fortuitous, but I suspect that it may be the result of movement away from the realistic representations to the abstract ones. One should note that all forty-four abstract ship representations are dated partially or fully to the Late Bronze period (as compared to the ten Late Bronze realistic representations).

In seal shape and material, it again may be due to the small number of ship representations preserved that there are no three-sided prisms (the overwhelming favorite shape in the Middle Bronze period) with ship representations in the Late Bronze period. The amygdaloid and the lentoid are the two shapes documented for the Late Bronze period. There is one example of an amygdaloid (no. 30) in the earlier period; none of the lentoid. Steatite in both periods is the favorite material. The harder carnelian and sardonyx (nos. 34 and 41 respectively) are documented in the later period, although there are isolated examples of carnelian (no. 22) and other harder stones in the earlier period.²²

21. In addition, no illustration of no. 33 was available and nos. 35 and 36 have virtually no applicable use.

22. Two examples of chalcedony (nos. 25 and 27) and one of agate (no. 28). Serpentine (no. 21) and marble (no. 30) are documented in the MM period. Neither is as hard as the crypto-crystallines (i.e., carnelian, chalcedony, agate, etc.) mentioned earlier, but both are harder than steatite; see Boardman (1976) 374-376.

The hull shape in both periods tends to be rounded on the ends, with some examples of straight sections amidships. One should note, however, that of the forty-one realistic ship representations, eleven have one or both ends missing.²⁵ The ends can either be of the same or different heights (fourteen representations where the ends are of unequal heights, fifteen representations where the ends are equal in heights). When they are of unequal heights, it is more often the right end (ten examples) than the left (four examples) which is higher.

The terminal ornament for realistic ship representations assumes many different shapes. We are again severely restricted by the small number of Late Bronze examples and the fact that only four representations (nos. 35, 36, 39 and 40) have both ends preserved. The only two terminal ornaments which appear to continue into the Late Bronze period are the trifoliation (no. 35) and the hull ends narrowing into points (nos. 36 and 39).

Oars are depicted on a majority of ship representations. Of those ships with definite oar representations, the number of oars varies from four (no. 14) to seventeen (no. 30). Five-oared vessels are documented more than any other type (nos. 1, 2, 5, 23 and 27, all MM). Oars can point down either towards the left (seven examples), to the right (seven examples), straight down (three examples) or both to the

25. In addition, no illustration was available for no. 33.

right and to the left on the same ship (no. 8).²⁴ Two steering oars appear to be preserved on nos. 26 and 39.²⁵ On no. 26 the oars appear to point straight down, although they may be set slightly towards the left (i.e., towards the steering oars); it is impossible to discern clearly. On no. 39 the oars clearly point down towards the right (i.e., away from the steering oars). Unfortunately, there are no ships from the Late Bronze period which have preserved both oars and ends of unequal heights. From the MM evidence, it has already been noted that the oars never incline down towards the higher end; but this cannot be applied to the Late Bronze period without firm evidence.

Four representations clearly show unmasted ships (nos. 9, 28, 35 and 36). In all four of these representations, there are human figures in the ship.²⁶ The masts on nos. 17 and 18 are not preserved because of damage to the stone, but there appear to be stays and thus probably masts in the original engravings. There is no realistic ship representation which shows more than one mast on a ship.

Where there is a mast, stays are normally shown (except nos. 10, 16 and 39), and when they are, the number of stays is usually the same on each side of the mast.²⁷ Other rigging

24. A paddle may be shown on nos. 28 and 35.

25. Perhaps one on no. 41.

26. In nos. 35 and 36, these figures may be divine. See Marinatos (1933) 225 and Persson (1942a) 84, 99, 180, for no. 35; Davaras (1976) 289, 326-327 and Brown (1978) 637, 640, for no. 36.

27. Note that of the three exceptions which do not have

includes lifts (nos. 10, 39 and perhaps no. 37; in all three instances running down to a lowered yard; nos. 38 and 40 may be equipped with one or more lifts) and one example of hal-yards (no. 34).

The three clearly identifiable sail representations (one MM, two LM) are very similar. Yard and boom are clearly present on nos. 30 and 32, while only the boom is shown on no. 34. Nos. 30 and 32 depict the sail on the far-side of the mast, no. 34 on the near-side. The sides of the sails on all three examples are concave (to give an impression of being inflated?) and all three have a diagonal network pattern on the sail itself. (See p. 79a).

stays, nos. 10 and 39 are rigged with lifts, while no. 16 is rather fantastic in its overall appearance. The examples showing unbalanced stays are nos. 4, 7, 14, 15, 24 and 41.

These three representations (nos. 30, 32 and 34) pose something of a problem. In appearance (specifically in having a mast and a sail) they are somewhat similar to Motif 1 in the abstract section. So, too, all three are amygdaloids and two are in harder materials (nos. 30 marble and 34 carnelian). This may suggest that the criteria for the "talismanic" class of gems are wrong or that the criteria have not been systematically applied. It appears to this writer that the visual aspect of the "talismanic" class of gems has been the major criterion and that the shape and material have been brought in to support the visual distinction.

In this respect, no. 22 and perhaps nos. 21 and 36 are also troublesome. No. 22 is a three-sided prism (apparently with amygdaloid faces) of carnelian, no. 21 a three-sided prism (oval faces?) of serpentine and no. 36 appears to be an amygdaloid (shape and material of this seal are not published). These facts in combination with the schematic character of these representations suggest that they may belong to the "talismanic" class of gems, although no scholar has classified them as such.

These problems are related to the troublesome question of "talismanic" gems as a whole. A large amount of work desperately needs to be done on this subject. Specifically, this writer would like to see a systematic examination of Aegean and Greek Bronze Age seals which would deal with the relationship between seal shape, material and engraving technique (see also my comments on pp. 139-140).

Chapter III

Abstract Ship Representations

Motif 1

Mast and sail above the hull.

42.

Current location: Geneva, anonymous dealer.

Provenience: unknown, said to have come from Crete.

Date: MM II-LM I.

CMS number: CMS X, no. 227.

Seal type: amygdaloid of orange-red carnelian with darker areas. The seal is broken at one end and the engraved surface is badly cracked and chipped.

Measurements: L.-1.52; H.-1.30; D.-0.70; SH.-0.22.

Bibliography: Betts (1973) 331-332, fig. 9.
(1980) 11, 201 (no. 227).
Humphreys (1977) 352 (Additions, no. 5a).

Description:

Hull: curved upwards to the left and to the right. Neither end preserved because of damage to the stone.

Hull decoration: longitudinally bisected.

Terminal ornament: not preserved.

Oars: none.

Mast: amidships.

Rigging: above the sail (and attached to it) are found three marks to the left and two marks to the right of the mast (perhaps lifts?).

Sail: top and bottom of sail straight; no separate yard or boom depicted. Depicted on near-side of mast. Sides of sail move in to a sharply-angled waist. Intersecting horizontal and vertical lines on sail (cf. no. 43).

Field: five pairs of marks intersect in a zig-zag pattern below the hull.

The paired diagonal marks under the hull here and on other abstract ship representations may represent waves.

43.

Current location: Great Britain, N. Colville Collection.

Provenience: unknown.

Date: LM IB.

CMS number: CMS VIII, no. 106.

Seal type: lentoid of burnt carnelian.

Measurements: L.-1.5; SH.-0.25.

Bibliography: Betts (1973) 331-332, 338.
Boardman (1970) 44-45, fig. 99.
Casson (1971) 33-34, 40, fig. 40.
(1975) 4, 6.
Gray (1974) 18 (no. C 26), 45,
fig. 9 (e).
Kenna (1967) 138 (no. 106).
Laviosa (1969-1970) 22 (fig. 19), 25.

Description:

Hull: top hull line fairly straight amidships, curving upwards slightly at both ends. Bottom hull line gently curved, narrows at both ends into a point. Ends of equal heights.

Terminal ornament: each end narrows into a point.

Oars: ten, pointing down towards the left.

Mast: slightly left of amidships. Relatively thick; bifurcated top (?).

Rigging: two diagonal marks to the left and two diagonal marks to the right of the mast run down from the masttop to the yard. To the left of the mast two diagonal marks and three vertical marks connect the boom to the hull. To the right of the mast three diagonal marks and two vertical marks connect the boom to the hull.

Sail: top and bottom of sail straight. Depicted on far-side of mast. Yard and boom shown. Sides of sail move in to a sharply-angled waist. Intersecting horizontal and vertical lines on sail (cf. no. 42).

Field: curved object below hull; intersected by the oars. Vertical mark stands on the yard to the left of the mast.

The only identifiable rigging lines would be the two lifts on each side of the mast. Other apparent rigging lines are placed illogically and in nonfunctional positions.

44.

Current location: Geneva, H. Basel and M. L. Erlenmeyer Collection.

Provenience: unknown. Betts (1980) noted that it was acquired in Greece.

Date: LM IB.

CMS number: CMS X, no. 100.

Seal type: amygdaloid of green jasper.

Measurements: L.-1.70; H.-1.16; D.-0.68; SH.-0.22.

Bibliography: Betts (1973) 331-332, 338.
 (1980) 12, 125 (no. 100).
 Erlenmeyer and Zai-Boerlin (1961) 17
 (no. 45), pl. 6 (no. 80).
 Humphreys (1977) 353 (Additions,
 no. 12).

Description:

Hull: roughly crescent-shaped. Ends of equal heights.

Hull decoration: ends longitudinally bisected.

Terminal ornament: each end narrows into a point.

Oars: none.

Mast: slightly right of amidships. Relatively thick.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: roughly rectangular. Depicted on near-side of mast. No separate yard depicted. Boom relatively thick. Ends are curved. Diagonal network pattern on sail.

Field: empty.

45.

Current location: Iraklion, Giamalakis Collection
#3071.

Provenience: Lasithi.

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of chalcedony. The seal is damaged at both ends of the seal hole.

Measurements: L.-1.3; H.-1.2.

Bibliography: Betts (1973) 331-332, 338;
Casson (1971) 33-34, 40, fig. 38.
(1975) 4, 6.
Gray (1974) 18 (no. C 24), 45,
fig. 9 (h).
Laviosa (1969-1970) 19.
Xénaki-Sakellariou (1958a) 52 (no.
341), 78-80, pls. 13 (no. 341),
18 (no. 341).

Description:

Hull: crescent-shaped. Lower part of left end not preserved because of damage to the stone. Ends of equal heights.

Hull decoration: six very faint diagonal marks pointing down towards the left are on the right end of the hull.

Terminal ornament: right end narrows into a point. "Elbows" above the left and right ends.

Oars: thirteen; all (except the fourth one from the left) point down towards the left end of the

ship. The one exception points down towards the right.

Mast: amidships. Relatively thick.

Rigging: a single, vertical mark on each side of the mast attaches the boom to the hull. Two curved marks to the left of the mast attach the boom to the left ship end. Two curved marks to the right of the mast attach the boom to the right ship end.

Sail: roughly rectangular. Depicted on far-side of mast. Yard and boom shown. Numerous vertical (some slightly diagonal) marks on the sail are intersected by one long diagonal mark to the left of the mast; two long diagonal marks to the right of the mast.

Field: short, vertical mark on ship to the right of the mast.

The two lines parallel to the mast, are probably halyards; the four curved lines probably stays.

Motif 2

Vertical elements above hull. Between these diagonal network patterns; the whole surmounted by two crescents.

46.

Current location: Iraklion, Archaeological Museum
#643.

Provenience: Crete.

Date: LM I (?).

CMS number: -----.

Seal type: three-sided prism (amygdaloid faces) of orange-red carnelian.

Measurements: L.-1.7; H.-1.2.

Bibliography: Betts (1968) 149-150 (no. 3), pl. 61, fig. 5.

(1973) 332-334, fig. 11.

Davaras (1976) 287, fig. 163.

Février (1935) 109.

Gray (1974) 17 (no. C 10).

Humphreys (1977) 351.
 Kenna (1969) pl. 13 (no. 6).
 Laviosa (1969-1970) 19.
 Marinatos (1926b) 81, fig. 2 (d).
 (1933) 177 (no. 45), pl. 16
 (no. 45).
 Mosso (1910) fig. 160 (no. 5).
 Paglieri (1960) 215, fig. 4 (no. 45).
 Xanthoudides (1907-1909) 184 (no. 164).
 pl. 8 (no. 164).

Description:

Hull: top hull line emerges from right in a very gentle curve. Bottom hull line emerges from right curving upwards gently then abruptly to the left into a point. Right end omitted.

Hull decoration: nine marks pointing down towards the right.

Terminal ornament: short diagonal extension on left end; "elbows" above and below.

Oars: perhaps the nine marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two "bundles," each consisting of three vertical elements. Between these and to the right parallel, diagonal marks. Two linked crescents surmount this structure. Two diagonal elements connect the left crescent to the hull (see pp. 128-129). The area to the far right is too worn to discern clearly.

Field: five pairs of diagonal lines intersect in a zig-zag pattern below the hull.

47.

Current location: Oxford, Ashmolean Museum
 #1938.966.

Provenience: Eretria.

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of brown and white agate.
The stone is badly fractured and one end is missing.

Measurements: L.-1.6; H.-1.55; SH.-0.25.

Bibliography: Betts (1968) 149.
Casson (1971) 34 n.10, 42.
Gray (1974) 17 (no. C 11).
Kenna (1960) 124 (no. 241), pl. 10
(no. 241).
Laviosa (1969-1970) 19.

Description:

Hull: top hull line emerges from right curving downwards slightly then upwards abruptly to the left. Bottom hull line emerges from right straight then curves upwards abruptly to the left into a point. Right end omitted.

Hull decoration: seven (perhaps eight) marks pointing down towards the right.

Terminal ornament: short extension on left end. Carets above and below the left end.

Oars: perhaps the seven (or eight) marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two thick, vertical elements. Between these and to the right of the right vertical element are diagonal network patterns. Each diagonal network pattern surmounted by a crescent. One diagonal mark connects the left vertical element to the left end of the ship (see pp. 128-129).

Field: five (perhaps six) pairs of diagonal marks intersect in a zig-zag pattern under the hull.

48.

Current location: Iraklion, Giamalakis Collection
#3151.

Provenience: unknown.

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of chalcedony.

Measurements: L.-1.8; W.-1.4.

Bibliography: Casson (1971) 40.
 Gray (1974) 18 (no. C 18).
 Laviosa (1969-1970) 19.
 Xénaki-Sakellariou (1958a) 52 (no. 339),
 78-79, pl. 27 (no. 339).

Description:

Hull: two vertical marks appear to define the right edge of the representation. From the left one the top hull line emerges straight then curves upwards slightly to the left. Bottom hull line emerges from the left vertical mark curving downwards slightly then upwards abruptly to the left into a point. It appears as if the right end has been omitted.

Hull decoration: perhaps longitudinally bisected for a short distance on the left end. Six marks point down towards the right.

Terminal ornament: very short, diagonal extension on left end. Carets above and below the left end.

Oars: perhaps the six marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two vertical elements. Between vertical elements and to the right diagonal network patterns. Each diagonal network pattern surmounted by a crescent. Two diagonal marks connect the left vertical element to the left end of the ship (see pp. 128-129).

Field: two vertical marks to the right (cf. hull description above).

49.

Current location: London, British Museum #1884.6-
 28.9.

Provenience: Crete.

Date: LM I-LM II.

CMS number: CMS VII, no. 104.

Seal type: amygdaloid of carnelian.

Measurements: L.-1.8; H.-1.4; SH.-0.15.

Bibliography: Betts (1968) 149-150.
 (1973) 332-334.
 Boardman (1970) 44-45, fig. 98.
 Brown (1978) 632, 635 (fig. 12), 639.
 Casson (1971) 33-34, 40, fig. 42.
 Davaras (1976) 287, fig. 163.
 Février (1935) 109.
 Furtwängler (1900) vol. I, pl. 4
 (no. 2), vol. II, 18 (no. 2).
 Furtwängler and Loeschcke (1886) 76,
 pl. E20.
 Gray (1974) 17 (no. C 9), 45, fig. 9
 (b).
 Höckmann (1968) 1178.
 Hutchinson (1962) 94 (fig. 15, right),
 95-96.
 Kenna (1967) 143 (no. 104).
 (1969) pl. 13 (no. 5).
 Laviosa (1969-1970) 19.
 Marinatos (1926b) 81, fig. 2 ("zeta").
 (1930) 123-124, fig. 11.
 (1933) 177 (no. 44), pl. 16
 (no. 44).
 Paglieri (1960) 215, fig. 4 (no. 44).
 Walters (1926) 3 (no. 13), pl. 1
 (no. 12).

Description:

Hull: top hull line emerges from right straight then curves upwards abruptly to the left. Bottom hull line emerges from right, curving downwards then upwards abruptly to the left into a point. Right end omitted.

Hull decoration: divided longitudinally into three sections for approximately two-thirds (to the right) of the preserved length.

Terminal ornament: short, diagonal extension on left end. "Elbow" above and below the left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three vertical elements (the one farthest left consisting of two thin, vertical elements). Between vertical elements are diagonal network patterns. The whole structure is surmounted by two linked crescents. Two diagonal elements connect the top of the vertical element farthest left with the hull (see pp. 128-129). Blemish on left crescent.

Field: three pairs of diagonal marks intersect in a zig-zag pattern under the left end of the ship.

50.

Current location: Geneva, Musée d'Art et d'Histoire #20475 (formerly in the Southesk Collection; later in the Kenna Collection).

Provenience: unknown.

Date: LM I-LM II.

CMS number: CMS VIII, no. 139.

Seal type: amygdaloid of rock crystal.

Measurements: L.-2.2; H.-1.5; SH.-0.2.

Bibliography: Betts (1968) 149 (no. 8), pl. 61, fig. 6.

(1973) 332-334, fig. 10.

Carnegie (1908) 204 (no. 015), pl. 16 (no. 015).

Casson (1971) 40.

Février (1935) 109.

Gray (1974) 17 (no. C 12), 45, fig. 9 (c).

Humphreys (1977) 352.

Hutchinson (1962) 94 (fig. 15, middle), 95-96.

Kenna (1966) 191 (no. 139).

Laviosa (1969-1970) 19.

Marinatos (1926b) 81, fig. 2 ("eta").

(1933) 178 (no. 51), pl. 16 (no. 51).

Paglieri (1960) 215, fig. 4 (no. 51).

Description:

Hull: top hull line emerges from right fairly straight curving upwards slightly to the left. Bottom hull line emerges from lower right field curving upwards abruptly to the left to meet the terminal ornament. Right end omitted.

Hull decoration: longitudinally bisected for all but the raised left section. The left hull end seems to be covered by a large knob, from which two amorphous extensions stretch back along the hull.

Terminal ornament: diagonal extension on left end. Very short, diagonal mark outboard on this extension. "Elbows" above and below left end.

Oars: perhaps the seven irregular diagonal marks on the hull (?).

Mast: unrecognized.

Rigging: unrecognized.

Sail: unrecognized.

Above hull: three thick, vertical elements (blunt-pointed tops). Between vertical elements diagonal network patterns. The whole structure surmounted by two linked crescents. The vertical element farthest right continues, narrowed, into the hull area.

Field: empty.

Motif 2a

Variation of Motif 2: no crescents surmounting the diagonal network patterns.

51.

Current location: Geneva, H. Basel and M.-L Erlenmeyer Collection.

Provenience: unknown. Betts noted that the seal was acquired in Greece.

Date: MM III-LM I.

CMS number: CMS X, no. 110 (b).

Seal type: three-sided prism (amygdaloid faces) of orange-red carnelian with pale grey and dark red

markings. The seal is damaged at the ends of the seal hole.

Measurements: L.-1.73; H.-1.00 (each face); D.-0.98;
SH.-0.18.

Bibliography: Betts (1980) 12, 131-132 (no. 110, b).

Description:

Hull; top hull line emerges from left straight then curves upwards slightly to the right. Bottom hull line emerges from left curving upwards more sharply to the right into a bifurcation. Left end omitted.

Hull decoration: appears to be divided longitudinally into three sections, the central section clearly defined only for about one-half the length portrayed (to the right).

Terminal ornament: right end bifurcated. Horizontal mark on top of the right end; caret below.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two tall, thick, vertical elements rising to blunt points; parts of two others, perhaps originally similar, to the left: one sloping to right; one vertical. Between vertical elements diagonal network patterns. To right, a thinner vertical element, connected to the hull at the base of the terminal ornament by a diagonal element; slightly broader (see pp. 128-129).

Field: two pairs of diagonal marks intersect in an inverted V below the right end of the hull.

52.

Current location: Iraklion, Archaeological Museum
#1054 (Metaxas Collection).

Provenience: Smari.

Date: LM IB.

CMS number: CMS IV, no. 227.

Seal type: amygdaloid of red and white banded sardonyx. A small part of the engraved field is lost owing to a fracture.

Measurements: L.-2.17; H.-1.54; D.-0.84; SH.-0.2.

Bibliography: Alexiou (1965) 551.
Betts (1973) 332-334.
Humphreys (1977) 353 (Additions, no. 14).
Kenna and Sakellarakis (1969) 258 (no. 227).
Laviosa (1969-1970) 19.

Description:

Hull: top hull line emerges from the right straight then curves upwards gently to the left. Bottom hull line emerges from the right curving upwards to the left into a point. Right end omitted.

Hull decoration: nine diagonal marks pointing down towards the right.

Terminal ornament: long, pointed projection on left end. Perhaps a very crude caret above the left end.

Oars: perhaps the nine diagonal marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three thick, vertical elements (blunt-pointed tops). Diagonal network patterns between the vertical elements. Three pairs of diagonal marks intersect in a zig-zag pattern above the structure. Five diagonal marks (irregular lengths) to the left of the zig-zag pattern.

Field: diagonal network pattern below the left end of the hull.¹ Two pairs of diagonal marks to the right of this.

Motif 2b

Variations on the vertical elements and diagonal network patterns (Motifs 2 and 2a) above the hull.

1. Betts described this feature as a fishing net.

53.

Current location: Geneva, H. Basel and M.-L. Erlenmeyer Collection.

Provenience: unknown. Betts noted that it was acquired in Greece.

Date: MM III-LM I.

CMS number: CMS X, no. 99.

Seal type: amygdaloid of green jasper.

Measurements: L.-2.25; H.-1.56; D.-0.80; SH.-0.18.

Bibliography: Betts (1980) 8, 124 (no. 99).

Description:

Hull; top and bottom hull lines nearly parallel; hull emerges from the right curving upwards abruptly to the left, narrowing into the terminal ornament. Right end omitted.

Hull decoration: hull divided longitudinally into three (perhaps four) sections. Ten diagonal marks (pointing down towards the right) intersect with the bottom hull line. Five diagonal marks (pointing down towards the right) run to the right to the edge of the engraved surface. Four vertical marks intersect the top hull line to the far right.

Terminal ornament: left end extended upwards by a long projection. To the right and left of this there are single "elbows."

Oars: perhaps the ten marks on the hull intersecting the bottom hull line.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three vertical elements surmounted by an horizontal element (its left end missing; continuation to join vertical element farthest left uncertain). Between vertical elements chevron patterns surmounted by open hanging triangles; marks parallel to the chevrons continue to the sides of the open triangles. Vestiges of a further structure extend above the center of the horizontal element.

Field: to the left numerous tall, vertical elements intersected by a row of short, horizontal marks. Two thick V's, one inverted, below the left end of the hull.

54.

Current location: Great Britain, J. M. Dawkins Collection.

Provenience: unknown.

Date: LM IA.

CMS number: CMS VIII, no. 49.

Seal type: amygdaloid of agate.

Measurements: L.-1.5; H.-1.1; SH.-0.2.

Bibliography: Betts (1968) 150.
Casson (1971) 33-34, 42 n.5, fig. 45.
Gray (1974) 18 (no. C 15).
Kenna (1966) 68 (no. 49).
Laviosa (1969-1970) 19.

Description:

Hull: emerges from the lower left field curving upwards abruptly into a point. Left end omitted.

Hull decoration: longitudinally bisected.

Terminal ornament: caret above right end; perhaps a caret below.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: to the left one very thick, vertical element; to the right two thin, vertical elements stand together. Between the vertical elements is a crude diagonal network pattern.

Field: starting slightly above upper hull line to the right, three pairs of diagonal marks intersect in a zig-zag pattern. These three pairs of diagonal marks appear to be attached to the thin, vertical element to the right. Four (five?)

vertical marks intersect with two longer horizontal marks at top right.

55.

Current location: New York, Metropolitan Museum of Art #26.31.225.

Provenience: unknown.

Date: LM I.

CMS number: CMS XII, no. 224.

Seal type: amygdaloid of opaque pink carnelian.
Part of the seal is fractured:

Measurements: L.-1.95; H.-1.4; SH.-0.17.

Bibliography: Humphreys (1977) 353 (Additions, no. 9).
Kenna (1972) 318 (no. 224).

Description:

Hull: top hull line emerges from the right in a gentle curve. Bottom hull line emerges from right curving upwards abruptly into a point. Right end omitted.

Hull decoration: four diagonal marks pointing down towards the right.

Terminal ornament: left end narrows into a long, pointed projection.

Oars: perhaps the four marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two thick, vertical elements. Diagonal network pattern and a crescent between vertical elements. Inverted crescent above right vertical element; two curved objects to the right of it. Thin, vertical mark to the left of the left vertical element. Two thin, diagonal marks connect the top of the vertical mark to the rod-like extension on the left end (see pp. 128-129).

Field: short, diagonal mark and two crescents under the left end.

56.

Current location: Berlin, Staatliche Museen
Preussischer Kulturbesitz, Antikenabteilung
#FG.50.

Provenience: unknown.

Date: LM I (?).

CMS number: -----.

Seal type: three-sided prism (amygdaloid faces).
The seal is damaged at one end.

Measurements: -----.

Bibliography: Davaras (1976) 287, fig. 163.
Février (1935) 109.
Furtwängler (1896) 6 (no. 50, b),
pl. 2.
Gray (1974) 17 (no. C 8).
Kenna (1969) pl. 13 (no. 4).
Laviosa (1969-1970) 19.
Marinatos (1933) 177 (no. 43), pl. 15
(no. 43).
Paglieri (1960) 213, fig. 3 (no. 43).

Description:

Hull: emerges from a damaged area to the right curving downwards slightly then upwards towards the left into a point. Right end not preserved because of damage to the stone.

Hull decoration: longitudinally bisected. A curved element is found (matching the curvature of the hull) under the hull for approximately four-fifths of its preserved length (omitted under the left end). It is not clear whether or not this is a structural element of the hull.

Terminal ornament: left end narrows into a point. Two diagonal elements intersect in crude T-shaped affair above the left end. "Elbow" below the left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three pairs of thin, vertical elements. The bottom sections of the pair farthest right are not preserved because of damage to the stone. Between the paired vertical elements diagonal network patterns. Horizontal element above the pair of vertical elements and diagonal network pattern farthest left. Two parallel, diagonal elements rise from top hull line to meet intersection of left vertical element with crowning horizontal (see pp. 128-129).

Field: empty.

57.

Current location: Iraklion, Archaeological Museum.

Provenience: Zakro.

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of green pyrite.

Measurements: -----.

Bibliography: Davaras (1976) 287, fig. 163.
 Février (1935) 109.
 Gray (1974) 18 (no. C 14).
 Kenna (1969) pl. 13 (no. 2).
 Laviosa (1969-1970) 19.
 Marinatos (1933) 177-178 (no. 47),
 pl. 16 (no. 47).
 Mosso (1910) fig. 160 (no. 47).
 Paglieri (1960) 215, fig. 4 (no. 47).
 Xanthoudides (1907-1909) 179 (no. 124),
 pl. 8 (no. 124).
 Zervos (1956) 418, pl. 661.

Description:

Hull: top hull line emerges from the right curving downwards slightly then upwards to the left. Bottom hull line emerges from right fairly straight then curves upwards to the left into a point. Right end omitted.

Hull decoration: longitudinally bisected. Numerous very short, diagonal marks (pointing down towards the left) on the hull.

Terminal ornament: left end narrows into a point.
"Elbows" above and below left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two vertical elements. Between them a crude diagonal network pattern. To the right of the right vertical are three short, diagonal elements. Diagonal ladder-like structure connects the left vertical element to the hull (cf. nos. 64 and 65). Above the whole structure are two long, slightly curved elements intersected by eleven short, diagonal elements. Diagonal element runs from this last feature down towards the hull.

Field: three pairs of diagonal marks intersect in a zig-zag pattern below the hull. One pair of diagonal marks below the left end.

58.

Current location: Oxford, Ashmolean Museum
#1941.118.

Provenience: Knossos.

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of green jasper. The stone is fractured.

Measurements: L.-1.8; H.-1.3; SH-0.2.

Bibliography: Casson (1971) 40.
Gray (1974) 18 (no. C 13).
Kenna (1960) 130 (no. 288) pl. 11
(no. 288).
Laviosa (1969-1970) 19.

Description:

Hull: top hull line emerges from right curving downwards then upwards abruptly to the left.

Bottom hull line emerges from lower right field curving upwards abruptly to the left into a point. Right end omitted.

Hull decoration: none.

Terminal ornament: vertical extension on left end. Carets above and below the left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three vertical elements. Between vertical elements diagonal network patterns. Four large linked carets surmount the entire structure. Two diagonal marks connect the large caret farthest left with the hull (see pp. 128-129).

Field: two short, vertical marks intersect at right angles with two long, horizontal marks above the ship.

59.

Current location: Iraklion, Giamalakis Collection
#3270.

Provenience: Mallia (Chrysolakko).

Date: LM I.

CMS number: -----.

Seal type: amygdaloid of chalcedony.

Measurements: L.-2.2; H.-1.6.

Bibliography: Betts (1968) 149-150
Gray (1974) 18 (no. C 19).
Xénaki-Sakellariou (1958a) 52 (no. 340), 78-79, pl. 27 (no. 340).

Description:

Hull: crescent-shaped. Right end slightly higher.

Hull decoration: none.

Terminal Ornament: both ends narrow into a point. Two carets (one above the other) above the right end.

Oars: ten (perhaps eleven) pointing down towards the lower (left) end of the ship.

Mast. unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: one thick, vertical element to the left, two thin, vertical elements to the right. Between these vertical elements are diagonal network patterns.

Field: two curved marks above the ship, stretching from the terminal ornament at right, to the outboard edge of the thick, vertical element.

60.

Current location: Paris, Louvre, Chandon de Briailles Collection #2.

Provenience: Crete (?).

Date: LM I-LM II.

CMS number: CMS IX, no. 116.

Seal type: amygdaloid of carnelian. The seal is chipped at one end of the seal hole and on the engraved surface.

Measurements: L.-2.0; H.-1.5; SH.-0.75.

Bibliography: Gray (1974) 18 (no. C 20b).
Humphreys (1977) 352.
van Effenterre and van Effenterre
(1972) 140 (no. 116).

Description:

Hull: very little preserved because of damage to the stone. Most of the top hull line is missing. Apparently emerged from the left curving downwards and then upwards abruptly to the right. Bottom hull line emerges from the left curving downwards and then upwards abruptly to the right into a point. Left end omitted.

Hull decoration: only discernible features are numerous diagonal marks (irregular in length) pointing down towards the right end.

Terminal ornament: right end appears to be pointed; perhaps an "elbow" above the right end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three thick, vertical elements. Each continues upwards to the edge of the engraved surface. Between vertical elements are diagonal network patterns. Inverted crescent (?) near bottom of left diagonal network pattern; crescent near the top. Inverted crescent on middle vertical element. Inverted crescent (?) near bottom of right diagonal network pattern; crescent near the top. Two diagonal elements appear to connect the top of the right vertical element to the hull (see pp. 128-129).

Field: empty.

61.

Current location: Athens, Numismatic Collection
(Schliemann Collection, no inventory number).

Provenience: unknown.

Date: LM.

CMS number: CMS V:1, no. 177.

Seal type: amygdaloid of light brown carnelian.
The back of the stone is colored by veins of red, light yellow-brown and yellow-white.

Measurements: L.-1.8; H.-1.3; D.-0.6.

Bibliography: Pini (1975) 137 (no. 177).

Description:

Hull: top hull line curves upwards very slightly at both ends. Bottom hull line curves upwards slightly to the left to terminate bluntly with the top hull line (the engraving may be damaged

by a scratch or an errant stroke by the engraver on the left of the hull). The bottom hull line curves upwards more sharply to the right into a blunt point. A small portion of the right end may be omitted.

Hull decoration: perhaps longitudinally bisected (?).

Terminal ornament: diagonal extension on left end. "Elbow" above left end (apparently also one below, although the two diagonal elements as preserved do not intersect). Right end narrows to a blunt point (?).

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two vertical elements and one curved element (to the right). Between these elements are diagonal network patterns. Five (perhaps six) vertical elements (of various heights) to the left of the vertical element farthest left. Three curved elements to the right, the one farthest left intersecting the hull.

Field: five pairs of diagonal marks intersect in a zig-zag pattern below the hull.

62.

Current location: Brauron, Brauron Museum (no inventory number).

Provenience: Brauron, found northwest of the Sanctuary of Artemis.

Date: LM.

CMS number: CMS V:1, no. 213 (a).

Seal type: three-sided prism (amygdaloid faces) of red carnelian. A small part of the seal face has been chipped off and there is a fracture in the stone.

Measurements: L.-1.35; H.-0.9, 0.8, 0.8.

Bibliography: Pini (1975) 167-168 (no. 213, a).

Description:

Hull: very difficult to discern. The two vertical elements above the hull appear to divide the hull into two parts. To the left of the vertical elements there is preserved only a very small, thin mark, slightly curved, which may be part of the bottom hull line. To the right of the vertical elements the top hull line is not preserved. It appears to have run in a fairly straight line from the right vertical element to the right end of the ship. The bottom hull line emerges from the right vertical element curving downwards slightly then upwards abruptly to the right into a blunt point (?). Left end appears to be omitted.

Hull decoration: apparently longitudinally bisected (?).

Terminal ornament: diagonal element (pointing down towards the left) below right end. Two diagonal elements intersect in a T-shaped affair above the right end. To the right of the crude T-shaped affair a short, diagonal element.

Oars: perhaps the three (or four) diagonal elements under the hull pointing down towards the left.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two vertical elements stand together. To the left of them a diagonal network pattern. The whole of this surmounted by a horizontal element. Two diagonal elements connect the horizontal element to the hull (see pp. 128-129).

Field: empty.

Motif 3

Two "bundles," each consisting of numerous vertical elements, above the hull. Crescents on "bundles."

63.

Current location: Geneva, anonymous dealer.

Provenience: unknown, said to have come from Crete.

Date: MM III-LM I.

CMS number: CMS X, no. 229.

Seal type: three-sided prism (amygdaloid faces) of red carnelian with darker areas. Only two faces of the gem are engraved and both are chipped.

Measurements: L.-1.80; H.-1.12, 1.03; SH.-0.28.

Bibliography: Betts (1973) 332-334, fig. 12.
(1980) 11, 203 (no. 229, a).
Humphreys (1977) 352 (Additions, no. 5b).

Description:

Hull: top hull line emerges from the right curving upwards gently to the left. Bottom hull line (lower right portion not preserved) emerges from the right curving upwards abruptly to the left into a bifurcation. Right end omitted.

Hull decoration: divided into three irregular sections.

Terminal ornament: left end bifurcated. Below left end an "elbow."

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two "bundles," each consisting of numerous vertical elements. A crescent on each

"bundle." Between "bundles" various diagonal marks. To the left a single, vertical element (pointed on both ends). The top of the element is connected to the hull by two diagonal marks (a single, diagonal element?) (see pp. 128-129).

Field: empty.

64.

Current location: Paris, Louvre, Cabinet des Médailles #AM.1623.25 (E. J. Demargne Collection).

Provenience: unknown.

Date: LM I.

CMS number: CMS IX, no. 117.

Seal type: amygdaloid of red-veined agate. The seal is damaged at one end of the seal hole.

Measurements: L.-2.1; H.-1.6; D.-0.6.

Bibliography: Davaras (1976) 287, fig. 163.
 Delaporte (1920) 93 (no. Δ17), pl. 59 (no. 5).
 Février (1935) 109.
 Gray (1974) 18 (nos. C 20, C 20c).
 Humphreys (1977) 352.
 Kenna (1969) 19, pl. 12 (no. 10).
 Laviosa (1969-1970) 19.
 Levi (1925-1926) 127 (no. 118).
 Marinatos (1933) 178 (no. 49), pl. 16 (no. 49).
 Paglieri (1960) 215, fig. 4 (no. 49).
 van Effenterre and van Effenterre (1972) 141 (no. 117).

Description:

Hull: emerges from right straight then curves upwards abruptly into a point. Right end omitted.

Hull decoration: divided longitudinally into three (?) irregular sections.

Terminal ornament: "elbow" above the pointed left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two "bundles," each consisting of numerous, thin, vertical elements. Two crescents on the left "bundle"; one crescent on the right "bundle." Area to far right not discernable.

Field: diagonal, latticed structure above left end of hull (may be connected to the left "bundle"? Cf. nos. 57 and 65?). Vertical ladder-like structure to the left of the left "bundle." Thin, diagonal mark intersects the ladder-like structure near its base. Six (perhaps seven) irregular diagonal marks below the hull.

65.

Current location: Los Angeles, University of California Museum of Cultural History #X65-12326.

Provenience: unknown.

Date: LM/LH.

CMS number: CMS XIII, no. 66.

Seal type: amygdaloid of red sardonyx. The seal is damaged at one end of the seal hole.

Measurements: L.-1.6; H.-1.3; Th.-0.4.

Bibliography: Humphreys (1977) 352 (Additions, no. 4).
Kenna and Thomas (1974) 68 (no. 66).

Description:

Hull: top hull line fairly straight. Bottom hull line curves upwards slightly to the left; very abruptly to the right into a point. It is not clear whether the abrupt termination of the left end of the hull is meant to show the entire end or to omit part of it (as on other representations which omit one end of the hull).

Hull decoration: divided longitudinally into three sections. The upper and lower sections are very shallow, apparently growing deeper near the right end.

Terminal ornament: two diagonal marks cross to form an X on the left end. Right end narrows into a point.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two "bundles." Left "bundle" consists of four thin, vertical elements; right "bundle" consists of four (perhaps five) thin, vertical elements. Two crescents on each "bundle." From the right "bundle" emerge two horizontal elements, which intersect at right angles, two vertical elements rising from the hull. A third vertical element, shorter and thinner, joins the lower horizontal at its tip. A ladder-like structure attaches the top of the right "bundle" to the right end of the ship (cf. nos. 57 and 67).

Field: six pairs of diagonal marks intersect in a zig-zag pattern below the hull. Single diagonal marks are found under the left and right ends of the hull.

Motif 3a

Variations on the "bundles" of Motif 3.

66.

Current location: London, British Museum #1884.6-28.8.

Provenience: Crete.

Date: LM IA.

CMS number: CMS VII, no. 72.

Seal type: amygdaloid of agate. The seal is damaged at both ends of the seal hole.

Measurements: L.-1.8; H.-1.6; D.-1.0; SH.-0.15.

Bibliography: Betts (1968) 149.
 (1973) 332-334.
 Davaras (1976) 287, fig. 163.
 Février (1935) 109.

Gray (1974) 18 (no. C 23), 45,
 fig. 9 (f).
 Kenna (1967) 109 (no. 72).
 Laviosa (1969-1970) 19.
 Marinatos (1933) 178 (no. 50), pl.
 16 (no. 50).
 Paglieri (1960) 215, fig. 4 (no. 50).
 Walters (1926) 3 (no. 12), pl. 1
 (no. 13).

Description:

Hull: emerges from the right curving upwards abruptly to the left. Left end not preserved because of damage to the stone. Right end omitted.

Hull decoration: appears to be longitudinally bisected. Sixteen (?) short, diagonal marks on hull.

Terminal ornament: perhaps an "elbow" on the left end.

Oars. perhaps some or all of the sixteen (?) marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: perhaps a "bundle" with two inverted crescents, connected to the hull by two marks (see pp. 128-129). To the right of the "bundle" parallel, diagonal marks apparently in an enclosure.

Field: four crescents in upper right field. Palm tree above the left end of the ship. Five pairs of diagonal marks intersect in a zig-zag pattern below the hull.

67.

Current location: Cambridge, Fitzwilliam Museum
 #GR. 58.1901.

Provenience: Palaikastro.

Date: LM IB.

CMS number: CMS VII, no. 227.

Seal type: amygdaloid of red carnelian.

Measurements: L.-1.8; H.-1.5; SH.-0.12.

Bibliography: Betts (1968) 150 (no. 9), pl. 61,
fig. 7.
_____ (1973) 332-334 (fig. 15),
338.
Casson (1971) 33-34, 42, fig. 44.
Gray (1974) 18 (no. C 22).
Humphreys (1977) 352.
Kenna (1967) 284 (no. 227).
Laviosa (1969-1970) 19.

Description:

Hull: top hull line emerges from the left straight. Bottom hull line emerges from left curving downwards slightly then upwards to the right into a point. Left end omitted.

Hull decoration: hull divided longitudinally into two (perhaps three) sections. Four (perhaps five) very faint diagonal marks pointing down towards the left.

Terminal ornament: right end narrows into a point. Caret and a diagonal mark above right end. Single diagonal mark points down towards the left from the tip of the ship end. Three short, diagonal marks (pointing down towards the right) below the right end.

Oars: perhaps the four or five diagonal marks on the hull.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two "bundles," each consisting of thin, vertical elements. Two linked circles on left "bundle," two linked crescents on the right one. Framing the "bundles" are two thin, vertical elements to the left, two thin, horizontal elements above and one thin, vertical element to the right. To the right of this structure are two curved marks and two long, parallel, diagonal marks (bases on the top hull line).

Field: a caret in upper right field; one diagonal mark above it, one (perhaps two) below it. Two V's below the hull. To the left of the right V are two short, diagonal marks, to the right a single diagonal mark.

Motif 4

Thin, vertical elements above the hull. Crescents between the thin, vertical elements.

68.

Current location: Iraklion; Archaeological Museum #613.

Provenience: Knossos.

Date: LM I.

CMS number: -----

Seal type: amygdaloid of orange-red carnelian.

Measurements: L.-1.6; H.-1.1.

Bibliography: Betts (1968) 149-150 (no. 2), pl. 61, fig. 4.
 _____ (1973) 332-334, fig. 13.
 Davaras (1976) 287, fig. 163.
 Février (1935) 109.
 Gray (1974) 18 (no. C 16).
 Humphreys (1977) 352.
 Kenna (1969) pl. 13 (no. 7).
 Laviosa (1969-1970) 19.
 Marinatos (1926b) 81, fig. 2 (e).
 _____ (1933) 177 (no. 46), pl. 16 (no. 46).
 Mosso (1910) fig. 160 (no. 6).
 Paglieri (1960) 215, fig. 4 (no. 46).
 Xanthoudides (1907-1909) 182 (no. 149), pl. 8 (no. 149).

Description:

Hull: emerges from right curving upwards abruptly to the left into a blunt point. Right end omitted.

Hull decoration: longitudinally bisected. Numerous tiny marks on hull pointing down towards the left.

Terminal ornament: long, thin, diagonal projection inboard on left end. "Elbow" with short extension above left end; peculiar lop-eared element under left end (a damaged "elbow"?).

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three thin, vertical elements. Two crescents between the left vertical element and the middle one; one (perhaps two) crescents between the middle vertical and the right one. A thin, horizontal element surmounts the entire structure.

Field: small dot in upper field.

69.

Current location: Paris, Louvre, Cabinet des Médailles
#3378.

Provenience: unknown.

Date: LM I-LM II.

CMS number: CMS IX, no. 92 (c).

Seal type: three-sided prism (oval faces) of brown and beige-veined agate (perhaps burnt). The stone is chipped at one end of the seal hole.

Measurements: L.-1.4; H.-0.9, 0.95, 0.85; SH.-0.8.

Bibliography: Gray (1974) 18 (no. C 20a).
van Effenterre and van Effenterre (1972)
116-117 (no. 92, c).
Xénaki-Sakellariou (1958a) 78.

Description:

Hull: top hull line emerges from right in a shallow curve. Bottom hull line emerges from right straight then curves upwards abruptly to the left into a point. Right end omitted.

Hull decoration: short diagonal line on the left end of the ship.

Terminal ornament: short, diagonal extension on left end. Carets above and below left end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three thin, vertical elements. Circle and crescent between the vertical element farthest left and the middle vertical element. Two crescents between the middle vertical element and the vertical element farthest right. From the middle vertical element a broad, irregular, horizontal element emerges which crosses the vertical element farthest right and continues to the edge of the engraved surface. The vertical element farthest right continues through the hull and the bottom hull line.

Field: two thin, vertical elements to the right of the ship.

Motif 5

Those representations on which the elements above the hull do not correspond to any of the four previous motifs or their variations.

70.

Current location: Zurich (Eglisau), E. and M. Heller Collection.

Provenience: unknown. Betts noted that it was acquired in Greece.

Date: MM III-LM I.

CMS number: CMS X, no. 290.

Seal type: amygdaloid of red carnelian. The seal is chipped on the back and at one end of the seal hole, the latter damaging the engraved surface.

Measurements: L.-1.85; H.-1.25; D.-0.60; SH.-0.20.

Bibliography: Betts (1980) 12, 257 (no. 290).

Description:

Hull: top hull line emerges from the right fairly straight then curves upwards to the left. Bottom hull line emerges from the right curving downwards slightly then upwards more sharply to the left. Right end omitted.

Hull decoration: longitudinally bisected for approximately the left one-half of the preserved hull.

Terminal ornament: perhaps a caret (?) above the blunt left end; its base slightly to the right of the ship end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two very thick, vertical elements (like the "bundles," but without internal vertical elements). Two crescents on each. Between thick, vertical elements three diagonal marks and a single horizontal one. Four diagonal marks outboard of each thick, vertical element. To the left there are a thin, vertical element and a diagonal one connecting it to the hull (see pp. 128-129).

Field: two V's and a three-stroke zig-zag below the hull.

71.

Current location: Iraklion, Archaeological Museum
#1045 (Metaxas Collection).

Provenience: Knossos.

Date: LM IA.

CMS number: CMS IV, no. 208.

Seal type: amygdaloid of rock crystal.

Measurements: L.-1.73; H.-1.22; D.-0.78; SH.-0.21.

Bibliography: Humphreys (1977) 353 (Additions,

no. 13).
 Kenna and Sakellarakis (1969) 238 (no.
 208).
 Laviosa (1969-1970) 19.

Description:

Hull: top hull line fairly straight. Bottom hull line curves upwards to the left into a point; curves upwards abruptly to the right into a blunt termination. Right end appears to be omitted (?).

Hull decoration: longitudinally bisected (?).

Terminal ornament: diagonal extension on left end. Above and below left end "elbows." The lower prong on the "elbow" below the left end appears to have an extra extension.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two thick, vertical elements; blunt points at their tops. Between these three pairs of diagonal marks intersect in a zig-zag pattern. A diagonal element attaches the top of the left vertical element to the upper "elbow" (see pp. 128-129).

Field: empty.

72.

Current location: London, British Museum #1947.926.28.

Provenience: unknown.

Date: LM IB.

CMS number: CMS VII, no. 85.

Seal type: truncated amygdaloid of grey agate.

Measurements: L.-1.5; H.-1.1; SH.-0.25.

Bibliography: Casson (1971) 31, 33 n.6, 34, 40, fig. 41.

Gray (1974) 18 (no. C 25), 45,
 fig. 9 (d).
 Kenna (1967) 123 (no. 85).
 (1969) pl. 17 (no. 3).
 Laviosa (1969-1970) 21-22 (fig. 17),
 25.

Description:

Hull: bottom and top hull lines straight. The bottom and top hull lines continue to the edge of the engraved surface both to the left and to the right. It is not clear whether or not either end of the ship is preserved. A vertical element to the left intersects the top hull line, continuing into the hull to the edge of the engraved surface. A vertical element stands upon the top hull line to the right. A thicker vertical element on the hull (placed in line with the vertical element above the hull) runs from the top hull line down to the edge of the engraved surface.

Hull decoration: ten (perhaps eleven) diagonal elements on the hull point down towards the left, passing through the bottom hull line into the field.

Oars: perhaps the ten (eleven?) diagonal elements on the hull.

Mast: amidships.

Rigging: three stays to the left and three stays to the right of the mast.

Sail: none.

Field: circle in upper left field; two circles in upper right field. All three circles appear to touch the upper stays.

73.

Current location: Athens, National Museum #5399.

Provenience: Crete.

Date: LM I.

CMS number: CMS I, no. 436 (b).

Seal type: three-sided prism (amygdaloid faces) of sardonyx.

Measurements: L.-1.7; H.-1.15 (each face).

Bibliography: Caspari (1916) 14, fig. 6.
 Casson (1971) 33, 40, 42, fig. 43.
 Cohen (1938) 486.
 Davaras (1976) 287, fig. 163.
 Février (1935) 109.
 Gray (1974) 17 (no. C 7), 45, fig. 9
 (a).
 Kenna (1969) 17, pl. 13 (no. 3), 21
 (no. 2, middle).
 Laviosa (1969-1970) 19.
 Marinatos (1933) 177 (no. 42), pl. 15
 (no. 42).
 Paglieri (1960) 213, fig. 3 (no. 42).
 Sakellariou (1964b) 463 (no. 436, b).
 Stais (1915) 138-139 (no. 5399).

Description:

Hull: top hull line emerges from the right in a gentle curve. Bottom hull line emerges from the right curving downwards abruptly then upwards to the left into a point. Small portion of right end omitted.

Hull decoration: none (?).

Terminal ornament: pointed projection on left end. Above left end two diagonal elements intersect in a T-shaped affair.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: rectangular structure consisting of thin, vertical elements connected by short, horizontal marks. On the top of this object are two horizontal elements. Three diagonal marks attach the top left end of this structure to the hull. Two diagonal elements run from the right side of this structure to the edge of the engraved surface (see pp. 128-129). A single diagonal mark attaches the end of the hull to the rectangular structure (far-side gunwale?).

Field: empty.

74.

Current location: London, British Museum #1947.9-
26.27.

Provenience: unknown.

Date: LM II.

CMS number: CMS VII, no. 101.

Seal type: truncated amygdaloid of carnelian.

Measurements: L.-1.7; H.-1.2; SH. -0.15.

Bibliography: Betts (1973) 332-334.
Gray (1974) 19 (no. C 36), 45,
fig. 9 (i).
Kenna (1967) 140 (no. 101).
(1969) pl. 13 (no. 9).
Laviosa (1969-1970) 19.

Description:

(Note that in the seal impression, all elements would be reversed).

Hull: top hull line emerges from the left curving upwards slightly then abruptly to the right. Bottom hull line emerges from the lower left curving upwards abruptly to the right into a point. Left end omitted.

Hull decoration: divided longitudinally into two sections for the entire preserved length of the hull; perhaps several more times for lower one-half of the preserved length (to the left).

Terminal ornament: right end narrows into a point.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: area not well preserved. Perhaps three vertical elements. A crescent is found between each pair of vertical elements; an inverted crescent on the middle vertical element.

Field: four linked crescents below the hull;
the one second from the left inverted.

75*

Current location: Iraklion, Archaeological Museum
#1758.

Provenience: Kavalo Pediados.

Date: LM.

CMS number: -----.

Seal type: -----.

Measurements: -----.

Bibliography: Betts (1968) 149.
Humphreys (1977) 353 (Additions,
no. 11).

Description:

Not available.

There is little which one can do with the abstract ship representations themselves beyond the classification by motif found above the hull.² One can, however, list the seal shapes and materials to see whether any patterns develop among chronological groups or among the various motifs. One point which has emerged clearly is that the seals with abstract ship representations follow very closely the trends which have been established elsewhere for the larger class of "talismanic" seals as a whole; especially in seal shape and material.

2. As found in the catalogue; see pp. 80, 84, 90, 92, 104, 107, 110 and 112.

The list below gives the chronological break-down of the abstract ship representations, in an attempt to discern patterns in seal shape and material. In parentheses next to the catalogue number is the motif classification of the representation. (Note these abbreviations: 3-SP, for three-sided prism; amyg. faces, for amygdaloid faces).

<u>MM III-LM I</u>	<u>Shape</u>	<u>Material</u>
42 (Motif 1)	amygdaloid	orange-red carnelian
51 (Motif 2a)	3-SP (amyg. faces)	orange-red carnelian
53 (Motif 2b)	amygdaloid	green jasper
63 (Motif 3)	3-SP (amyg. faces)	red carnelian
70 (Motif 5)	amygdaloid	red carnelian
<u>LM IA</u>		
54 (Motif 2b)	amygdaloid	agate
66 (Motif 3a)	amygdaloid	agate
71 (Motif 5)	amygdaloid	rock crystal
<u>LM IB</u>		
43 (Motif 1)	lentoid	carnelian
44 (Motif 1)	amygdaloid	green jasper
52 (Motif 2a)	amygdaloid	red and white banded sardonyx
67 (Motif 3a)	amygdaloid	red carnelian
72 (Motif 5)	truncated amygdaloid	grey agate
<u>LM I</u>		
45 (Motif 1)	amygdaloid	chalcedony
46 (Motif 2)	3-SP (amyg. faces)	orange-red carnelian
47 (Motif 2)	amygdaloid	brown and white agate
48 (Motif 2)	amygdaloid	chalcedony
55 (Motif 2b)	amygdaloid	opaque pink carnelian
56 (Motif 2b)	3-SP (amyg. faces)	?
57 (Motif 2b)	amygdaloid	green pyrite
58 (Motif 2b)	amygdaloid	green jasper
59 (Motif 2b)	amygdaloid	chalcedony
64 (Motif 3)	amygdaloid	red-veined agate

<u>LM I</u>	<u>Shape</u>	<u>Material</u>
68 (Motif 4)	amygdaloid	orange-red carnelian
73 (Motif 5)	3-SP (amyg. faces)	sardonyx
<u>LM I-LM II</u>		
49 (Motif 2)	amygdaloid	carnelian
50 (Motif 2)	amygdaloid	rock crystal
60 (Motif 2b)	amygdaloid	carnelian
69 (Motif 4)	3-SP (oval faces)	brown and beige- veined agate
<u>LM II</u>		
74 (Motif 5)	amygdaloid	carnelian
<u>LM</u>		
61 (Motif 2b)	amygdaloid	light-brown carnelian
62 (Motif 2b)	3-SP (amyg. faces)	red carnelian
75 (Motif 5)	?	?
<u>LM/LH</u>		
65 (Motif 3)	amygdaloid	red sardonyx

Of the thirty-four abstract ship representations, twenty-nine are dated to some part of the LM I period. Only one (no. 74) is dated securely to an LM II context, while the remaining four seals are dated only very broadly to LM (nos. 61, 62 and 75) or LM/LH (no. 65). I suspect that these last four seals may also belong to the earlier part of the LM period (no. 65 perhaps LH). The evidence available to date strongly suggests that the majority of abstract ship representations are found on gems dated to the earlier part of the LM period. (See also the discussion on the dating of seals in the Introduction, pp. 8-9).

Since such a large number of the abstract representations

are dated to the LM I period, it is difficult to establish patterns in motif distribution according to chronological divisions. It may be worth noting that Motifs 1 and 2a have not been found in or after LM II.

The abstract ship representations are confined almost exclusively to the amygdaloid (twenty-five examples) and to three-sided prisms with amygdaloid faces (six examples).³ The only exceptions are a lone lentoid (no. 43) and a three-sided prism with oval faces (no. 69).⁴

Stones used for abstract seals are all harder than the steatite most commonly used for realistic gems. Carnelian is by far the most popular (fourteen examples), followed by agate (six examples), jasper, chalcedony and sardonyx (three examples of each), with two examples of rock crystal (nos. 50 and 71) and an isolated example of pyrite (no. 57).⁵ As for patterns, all that one can note is that jasper and sardonyx, rare in the earlier period, do not appear in or after LM II; but this again is probably due to the fact that few of the abstract ship representations are dated in or after LM II.

The following list contains a break-down of the abstract ship representations by motifs, in an attempt to discern

3. Note that the information for no. 75 was not available for any of the following discussion in this chapter.

4. I am somewhat uncomfortable with the description of the faces of no. 69 as "faces ovalisées" in CMS IX. They appear to be more amygdaloid than oval.

5. Note that the information for the material of no. 56 was not available.

patterns in seal shape and material. (Note the abbreviations on p. 119).

<u>Motif 1</u>	<u>Date</u>	<u>Shape</u>	<u>Material</u>
42	MM III-LMI	amygdaloid	orange-red carnelian
43	LM IB	lentoid	carnelian
44	LM IB	amygdaloid	green jasper
45	LM I	amygdaloid	chalcedony
<u>Motif 2</u>			
46	LM I	3-SP (amyg. faces)	orange-red carnelian
47	LM I	amygdaloid	brown and white agate
48	LM I	amygdaloid	chalcedony
49	LM I-II	amygdaloid	carnelian
50	LM I-II	amygdaloid	rock crystal
<u>Motif 2a</u>			
51	MM III-LM I	3-SP (amyg. faces)	orange-red carnelian ^e
52	LM IB	amygdaloid	red and white banded sardonyx
<u>Motif 2b</u>			
53	MM III-LM I	amygdaloid	green jasper
54	LM IA	amygdaloid	agate
55	LM I	amygdaloid	opaque pink carnelian
56	LM I	3-SP (amyg. faces)	?
57	LM I	amygdaloid	green pyrite
58	LM I	amygdaloid	green jasper
59	LM I	amygdaloid	chalcedony
60	LM I-II	amygdaloid	carnelian
61	LM	amygdaloid	light brown carnelian
62	LM	3-SP (amyg. faces)	red carnelian
<u>Motif 3</u>			
63	MM III-LM I	3-SP (amyg. faces)	red carnelian
64	LM I	amygdaloid	red-veined agate
65	LM/LH	amygdaloid	red sardonyx
<u>Motif 3a</u>			
66	LM IA	amygdaloid	agate
67	LM IB	amygdaloid	red carnelian
<u>Motif 4</u>			
68	LM I	amygdaloid	orange-red carnelian
69	LM I-II	3-SP (oval faces)	brown and beige-veined agate
<u>Motif 5</u>			
70	MM III-LM I	amygdaloid	red carnelian
71	LM IA	amygdaloid	rock crystal
72	LM IB	truncated amygdaloid	grey agate

<u>Motif</u>	<u>5</u>	<u>Date</u>	<u>Shape</u>	<u>Material</u>
73		LM I	3-SP (amyg. faces)	sardonyx
74		LM II	truncated amygdaloid	carnelian
75		LM	?	?

Because the abstract representations are confined chiefly to the amygdaloid in carnelian, it is impossible to establish any significant correspondence between motif and seal shape or material. Amygdaloids occur in all motifs; three-sided prisms occur in all motifs except nos. 1 and 3a, while the lone lentoid occurs in Motif 1. Carnelian is found in all motifs, while agate (the next most popular stone, six examples) is not found in Motifs 1 and 2a. The single example of pyrite is found in Motif 2b.

As for the ship representations themselves, the two-fold classification of Betts (1973) is still applicable for much of the evidence.⁶ The following lists contain: (1) those abstract ship representations which would correspond to Betts' "whole ship" representation (our Motif 1); (2) the single whole ship (?) representation which does not fit into Betts' "whole ship" category (no. 59); (3) those abstract ship representations which would correspond to Betts' half ship representations (only one end clearly shown); (4) those abstract ship representations which could be grouped with Betts' half ship category, but which appear to show substantially more of the hull; (5) those abstract ship representations which are so damaged that they cannot be placed in any of these categories, or which are too enigmatic to

6. Betts (1973) 331-334. See Introduction pp. 3-4.

group with any of the categories (listed under the ? column). In parentheses after those catalogue numbers corresponding to the half ship category is an indication whether the right or the left end of the ship is shown. (An asterisk denotes that the illustration has been reversed for comparative reasons).

<u>Motif 1</u>	<u>Half ship</u>	<u>Possible half ship</u>	<u>?</u>	<u>Whole ship; no sail</u>
42	46 (left)	65 (right)	56 (damaged)	59
43	47 (left)	71 (left)	61	
44	48 (left)	73 (left)	62 (damaged)	
45	49 (left)		72	
	50 (left)			
	51 (right)			
	52 (left)			
	53 (left)			
	54 (right)			
	55 (left)			
	57 (left)			
	58 (left)			
	60 (right)			
	63 (left)			
	64 (left)			
	66 (left)			
	67 (right)			
	68 (left)			
	69 (left)			
	70 (left)			
	74* (left)			

There are then only eight possible exceptions to the two-fold classification of whole and half ship representations. I suspect, however, that nos. 65, 71 and 73 are attempts at the half ship type, the artist having failed in some cases, changed conventions slightly in others. No. 59 appears to show both ends of the vessel, but the objects above its hull place it closer to the half ship representations rather than the whole. No. 56, were it not damaged, would also, I think,

show only one end of the vessel. Nos. 61, 62 and 72 are enigmas; the first two are incredibly careless works, while the last stands out as something radically different from other abstract representations (it is not even clear if either of the ship ends is shown).

The ships shown in the representations of ships with sails displayed (Motif 1) are fairly uniform. The hulls are curved and mast, sail and rigging are shown. Two representations show the sail on the near side of the mast (nos. 42 and 44) and two show the sail on the far-side of the mast (nos. 43 and 45). The sails are shown on nos. 43 and 45 with clear yard and boom, on no. 44 with only a boom and on no. 42 with neither yard nor boom distinguished. The pattern on the sail varies from intersecting horizontal and vertical lines (nos. 42 and 43), to a diagonal network pattern (no. 44) to a crude diagonal network pattern (no. 45). The sides of the sail move in to sharply-angled waists on nos. 42 and 43, while on nos. 44 and 45 they appear to be roughly straight. Stays (nos. 44 and 45), lifts (nos. 42 and 43) and halyards (no. 45) are present. The rigging on no. 43 is impossible to comprehend. Nos. 43 and 45 are equipped with oars as well as sails.

With the evidence which we have currently, there is simply no way to interpret the details of the half ship representations; neither which end they are showing (i.e., prow or stern), nor in identification of the objects above the hull. It does appear that the left end is preferred

(seventeen examples) over the right (four examples). This may have been significant for the Minoans; but we do not know how, or what it meant.

There are two features on the abstract half ship representations which occur frequently and with no regard to the motif above the hull: (1) the terminal ornament of one or two "elbows" (or carets); (2) diagonal elements (usually one or two) which connect the upper part of the structure above the hull to the hull.

Taking the "elbow" devices first, it should be noted that in the catalogue the descriptive term "caret" is used to denote those elements which appear to consist of two very thin scratches on the stone, (e.g., nos. 47, 48, 58, etc.) while the descriptive term "elbow" is used to denote those elements which consist of two broad strokes (e.g., nos. 50, 56, etc.). Although this distinction has been made in the catalogue and in the following lists, it is safe to assume that the caret and the "elbow" device are two different conventions to show the same thing.

The following lists contain those representations which have a caret or an "elbow" device. Under the two-caret and the two-"elbow" category, it is assumed that one is shown above and one below the tip of the hull unless noted otherwise.

<u>One caret,</u>	<u>Two carets</u>	<u>?</u>
54 (above)	47	51 (one below?)
67 (above)	48	52 (one above?)
69 (above)	58	70 (one above)
	59 (both above)	

<u>One "elbow"</u>	<u>Two "elbows"</u>	<u>?</u>
63 (below)	46	60 (one above?)
64 (above)	49	61 (one above and one below?)
68 (above)	50	62 (one above?)
	53	66 (one above?)
	56	73 (one above?)
	57	
	71	

Neither caret nor "elbow"

55
65
72 (neither end clearly shown)
74

Of those seventeen representations on which the caret or "elbow" element is found with certainty, there is either an extension from the end of the hull, or the hull narrows into a point:

<u>Extension</u>	<u>Pointed hull</u>
46	54
47	56
48	57
49	59
50	63
53	64
58	
67	
68	
69	
71	

The carets or "elbows," then, flank the narrowed hull tip or its pointed projection. The conventions adopted by the seal engravers do not allow us to be certain whether, on actual ships, the features to which the carets and "elbows" correspond were above and/or below the hull tip, or whether they projected outward from either side.⁷ One is left with a

7. See the discussion below pp. 133-136, for the "elbow" devices on abstract and realistic ship representations and

feature whose appearance, although assuming a different variation on each representation, is fairly uniform; but whose function is completely unknown.⁸ From the appearance of the feature, I doubt very much whether it had a structural purpose; some type of prow or stern decoration may be the answer. The fact that "elbows" occur also on one example in the whole ship representations (no. 45), one above each end of the hull, shows that the presence of "elbows" is of no assistance in determining whether prow or stern is depicted.

The diagonal elements connecting the upper part of the structure above the hull to the hull assume (as is the case with the "elbows") various lengths and thicknesses and are found in varying numbers. The following list breaks down the examples by the number of diagonal elements found in the representation.

<u>One</u>	<u>Two</u>	<u>Three</u>	<u>?</u>	<u>None</u>
47	46	73	57 (one?)	50
70	48			52
71	49			53
	51			54
	55			59
	56			61
	58			64 (ladder-like element)
	60			65 (ladder-like element)
	62			67
	63			68
	66			69
				72
				74

their tentative identification (based on the Thera ships) by van Effenterre as the distinguishing feature of the prow.

8. That each representation's "elbow" devices assume a unique form should not be surprising, since the small size of the engraving would hamper any attempts at exact duplication. Indeed, every ship representation in the entire catalogue has an unique identity.

The preferred combination is two diagonal elements (eleven examples); three representations have one and a lone example (no. 73) has three.⁹ The diagonal elements are found on all motifs except nos. 1 and 4. One would not expect to find these diagonal elements on the whole ship representations (Motif 1), since these have masts and sails and thus there is no need for them, and no space. That there are no diagonal elements in Motif 4 may be due to the fact that there are only two representations classified in it. The diagonal elements appear to be cords of some type. This may suggest that they are meant to secure the structures above the hull. This assumes, however, that the features above the hull are structures which would have need of securing. This may not be the case at all (see p. 134). With the evidence as we have it currently, there appears to be no way to determine what the features above the hull are, or the exact function of the diagonal elements connecting them with the hull.

9. It is worth noting, although of no assistance in interpretation, that no. 73 has two diagonal elements to the right as well as three to the left of the structure above the hull. The unique nature of this representation (the only one with three diagonal elements, no comparable examples for the structure above the hull) among the abstract examples may partially explain the presence of this oddity.

Chapter IV

Conclusions and Summary

Combining the number of realistic and abstract ship representations we arrive at the following numbers:

<u>Middle Bronze</u>	<u>Late Bronze</u>	<u>Total</u>
31	44	75

It should be noted that all thirty-one of the Middle Bronze examples are realistic, while thirty-four of the forty-four Late Bronze examples are abstract. This in itself suggests that there was a definite move in the Late Bronze period away from realistic ship representations and towards abstract ship representation. So, too, most of these abstract representations are dated to the earlier phase of the LM period. Indeed, only five abstract representations (nos. 49, 50, 60, 69 and 74) can be dated as late as LM II; only one of those securely (no. 74). There may have been a brief return to realistic ship representation at the end of LM II and in LM III, since three of the Late Bronze realistic representations (nos. 37-39) are dated to these later phases of LM, and another (no. 40) may be as late as that.¹ The fact that three of these representations (nos. 37, 38 and 39) are some of the more important ones for ship representations as a whole may also add credence to the suggestion that there was some revival of realistic representations in LM II and LM III.

The fact that all the gems of known origin (except,
1. No. 40 is dated broadly to LM I-LM III.

perhaps, no. 33) come from Crete is noteworthy. Only two stones (nos. 41 and 65) have been provisionally attributed by some scholars to the Mainland on the basis of style, and to the LH period. This may suggest that the ship motif was not used on seals to a wide extent on the Mainland.

The view that there are two separate traditions in the depiction of ships on seals is supported very clearly by the differences in seal shapes and materials. Realistic representations are confined almost exclusively to the three-sided prism done in steatite. Abstract representations, however, are confined almost exclusively to the amygdaloid (with an occasional three-sided prism with amygdaloid faces) in various harder stones, chiefly carnelian.² In this respect also nos. 37-40 may suggest a revival of the realistic tradition in LM II and LM III: none of them can be proven to be amygdaloid and the two whose material is known (nos. 39 and 40) are steatite.³

Given this dual tradition in the representations of ships on seals, the amount of comparative analysis which can be done between the two types is limited; especially since the majority of abstract representations are so noticeably

2. Isolated examples of the amygdaloid shape and of harder stones are documented among the realistic representations: amygdaloids - nos. 30, 32 and 34; harder stones - nos. 22 (MM) and 34 (LM) (carnelian), 28 (MM) (agate) and 41 (LM) (sardonyx).

3. Nos. 37 and 38 are impressions which appear to have been made by lentoids or perhaps (for no. 38) a signet ring. Both nos. 39 and 40 are elliptical lentoids.

different in many details from the realistic ones.

The four whole abstract ship representations showing sails (i.e., Motif 1) are an exception, since they also show numerous similarities with the three realistic representations having sails (nos. 30, 32 and 34). Indeed, it appears as if all seven examples are attempting to show the same type of vessel. The hulls are all curved to various extents (the top hull lines on nos. 30 and 32 are straight amidships) with a mast set approximately amidships (the mast on no. 43 is left of amidships). The sails are either on the far-side (no. 30, 32, 43 and 45) or the near-side (nos. 34, 42 and 44) of the mast, without distinction as to realistic or abstract classification. Yard and boom are shown on nos. 30, 32, 43 and 45, only a boom on nos. 34 and 44, while no. 42 apparently shows neither yard nor boom. Again distribution between the two classes is uniform. The sails themselves in the three realistic examples have diagonal network patterns and their sides are concave. The abstract examples are a little more varied. No. 44 has a diagonal network pattern on its sail, whose sides appear to be fairly straight; no. 45 is similar in both respects, although the network pattern is even cruder. Nos. 42 and 43 have interesting horizontal and vertical lines on the sail, while the sides of the sails move in to sharply-angled waists. This could be equivalent, in the abstract style, to the concave sides of the three realistic ships with sails.

The rigging on these seven representations is fairly

uniform. There are three stays on each side of the mast on nos. 34 and 44; apparently the same number (although in rather awkward positions) on nos. 30 and 32. Halyards (one on each side of the mast) are shown on nos. 34 and 45. There appear to be lifts on nos. 42 and 43, although the rest of the apparent rigging on no. 43 is impossible to interpret, making this interpretation somewhat provisional.

Oars appear on ships showing sails in both types of representations (nos. 30, 32, 43 and 45). There does not appear to be any pattern to the direction in which these oars incline. On no. 30 most of the oars point straight down, but some point to the right; on no. 32 they point down towards the right, while on nos. 43 and 45 they point down towards the left.⁴ The number of oars in all four examples is relatively large in comparison to the other ship representations with oars.

One final feature can be found in common between one of the realistic and one of the abstract ship representations showing sails. This is the "elbow" device, which appears above the left end of no. 30, above both ends of no. 45.

The abstract half ship representations present a different set of problems. In the past scholars have engaged in speculation concerning the identification of the objects above the hull (suggestions have included deck cargo, cabins, stylized sails, etc.). These objects above the hull can be compared, to my knowledge, to no other structure on ship

4. There is one exception (pointing down towards the right) on no. 45.

representations in the whole corpus of Bronze Age Aegean ship representations. One is immediately struck by the unseaworthy appearance of these structures. Aegean waters are normally quite rough. It is difficult to imagine that a structure that looks anything like what we see above the hulls on the abstract half ship representations could withstand the open waters of the Aegean.

On the abstract half ship representations it is not clear whether there is a convention of showing only the prow or only the stern; nor can it be clearly established, in any of the extant examples, whether prow or stern is depicted.

The identification of which end is shown on the abstract half ship representations is difficult, since those representations have few points in common with the realistic ship representations. The isolated exceptions are the "elbow" devices found on three realistic representations: the right end of no. 10, the left end of no. 30 and the right end of no. 28. These "elbow" devices are similar to the "elbows" found on many of the abstract half ship representations (see the table p. 126). Unfortunately, these three realistic ship representations are little help, since there is no way to discern whether these "elbow" devices are found on the prows or on the sterns.⁵

5. The "elbow" (i.e., caret) on no. 28 may be on the prow, if the figure in the boat is indeed paddling and not rowing or pushing the boat off a shore or sand-bank with a pole. There are just too many variables to say definitely that it is on the prow.

Mrs. van Effenterre's suggestion that the abstract half ship representations always show the prow and that it is always "a high-hooked prow" is very questionable.⁶ One wonders, if this true, why there are no "elbow" devices at all on nos. 55, 65, 72 and 74 and, most important, why there is a single "elbow" above each end of no. 45 (a whole ship representation). I am, therefore, hesitant to identify the "elbows" on the abstract half ship representations as being strictly on the prow or the stern. The single "elbows" found above both the prow and the stern of no. 45 demonstrates that this feature was not, in the mind of one gem engraver at least, confined only to one end of the ship. This emphasizes once again the need for caution.

The problem of which end is shown on the abstract half ship representations might be lessened if we knew which end was the prow and which end was the stern on the realistic ships. The only secure way to identify the stern is by the appearance of identifiable steering oars. There are only two representations which appear to show them: nos. 26 and 39. No. 26 is not too clear and is arguable only on the basis of no. 39. The criteria for identifying them as steering oars is not their larger size in relation to the other oars, as they would be in real life, but that they are off-set from the other oars and, more clearly, so for no. 39, that they point in a different direction than the other oars. Neither example is informative on the problem of high stern

6. van Effenterre (1978) 596. See also my earlier remarks on pp. 4-5.

or high prow, since the ends are of roughly equal heights in both representations.

It has been argued in the past that there was a convention in the depiction of oar direction. The suggested convention is that if oars incline in one direction, they point down towards the prow; i.e., as if the rowers were at the beginning of their stroke.⁷ There is, however, only one example which clearly confirms this (no. 39) and one which may confirm it (no. 38).⁸ Most oar representations^{see p. 136a} could plausibly be interpreted as pointing down towards either the prow or the stern.

It has been noted above, that, on the realistic ship representations with ends of unequal heights, when the oars incline in one direction, they never incline down towards the higher end. Assuming a convention in the depiction of oar direction (for which the evidence is not convincing), this would suggest that the high end (on those ships with ends of unequal heights) is the stern. I would prefer a high stern for reasons of practicality (it allows the helmsman to see over the prow and gives protection against stern seas) and because ship representations in the Greek Geometric and later periods have a high stern and a low prow. Unfortunately, there is nothing to prevent one from arguing

7. Marinatos (1933) 189; Gray (1974) 75-81.

8. One could use no. 26 to argue against this theory. Here there appear to be two steering oars to the left. The other oars appear to point straight down, but they may be pointed down slightly towards the left (i.e., towards the steering oars).

Add: which incline decisively towards one end of the ship...

that there could be a mix of ships with high prow and ships with high stern, especially if the size of the ships is as small (five oars shown = a ten-oared vessel) as shown on some of the seals. So, too, one must remember that we are dealing with an extremely long time period, perhaps long enough for even the most conservative boat-building tradition to change substantially or undergo important modifications.

As relates to conventions in the depiction of oar direction, it should be mentioned that some abstract half ship representations have markings on or under the hull which could conceivably be oars (nos. 46, 47, 48, 50, 52, 53, 55, 59 and 62, perhaps nos. 57, 60, 66 and 67). Whether these are oars or purely decoration on the hull is open to discussion; nos. 48, 52, 53 and 59 are more convincing as oars than as decoration. On all examples except nos. 57 and 66 these markings always point down away from the end of the ship depicted. There may be a tenuous link here between the realistic and the abstract half ship representations, although I doubt that many of these marks on the hulls of abstract half ship representations are oars at all.

It is difficult to make general observations from the ship representations on seals about the actual ships themselves. In general, most have a rounded hull, but this may be due more to the rounded nature of the engraved surface than to actual rounded ships. The size of the ships can be best determined by the number of oars. In this respect,

most of the earlier examples appear to be quite small (five - nine oars on each side). Nos. 30 (seventeen oars to a side), 39 (fifteen oars to a side), 40 (ten - eleven oars to a side), 43 (ten oars to a side) and 45 (thirteen oars to a side) clearly appear to show larger craft. All these examples, except no. 30, are dated to the LM period, suggesting that the larger vessels appear in the later period. One must be cautious here, however, since we cannot be certain that the gem engraver accurately copied the exact number of oars from his model. (See p. 138a).

Having examined the two distinct traditions of ship representations and the conventions used in both, one becomes aware of certain problems which need to be addressed in the future. A project which certainly needs to be undertaken is the examination of all the seals and sealings in the original. In this respect new impressions of the seals should be made, photographs taken of both the seal and the new impression and new line drawings made, the whole then being published (preferably in life size, as well as with enlargements). This would afford scholars the opportunity to examine the representations in a form closer to the original and to eliminate much of the guesswork brought on by second- and third-hand examination. While this is indeed a project which needs to be undertaken, the resources required to cover the rather widespread distribution of these seals would be considerable. So, too, it would be difficult to track down those seals found in the collections of private

On the problem of dating, see pp. 8-9.

owners or dealers.

An even bigger project, and one which is conceivably impossible, would be the examination of all those seals of the so-called "talismanic" class in an attempt to discern if indeed these seals had a specific non-sphragistic use. In this respect the examination of the engraving itself would be important; how do the depths of the engravings on "talismanic" seals relate to the depths of engravings on other seals? Do "talismanic" seals show evidence of little use? (In this respect how much wear does a seal undergo after constant use and would a seal wear differently in different impression materials? Were different impression materials used?). The actual cuttings in the stones of the "talismanic" ship representations appear quite different from the cuttings in the stones of realistic ship representations. Does this denote new tools, or old tools being used in a new way? Is this no more than a reflection of the greater difficulty of cutting the harder stones regularly used for the "talismanic" class?

All of these questions apply directly to the abstract ship representations. If it could be proven that the so-called "talismanic" seals were intended for a specific non-sphragistic use, it might help to explain why there are these two distinct traditions of ship representations. I doubt, however, if it would help to explain what we are seeing on the abstract half ship representations. For that answer one could hope for the discovery of a realistic

representation which has structures similar in appearance to those found above the hulls on the abstract half ship representations, and which could perhaps be identified with their counterparts in real life.

Although the representations of ships on seals and sealings constitute a large percentage of the corpus of representations of ships in all media from the Bronze Age Aegean, one should remember that the seals are only a part of the evidence. For Bronze Age Aegean ship representations as a whole, one would need to consult the ship representations in all artistic media. This is especially true for the Early Bronze period and the very end of the Late Bronze period, where the evidence for ship representations from seals is very slim. There is a real need for a detailed and up to date catalogue of all ship representations from the Bronze Age Aegean. Such a work would allow for comparisons between the different artistic media in an attempt to discern whether there are any conventions which overlap from one artistic medium to another. Ideally, the illustrations in a catalogue such as this should be drawn to scale and the author should take every opportunity to examine the representation in the original. A work such as this would provide the scholarly community an opportunity to examine the corpus of Bronze Age Aegean ship representations as a whole.

Appendices

APPENDIX I

Ship Representations on Rings

76.Current location: lost. In Iraklion, Archaeological Museum, until 1909.Provenience: Mochlos.Date: LM I.CMS number: -----.Seal type: gold signet ring, oval face.Measurements: -----.

- Bibliography: Alexiou (1972) 98.
 Barnett (1958) 224-225, fig. 4.
 Basch (1973) 71-73, fig. 3.
 Behn (1927-1928) 242, pl. 62 (b).
 Betts (1973) 328.
 Brown (1978) 638.
 Buck (1962) 134.
 Cohen (1938) 487.
 Davaras (1976) 287 (fig. 163), 289.
 Dussaud (1914) 416, 418, fig. 308.
 Evans (1928) 249-250, fig. 147 (a).
 (1935) 952, fig. 919.
 Gray (1974) 18 (no. C 27).
 Humphreys (1977) 352.
 Johnstone (1973) 5, fig. 1.
 (1980) 58-59, fig. 6.3.
 Karo (1910) 343-344.
 (1926b), pl. 72 (g).
 Köster (1923) 60, 62 (fig. 13), 63.
 Laviosa (1969-1970) 20.
 Marinatos (1933) 179 (no. 56), pls.
 16 (no. 56), 17 (no. 56).
 Meyer (1928) 194 n.13.
 Miltner (1931) col. 908.
 Nilsson (1950) 269-270, fig. 136.
 Paglieri (1960) 215, fig. 4 (no. 56).
 Persson (1942a) 82-84, 99-100, 102,
 180 (no. 27).
 Sakellarakis (1971) 209-213 (figs.

11-12), 218-219.
 Schachermeyr (1964) 147, fig. 71 (h).
 Seager (1912) 89-91, fig. 52.
 Sourvinou-Inwood (1973) 149-158, pls.
 1-2.
 Vingiano (1995) 51, pl. 7 (middle).
 von Salis (1930) 15-16.
 Warren (1966) 196.

Description:

Hull: curved upwards slightly to the left into the terminal ornament; more sharply to the right into an animal head. Right end higher.

Terminal ornament: bulb from which emerge four short, diagonal extensions on left end. Right end an animal head turned inboard.

Oars: none.

Mast: none.

Rigging: none.

Sail: none.

Above hull: a female figure sits in the boat. To the right of her stands a tree with some type of enclosure surrounding (or underneath) it.

Field: to the left of the boat a structure and some enigmatic objects. Below the hull are five pairs of vertical marks.

77.

Current location: Athens, National Museum #6209.

Provenience: Tiryns.

Date: LH II-LH III.

CMS number: CMS I, no. 180.

Seal type: gold signet ring; oval face.

Measurements: -----.

Bibliography: Alexiou (1972) 92 n.2, 98.
 Boardman (1970) 395.
 Brown (1978) 630, 639.

- Casson (1971) 33-34, fig. 50.
 (1975) 4, 5.
 Cohen (1938) 487, 490.
 Davaras (1976) 287, fig. 163.
 Evans (1928) 245-246, fig. 142.
 (1935) 956, fig. 926.
 Fevrier (1935) 112, 114.
 Gray (1974) 18 (no. C 34), 45, fig.
 9 (j).
 Hutchinson (1962) 96, fig. 16.
 Johnstone (1973) 5, fig. 2.
 (1980) 58-59.
 Karo (1930b) 122-124, pls. 2 (no. 2),
 3 (no. 1), Suppl. pl. 30 (no. 1).
 Köster (1923) 63-64, pl. 14
 Laviosa (1969-1970) 13, 15 n.5, 21.
 Marinatos (1926b) 81, fig. 2
 ("gamma").
 (1933) 179 (no. 58), pls.
 16 (no. 58), 17 (no. 58).
 Miltner (1931) col. 908.
 Nilsson (1950) 38-39 (no. 6), fig. 6.
 Paglieri (1960) 215, fig. 4 (no. 58).
 Persson (1942a) 29, 68, 80-81, 82,
 84-85, 99, 153, 179 (no. 25).
 Sakellarakis (1971) 217.
 Sakellariou (1964a) pl. 5 ("zeta").
 (1964b) 204-205 (no. 180).
 (1971) 9.
 Shaw (1980) 176-177, ill. 11.
 von Salis (1930) 27-29, figs. 29, 30,
 31.

Description:

Hull: crescent-shaped. Curved marks decorate the hull. These give way to linked rings on both extremities. Right end higher.

Terminal ornament: both ends narrow into points.

Oars: perhaps the three diagonal marks under the hull pointing down towards the lower (left) end of the ship. A fourth diagonal mark under the right end of the ship pointing down towards the right may be a steering oar.

Mast: apparently attached to the top of the cabin on the left of the ship. Masttop appears to be circular.¹

1. If this is indeed a mast with two stays (as its position amidships suggests), then the mast must have run through the cabin into the hull on the actual ship. A mast attached to

Rigging: one stay on each side of the mast; attached to the cabin (see n.1 above).

Sail: none.

Above hull: cabin on left side of the ship. Inside two seated figures. To the right of the cabin a standing figure.

Field: various circular and oval objects (undecipherable) above the ship. Over the right end one can distinguish the head and shoulders of a human figure. To the right of the ship a male and a female figure (facing each other); to the right of them a male and a female figure (facing each other) standing in some type of enclosure. Below the hull two objects which appear to be fish.

the top of a cabin as shown would have been carried away in a mild breeze. The artist may have omitted the mast running through the cabin so as to show the figures in the cabin.

APPENDIX II

Questionable Ship Representations

78(?).Current location: Iraklion, Giamalakis Collection
#3119.Provenience: Siteia.Date: EM III-MM I.CMS number: -----.Seal type: three-sided prism (irregular faces) of
steatite.Measurements: L. 1.5; H. 1.2, 1.2, 0.9.Bibliography: Casson (1971) 40.
Gray (1974) 15 (no. A 11).
Laviosa (1969-1970) 19.
Xénaki-Sakellariou (1958a) 14
(no. 79a), 78-79, pl. 18 (no. 79a).Description:

Hull: bottom hull line nearly straight amidships, curving upwards to the left into a point; curving upwards abruptly to the right into a point. Slight bulging on top hull line to the right of amidships. Left end higher.

Terminal ornament: left end pointed. Short, diagonal extension on the right end.

Oars: perhaps a single steering oar below the left end.

Mast: three vertical marks are found above the hull; perhaps one of the two amidships may be a mast.

Rigging: none.

Field: diagonal mark above hull slightly right of amidships.

79(?).

Current location: Iraklion, Archaeological Museum
#1819.

Provenience: Mallia, Workshop "delta."

Date: MM I.

CMS number: CMS II:2, no. 147. (b).

Seal type: three-sided prism (oval faces) of
bright brown steatite.

Measurements: L.-1.8; H.-1.0. (each face).

Bibliography: Platon et alii (1977) 109, 194-195
(no. 147, b).

Description:

Hull: U-shaped. Left end higher, tip almost touching the edge of the engraved surface.

Terminal ornament: left end narrows into a point. Very short projection outboard on the right end.

Oars: possibly the four marks below the hull (?).

Mast: slightly left of amidships.

Rigging: perhaps three stays to the left and four stays to the right of the mast.

Sail: none.

Field: empty.

80(?).

Current location: Iraklion, Archaeological Museum
#2466.

Provenience: Mallia, found in 1971.

Date: MM I.

CMS number: CMS II:2, no. 194 (b).

Seal type: three-sided prism (oval faces) of
grey-white steatite. Only about one quarter
of two faces of the seal is preserved.

Measurements: preserved L.-1.1; preserved H.-0.7.

Bibliography: Platon et alii (1977) 109, 265
(no. 194, b).

Description:

Hull: not preserved.

Terminal ornament: not preserved.

Oars: not preserved.

Mast: small section preserved.

Rigging: part of one stay to the left of the mast and parts of three stays to the right of the mast are preserved.

Sail: none.

Field: diagonal mark in upper right field.

81(?):

Current location: Iraklion, Archaeological Museum
#806.

Provenience: Phaistos, Room 25.

Date: MM IB-MM IIA.

CMS number: CMS II:5, no. 245.

Seal type: sealing found on a lump of clay. The impression, as described in CMS, is "oval und leicht konkav gewölbt." The surface of the impression is badly damaged.

Measurements: L.-1.6; H.-1.1.

Bibliography: Levi¹ (1957-1958) 101-102 (no. 175),
fig. 240, pl. 12.
Pini (1970) 207 (no. 245).

Description:

Hull: perhaps the curved, ladder-like object at the bottom of the engraved surface.

1. This is Levi, D., ASAthene 35-36, 1957-1958, which I was unable to consult.

Terminal ornament: not preserved (?).

Oars: none.

Mast: none.

Rigging: none.

Sail: none.

Field: myriad of diagonal marks and enigmatic objects above hull.

82(?).

Current location: -----.

Provenience: Mirabello Province.

Date: MM.

CMS number: -----.

Seal type: three-sided prism (oval faces) of white carnelian.

Measurements: -----.

Bibliography: Evans (1909) 159 (no. P49*c), 225
(no. 116, A).
Marinatos (1933) 202 n.3.
Stawell (1924) 136, pl. 6 (no. P49*c).

Description:

Hull: perhaps represented by the two vertical and one diagonal straight marks to the left of the engraved surface. Left end omitted (?).

Terminal ornament: the diagonal mark constituting the right end of the representation could be a projecting terminal ornament (cf. e.g., no. 85 [?]).

Oars: none.

Mast: there appear to be two (?).

Rigging: perhaps one stay (?) to the left of each mast.

Sail: none.

Field: two circular objects above the hull.
To the right of the representation other
hieroglyphic symbols.

83(?).

Current location: Oxford, Ashmolean Museum #1938.957.

Provenience: environs of Knossos.

Date: MM III-LM I.

CMS number: -----.

Seal type: flattened cylinder of bronze.²

Measurements: The measurements given by Kenna
were a little unusual: L.-0.5; H.-1.15;
D.-0.5; SH.-0.2.

Bibliography: Buchholz and Karageorghis (1971)
115 (no. 1389), 117, fig. 39.
Buck (1962) 134.
Casson (1971) 32, 40, fig. 26.
Cohen (1938) 487.
Davaras (1976) 286-289, fig. 164.
Evans (1928) 206-207, 243, fig. 140.
Février (1935) 109, pl. 3 (no. 41).
Gray (1974) 17 (no. B 26), 43, fig. 8
(d).
Kenna (1960) 122 (no. 228), pl. 9
(no. 228).
Marinatos (1933) 177 (no. 41),
pl. 15 (no. 41)...
Paglieri (1960) 213, fig. 3 (no. 41).
Schachermeyr (1964) 205-206, fig.
118.

Description:

Hull: top hull line emerges from the left
curving down slightly then up towards the
right. Bottom hull line fairly straight;

2. Marinatos (1933) 177, noted the material as haematite. Kenna held that the seal has not been subject to much wear and that the engraving is too shallow to make a good impression. He suggested that it was originally decorated with gold, silver or some other inlay. This would explain; he said, the unusual character of the ship representation and the lack of a mast, i.e., the shallow engravings were used to receive some type of inlay.

possibly a slight curvature near the right end. Bottom hull line angles upwards abruptly to the left to join (apparently) the top hull line. The very tip of the left end is omitted (?). Bottom hull line curves inward slightly then outwards, while moving almost straight up to join the top hull line to the right. Right end higher.

Terminal ornament: left end narrows into a point (?). Long, diagonal projection, bifurcated at the end into two long extensions, on the right end.

Oars: none.

Mast: vertical mark slightly right of amidships may represent part of the mast.

Rigging: thick, curved mark attaches the left end to the possible sail. Sheet (?).

Sail: perhaps the checkered pattern in the upper left field.

Field: lunette linked to a curved mark in lower right field. Two enigmatic objects in the upper right field.

84 (?).

Current location: Iraklion, Archaeological Museum.

Provenience: Knossos, Temple Repositories.

Date: MM III-LM I.

CMS number: -----.

Seal type: small, worn fragment of a seal impression.

Measurements: -----.

Bibliography: Behn (1927-1928) 242, pl. 62 (d).
 Casson (1959) 23, pl. 1 (d).
 Davaras (1976) 287, fig. 163.
 Dussaud (1914) 416-417, fig. 307.
 Evans (1902-1903) 58, fig. 36.
 _____ (1909) 204 (no. 58).
 _____ (1921) 697-698, fig. 520.
 _____ (1935) 952, fig. 921.
 Gill (1965) 71 (no. 149).
 Gray (1974) 17 (no. C 1).

Hood (1978) 219-220, fig. 220 (A).
 Karo (1926b) pl. 72 (d).
 (1930a) 107-108, fig. 37.
 Köster (1923) 60, 62 (fig. 14), 63.
 Marinatos (1926a) 57-58, fig. 2
 (no. 1).
 (1927-1928) 53-54, fig. 1.
 (1933) 178 (no. 53), pl. 16
 (no. 53).
 Miltner (1931) col. 908.
 Nilsson (1950) 37-38 (no. 5), fig. 5.
 Paglieri (1960) 215, fig. 4 (no. 53).
 Persson (1942b) 184.
 Studniczka (1906) 50, fig. 1.

Description:

Hull: preserved portion shows upward curved left end. The tip of the left end is not preserved, nor is the bulk of the representation to the right.

Terminal ornament: not preserved.

Oars: not preserved.

Mast: not preserved.

Rigging: not preserved.

Sail: ~~not preserved.~~

Field: a figure (apparently standing on the boat) appears to be fighting off an animal, whose head is preserved in the lower left field.

85(?).

Current location: Paris, Cabinet des Médailles,
 Dépôt du Louvre #AM 1623.10 (Collection
 Demargne).

Provenience: Crete.

Date: MM III-LM I.

CMS number: CMS IX, no. 88 (c).

Seal type: three-sided prism (oval faces) of
 blond agate speckled with red-brown.³

3. A second seal hole was bored at some time after the gem was fractured. The original hole was utilized in the

Measurements: L.-1.3; H.-0.7, 0.6, 0.6; SH.-0.15.

Bibliography: Delaporte (1920) 92-93 (no. ΔII),
pl. 58 (no. 36, a).
Humphreys (1977) 353 (Additions,
no. 10).
Marinatos (1933) 203 n.2.
van Effenterre and van Effenterre
(1972) 110 (no. 88, c).

Description:

Hull: two long, horizontal elements. Left end omitted.

Hull decoration: longitudinally bisected; perhaps another longitudinal division to the right, running for approximately half of the preserved length of the hull.

Terminal ornament: two short, vertical elements (tops and bottoms narrow into points) on the right end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: three thick, vertical elements, the two to the right standing together. The bottoms of these elements narrow into points, while the tops continue upwards to the edge of the engraved surface. To the left and to the right of the vertical element farthest left are diagonal network patterns (cf. Motif 2a). Two diagonal elements emerge from near the base of the vertical element farthest right upwards to the edge of the engraved surface.

Field: empty.

86(?)

Current location: Zurich (Mannedorf), E. Bollman
Collection.

engraving. One can see where the two borings meet in the middle of face "a."

Provenience: unknown.

Date: MM III-LM I.

CMS number: CMS X, no. 276.

Seal type: amygdaloid of rock crystal. The seal is damaged at one end of the seal hole.

Measurements: L.-2.00; H.-1.60; D.-0.70; SH.-0.20.

Bibliography: Betts (1980) 247 (no. 276).

Description:

Hull: perhaps the very thick; diagonal object in the lower right field. Both ends omitted (?).

Hull decoration: none preserved.

Terminal ornament: perhaps a caret above the right end.

Oars: none.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Field: various objects to the left of the hull: two sets of three diagonal marks; three vertical marks. Between each pair of vertical marks are two crescents above and one inverted crescent below (cf. Motif 4). To the right of the right vertical mark are four diagonal marks and a crude Y-shaped object.

87(?).

Current location: Stafford, private collection (formerly in the J. M. Dawkins Collection).

Provenience: unknown.

Date: LM IA.

CMS number: CMS VIII, no. 55.

Seal type: amygdaloid of red carnelian. The seal is broken on one edge damaging about one fourth of the engraved surface.

Measurements: L.-1.3; H.-1.5; SH.-0.2.

Bibliography: Betts (1973) 332-334, fig. 14.
 Casson (1971) 40.
 Gray (1974) 18 (no. C 21).
 Humphreys (1977) 352.
 Kenna (1966) XII, 74 (no. 55).
 Laviosa (1969-1970) 19.

Description:

Hull: perhaps the horizontal object in the lower right field.

Hull decoration: perhaps longitudinally bisected (?).

Terminal ornament: both ends appear to narrow into points.

Oars: perhaps the six short, diagonal marks pointing down towards the right.

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two thick, vertical elements. Three crescents on left vertical element; a circle and a crescent on the right vertical element (cf. Motif 3). Three diagonal marks (pointing down to the right) and a horizontal mark are between the vertical elements.

Field: vegetation spray (?) in upper field (cf. nos. 1 and 24). To the left of the hull a large multi-pronged object.

88 (?).

Current location: Great Britain, J. M. Dawkins Collection.

Provenience: unknown.

Date: LM IB.

CMS number: CMS VIII, no.: 64.

Seal type: amygdaloid of basalt. The engraved surface of the seal is badly damaged.

Measurements: L.-1.8; H.-1.6; SH.-0.2.

Bibliography: Gray (1974) 18 (no. C 29).
Kenna (1966) 84 (no. 64).
Laviosa (1969-1970) 19.

Description:

Hull: perhaps the curved object in the lower field (cf. perhaps nos. 14 and 20).

Hull decoration: perhaps longitudinally bisected.

Terminal ornament: both ends narrow into blunt points.

• Oars: none.

Mast: perhaps the vertical object amidships.

Rigging: none.

Sail: none.

Field: five diagonal elements (pointing down towards the left) in the lower left field; three diagonal elements (pointing down towards the right) and a T-shaped affair in lower right field. Two long diagonal elements on each side of the mast. Five or six short, diagonal elements in upper right field.

89(?).

Current location: Great Britain, J. M. Dawkins Collection.

Provenience: unknown.

Date: LM IB.

CMS number: CMS VIII, no. 74.

Seal type: amygdaloid (ends slightly blunted) of dark green steatite. One edge of the seal is damaged.

Measurements: L.-2.1; H.-1.1; SH.-0.3.

Bibliography: Gray (1974) 18 (no. C 30)..
Kenna (1966) 95 (no. 74).
Laviosa (1969-1970) 21-22 (fig. 18),
25.

Description:

Hull: perhaps the long, curved object in lower field (cf. perhaps nos. 14 and 20).

Hull decoration: perhaps longitudinally bisected for a short distance on the right side of the hull.

Terminal ornament: not preserved.

Oars: perhaps some or all of the twelve short, diagonal elements above the hull and the twelve (or thirteen) short, diagonal elements below the hull.

Mast: perhaps the diagonal mark slightly right of amidships.

Rigging: none.

Sail: none.

Field: large diagonal marks intersect in a crude diamond pattern above the hull.

90(?).

Current location: Iraklion, Archaeological Museum
#74.

Provenience: Phaistos.

Date: LM I.

CMS number: -----.

Seal type: flattened cylinder of green stone (type not specified).

Measurements: -----.

Bibliography: Betts (1968) 149.
Davaras (1976) 287, fig. 163.
Février (1935) 109.
Gray (1974) 18 (no. C 17).
Humphreys (1977) 352.
Kenna (1969) pl. 13 (no. 8).
Laviosa (1969-1970) 19.
Marinatos (1933) 178 (no. 48),
pl. 16 (no. 48).
Paglieri (1960) 215, fig. 4 (no. 48).

Xanthoudides (1907-1909) 172-
(no. 80), pl. 7 (no. 80).

Description:

Hull: perhaps the long, diagonally placed object with raised left end. Right end omitted.

Hull decoration: twenty-six curved marks on the hull.

Terminal ornament: left end bifurcated. "Elbows" to each side of the left end.

Oars: perhaps some or all of the twenty-six curved marks on the hull.⁴

Mast: unrecognizable.

Rigging: unrecognizable.

Sail: unrecognizable.

Above hull: two tall, vertical elements. The tops of the vertical elements continue upwards to the edge of the engraved surface. Four linked crescents (the two on the vertical elements inverted, the one farthest right in-turned) run across the upper field intersecting the vertical elements.

Field: three crescents and a long, diagonal element under the hull.

(See p. 159a).

91(?).

Current location: Iraklion, Archaeological Museum, sealing #110.

Provenience: Knossos.

Date: LM.

CMS number: -----.

Seal type: small fragment of a baked clay sealing.

4. If the diagonal objects on the hull of no. 39 are thwarts, as suggested by most authorities, these twenty-six curved marks on the hull of no. 90(?) could also be thwarts (i.e., as if viewed from above).

Measurements: L.-0.9; H.-1.35.

Bibliography: Betts (1967) 34 (no. 20).
 (1973) 329-330, fig. 8.
 Gill (1965) 96.
 Humphreys (1977) 352 (Additions,
 no. 6).

Description:

Hull: not preserved.

Terminal ornament: the "elbow" to the right of the impression may have been on the right end of the hull.

Oars: not preserved:

Mast: perhaps the thin, vertical element.

Rigging: perhaps three stays (?) to the right of the mast. The lower two are connected at their left ends by a curved element; its upper end does not touch the mast.

Sail: none.

Field: the "elbow" in lower right field may not be part of the "ship."

92(?).

Current location: Iraklion, Archaeological Museum, sealing #384.

Provenience: Knossos, East Temple Repository.

Date: LM.

CMS number: -----

Seal type: from Betts (1968) it seems that there are three seal impressions, all of which were made by the same seal; all have the same inventory number.⁵

5. Betts published only two of the three sealings (my nos. 92b-c) and said that the third sealing had been neglected (unpublished?). From the two extant sealings (nos. 92b-c) Betts reconstructed the original sealing (no. 92a). Evans and Kenna both held that no. 92c represented trees swaying in the wind. Betts, following Gill's suggestion that nos. 92b and 92c were made by the same seal and the fact that

Measurements: -2-----.

Bibliography: Betts (1968) 149-150, pl. 61, figs. 1-3.
 Evans (1902-1903) 54-55 (nos. 15,
 22) 58, figs. 30-31.
 (1921) 696-697, figs. 518
 (k), 519.
 (1935) 490-491, fig. 423.
 Gill (1965) 70 (nos. L15, L22i-ii).
 Humphreys (1977) 352 (Additions,
 no. 7).
 Kenna (1960) 44, fig. 73.

Description:

Hull: all three hulls are shallow and curve upwards slightly to the right into points. All emerge from an enigmatic motif (rocks?) to the left.

Terminal ornament: double inturned "elbows" above the right end of each hull.

Oars: none.

Mast: none.

Rigging: none.

Sail: none.

Above hull: two Y-shaped objects (Betts' "crescent stands") above each hull. The right one above each hull stands between two short, parallel, diagonal marks.

Field: enigmatic motif to the left.

trees or trees swaying in the wind do not occur on any other sealstone, argued that the horizontal objects were the prows of ships (similar to other "talismatic" ship representations in showing only one end of the ship) and produced his version of the original sealing (no. 92a). However: (1) multiple ships never occur on the so-called "talismatic" gems; (2) the enigmatic motif on the left, as Betts admitted, has no parallel in Minoan ship representations; (3) while crescents occur frequently in ship representations, "crescent stands" as such are unknown. In view of these considerations I have grouped the three ship representations under one catalogue number in the questionable category.

No. 90(?) comes from a securely dated context and for this reason it is important. The degenerated nature of the representation suggests that it may not be a ship, but features such as the "elbows," crescents and vertical elements argue for its identification as a ship. If it is a ship, the artist has used some new conventions for which there are no direct parallels. This representation may one day be of assistance in interpreting the objects above the hull, if comparable examples are ever found.

APPENDIX III

Gemmae Dubitandae

(93).

Current location: Philadelphia, University Museum
#MS.4790.Provenience: unknown.Date: Middle Bronze.CMS number: CMS XIII, no. 15D (a).Seal type: three-sided prism of dark green-brown steatite. An incised line runs around the edge of each side. This seal is listed under gemmae dubitandae in CMS.Measurements: L.-1.2; H.-0.9 (each face).Bibliography: Humphreys (1977) 351 (Additions, no. 5).
Kenna and Thomas (1974), 170-171 (no. 15D, a).Description:

Hull: top hull line straight. Bottom hull line slightly curved. Hull is very deep, bifurcating to the left into two large projections. Right end terminates bluntly. Right end higher.

Terminal ornament: left end bifurcated. Tall, diagonal projection on the right end terminates in a trifoliate ornament.

Oars: none.

Mast: slightly right of amidships.

Rigging: two stays to the right and two stays to the left of the mast.

Sail: none.

Field: empty.

The uniqueness of this ship representation further suggests that the gem may be a forgery.

(94).

Current location: Oxford, Ashmolean Museum
#1938.1129 (Evans Collection).

Provenience: environs of Knossos (?).¹

Date: LM I.

CMS number: -----

Seal type: gold signet ring.²

Measurements: -----

Bibliography: Alexiou (1958) 1-3, fig. 1.
Betts (1973) 328.
Brown (1978) 638 n.4.
Buck (1962) 134.
Casson (1971) fig. 51.
(1975) 4.
Cohen (1958) 487, 490.
Evans (1928) 250, fig. 147 (b).
(1935) 953-954, fig. 923.
Gray (1974) 18-19 (no. C 35).
Kenna (1960) 154, pl. 20.
Nilsson (1950) 39 (no. 7), fig. 7.
Persson (1942a) 81-82, 99-100,
153-154, 179 (no. 26).
von Salis. (1930) 13-15, 17, fig. 11.

Description:

Hull: long, horizontal section amidships curves upwards abruptly to a point on the left end, a bifurcation (?) on the right end. Ends of equal heights.

Hull decoration: zig-zag pattern.

1. Evans (1928) noted that the ring had been acquired by a traveller in 1927 and that it probably comes from the harbor town of Knossos.

2. Kenna doubted the authenticity of the ring for three reasons: (1) unusual motif; (2) unusual technique; (3) unusually excellent state of preservation.

Terminal ornament: left end narrows into a point; right end bifurcated (?).

Oars: perhaps one steering oar held by the figure on the left of the boat.

Mast: none.

Rigging: none.

Sail: none.

Above hull: besides the figure holding the possible steering oar, six crude figures are apparently sitting in the boat.

Field: three fish below hull. Male and female figures to the left of the boat; a jar (?) to the left of them. One female figure in the upper field. Some enigmatic marks in the upper right field may be parts of more figures.

APPENDIX IV

Concordance of Catalogue Numbers

The first number indicates the catalogue number found in this text. It is followed by an M (Marinatos) and/or a G (Gray) and the corresponding catalogue number (in parentheses) and complete references of the artifact in the respective study. If one or both of the letters is missing, it means that the artifact is not found in the respective catalogue.

1. M (32): 176, 181, 190, 198, 209, 212.
G (A 7): 15, 40, 76, 77.
2. M (31): 175-176, 181, 190, 198, 214.
G (A 6): 14, 40, 76, 77.
3. M (29): 175, 181, 190, 210, 214.
G (A 8): 15, 40, 76, 77.
4. M (30): 175, 181, 190, 210, 214.
G (A 8): 15, 40, 76, 77.
5. G (A 10): 15, 40, 76, 77.
6. G (A 9): 15, 40, 76, 77.
7. M (36): 176, 191, 210, 214.
G (A 12): 15, 40, 76, 77.
8. G (B 1): 15, 40, 42.
9. G (B 8): 16, 77.
10. M (28): 175, 181, 190, 206, 210, 214, 219.
G (B 2): 15, 33, 40, 76, 77.
11. M (34): 176, 191, 209, 210, 214.
G (B 3): 15, 40, 76, 77.
12. G (B 5): 16, 40, 77, 82.

13. -----
14. G (B 6): 16, 33, 42, 77.
15. -----
16. -----
17. -----
18. -----
19. M (no catalogue number): 235.
G (B 7): 16, 40, 76, 77.
20. G (B 4): 16, 77.
21. G (B 10): 16, 42, 82.
22. G (B 12): 16, 42, 76, 77, 82.
23. M (35): 176, 190, 191, 198, 210, 214.
G (B 13): 16, 44, 77.
24. M (37): 176, 187, 191, 209, 214.
G (B 14): 16, 40, 44, 77.
25. M (38): 176, 186, 187 n.2, 189, 198, 200, 205, 209,
210, 214.
G (B 15): 16, 42, 77, 82.
26. M (39): 176, 186, 189, 198, 200, 209, 210, 124.
G (B 16): 16, 40, 77.
27. M (33): 176, 187, 189, 198, 214.
G (B 19): 16, 40, 42, 77.
28. -----
29. G (B 25): 17, 40, 42, 77, 82.
30. -----
31. -----
32. G (B 17): 16, 40, 42, 77, 82.
33. G (C 2): 17, 46, 50, 77, 79.
34. M (52): 178, 188, 189 n.1, 201, 207, 210, 216.
G (B 18): 16, 40, 42, 77, 82.
35. M (57): 179, 223, 225.
G (C 28): 18, 46, 75, 78.

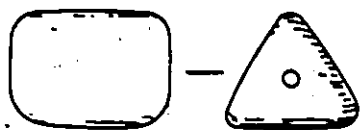
36. -----
37. M (54): 178-179, 188, 189 n.1, 194, 210.
G (C 37): 19, 46, 47, 78, 82, 83.
38. M (55): 179, 181 n.1, 188, 189, 194, 195, 198.
G (C 38): 19, 46, 47, 78, 82, 83.
39. M (40): 176-177, 185, 189, 192, 196, 200, 205, 206,
210, 214, 234.
G (B 9): 16, 40, 42, 77, 82, 83.
40. G (B 11): 16, 40, 42, 77, 82.
41. -----
42. -----
43. G (C 26): 18, 45.
44. -----
-
45. G (C 24): ~~18, 45, 48, 78.~~
46. M (45): 177, 181 n.1, 186, 188, 189, 198, 200, 202,
204, 207, 210.
G (C 10): 17, 44, 45, 78.
47. G (C 11): 17, 44, 45, 50.
48. G (C 18): 18, 78.
49. M (44): 177, 181 n.1, 188, 189 n.1, 202, 204, 207,
210.
G (C 9): 17, 44, 45.
50. M (51): 178, 181 n.1, 188, 189, 198, 202, 207.
G (C 12): 17, 44, 45, 78.
51. -----
52. -----
53. -----
54. G (C 15): 18.
55. -----
56. M (43): 177, 181, 188, 189 n.1, 201, 202, 207, 210.
G (C 8): 17, 44, 45.
57. M (47): 177-179, 181 n.1, 188, 189 n.1, 202, 207,
210, 211.

- G (C 14): 18.
58. G (C 13): 18, 44, 45.
59. G (C 19): 18, 78.
60. G (C 20b): 18, 82.
61. -----
62. -----
63. -----
64. M (49): 178, 181 n.1, 188, 189, 198, 202, 204, 207,
210, 211.
G (C 20 and C 20c): 18, 82.
65. -----
66. M (50): 178, 181 n.1, 188, 189, 198, 202, 207, 210.
G (C 23): 18.
67. G (C 22): 18.
68. M (46): 177, 181 n.1, 188, 189 n.1, 202, 207, 210.
G (C 16): 18..
69. G (C 20a): 18, 82.
70. -----
71. -----
72. G (C 25): 18.
73. M (42): 177, 181, 188, 189 n.1, 197, 201, 202, 204,
205, 207, 210, 217.
G (C 7): 17.
74. G (C 36): 19.
75. -----
76. M (56): 179, 223, 228, 232.
G (C 27): 18, 46, 75, 78.
77. M (58): 179, 185, 189, 197, 198, 227, 228, 229, 230,
231.
G (C 34): 18, 50, 77.
- 78(?). G (A 11): 15, 40, 76, 77.
- 79(?). -----

- 80(?). -----
81(?). -----
82(?). M (no catalogue number); 202 n.3.
83(?). M (41): 177, 186, 191, 207, 210, 214.
G (B 26): 17, 77.
84(?). M (53): 178, 188, 189 n.1, 228 n.1, 232.
G (C 1): 17, 46.
85(?). M (no catalogue number): 203 n.2.
86(?). -----
87(?). G (C 21): 18.
88(?). G (C 29): 18.
89(?). G (C 30): 18.
90(?). M (48): 178, 181 n.1, 188, 189 n.1, 202, 204, 207,
210.
G (C 17): 18.
91(?). -----
92(?). -----
(93). -----
(94). G (C 35): 18-19, 46, 78.

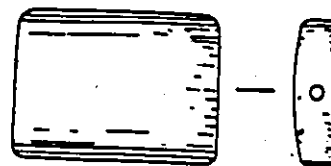
APPENDIX V

Seal Shapes



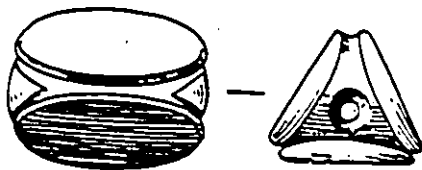
1

Early three-sided prism



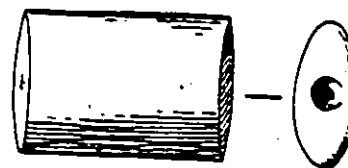
2

Flattened cylinder



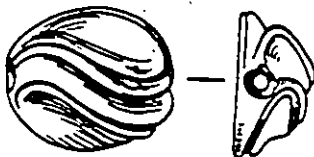
3

Later three-sided prism



4

Later flattened cylinder



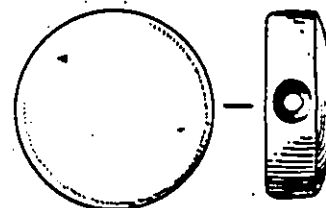
5

Foliate-back seal



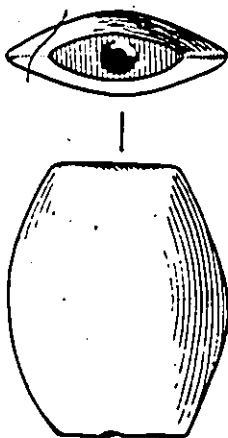
6

Theriomorph



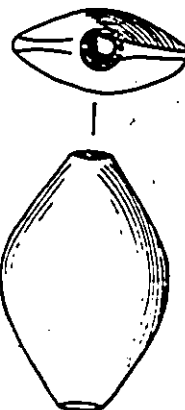
7

Discoid



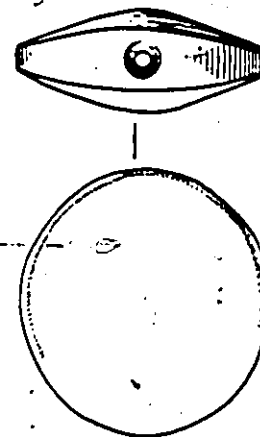
8

Glandular-shaped seal



9

Amygdaloid



10

Lentoid

APPENDIX VI

Nautical Terms

- abaft: to the rear of a ship.
abeam: on either side of the middle area of a ship.
aft: towards the rear of a ship.
amidships: in or towards the central part of a ship.
athwartship: across the length of a ship.
- backstay: line to support the mast running from the mast aft.
ballast: heavy material set in the ship's hold to keep the ship stable.
beam: the width of a ship at the widest part.
boom: spar (usually extending from the mast) to hold the bottom of a sail outstretched.
bowsprit: a large, tapered pole extending forward from the prow; the foremost stays are fastened to it.
braces: ropes attached to the yard of a sail, used to control its position.
brails: ropes used to control the area of sail exposed to the wind.
- carvel-built: ship having its planks all flush (edge to edge) from keel to gunwale.
crutch: wooden support on which the mast rests when unstepped.
cutwater: that part of the prow which cleaves the water as the ship moves forward.
- deck: a horizontal level in a ship.
dunnage: brushwood or other material used to protect the cargo.
- fore: towards the front of a ship.
fore-and-aft rig: ship rig in which most or all of the sails are not attached to yards, but are bent to gaffs or set on the mast or on stays aligned with the keel.
forestay: line to support the mast, running from the mast fore.
frames: the lateral timbers forming the internal skeleton of a ship.
freeboard: the part of a ship's side between the deck or gunwale and the waterline.

gaff: the spar upon which the head of a fore-and-aft sail is extended.

gangplank: plank temporarily extended from the ship to shore for embarking and disembarking.

gunwale: the upper edge of the side of a ship.

halyard: rope for raising and lowering the sail.

hold: the space below the main deck.

hull: the body of a ship.

inboard: within (or pointing within) the ship.

keel: chief timber extending along the entire length of the bottom of a ship.

lee: side of a ship away from the wind.

lifts: ropes running from the masttop to the yard.

port: the lefthand side facing forward.

proW: the front part of a ship.

rig: distinctive shape, number and arrangement of sails and masts on a ship; to fit out a ship with the lines used in working the sail and supporting mast and spars.

rigging: the ropes fitted to mast, yards and sails.

running rigging: the lines which control the movement of sails and spars.

sheets: ropes attached to the lower corners of a sail to control the set of the sail.

shrouds: any of the ropes stretched from a ship's side to the masttop to offset lateral strain on the mast.

spar: any pole supporting or extending a sail on a ship.

sprit: spar extending diagonally upwards from the mast to the topmost corner of a fore-and-aft sail.

spritsail: sail extended by a sprit.

standing rigging: rigging which supports the mast.

starboard: the right-hand side facing forward.

stay: large, strong rope used to support a mast fore and aft.

step: to raise the mast.

stern: the rear of the ship.

strake: line of planking extending the length of a vessel.

tabernacle: housing in which a mast may be set up and lowered.

tack: to change direction of a ship when sailing close to the wind by putting the helm alee and shifting the sail; to follow a zig-zag course.

tholepin: pin set in pairs in the gunwale against which an oar is worked.

thwarts: cross planks which serve as seats for the oarsmen.

tiller: lever for controlling a ship's rudder or steering gear.

transom: the athwartship timber or structure at the aft end of a ship's hull framing.

unstep: to remove a mast from its support and lower.

waterline: that point on the hull which the water reaches when a ship is afloat normally.

wooldings: bindings to hold together and stiffen a mast or spar.

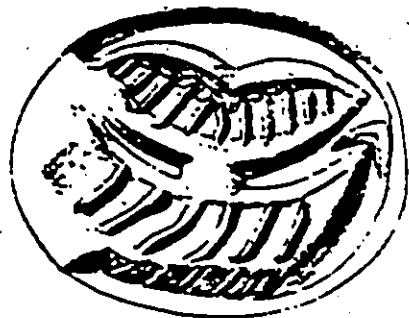
yard: spar along the head of a sail to support it.

yardarm: either end of a yard supporting a square sail.

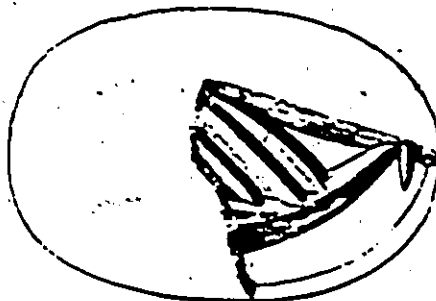
Illustrations

5

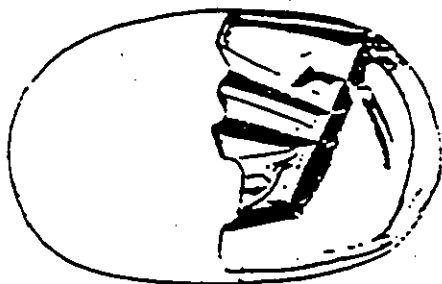
16



17



18



19



20



21



22



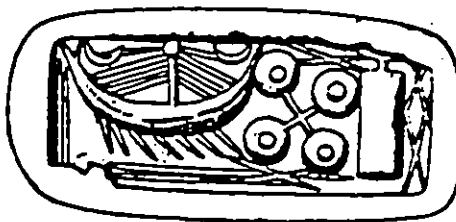
23



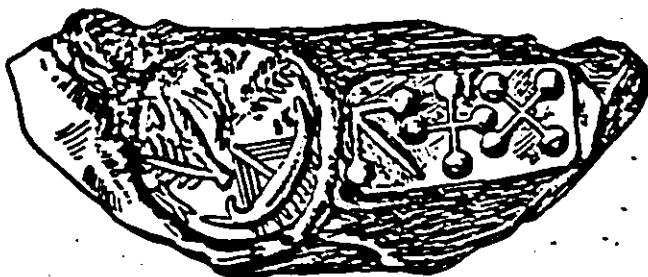
24



25



26



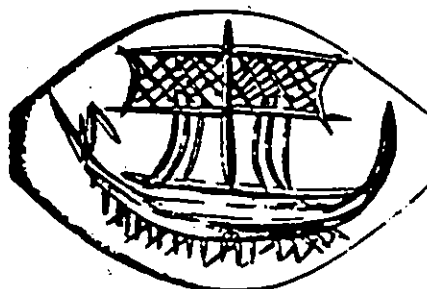
27



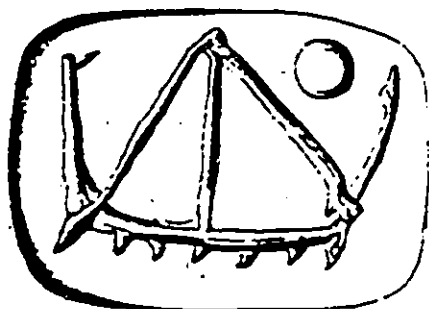
29



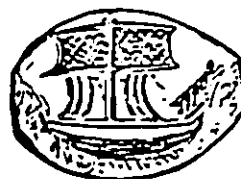
30



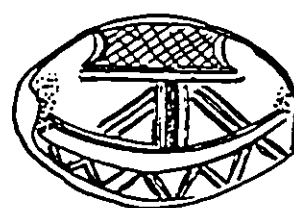
31



32



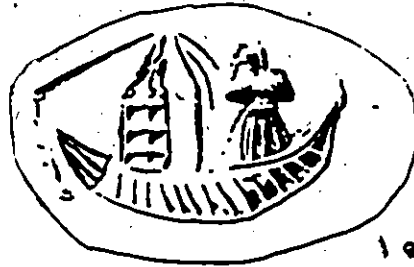
34



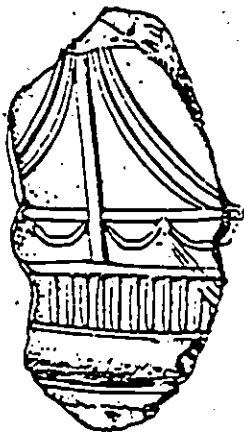
35



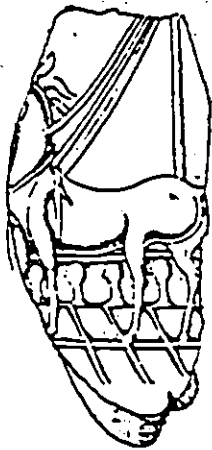
36



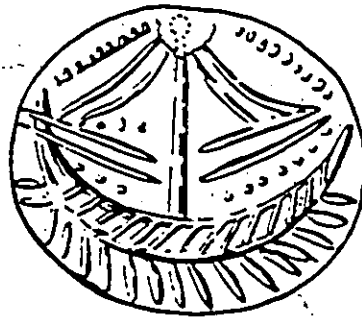
37



38



39



40



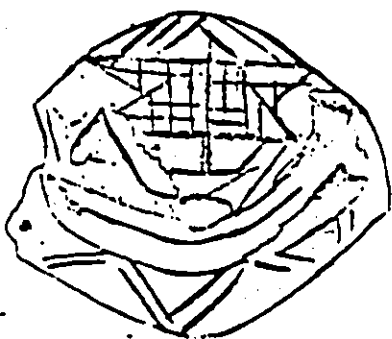
41



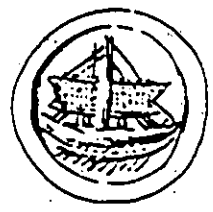
Abstract Ship Representations

Motif 1

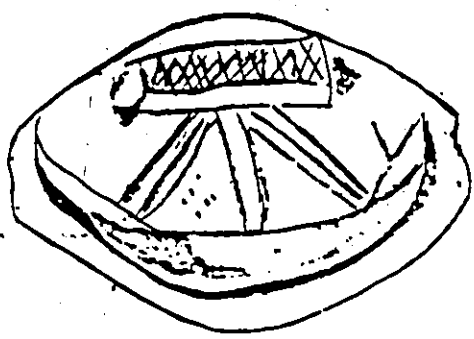
42



43



44



45



Motif 2

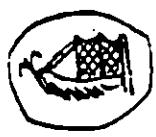
46



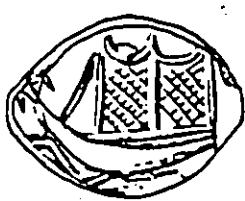
47



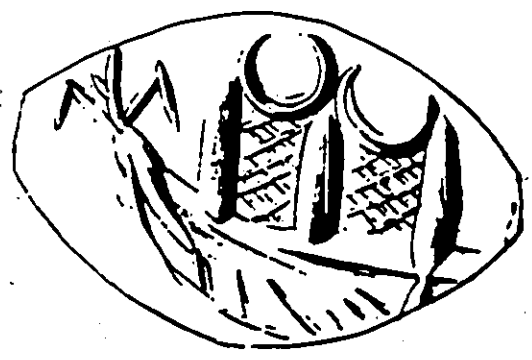
48



49

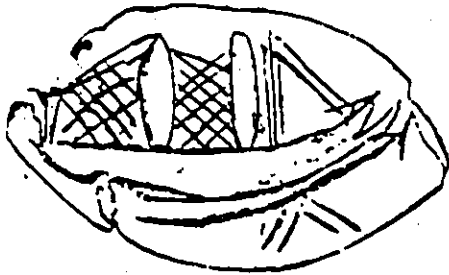


50



Motif 2a

51

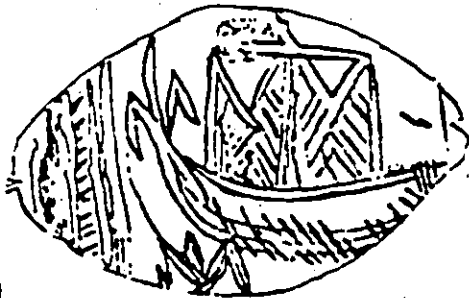


52

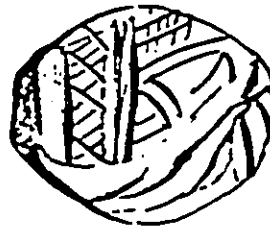


Motif 2b

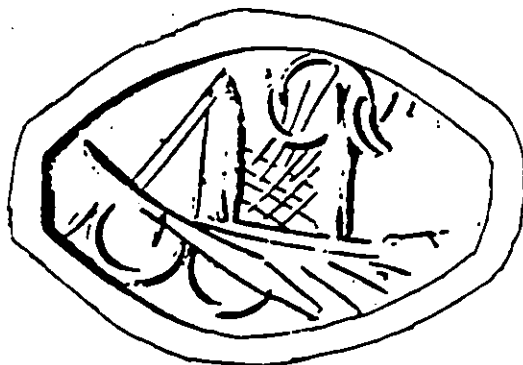
53



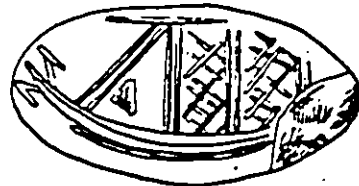
54



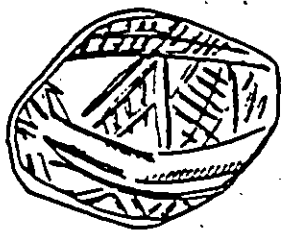
55



56



57



58



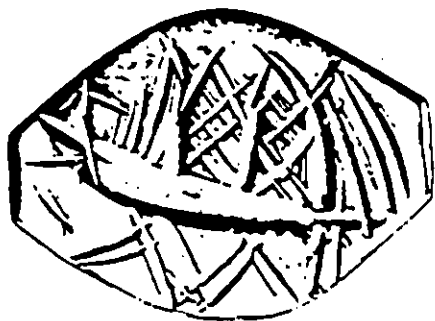
60



59



61

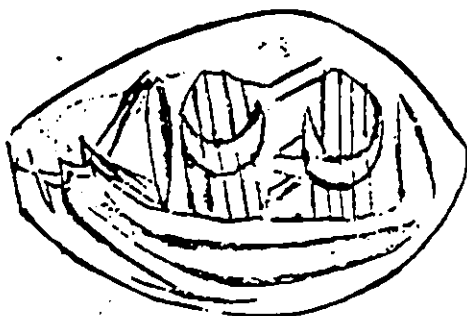


62

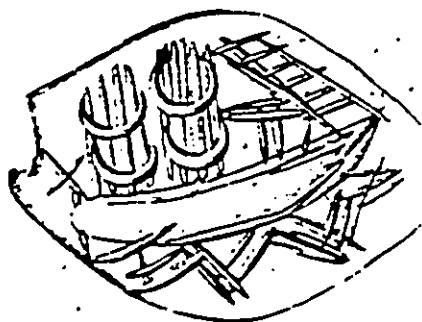


Motif 3

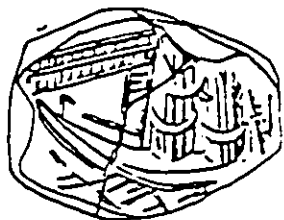
63



65



64

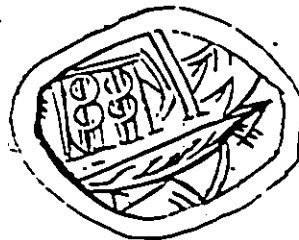


Motif 3a

66

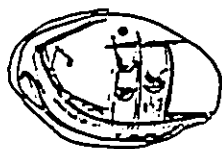


67



Motif 4

68

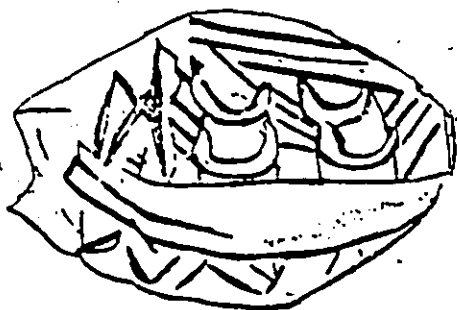


69

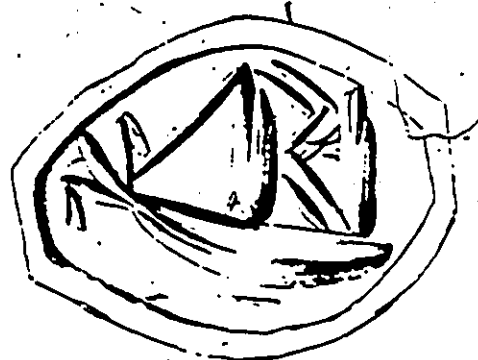


Motif 5

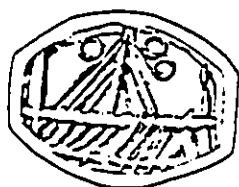
70



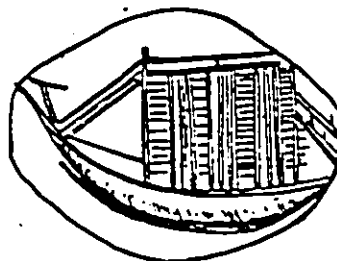
71



72



73



74

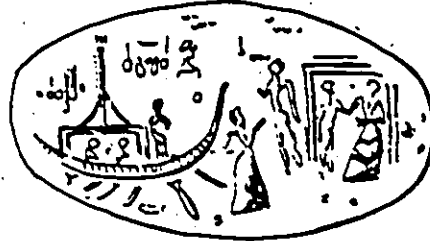


Rings

76



77



Questionable Ship Representations

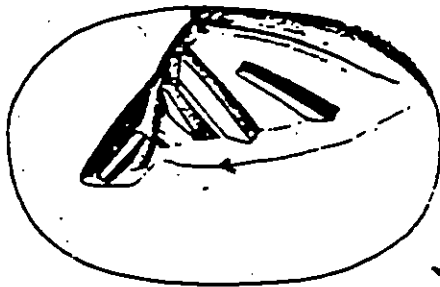
78(?)



79(?)



80(?)



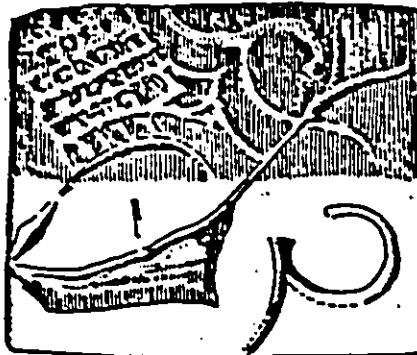
81(?)



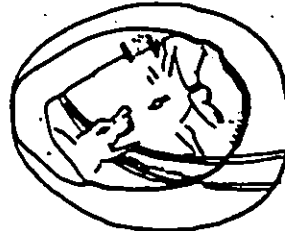
82 (?)



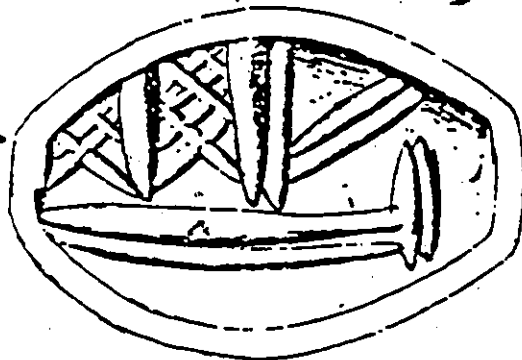
83 (?)



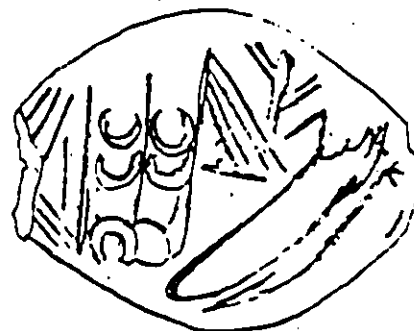
84 (?)



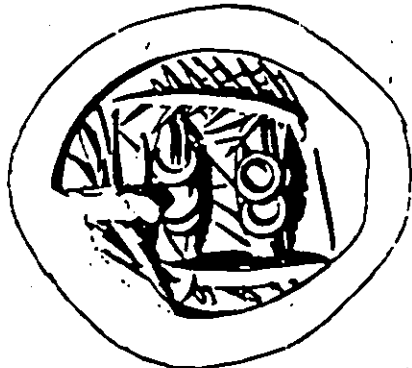
85 (?)



86 (?)



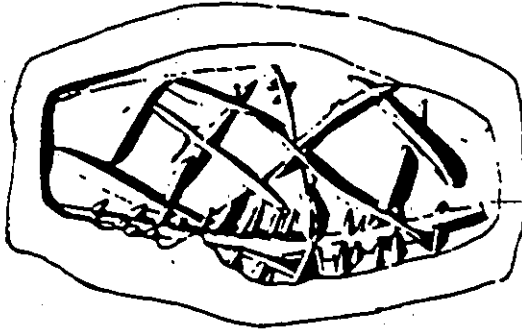
87 (?)



88 (?)



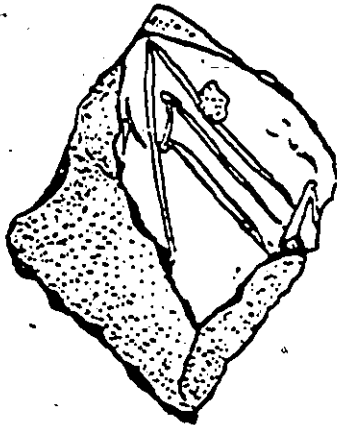
89(?)



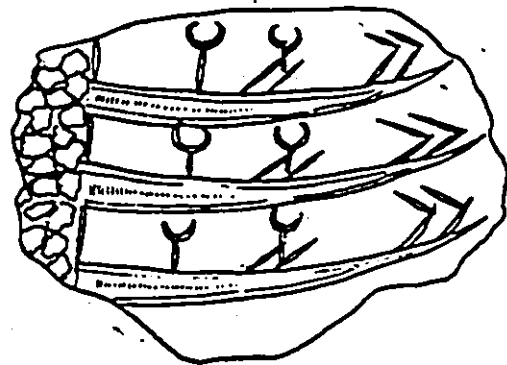
90(?)



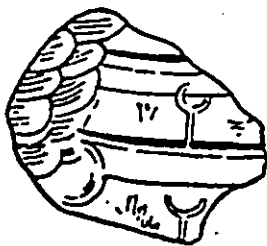
91(?)



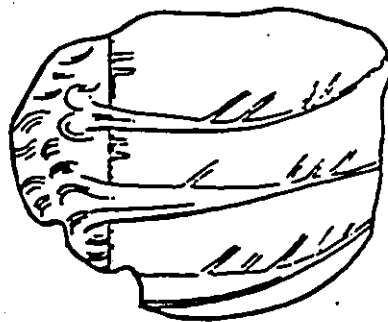
92a(?)



92b(?)

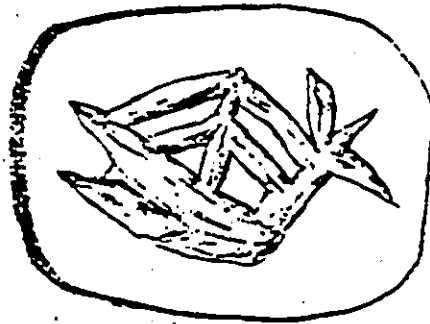


92c(?)



Gemmae Dubitandae

(95)



(94)



Bibliography

BIBLIOGRAPHY.

- Alexiou, S.
1958 "O Daktulios tes Oxfhordes." in Grumach, E. (ed.), Minoica, Festschrift zum 80. Geburtstag von Johannes Sundwall. Berlin.
- 1965 "Archaiothetes kai Mnemeia Kentrikes kai Anatol. Kretes." Deltion (B3:Chronika) 20, 549-557.
- 1972 "Larnakes kai Aggeia ek Taphou para tou Gazi Erakleiou." ArchEph 1972, 86-98.
- Amandry, P.
1953 Collection H. Stathatos: Les Bijoux Antiques. Strasbourg.
- Assmann, A.
1921 "Segel." RE II A, 1, cols. 1049-1054.
- Barnett, R.D.
1958 "Early Shipping in the Near East." Antiquity 32, 220-230.
- Bass, G.F.
1967 Cape Gelidonya: A Bronze Age Shipwreck. TAPS 57, part 8. Philadelphia.
- 1972 (ed.) A History of Seafaring Based on Underwater Archaeology. London.
- Behn, F.
1927-
1928 "Schiff." in Ebert, M. (ed.), Reallexikon der Vorgeschichte. XI. Berlin, 235-254.
- Betts, J.H.
1967 "Some Unpublished Knossos Sealings and Seal Stones." BSA 62, 27-45.
- 1968 "Trees in the Wind on Cretan Sealings." AJA 72, 149-150.
- 1973 "Ships on Minoan Seals." in Blackman, D.J. (ed.), Marine Archaeology. London, 325-338.
- 1980 CMS. X. Die Schweizer Sammlungen. Berlin.
- Boardman, J.
1961 The Cretan Collection in Oxford; the Dictaeon Cave and Iron Age Crete. Oxford.

- 1970 Greek Gems and Finger Rings. New York.
- Bonino, M.
1965 "Un Modello di Nave Cipriota del Secolo VI-V a. C." Rivista di Studi Liguri 31, 301-310.
- Branigan, K.
1970 The Foundations of Palatial Crete: a Survey of Crete in the Early Bronze Age. London.
- Brown, L.M.
1977 "The Ship Fresco from Thera. Some Thoughts on the Iconography." BICS 24, 144-145.
1978 "The Ship Procession in the 'Minature Fresco'." in Doumas (1978) 629-644.
- Buchholz, H.-G. and Karageorghis, V.
1971 Altägäis und Altkypros. Tübingen.
- Buck, R.J.
1962 "The Minoan Thalassocracy Re-examined." Historia 11, 129-137.
- Carnegie, H.M.
1908 (ed.) Catalogue of the Collection of Antique Gems Formed by James, Ninth Earl of Southesk. I. London.
- Caspari, F.
1916 "Das Nilschiff Ptolemaios IV." JdI 31, 1-74.
- Casson, L.
1959 The Ancient Mariners. New York.
1964 The Illustrated History of Ships and Boats. Garden City, New Jersey.
1971 Ships and Seamanship in the Ancient World. Princeton.
1975 "Bronze Age Ships. The Evidence of the Thera Wall Paintings." IJNA 4, 3-10.
- Chapouthier, F.
1930 Les Ecritures Minoennes au Palais de Mallia. Paris.
1932 "A Travers Trois Gemmes Prismatiques." in Mélanges Gustave Glotz. I. Paris.
- Cohen, L.
1938 "Evidence for the Ram in the Minoan Period." AJA 42, 486-494.

- Cook, A.B.
1931 "Ships." in Whibley, L. (ed.), Companion to Greek Studies. Cambridge, 567-588.
- Daux, G.
1957 "Mallia: Recherches dans les Quartiers d'Habitation." BCH 81, 687-700.
- Davaras, C.
1976 Guide to Cretan Antiquities. New Jersey.
- De Cervin, G.B.R.
1977 "The Thera Ships - Other Suggestions." MM 63, 150-152.
- Delaporte, L.
1920 Musée du Louvre, Catalogue des Cylindres. I. Cachets et Pierres Gravées de Style Oriental. Paris.
- Demargne, P.
1939 "Le Maître des Animaux sur une Gemme Crétoise du M.M. I." in Mélanges Syriens Offerts à Monsieur René Dussaud. I. Bibliothèque Archéologique et Historique 30. Paris, 121-127.
- 1964 Naissance de l'Art Grec. III. Paris.
- Doumas, C.
1965 "Korphe t'Aroniou. Mikra Anaskaphike Ereuna en Naxas." Deltion (A:Meletai) 20, 39-64.
- 1970 "Remarques sur la Forme du Bateau Égéen à l'Age du Bronze Ancien." in Valcamonica Symposium. Centro Camuno di Studi Preistorici. Capo di Ponte, 285-290.
- 1978 (ed.) Thera and the Aegean World. I. Papers Presented at the Second International Scientific Congress, Santorini, Greece, August 1978. London.
- Dumont, A.
1871 Inscriptiones Céramiques de Grèce. Paris.
- Dussaud, R.
1914 Civilisations Préhelléniques². Paris.
- Eccles, E.
1939-
1940 "Unpublished Objects from Palaikastro and Praisos: the Seals and Sealings." BSA 40, 43-49.
- Erlennmeyer H. and Zai-Boerlin, H.
1961 "Von Minoischen Siegeln." AntK 4, 9-20.

Evans, A.M.

1895

Cretan-Pictographs and Prae-Phoenician Script.
With an Account of a Sepulchral Deposit at
Hagios Onuphrios near Phaestos in its Relation
to Primitive Cretan and Aegean Culture. London.

1897

"Further Discoveries of Cretan and Aegean Script:
 with Libyan and Proto-Egyptian Comparisons."
JHS 17, 327-395.

1901-

1902

"The Palace of Knossos. Provisional Report of
 the Excavations for the Year 1902." BSA 8,
 1-124.

1902-

1903

"The Palace of Knossos. Provisional Report
 for the Year 1903." BSA 9, 1-153.

1904-

1905

"The Palace of Minos and its Dependencies.
 Provisional Report for the Year 1905." BSA
 11, 1-26.

1909

Scripta Minoa. I. The Written Documents of
Minoan Crete with Special Reference to the
Archives of Knossos. Oxford.

1921

The Palace of Minos. I. London.

1925

The Early Nilotic, Libyan and Egyptian Relations
with Minoan Crete. The Huxley Memorial Lecture
 for 1925. London.

1928.

The Palace of Minos. II. London.

1930

The Palace of Minos. III. London.

1935

The Palace of Minos. IV. London.

Février, J.-G.

1935

"Les Origines de la Marine Phénicienne." Revue
d'Histoire de la Philosophie et d'Histoire
Général de la Civilisation 3, 97-125.

1949-

1950

"L'Ancienne Marine Phénicienne et les Découvertes
 Récentes." La Nouvelle Clío 1-2, 128-143.

Fimmen, D.

1921

Kretisch-Mykenische Kultur. Leipzig.

Furtwängler, A.

1896

Beschreibung der Geschnittenen Steine im
Antiquarium. Berlin.

1900

Die Antiken Gemmen; Geschichte der Steinschneide-
kunst in Klassischen Altertum. Amsterdam.

- Gibson, C.E.
1947 "The Origin of the Ram." MM 33, 164-169.
- Gill, M.A.V.
1965 "The Knossos Sealings: Provenance and Identity." BSA 60, 58-98.
- Gillmer, T.C.
1975 "The Thera Ship." MM 61, 321-327.
1978 "The Thera Ships, a Re-analysis." MM 64, 125-133.
- Glötz, G.
1925 Aegean Civilization. New York.
- Gray, D.H.F.
1974 Seewesen. Archaeologia Homerica. I:G. Göttingen.
- Herbig, R.
1940 "Philister und Dorier." JdI 55, 58-89.
- Hiller, S.
1972 "Fisch oder Schiff. Zu einem Bemalten Middlebronzezeitlichen Gefäßfragment aus Aegina." Pantheon 30, 439-446.
1977 Review of Gray (1974). Gnomon 49, 398-404.
- Höckmann, O.
1968 "Frühe Schifffahrt im Adriatischen Meer." in Atti e Memorie del I° Congresso Internazionale di Micenologia, Rome 27 Settembre-3 Ottobre 1967. III. Incunabula Graeca 25:3. Rome, 1176-1178.
- Hood, M.S.F.
1967 The Home of the Heroes: the Aegean Before the Greeks. London.
1971 The Minoans. Crete in the Bronze Age. London.
1978 The Arts in Prehistoric Greece. Norwich.
- Humphreys, S.C.
1973 Review of Renfrew (1972). IJNA 2, 218-219.
1977 Review of Gray (1974). CP 72, 347-355.
- Hutchinson, R.W.
1962 Prehistoric Crete. Harmondsworth.
- Johnstone, P.
1973 "Stern First in the Stone Age." IJNA 2, 3-11.

- 1980 The Sea-Craft of Prehistory. London.
- Karo, G.H.
1910 "Ein Gestohlener Ring." AM 35, 343-344.
- 1926a "Hagia Triada." in Ebert, M. (ed.), Reallexikon der Vorgeschichte. V. Berlin, 19.
- 1926b "Kreta." in Ebert, M. (ed.), Reallexikon der Vorgeschichte. VII. Berlin, 63-93.
- 1930a Die Schachtgräber von Mykenai. Munich.
- 1930b "Schatz von Tiryns." AM 55, 120-140.
- Kenna, V.E.G.
1960 Cretan Seals, Together with a Catalogue of the Minoan Gems in the Ashmolean Museum. Oxford.
- 1964 "Archäologische Gesellschaft zu Berlin 1963: Sitzung am 19. November 1963." AA 79, 911-954.
- 1966 CMS. VIII. Die Englischen Privatsammlungen. Berlin.
- 1967a CMS. VII. Die Englischen Museen. II. Berlin.
- 1967b "The Seal Use of Cyprus in the Bronze Age, II:" BCH 91, 552-577.
- 1969 The Cretan Talismanic Stone in the Late Minoan Age. SIMA 24. Lund.
- 1972 CMS. XII. Nordamerika. I. Berlin.
- Kenna, V.E.G. and Sakellarakis, J.G.
1969 CMS. IV. Iraklion, Sammlung Metaxas. Berlin.
- Kenna, V.E.G. and Thomas, E.
1974 CMS. XIII. Nordamerika. II. Kleinere Sammlungen. Berlin.
- Kirk, G.S.,
1949 "Ships on Geometric Vases." BSA 44, 93-153.
- Köster, A.
1923 Das Antike Seewesen. Berlin.
- 1924 Schiffahrt und Handelsverkehr des Östlichen Mittelmeeres im 3. und 2. Jahrtausend v. Chr. Leipzig.
- 1934 Studien zur Geschichte des Antiken Seewesen. Aalen.

- Landström, B.
 1961 The Ship. A Survey of the History of the Ship from Primitive Raft to the Nuclear-Powered Submarine with Reconstructions and Pictures. London.
- 1969 Sailing Ships, in Words and Pictures, from Papyrus Boats to Full Riggers. Garden City.
- Laviosa, C.
 1969- "La Marina Micenea." ASAthene 47-48, 7-40.
 1970
- Levi, D.
 1925- "Le Cretule di Haghia Triada." ASAthene 8-9,
 1926 71-156.
- Lorimer, H.L.
 1950 Homer and the Monuments. London.
- Marinatos, S.
 1924- "Mesominoike Oikia en kato Mesara." Deltion 9,
 1925 53-78.
 1926a "Minoike kai Omerike Skylla." Deltion 10,
 51-62.
 1926b "Nea Ermeneia tou Argyrou Rytou ton Mykenon." Deltion 10, 78-80.
 1927- "Apax eti peri Minoikes 'Skyllas'." Deltion
 1928 11, 53-54.
 1930 "Ai Thalassographikai Parastaseis tes Kretomykenaikes Epoches." ArchEph 1930, 108-126.
 1933 "La Marine Créto-Mycénienne." BCH 57, 170-235.
 1973a "Andron Eroon Theios Stolos." AAA 6, 289-292.
 1973b "A Fresco of Historical Nature from Thera." PraktAkAth 48, 231-237.
 1974a "Das Schiffsfresko von Akrotiri, Thera." in Gray (1974) 140-151.
 1974b "The 'Libya Fresco' from Thera." AAA 7, 87-94.
 1974c Excavations at Thera. VI. Athens.
- Marinatos, S. and Hirmer, M.
 1960 Crete and Mycenae. New York.
- Matz, F.
 1928 Die Frühkretischen Siegel. Berlin.

- Meirat, J.
1964 Marines Antiques de la Méditerranée. Paris.
- Meyer, E.
1928 Geschichte des Altertums.² II, Stuttgart.
- Miltner, F.
1931 "Seewesen." in RE, Supplement V, cols. 906-962.
- Morrison, J.S.
1972 Review of Casson (1971). IJNA 1, 230-233.
- Mosso, A.
1910 The Dawn of the Mediterranean Civilization. London.
- Nilsson, M.P.
1950 The Minoan-Mycenaean Religion. Lund.
- Pagliari, S.
1960 "Origine e Diffusione della Navi Etrusco-Italiche." StEtr 28, 209-231.
- Paribeni, R.
1908 "Il Sarcophago Dipinto di Haghia Triada." MonAnt 19, 5-86.
- Pendlebury, J.D.S.
1967 The Archaeology of Crete. London.
- Persson, A.W.
1942a The Religion of Greece in Prehistoric Times. Berkeley.
1942b New Tombs at Dendra near Midea. Lund.
- Pini, I.
1970. CMS. II:5. Iraklion, Archäologisches Museum: Die Siegelabdrücke von Phastos. Berlin.
1975 CMS. V:1. Kleinere Griechische Sammlungen. Berlin.
- Platon, N.
1969 CMS. II:1. Iraklion, Archäologisches Museum: Die Siegel der Vorpalastzeit. Berlin.
- Platon, N., Pini, I. and Salies, G.
1977 CMS. II:2. Iraklion, Archäologisches Museum: Die Siegel der Altpalastzeit. Berlin.
- Reich, J.J.
1968 "The Role of the Naturalistic Signs in the Minoan Hieroglyphic Script." in Atti e Memorie

del I° Congresso Internazionale di Micenologia,
Rome 27 Settembre-3 Ottobre 1967. I. Incunabula
Graeca 25:1. Rome, 448-460.

- Renfrew, C.
1957 "Cycladic Metallurgy and the Aegean Early
Bronze Age." AJA 71, 1-20.
- 1972 The Emergence of Civilization. The Cyclades
and the Aegean in the Third Millenium B.C.
London.
- Sakellarakis, J.A.
1971 "Elephantinon Ploion ek Mykenon." ArchEph
1971, 188-233.
- Sakellarakis, J.A. and Sapouna-Sakellaraki, E.
1981 "Drama of Death in a Minoan Temple." National
Geographic 159, 205-222.
- Sakellariou, A.
1964a Die Mykenische Siegelglyptik. SIMA 9. Lund.
1964b CMS. I. Die Minoischen und Mykenischen Siegel
das Nationalmuseums in Athen. Berlin.
- 1971 "Scène de Bataille sur un Vase Mycénien en
Pierre?" RA 1971, 3-14.
- Schachermeyr, F.
1951 "Streitwagen und Streitwagenbild im Alten
Orient und bei den Mykenischen Griechen."
Anthropos 46, 705-753.
- 1955 Die Älteste Kulturen Griechenlands. Stuttgart.
1964 Die Minoische Kultur des Alten Kreta. Stuttgart.
1967 Ägäis und Orient. Die Überseeischen Kultur-
beziehungen von Kreta und Mykenai mit Agypten,
der Levante und Kleinasien unter Besonderer
Berücksichtigung des 2. Jahrtausends v. Chr.
Wien.
- Seager, R.B.
1909 "Excavations on the Island of Mochlos, Crete,
in 1908." AJA 13, 273-303.
- 1912 Explorations in the Island of Mochlos. New York.
- Shaw, M.C.
1980 "Painted 'Ikria' at Mycenae?" AJA 84, 167-179.
- Sourviñou-Inwood, C.
1973 "On the Lost 'Boat' Ring from Mochlos."

- Kadmos 12, 149-158.
- Stais, V.N.
1915 Collection Mycénienne² Athens.
- Stawell, F.M.
1924 "Suggestions Towards an Interpretation of the Minoan Scripts." AJA 28, 120-141.
- Studniczka, F.
1906 "'Skylia' in der Mykenischen Kunst." AM 31, 50-52.
- Suder, H.
1930 Vom Einbaum und Floss zum Schiff. Die Primitiven Wasserfahrzeuge. Berlin.
- Svoronos, J.N.
1915 "Prosktemata tou Ethe. Nomismatikou Mouseiou." Journal International d'Archéologie Numismatique 17, 71.
- Tilley, A.F. and Fernwick, V.A.
1973 "Rowing in the Ancient Mediterranean: a New Aspect." MM 59, 96-99.
- Tilley, A.F. and Johnstone, P.A.
1976 "A Minoan Naval Triumph?" IJNA 5, 285-292.
- Toudouze, G.G., Roncière, C. de la, Tramound, J., Rondeleux, C., Dollfus, C. and Lestonnat, R.
1934 Historie de la Marine. Paris.
- van Effenterre, H. and van Effenterre, M.
1972 CMS. IX. Cabinet des Médailles de la Bibliothèque Nationale Paris. Berlin.
- van Effenterre, M.
1978 "Cretan Ships on Seal Stones; Some Observations." in Doumas (1978) 593-597.
- Vingiano, G.
1955 Storia della Nave. Rome.
- von Salis, A.
1930 Theseus und Ariadne; Festschrift der Archäologischen Gesellschaft zu Berlin zur Feier des Hundertjährigen Bestehens der Staatlichen Museen zu Berlin am 1. October 1930. Berlin.
- Wachsmann, S.
1977 "On the Thera Paintings." IJNA 6, 266-267.

- Walters, H.B.
1903 British Museum. Catalogue of the Terracottas in the Department of Greek and Roman Antiquities, British Museum. London.
- 1926 British Museum. Catalogue of Engraved Gems and Cameos, Greek, Etruscan and Roman in the British Museum. London.
- Warren, P.M.
1966 "A Stone Receptacle from the Cave of Hermes Kranaios at Patsos." BSA 61, 195-196.
- Wiesner, J.
1936 Grab und Jenseits. Untersuchungen im Ägäischen Raum zur Bronzezeit und Frühen Eisenzeit. Breslau.
- 1968 Fahren und Reiten. Archaeologia Homerica. I:F. Göttingen.
- Williams, R.T.
1949 "Ships in Greek Vasepainting." Greece and Rome 18, 126-137, 143-144.
- Xanthoudides, S.A.
1907-
1909 "Ek Kretes." ArchEph 1907-1909, 141-186.
- 1924 The Vaulted Tombs of Mesará: an Account of Some Early Cemeteries of Southern Crete. Westmead.
- Xénaki-Sakellariou, A.
1958a Les Cachets Minoens de la Collection Giamalakis. Ecole Française d'Athènes, Etudes Crétoises 10. Paris.
- 1958b "Sur le Cachet Prismatique Minoen." in Grumach, E. (ed.), Minoica, Festschrift zum 80. Geburtstag von Johannes Sundwall. Berlin, 451-460.
- Zervos, C.
1956 L'Art de la Crète Néolithique et Minoenne. Paris.
- 1957 L'Art des Cyclades, du Début à la Fin de l'Age du Bronze, 2500-1100 avant Notre Ère. Paris.
- Zwierlein-Diehl, E.
1969 Antike Gemmen in Deutschen Sammlungen. II. Munich.