INTRODUCTION

Acknowledgements

This volume could not have been assembled without the generous and enthusiastic co-operation of those dealers and collectors of antiquities whose sealstones are published in it. To those who are mentioned by name and those who have preferred to remain anonymous I extend my gratitude. Their willingness to allow publication of the sealstones in their possession and very often their kind hospitality made the preparation of their material an honour and a pleasure. There were also many Swiss collectors of antiquities, too numerous to mention here, who, though they had no relevant material themselves, were always ready to suggest the names of colleagues who did; to them too I owe a debt of gratitude for their assistance.

I would also like to express my thanks to Professor H.A. Cahn and his assistants at Münzen und Medaillen A.G. (Basel), to Mrs. H. Rosenberg and Dr. L. Maly of Ars Antiqua A.G. (Luzern), to Dr. L. Mildenberg of Bank Leu und Co. A.G. (Zürich), and to Miss H. Vollmoeller of Galerie Heidi Vollmoeller (Zürich). As a result of their kind co-operation sealstones which have passed through their hands between 1964 and the time of writing have been included in the volume.

At the Rietberg Museum (Zürich) Dr. E. Leuzinger and her assistants provided facilities to study sealstones in that collection and at the Musée d'Art et d'Histoire (Geneva) the same facility was generously extended by Dr. C. Dunant and members of her department.

In Geneva too Dr. M.-L. Vollenweider's interest in the publication of this volume was invaluable. Her knowledge of Swiss collections and her scholarly approach to all aspects of ancient glyptic art provided me with an example and a stimulus in the early stages of the work. I also benefited from the advice of the late Revd. Dr. V.E.G. Kenna who first proposed that I undertake this work and took time to discuss most of the pieces with me; the fact that I have not always accepted his advice in no way diminishes my gratitude for it. Mr. J.T. Hooker provided an expert opinion on the Linear A signs incised on the clay sealing (120). Professor Schwander, Dr. Stern and Dr. Hänni of the Mineralogisch–Petrographisches Institut of the University of Basel identified the material of five sealstones submitted to them by Dr. Ingo Pini (2, 167 and 206–208). The section on materials has benefited from the constructive criticisms of Professor P.M. Warren on stones and of Miss Olga Krzyszkowska on bone and ivory. The whole introduction has also been read by Dr. J.G. Younger and I have incorporated his helpful suggestions on a number of points.

To the editors of this series, Dr. Pini and the late Professor F. Matz, I owe a great deal. In particular Dr. Pini has been my constant and patient advisor and helper. He has taken many of the photographs, and he and his assistant, Dr. Gisela Salies, have discussed with me all the sealstones and the manner of their presentation, saving me from many mistakes. Errors of fact or judgment which may remain are my own.

Typing of draft and final manuscripts was undertaken by Mrs. Jeanne Bishop, Miss Hilary Deighton, and Mrs. Cathy Eaglen to whom I am indebted for their patience. My final thanks are reserved for Mr. and Mrs. William Dawson who allowed me to make their home in Geneva my base in Switzerland for two long periods of study. To their tolerance, hospitality and friendly encouragement this volume owes more than I can possibly express here.

Illustrations

The sealstones themselves were photographed by Mr. Peter Gautel and by Dr. Pini as follows: Gautel–1–25, 26 (shape), 27–35, 37–39, 41–43, 45, 46, 48 (shape), 49–68, 70–74, 76–79, 82–85, 87–96, 98–100, 103–113, 115–120, 122–124, 126, 131–135, 137–139, 143, 146–166, 169–185, 187–210, 212, 214, 215, 218, 220–223, 226–230, 233–248, 250–252, 254–257, 259–263, 265, 271–274, 276, 277 (side b), 278, 279, 281, 283–285, 290, 292, 294, 295, 303, 307, 310, 312–316; Pini–26 (engraved surface), 36, 40, 44, 47, 48 (engraved surface), 69, 75, 80, 81, 86, 97, 101, 102, 114, 121, 125, 127–130, 136, 140–142, 144, 145, 167, 168, 186, 224, 225, 231, 232, 249, 253, 267–270, 275, 277 (side a), 280, 282, 286–289, 291, 293, 296–302, 304–306, 308, 309, 311, 317–323. The prints used for publication have mostly been prepared by Dr. Pini and Miss Gisela Burgfeld. Movement of pieces from dealer to collector and consequent lack of knowledge about their present whereabouts accounts for the fact that no photographs are available for 55 (engraved side), 211, 213, 216, 219, 225 (engraved side c) and 266, and that in the case of 264 and 319 copies have been prepared by Mr. Gordon Kelsey of the Arts Faculty Photographic Unit of the University of Bristol from existing photographs supplied by Dr. M.-L. Vollenweider and Miss H. Vollmoeller respectively. Dr. Vollenweider also provided the photograph of 258. That of 217 was supplied by Münzen und Medaillen A.G.

All the photographs of impressions were made by Miss Burgfeld, with the exception of 174, 219, 264 and 266 which are by Mr. Kelsey, who also copied an existing photograph of 216 supplied by Miss Vollenweider. Mr. Kelsey produced initial working photographs of most of the impressions.

The drawings for the tables of profiles are by Mrs. Hannelore Otto. In one or two cases no profile has been included, either because the seal's whereabouts is no longer known (211, 213, 216, 217, 219, 266 and 319) or because the stone is in a setting which prevents an accurate profile being taken (264, 299 and 310). Drawings of most of the motifs were made by Mrs. Beryl Down; as a result of a change in editorial policy they have not been published in this volume but are lodged with the Redaktion of *Corpus*

der minoischen und mykenischen Siegel in Marburg. Drawings have, however, been included of the sealing (120) and of some seals where they seem to contribute to the understanding of a motif unclear from the available photographs. They are by Mrs. Down, Mr. Herbert Enderlin and Mrs. Alice Fäthke, as follows: Down–53, 211, 213, 216, 252, 266; Enderlin–234; Fäthke–28, 96, 120, 131, 145, 162, 170, 219, 240, 247.

Provenience

None of the sealstones in this volume comes from a securely documented find-spot. Some were acquired by their present owners during travels in the Aegean area and some purchased from dealers in Greece, Switzerland, and other European countries.

Collectors, interested for the most part in sealstones as *objets d'art*, tend to make no note of where their pieces are said to have been found. Such notes might in any case carry little weight, as dealers are often understandably silent–on occasion even misleading–about their sources of supply. Some of the pieces, however, come with more or less vague indications as to their original provenience and these are listed here, first those for which the information is more specific and then those for which it is of a more general nature.

312 (E. Peters-Schmidt) was published by Sir Arthur Evans in *Scripta Minoa* I as coming from the Mirabello region in Crete. 6 (H. [†] and M.-L. Erlenmeyer) is said to have come from a plundered *tholos* tomb at Siva in the Mesara and the information could well be correct, though an ivory cylinder originally purchased with 6 and said to be from the same source is a certain forgery.[1]

Also said to come from Crete are the following: 315 and 316 (Rietberg Museum); 225–232 (Geneva dealer) with 272, 273 and 277 (E. Bollmann, purchased from the same Geneva dealer), though this group contains at least one piece of doubtful authenticity (232) and a certain forgery which has not been included here; 271 (Bank Leu & Co.) which was purchased with a number of certain forgeries; 223 and 224 (R. Muehlon) which were acquired by their present owner on the island. 269 (H. Seyrig [†]) and 314 (E. Peters-Schmidt) once formed part of the R.M. Dawkins collection which was assembled primarily in Crete (and perhaps Melos) (see under History of the Collections below).

242 (N.K.) was seen in Athens in 1946 by F. Chapouthier and published by him in *Revue des Etudes Anciennes* (1947) as coming from 'the Islands'. 267 and 268 (H. Seyrig [†]) were purchased in Lebanon, at Tripoli and Beirut respectively, but, given present

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[1] *EAG* 24, no. 62 with ill.; this piece, with two horses, is now in the Museum of Cultural History, University of California, Los Angeles but it is not included in *CMS* XIII, presumably on the grounds that it is not of genuine Minoan workmanship. Horses–and they *are* clearly horses–do not appear so early in the Minoan repertoire. Impression and photographs of the piece are kept at the Redaktion of *Corpus der minoischen und mykenischen Siegel* in Marburg.

knowledge of the ancient distribution of Minoan-Mycenaean sealstones, it seems unlikely that they were found there; doubts have been expressed by some about the authenticity of 268 (see under Forgeries and Doubtful Pieces below). 233–238 (J. Dörig) and 270 (H. Seyrig [†]) were purchased in Athens. 280–311 (E. [†] and M. Heller) and many of the Erlenmeyer sealstones (3–210) were acquired in Greece by their present owners.

History of the Collections

Switzerland provides a centre for dealing in antiquities and the Swiss themselves are inveterate collectors, some specializing in engraved gems. Quite frequently pieces change hands; and such changes have even occurred during the preparation of this volume. This redistribution and the understandable reluctance of dealers to reveal their customers' names means that the present whereabouts of some of the pieces published here is now uncertain;[2] they are presented here under the names of those dealers and collectors in whose possession they were most recently seen.

Apart from the seals mentioned above which were acquired by their present owners in Greece or the Near East, the remainder published here came to their collectors by way of other hands. Three of these previous owners are well known connoisseurs, others are dealers and a few are private individuals.

Six seals once in the possession of Sir Arthur Evans came into the collection of M. Velay which was for a time in Geneva but is now in New York; these have already been published as *CMS* XIII 79–84 and are therefore not included in this volume. Fourteen seals from the V.E.G. Kenna collection have been acquired by the Musée d'Art et d'Histoire in Geneva; they were published in *CMS* VIII and are not republished here.[3] The considerable collection of R.M. Dawkins, amassed mainly in Crete, has been widely dispersed. It was sold by Sotheby and Co. (London) in two groups: the first in 1957[4] was mostly purchased by another London dealer, from whom 269 in this volume passed to the collection of H. Seyrig (†) and 312 and 314 to that of R. Schmidt (†) (Solothurn), now inherited by Mrs. E. Peters-Schmidt; 312 was once on loan to the Fitzwilliam Museum (Cambridge), where Evans saw it and published it in *Scripta Minoa* I; both 312 and 314 were published in 1967 in the catalogue of an exhibition of Greek and Roman antiquities from private collections in Bern, Biel and Solothurn. The second group of R.M. Dawkins' seals was sold in 1967 after their publication in *CMS* VIII, many of them to Münzen und Medaillen A.G. (Basel); of these, four (*CMS* VIII 47, 66, 80 and 89) are now in the collection of E. Bollmann, two (*CMS* VIII 76 and 84) were acquired by the Koninlikjk Kabinet van Munten, Peningen en Gesneden Stenen (The Hague),

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[2] This also explains a number of missing photographs (e.g. 55 – engraved side, 211, 213, 216, 219, 225 – engraved side c–and 226), missing profiles (e.g. 211, 213, 216, 217, 219, 266 and 319), illustrations which may fall below *CMS*' usual standard (e.g. 319 and 264), and a few instances where it has not been possible to acquire a full set of measurements (e.g. 213, 216 and 320).

and seven (*CMS* VIII 53, 72, 87, 91, 95, 96 and 97) are still, at the time of writing, with Münzen und Medaillen A.G. These pieces are not republished in this volume.[5]

The largest Swiss handler of Minoan-Mycenaean sealstones is Münzen und Medaillen A.G. (Basel). In addition to the R.M. Dawkins pieces already discussed, fifteen genuine pieces have been published in the firm's catalogues since 1964.[6] Of these, nine (211–218 and 220 in this volume) are still, at the time of writing, in the firm's possession or sold to customers whose names have not been disclosed; one, now in Los Angeles, has appeared as *CMS* XIII 68 and is not republished here; the remaining five have passed to Swiss collectors and are published here: 1 (H. Bloch); 6, from the collection of J.B. (Celle, Germany), and 44 (H.[†] and M.-L. Erlenmeyer); 264 (E. Rutishauser [†]); and 313 (E. Peters-Schmidt). 264 has now been acquired by the Cabinet des Médailles (Paris) but is included here because it arrived there too recently to be included in *CMS* IX. Still other sealstones have passed through Münzen und Medaillen's hands without

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[3] Their *CMS* VIII numbers are listed here with their Musée d'art et d'Histoire inventory numbers (those marked * have also been published in J.H. Betts. *Art Antique: Collections Privées de Suisse Romande* [1975]):

CMS VIII 131*	Inv. No. 20469
132*	20470
133*	20471
136*	20472
137	20473
138	20474
139*	20475
140*	20476
141	20477
142	20478
143	20479
144*	20480
145	20481
146*	20482

[4] Sotheby and Co. (London), Sale Catalogue lst July 1957. Except for those which found their way into other British private collections, these pieces were unfortunately not included in *CMS* VIII, though good impressions of them were lodged in the Ashmolean Museum (Oxford) and the island gems amongst them published by J. Boardman, *Island Gems* (1963).

[5] With the exception of the four pieces now in the collection of E. Bollmann, these seals were published by Münzen und Medaillen in their catalogue *GSA/K*. Their *CMS* VIII numbers are listed here with their numbers in that catalogue:

CMS VIII 53	*GSA/K* 91
72	92
76	95
84	94
87	96
91	97
95	103
96	102
97	101

[6] *Vente Publique* XXVIII, Vendredi 19 et Samedi 20 Juin 1964 (hereafter *VP*); *Early Art in Greece*, an exhibition organised in co-operation with Dr. Herbert A. Cahn, Münzen und Medaillen A.G. by André Emmerich Gallery Inc., New York, May 7 to June 11, 1965 (hereafter *EAG*); *Geschnittene Steine der Antike*, Sonderliste K, Dezember 1968 (hereafter *GSA/K*); and *Kunstwerke der Antike*, Auktion 40, 13. Dezember 1969 (hereafter *KA*) (see also List of Abbreviations).

appearing in the firm's published catalogues; these include the four ex-Dawkins pieces mentioned above, now with E. Bollmann, 253 sold to the Musée d'Art et d'Histoire (Geneva) and 219 still in the firm's possession.

Galerie Heidi Vollmoeller (Zürich) has in recent years handled ten traceable Minoan-Mycenaean sealstones. Of these, 317–321 in this volume are still, at the time of writing, in the firm's possession, 276 has been purchased by E. Bollmann and three, now in German collections, are to appear in *CMS* XI.[7]

Other dealers have also sold to Swiss collections. From Geneva dealers the Musée d'Art et d'Histoire acquired 245–248, 250–252, 254–257, 259–261, and 263 and E. Bollmann purchased 272, 273 and 277. 225–232 are still, at the time of writing, on the Geneva market along with 322 and 323, which are published as *addenda* because they arrived there late in the preparation of this volume. 274, 275, 278 and 279 were supplied to E. Bollmann by a Paris dealer. 249 was sold by Sotheby and Co. (London) to the Musée d'Art et d'Histoire; it came from their sale of the Southesk collection, which had acquired it in 1879 from Mr. C. Schmidt. 266 was published in a catalogue of Ars Antiqua A.G. (Luzern) in 1969 along with a Melian gem but the present whereabouts of neither is known.

Private collectors have occasionally supplied museums. 315 and 316 came to the Rietberg Museum from the collection of the late Baron E. von der Heydt (Geneva) while 258 and 262 were presented to the Musée d'Art et d'Histoire in 1966 by Mr. N. Koutoulakis.

221 and 222 were inherited from their present owner's father who was collecting in the early years of this century. 241 and 242 are said to have been in the collection of N.K. (Geneva) for 'twenty to thirty years'. But for many of those sealstones which may not have come directly into their present owners' hands in Greece or the Near East, like 2 (E. Borowski), 265 (H. Dahn) and many of the Erlenmeyer collection, it remains virtually impossible to trace any kind of coherent history, much less any reliable indication as to their original provenience or date of discovery.

Chronology

Within each collection the sealstones in this volume have been arranged in roughly chronological order. The system of dates adopted is that based on pottery classifications, first proposed by Sir Arthur Evans: Early Minoan, Middle Minoan, and Late Minoan with Late Helladic on the Mainland; (there are in Swiss collections no pieces representative of pre-Mycenaean mainland engraving). The Evans system still seems preferable to that based on Cretan architectural phases, Pre-, Proto-, Neo- and Post-palatial favoured by some earlier authors in the series.

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[7] One is in Hamburg–*AGDS* IV 351f., no. 2, pl. 245; one in the Martin von Wagner Museum, University of Würzburg–*Antike Kunstwerke aus dem Martin von Wagner Museum* (1962) pl. 47, no. 66; and the third, unpublished, in the possession of Dr. R. Purrmann, Starnberg, Germany.

Within each Bronze Age phase, Early, Middle and Late, sealstones have been arranged in a roughly chronological sequence; but at the same time by groups representing certain materials, shapes, styles or motifs. For instance, within the Middle Minoan period early three-sided prisms in soft stones precede button and 'signet' shapes, which give way in turn to pieces in hard stones with newly introduced shapes, flattened cylinder (cushion), discoid and lentoid, among which those with motifs of the so-called 'architectural' type are grouped together. Only within a large collection like that of H. (†) and M.-L. Erlenmeyer does this arrangement become apparent but it has also been adhered to, so far as possible, in the smaller collections.

As a matter of both editorial policy and personal preference I have eschewed those more precise datings within each period which some authors in the series have attempted. Such nice judgments are very often subjective and tend to disperse homogeneous groups of sealstones, such as the Middle Minoan group with 'architectural' designs or the subsequent 'talismanic' group. These seem best kept together. Some earlier volumes produced not only very precise chronology within the narrow periods of Evans-style pottery classification but also the additional refinement of 'transitional phases' between Early and Middle, and between Middle and Late periods of the Bronze Age. This refinement added to and distorted the basic chronological system; for it was little more than an attempt to avoid the dogmatism of placing a group of sealstones within one period when their manufacture and use, on present evidence, continued into the succeeding period. To meet the same difficulty in two specific areas, I have adopted an alternative solution: some of the earliest stone seals have now been found in contexts with a *terminus ante quem* well within the Early Minoan period (e.g., at Lebena and Myrtos) but some of the more elaborate examples and their ivory or bone counterparts are found in tombs of the Mesara whose multiple burials continue into the Middle Minoan period; for these the heading 'Early Minoan–Middle Minoan I' has been used here. Similarly, the so-called 'talismanic' group began to appear in Middle Minoan III (e.g. at Mochlos and Sphoungaras) and, though they crop up in later contexts, their manufacture probably did not continue much after Late Minoan IB;[8] in their case the designation 'Middle Minoan III–Late Minoan I' has been adopted. In all other cases sealstones have been placed under the broader headings Early, Middle and Late.

Even within this cautious scheme there will perhaps be areas of disagreement. For instance, some may wish to place the earliest of the three-sided prisms in soft stones in the Early Minoan period; in the virtual absence of secure contextual evidence for doing so, they are here all placed in Middle Minoan. Some of the 'architectural' designs, particularly on lentoids may, for some scholars, be as late as Late Minoan I but they are here all confined to Middle Minoan. In Middle Minoan there was a vogue for designs incorporating tubular-drilled circles with a central dot; a similar fashion can also be traced both in Crete and on the Mainland as late as Late Minoan/Late Helladic III; the early circles tend to have a larger, and the later ones a smaller central dot

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[8] J.H. Betts, review of V.E.G. Kenna, *The Cretan Talismanic Stone in the Late Minoan Age*, in *Bibliotheca Orientalis* 31 (1974) 311ff.

while material and minor differences of shape also help to distinguish; but again there is room for divergent opinions on individual pieces.

Above all it should be recalled that Evans' phases were based on changes in ceramic style and there is no real reason to suppose that developments in artistic taste or in the techniques available within the major art of the gem-engraver developed *pari passu* with developments in the minor, if functional, ceramic art form.

Crete and Mainland

Within the late period attempts have been made in previous volumes in the series to distinguish between sealstones of Cretan and Mainland manufacture. None of the criteria so far advanced for making such clear distinctions proves satisfactory in every case. There is a wide area in which such speculations remain highly subjective. In line with current editorial policy, the general designation 'Late Minoan/Late Helladic' is preferred here, leaving the matter open to individual judgment until such time as criteria, less subjective than some used at present, can be established. Indeed it may ultimately prove that the necessity for such distinctions virtually disappears. When the Mainlanders, from the Shaft Grave period onwards adopted the habit of acquiring sealstones, their styles were derived from Crete and their chosen subject-matter varied from that of Crete less than scholars have sometimes supposed. Equally the Mainlanders themselves influenced some of the styles adopted in Crete after the Late Minoan IB fall of the Palaces, when Knossos alone continued to function bureaucratically. While the products of some craftsmen and workshops may be confined to one region or the other, many can be traced in both simultaneously. The distinctions to be made may well turn out to be far more subtle than those assumed by the facile division of styles between Minoan in Crete and Mycenaean on the Mainland.

Material

It has unfortunately not proved possible (except in the case of fluorite) to employ petrographic analysis in identifying the material of sealstones in widely scattered collections. Identification has therefore been by eye, as in previous volumes in the series. Where doubt existed the identification has been left vague (53 and 116) or is queried in both description and index (121 and 219). Colour and markings in the material are defined as accurately as possible in the descriptions and the following notes are arranged by materials in descending order of hardness measured on Mohs scale.

Most of the harder semi-precious stones engraved by Minoan-Mycenaean artists are varieties of silica or dioxide of silicon. Of the *quartz* group (hardness 7), the clear, colourless

variety, *rock crystal* is represented by ten examples in Swiss collections, the violet *amethyst* by three, and the smoky *grey* and pinkish *rose quartzes* each by a single example.

Jasper is a compact quartz impregnated with impurities, mainly of clay and iron oxide, giving it an opaque appearance and a range of vivid colours. Green jasper was the one most commonly used by Minoan engravers, though there are also in Swiss collections three examples of red (117, 123 and 253), two of dark grey to black (65 and 83) and some variegated specimens (62, 128, 219, 250 and probably 302).

Rather more common are the chalcedonic varieties of silica (hardness 7 to 6.5). *Chalcedony* itself is usually semi-translucent with a bluish ('sapphirine') or pale grey colour. There are two Swiss examples of the former (249 and 255) and one of the latter (254), though this last piece contains some very slight banding and might therefore be described by some authorities as agate. *Agate* itself consists mostly of chalcedonic silica arranged in curving bands or with markings of varying colours and degrees of translucency. For instance clear chalcedony may alternate with milky opaline layers to produce a prevailing milky grey tint–chalcedony-agate (e.g. perhaps 323). More strongly coloured bands can be formed in the stone where there is an admixture of carnelian ranging from dark red, through orange to golden yellow–carnelian-agate (e.g. 221, 256, 271 and perhaps 287); of sard ranging from brownish-yellow to dark brown; or of jasper which produces bright opaque red, brown, yellow and green colouring–jasper-agate (e.g. perhaps 127 in mauve, orange-brown and grey). The commonest types of agate in use by Minoan-Mycenaean engravers are those with bands or areas of milky or grey opaline consistency alternating with areas of brown, buff or yellow (129, 130, 133, 136, 216–218, 222, 242, 257 and 289). The terms onyx (black and white) and sardonyx (red-brown and white) are properly used for agates with straight bands and generally applied to gems so shaped that the bands run parallel to the face, that is in superimposed layers, as used in the cutting of cameos. The terms have also been used improperly by some authorities to designate gems cut across the bands so that the face itself appears banded. 'Onyx', in particular, has sometimes been applied to a type of agate with sharply differentiated bands across the face of the stone, ranging in colour from milky grey-white through buff to dark brown (e.g. 242). In this volume, however the terms onyx and sardonyx have been avoided; all are referred to as agate.[9]

The colours of the bands in agate can be altered or intensified by soaking in various chemical and natural solutions; varying degrees of opacity can be achieved by an even application of heat. Such processes have most commonly been used to 'improve' onyx for cameos. To what extent they were known to Minoan-Mycenaean lapidaries remains open to question but it is certainly possible that some such process was employed to produce the attractive creamy opaque stone with pink 'ripple' markings used in two instances (50 and 82)[10] and also the opacity and unusual colouring in two others (135

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[9] The inaccuracy of the term 'onyx' is illustrated by the example of two sealstones from Chamber tomb 515 at Mycenae – *CMS* I 140 and 141. A. Sakellariou calls one onyx and the other agate but careful study of the banding indicates that both were cut vertically, *across* the layers, from the same original block of material.

[10] A very similar creamy opaque stone with brown, buff and grey bands was used, perhaps even by

and 313). Heat applied deliberately or accidentally may also account for uneven creamy patches (noted in the descriptions) on the surface of some carnelian pieces.

There are two other varieties of chalcedonic silica: *carnelian*, which ranges from dark red to golden yellow, sometimes translucent and sometimes more opaque; and *sard*, which varies from yellowish brown to dark brown. The terms *σάρδιον*, *sardius* and *sarda* were applied indiscriminately to both stones in antiquity and distinctions made between them by modern authorities are often imprecise.[11] In this volume I have rejected the term sard. Of the stones used by Minoan-Mycenaean engravers the brown ones are usually to some extent banded and therefore might be better described as agate; but for the red to golden yellow chalcedonic stones, including those with slight banding and those with red carnelian areas in a milky grey chalcedonic base, I have used only the term carnelian and given details of colour and markings in the description.

There are in Swiss collections nine sealstones of *haematite* (hardness 6), all of the common metallic texture and steel-grey colour with, very occasionally, the small red flecks which give it its name (bloodstone). Iron bearing substances such as *meteorite* were highly valued in the Bronze Age, and, though it does not prove a very suitable material for engraving, there are two examples, published here (298 and 299), both in the collection of E. (†) and M. Heller. The terms haematite, and meteorite (as well as marble and black jasper) have been used by other authorities for fine shiny black stones (hardness ca. 4) but they are probably high quality steatite (see below). *Bronze* was used occasionally for the elliptical bezels of rings and more rarely for seals of other shapes; there is a single example (69) here but it may not be of Minoan workmanship (see under Forgeries and Doubtful Pieces below).[12] Another metallic substance used for 53 remains unidentified.[13]

Obsidian (hardness 5 to 5.5) is a glassy lava or volcanic glass of the rhyolite group of rocks used throughout the Aegean from the Neolithic onwards mainly for blades. The obsidian of highest quality and in common use in prehistoric Greece came from Melos. The evidence of the Middle Minoan engraver's workshop at Mallia suggests that it was even used in the cutting of softer stones.[14] It was not often itself engraved, perhaps because of its brittleness rather than its hardness; there is one example published here (70).[15]

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the same engraver, for *CMS* XII 158 and one with chocolate brown bands was used at about the same period (Middle Minoan III) for HM 1609 – N. Platon, *Crete* (1966) 135, pl. 86.

[11] G.M.A. Richter, *Engraved Gems of the Greeks, Etruscans and Romans* I (1968) 9.

[12] Apart from occasional elliptical ring-bezels the following bronze seals are known in the Middle Minoan period: *CS* no. 116 (a signet–*Petschaft*); *CS* no. 228 (a flattened cylinder); *Archaiologikon Deltion* 4 (1918) 57, pl. 5.3 (an 'architectural' discoid from Gournes Pediadha, Tomb 1); *CMS* IV 167 (apparently a discoid bead rather than a seal). There are also three other examples from Late Minoan/Late Helladic III contexts: *CMS* V 34 (an unusual conical stamp), 298 and 593 (both flattened cylinders). *CMS* IV 230 (an amygdaloid) may not be Minoan. Apart from 69 in this volume there seem to be no lentoids.

[13] J. Boardman, *GGFR* 98, pl. 32, describes it as black jasper but neither the colour nor the material answer to his description.

[14] A. Dessenne, *BCH* 81 (1957) 693ff., figs. 11–14 and *Comptes Rendues* (1957) 123; J.-C. Poursat, 'L'atelier de sceaux de Malia, et la chronologie des sceaux protopalatiaux', in *Kretisch-mykenische Siegel und ihre gegenwärtigen Probleme* (1974) 111ff; *CMS* II_2 86–198.

[15] Other known examples are all Middle Minoan III – Late Minoan I seals: two 'architectural' pieces, *CMS* IV 157 and *CS* no. 160; three 'talismanic' pieces (in addition to 70 here), *CMS* IV 195 and 207, and

Identification of softer, less precious stones has proved something of a problem. A dull colourless semi-translucent stone, used especially for a group of Late Minoan/Late Helladic III pieces bearing simple linear designs (e.g. 206, 207 and 208) and occasionally other motifs (e.g. 2 and 167), has hitherto been identified either as glass or poor quality rock-crystal but proves on analysis to be a variety of *fluorite* or flour-spar (hardness 4).[16] *Breccia*, containing dark brown and pale orange pieces outlined with creamy white calcite veins, was used by Minoan craftsmen for stone vases more commonly than for sealstones but there is here a single Early Minoan example (21); the origin of this stone may well be Kakon Oros east of Herakleion, though other areas of Crete also produce similar material.[17] There are in Swiss collections no sealstones of the dark and light green mottled *lapis lacedaemonius* (Spartan basalt) which was imported into Crete from Krokeai in the southern Peloponnese and used for both sealstones and stone vases; nor are there any of the rarer bright blue *lapis lazuli*, which must have been imported by way of Anatolia or the Levant from its source in Afghanistan.

The term *steatite* has frequently been used by previous authorities to cover a variety of soft stones (hardness 4 to 1.5) used by Minoan-Mycenaean engravers and manufacturers of other stone artifacts, especially vases. The term is often technically incorrect;[18] many of the stones so described are in fact *serpentine* (hardness ca. 4 to 3.5), while others have from time to time been described as chlorite, schist, chlorite-schist, limestone and especially the black, well-polished variety already mentioned, marble, haematite, meteorite or black jasper. These identifications have not generally been backed by petrographic analysis or even accurate measurements of hardness, nor have they been used consistently. At risk of compounding earlier error, 'steatite' has been retained here as a blanket term for these materials. Indeed in many cases it may not be totally inaccurate; for Cretan serpentines often contain much steatite proper (talc or soapstone) (hardness 2.5 to 2) or chlorite/schist, and outcrops of steatite, serpentine and chlorite rocks occur at many points in Crete's limestone areas. Identifications of marble for Minoan-Mycenaean sealstones are probably erroneous; Crete, at least, possesses little good marble.[19]

Scientific analysis will, no doubt, ultimately produce more accurate definitions for

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CMS VIII 136 which is now also in Geneva (see footnote 3 above); two unusual pieces, *CMS* XII 119 and 197, perhaps experiments with the material; and five peculiar discoid beads with clumsy gouges across the faces, *CMS* VII 37 and 38, *CMS* VIII 39 and 40, and *CMS* IV 166 on which one of the gouges was turned into a dolphin and a goat engraved on the other face. Another obsidian seal, an 'architectural' flattened cylinder, has been published by H. Hughes and P. Warren, 'Two Seals from Mochlos', in *Kretika Chronika* 17 (1963) 352ff., where the use of the material for sealstones is discussed.

[16] The following sealstones seem to be of fluorite: *CMS* I 300; *CMS* V 163, 171, 217, 229, 271, 277, 278, 373–375, 412, 591, 592, 617, 620, 630, 737, 739, 742 and 743; *CMS* VII 194 and 256; *CS* nos. 360 and 361. The group with linear designs are commonest on the Mainland in LH III B-C, though some similar examples occur in Crete from the tombs at Olous and from those at Armeni (dated LM III A2-B1). Earlier uses of the material are rare: there is a seal of fluorite from a LM II context in the Unexplored Mansion at Knossos (HM 2505) and a single example from an EM III–MM II context at Trapeza in Crete (*CMS* II_1 432).

[17] P. Warren, *Minoan Stone Vases* (1969) 127. There is only one published sealstone of the material – *CMCG* no. 126; two further examples have been found in recent excavations at Knossos.

[18] Warren, *op. cit.* 138; *GGFR* 15f.

[19] Warren, *op. cit.* 134f.

these soft stones and even pinpoint their sources in Crete.[20] In the meantime the stones may be considered as steatite or steatite/serpentine/chlorite mixtures. They vary in colour from white or pale grey, green and yellow (sometimes with a slight 'soapy' translucency) to dark grey-green and black, often with markings in one of the other colours. Early and Middle Minoan engravers tended to favour the paler and sometimes semi-translucent varieties (as did Melian engravers of the archaic period), while late Minoan engravers preferred the darker, opaque, greenish types; and Late Helladic III engravers, in particular, favoured a shiny black opaque type with a somewhat 'soapy' texture. Less frequently used were brown varieties, one in a rusty colour due to haematite staining through the oxidization of iron ore (e.g. 115 and 303) and another dark brown with minute particles (e.g. perhaps 116). There is also one example (121) of a deep red colour, a kind which was used in Anatolia, notably for Hittite *bullae*; 121 may in fact be a Hittite *bulla* imported and re-used by a Minoan engraver (see under Re-engraved Pieces below), but examples of a somewhat darker red and of dark grey with red-brown markings (e.g. 194 and 196) seem indigenous to Crete.

Minoan craftsmen also used solidified *pastes* of various kinds, faience for statuettes and inlays, for example; and moulded glass for seals and pieces of jewellery. Two Middle Minoan pieces in the H. (†) and M.-L. Erlenmeyer collection (38 and 39) appear to be of some white paste-like material, though its composition has not been analysed.

Distinctions between *ivory* and *bone* are difficult to make; the most reliable test, the presence of calcium carbonate (approximately 2% for ivory and 10% for bone), unfortunately requires destructible samples. Specific gravities of both materials are similar (1.80 to 2.00). 'Mohs scale is not a very accurate instrument with which to test ivory':[21] elephant ivory has a hardness of about 2.5 to 3 but this may vary with the material's source, and its age. There is also evidence that Early Minoan engravers used varieties of 'dentine' other than elephant ivory; one example here (7) is formed from the end of a smaller tooth.[22] The enamel on ivory and other forms of dentine is sometimes as hard as 4 on Mohs scale in the case of elephant ivory and even 7 for some hippopotamus dentine.[23] Some other early Minoan seals were made from bones of appropriate size and shape and the natural shape may sometimes have dictated that of the finished seal, as in the case of the *epomion* or 'shoulder-shape' (4 and 5).[24] In the absence of scientific criteria for determining distinctions, the general designation ivory/bone is used in the

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[20] M. Becker and P. Betancourt, 'New Techniques for Analyzing Minoan Stonework', in *Archaeology* 30 (1977) 276f.

[21] C.I.A. Ritchie, *Ivory Carving* (1968) 126.

[22] For other examples, see *CMS* II_1 79, 143 and 440; *CMS* IV 6.

[23] Ritchie, *op. cit.* 41, 49 and 126f.

[24] For other examples of this and other shapes based on the original structure of the bone, see *CMS* II_1 in general and N. Platon, '*Μία Σφραγιστική Ἰδιορρυθμία τῆς Προανακτορικῆς Μινωικῆς Περιόδου*', in *Festschrift für Friedrich Matz* (1962) 14ff., pls. 3–5. To create the required shapes Early Minoan engravers sometimes 'patched' their work, filling the bone's natural hollow with tightly fitted additional pieces of the material. This appears to be the simple explanation of a phenomenon more fancifully interpreted by Platon; see J.G. Younger, review of *CMS* IV, in *JHS* 95 (1975) 285.

descriptions in this volume (but see under Forgeries and Doubtful Pieces below, especially footnote 32).[25]

Shape

Descriptions of shape are as accurate and detailed as possible. Photographs are included in some cases specifically to illustrate shapes. For the commoner shapes, tables of profiles are provided at the end of the volume, except when a setting around the stone prevented an accurate profile being taken or when the seal's present whereabouts is no longer known (see under Illustrations above, especially footnote 2). The terminology used in the descriptions and in the index of shapes for the most part follows current scholarly practice.

Apart from one theriomorphic seal (31) in the form of an ape, two apparent foot amulets (32 and 55), the *epomion* or 'shoulder shape' (4 and 5) and a few irregular shapes, the Early Minoan–Middle Minoan I seals here are mostly discs or cylinders (engraved on the ends and clearly distinguished from *Rollsiegel* engraved on the side), rings of the typical Early Minoan type, and various pyramidal and conical shapes. The latter have been described simply as pyramid or cone; the confusing term conoid has been avoided. 'Button' is used to describe a shape with flat engraved surface (circular or, in the case of 223, quatrefoil) with a low handle on the back pierced by the string-hole.

During the Middle Minoan period a variety of new shapes were in use which include scaraboids (38 and 39) and an unusual flat oval stamp, its back decorated with antithetic serpents' heads (51).[26] Perhaps an elaboration of both button and cone was a tall shape, sometimes not unlike the pawn of the standard modern chess-set, here called 'signet' (*Petschaft*). The three-sided prism of the Middle Minoan period with its circular, roughly oval or roughly rectangular, flat faces gave way to another type of three-sided prism (107, 109, 110, 229 and 277), common in the 'talismanic' group of seals (Middle Minoan III to Late Minoan I), with convex faces each shaped like the single engraved face of the amygdaloid which was itself introduced at about the same time. A three sided-prism with circular faces was also used in the Late Bronze Age but there are no examples in Swiss collections.

In both the descriptions and the index of shapes, amygdaloids are divided between those with concave-faceted or flat-faceted backs and the more common variety with rounded backs. The proportions of the shape vary and this is clear enough from the photographs; terms like 'elongated' or 'truncated' amygdaloid have therefore been avoided here–as has 'glandular' for the truncated type.

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[25] These problems are discussed by R. Webster, 'Ivory, Bone and Horn', in *The Gemmologist* 27, no. 322 (1958) 19ff.

[26] For similar shapes formed from two joined animal foreparts, see *CS* no. 132 – *GGFR* 39, col. pl. no. 1; and *AGDS* II 26 f., no. 9, pl. 3.

With the advent of harder materials and new techniques during the latter part of the Middle Minoan period, the engraver found convex surfaces easier to engrave than flat ones. The rectangular block with flat faces (e.g. 50) was gradually replaced by the one with convex faces. The longer edges, parallel to the string hole, were at first flat but gradually came closer together to form the mature 'cushion shape'. The older term for this shape was flattened cylinder; neither designation correctly describes the origin of the shape or the process by which it evolved from the rectangular block; 'flattened cylinder' has been retained here.

At the same time, and by a similar process of evolution, the disc with flat faces was replaced by one with convex faces, which is here called 'discoid'. Later, as with the flattened cylinder, the edges farthest from the mouth of the string hole were gradually tapered together to form the common Late Minoan/Late Helladic lentoid shape. In this process of transition it is sometimes hard to draw a distinction between discoid and lentoid and some may prefer to call a number of these pieces (e.g. 63 and 121) lentoids rather than discoids. A circular shape with convex faces (40) is simply described as such; its date is much earlier than the general introduction of the lentoid; the confusing term 'lenticular' has been avoided. The back of the lentoid may be smoothly rounded, slightly ridged along the string hole, or more conical (described by some authorities as 'carinated'). The table of profiles clarifies these variations, which, on present evidence, cannot be used as a criterion for judging fine chronological distinctions, though the conical types are perhaps fewer before Late Minoan/Late Helladic III.

Motifs

It has been the aim of this volume to keep description of the motifs as brief and as consistent as possible and to avoid dogmatism in interpreting enigmatic motifs, particularly on Middle Minoan three-sided prisms or sealstones of the 'talismanic' group. For instance, 'heart-shape' is preferred to 'silphium seed' and no decision has been reached as to whether another puzzling 'talismanic' motif represents fronds or the foreparts of fish. Many seals depict horned quadrupeds of various species and where the seal is too worn or the original engraving too imprecise to make possible a clear identification of the animal, the question has been left open, sometimes with a tentative suggestion. This caution is also reflected in the index of motifs where inverted commas are placed round some 'interpretive' descriptions and queries after tentative identifications.

Forgeries and Doubtful Pieces

In Swiss collections there is hardly a single sealstone that has a specific or even vague provenience. Only a few have any known history, which might suggest that they came

to light at a date before reasonable forgeries began to appear, towards the end of the first decade of this century. Suspicions about authenticity must therefore be rife and some scholars would, on principle, refuse to base any general conclusions about Minoan-Mycenaean engraving on the authority of such pieces. Their view is extreme; for it is clear that chance discovery or illicit excavation will produce genuine pieces and that, if *bona fide* excavation continually brings to light pieces which extend in wholly unexpected directions our knowledge of the Minoan-Mycenaean repertoire of motifs, techniques and styles, then sealstones from less reliable sources are likely to do the same.

I cite just two instances. A carnelian lentoid (*CMS* V 431) depicting a frontal male face with spiky hair and the hem of a *chiton*-like garment at the neck, came from the floor of the Nichoria *tholos* in Messenia; it is so different from any Bronze Age sealstone hitherto known that, had it appeared in a private collection or come onto the market without provenience or history, it would almost certainly have been condemned by most scholars as a forgery. The second example is a gold ring from the chest of the priestess-queen in *tholos* A at Archanes;[27] had it not come from a secure excavation context, it too might have been doubted, not because of its differences from the known Minoan-Mycenaean repertoire but because its cult scene combines in an unusual way religious motifs known from other rings[28] and it is therefore too close to what might be expected.

These two examples highlight the dilemma which confronts the student of sealstones when he is faced with pieces which have no assured provenience or history. He must guard against those which are suspiciously different from the known repertoire and at the same time against those which are suspiciously similar to it and therefore perhaps imitative of it. He has no scientifically based criteria to guide him. His doubts begin as personal and subjective and must rest on a broad familiarity with the known repertoire. Once their seed is sown he must endeavour to justify them by objective reasoning.[29] My own doubts often begin with the motif and its style; the justification is based on other factors such as technique, material, shape, size and the nature of wear or damage.

Some pieces one feels confident to reject outright and those in Swiss collections which fell into this category, I have excluded from the volume.[30] Other seals about which I have doubts are included in the volume and marked with an asterisk; these are discussed below in chronological order. The asterisked pieces fall into two groups: those rare examples which, though clearly not of genuine Minoan-Mycenaean workmanship, are in themselves

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[27] I. Sakellarakis, 'Minoan Cemeteries at Archanes', in *Archaeology* 20 (1967) 280, fig. 13; P. Warren, *Aegean Civilizations* (1975) 99.

[28] e.g. *CMS* I 219 (Vapheio); *PM* III 68, fig. 38 and *GGFR* 49, col. pl. no. 1 (Isopata); Sp. Marinatos and M. Hirmer, *Crete and Mycenae* (1960) pl. 111, centre left (Kalyvia Mesara); Ashmolean Museum 1919.56 which has itself been justly suspected by Kenna, *CS* pl. 20, and by H. Biesantz, *Kretisch-Mykenische Siegelbilder* (1954) 114ff., pl. 9, no. 56.

[29] The dilemma is succinctly put by P. Yule, 'Zwei minoisch-griechische Bilinguische Siegel', in *AA* (1977) 141: "Wenn der Experte die Frage nach der Authentizität eines Siegels oder anderer antiker Gegenstände stellt, so wird er versuchen, objektive Kriterien zur Unterstützung seiner subjektiven Ansichten zu finden".

[30] Impressions, photographs and my comments on these pieces are lodged with the Redaktion of *Corpus der minoischen und mykenischen Siegel* in Marburg.

interesting enough to merit publication; and those more numerous pieces that may well be authentic but about which I still feel niggling suspicions. As will be clear from the number of pieces mentioned in the following discussion, my doubts sometimes also extend to some against which no asterisk appears and I include in the discussion many pieces which I, at least, prefer to accept as genuine. For I am generally reluctant to condemn pieces to the limbo of *gemmae dubitandae* from which they can be redeemed only with difficulty.[31] It is my contention that 'innocence' should be assumed until a cogent set of reasons for 'guilt' can be presented.

Genuine and false pieces often find their way onto the market or into collectors' hands through the same intermediaries, where a genuine seal, with a perhaps reliable provenience, may attempt to lend authenticity to associated pieces of modern manufacture. An example of this combination has been noted (6 with the piece cited in footnote 1 above). It seems likely that the illicit excavator or, more probably, the first intermediary may be associated with a modern engraver, who thus has the opportunity to handle and to imitate original pieces (see e.g. on 224 below).

Copies and adaptations made from published illustrations or from memory of pieces on display in museums often betray themselves more readily; errors or misinterpretations are more likely to be made by the modern imitator and the expert can sometimes pinpoint the source of the imitation. Even here, however, a good forger may defy detection. If a forger's techniques are completely sound, his material correct, his treatment of a known motif consistent with the common Minoan-Mycenaean repertoire, and if he is able to give his piece natural-looking wear or damage, it will often be hard to detect him. If, on the other hand, the technique is faulty or can be seen to use modern tools, if the shape, material, or motif is inconsistent with the known ancient repertoire, if wear or damage appears deliberate or, in some cases, totally non-existent, if, in particular, some or all of these elements are combined in a single piece, then grave doubts about its authenticity seem justified.

Early Minoan Ivories[32]

The modern production of ivory seals, in imitation of those Early Minoan-Middle Minoan I types which come mainly from the Mesara *tholoi*, gives cause for concern.

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[31] In *CMS* IV (p. xii) *gemmae dubitandae* are defined as follows: 'although on present evidence these pieces are not wholly related to the body of Cretan glyptic, yet on available evidence, no decisive judgment on them can be given, since the crucial knowledge to regard them as falsifications or completely genuine is absent'. In *CMS* XII (p. 391) the same author says of the *dubitandae*: 'in no case on present evidence from the range of Minoan and Mycenaean subjects, style or technique, can they be wholly accepted or completely rejected. Further evidence may, in this matter, become decisive. Their present classification, however, is not due to the predilection or prejudice of the author'. Such criteria, even if they could be applied objectively, might well condemn genuine pieces because they were different and fail to condemn others because they were similar to the known repertoire.

[32] The term 'ivories' is used in this section to cover seals which may also be of other forms of dentine or bone (see under Material above).

The material is readily available, copies can be rapidly produced, and convincing damage easily created. Early in this century Sir Leonard Woolley saw ivories forged in Crete.[33] And more recent instances can be cited: an illicit workshop has produced pieces similar to many offered for sale as genuine on the open market;[34] and another forger favours anthropomorphic shapes of a kind which have not appeared in any excavation context.[35] Being so different from the known repertoire, the products of these two workshops are instantly detectable but there have certainly been others which indulged in less fanciful shapes and imitated more closely the genuine pieces.

The closeness of the shape and motif of 4 to *CMS* IV 15 may suggest the same hand and both are probably genuine; both have the double boring through the handle, which is characteristic of their shape (e.g. *CMS* II_1 316–320). 5 is of similar shape and its motif is closely paralleled by *CMS* IV 13 and, from *bona fide* excavation contexts, *CMS* II_1 61 (Agia Triadha, *tholos* A), 361 (Porti, *tholos*) and 424 (Phaistos, old palace); all or any of these pieces could have provided a model for 5. The Phaistos and Porti examples have the characteristic double boring and that from Agia Triadha the other type of boring commonly used for Early Minoan ivories and sometimes for this shape (e.g. *CMS* II_1 371)–drilled from a single point at the top of the handle to two points on the side and laterally between those two points (hereafter described as a △-boring); the handle of *CMS* IV 13 is missing. 5 has only a single lateral boring through the handle but, though rare, this too can be paralleled (e.g. *CMS* II_1 76) and in itself provides insufficient ground for doubt since there seem to be no other suspicious criteria.

Both motifs on 14 are clumsily executed and there is some indication that they may have been engraved on already damaged surfaces. The single boring of 18, where a △-boring might have been expected, combined with its unusual shape (conical around the natural hollow of the bone), the clumsy motif and the virtual lack of wear or damage raise severer doubts. On 27 the motif (a large key pattern) is also carelessly rendered; it is closely paralleled by one of the motifs on *CMS* XII 6D, where shape, material and motif have justly aroused suspicions. The large simplified key pattern does not occur on any of the seals from secure excavation contexts published in *CMS* II_1. It recurs in triple lines, the central one more heavily engraved than the outer two, on 23, an apparently unique shape (pyramid with faceted edges), which is also suspiciously without wear or damage and of an unusual buff-brown colour.

28 is of the typical Early Minoan ring shape (e.g. *CMS* II_1 31–36), has damage only at the edges of the motif and is almost twice the size of most examples of the shape, which is commonly engraved with simple cross-hatching (cf. 24).[36] Three larger examples however, have the same motif as 28 – *CMS* II_1 34 (Agia Triadha, *tholos* B), 179 (Lebena, *tholos* 1) and 350 (Porti, *tholos*) of which the first and third were accessible early enough

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[33] L. Woolley, *As I Seem to Remember* (1962) 21ff.

[34] Ph. Petsas, *Archaiologikon Deltion* 24 (1969) 292f., pl. 296–298; *EAG* 23ff., nos. 65 and 66.

[35] *CMS* IV 4D; *EAG* 23, nos. 60 and 61.

[36] For other examples, see *CMS* II_1 p. xxii under 'Ring' and *CMS* IV p. xix under 'Signet, ring-shaped.'

to provide models for 28; on the other hand, they might equally serve to authenticate it as an example of the same group.

There are, in addition, two of the more complex theriomorphic shapes found attractive by modern imitators such as those of the two workshops mentioned above (see footnotes 34 and 35). 31 resembles an ape, rather taller and thinner than its closest parallels where the animal is in a more clearly crouched position – *CMCG* no. 2, *CMS* II_1 20 (Agia Triadha, *tholos* A) and 249 (Platanos, *tholos* A). Only the Agia Triadha example is comparable in size and motif (cross-hatching) with 31; the other two are larger and have △-borings. 31 and the Agia Triadha piece have single lateral borings below the ape's head but the latter also has the eye-holes drilled through as an additional boring, a feature not shared by 31. The severe damage to the base may also be inconsistent with the comparatively well preserved upper part of the piece.

The shape of 30 seems to have only one parallel – *CMS* II_1 281 (Platanos, *tholos* B), which is about the same size and would have been available as a model. It is, however, broken and less elaborate than 30, whose motif (carefully drilled circles with central dot) is not common on Early Minoan ivories; when such circles are used in the period, they are frequently incorporated into a motif with much less assurance, sometimes perhaps engraved free hand rather than drilled.[37] Similar doubts apply to the two motifs on 13 whose closest parallel from an excavation context – *CMS* II_1 273 (Platanos, *tholos* B) – is less elaborate and assured but might have provided a model. 29, a ring with an unusual rectangular base, also incorporates concentric circles into its motif, which, despite both the loss of the ring's hoop and the intense burning to which the already broken piece was subjected, remains suspiciously well-preserved.

If pressed beyond the limits of academic caution in the area of Early Minoan ivories, where demonstrable forgery is rife, I would say that my strongest doubts attach to 23, 27, 29 and 30. The others discussed here may well be genuine.

Early Minoan Stone Seals

Among the steatite pieces, contemporary with the ivories, the motif of 22 and its deep cutting have no exact parallel and it is in remarkably good condition; on the other hand it has the characteristic △-boring. 26 seems to be a well-preserved rare steatite imitation of the ring or 'ring-shaped signet' common in ivory and its motif is closely paralleled by that on *CMS* II_1 463 (Kaminaki) which could hardly have served as a model because it remained unpublished until 1969. 32 is also well preserved and its over-elaborate but somewhat heavy shape has no precise parallels among known foot amulets.[38] 233, a quatrefoil button, has parallels in *CMS* II_1 104 (Agios Onouphrios,

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[37] e.g. *CMS* II_1 29, 94, 189, 257, 273, 397; *CMS* IV 42.

[38] K. Branigan, 'Minoan Foot Amulets and their Near Eastern Counterparts', in *SMEA* 11 (1970) 7ff.; I. Pini, 'Weitere Bemerkungen zu den minoischen Fussamuletten', in *SMEA* 15 (1972) 179ff.

tholos) and *CMS* XII 9 (no secure provenience but from the mainly Cretan collection of R.B. Seager); clumsier in their engraving but related are *CMS* II_1 166 (Koumasa, *tholos* B) and 454 (Knossos), while a very similar motif occurs on a rectangular block shape, *CMS* V 526 (Asine, EH II context). On none of these examples is the handle precisely the same as that of 223, though the Seager and Agios Onouphrios pieces come closest; the Knossos piece has its boring along the ridged handle rather than through it.

On balance, I would accept 26 and 233 as genuine but remain dubious about 22 and 32.

Middle Minoan Three-sided Prisms

The modern manufacture of three-sided prisms in imitation of Middle Minoan types may well be much rarer than that of ivories. The soft materials of the earlier examples are readily available in Crete but the necessity of getting all three motifs within the known repertoire, in mutually consistent style and in convincing relationship with one another, the correct interpretation of their sometimes enigmatic subjects, the small scale of many pieces, and the difficulty of convincingly reproducing with modern tools the somewhat 'primitive' engraving techniques may all deter the forger.[39] Similar difficulties attach to the later examples in rarer hard stones; many of them bear symbols of hieroglyphic/pictographic script, of which a successful forger would need to make a detailed study to produce convincing 'inscriptions'. Oddities abound on three-sided prisms; the Minoan engraver himself may have not always been quite clear about the meaning of a traditional motif he was adapting. I therefore believe many of the pieces of this shape doubted in previous volumes in this series to be idiosyncratic but of genuine Minoan workmanship.

36 presents an unusual range of clearly defined motifs; the water-bird (side b) and goat (side c) seem drawn from the repertoire of late Minoan rather than Middle Minoan engraving, and the style likewise. The exactly circular faces are uncommon and are curiously raised from the piece, which is suspiciously well preserved. The excellent state of preservation and perhaps some inconsistencies of style and technique in the treatment of the three separate motifs may also raise doubts in the case of 245; it is larger and more detailed in its engraving than many pieces of the period.

Middle Minoan three-sided prisms rarely have one side unengraved, as is the case with 272. *CMS* VIII 31 provides a parallel and may well have remained unfinished if it broke during engraving; there are many such broken pieces from the Mallia workshop (see footnote 14 above). 272 may have similarly remained unfinished because of an incipient

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[39] Poor quality engraving is found on some seals of the period. Of the pieces found in the Mallia workshop, a large number were by a craftsman whom the excavators called 'le gaucheur' (see footnote 14 above).

crack in the material. 322 has an unusual combination of motifs: one (side a) is without parallel and the tail and hind legs of the animal on side c are confused. It may, however, represent the work of a bad ancient engraver rather than a forger; for the wear and damage look wholly convincing and one wonders why a forger would go to such trouble to produce so worn and unattractive a piece.

323 with its rather aimless designs of tentatively drilled circles and semi-circles, sometimes attempted twice, seems suspect. The shape is clumsy, the material most unusual for the period and the splintering at the edges of the drill marks may have resulted from the use of a modern high-speed drill (cf. perhaps *CMS* IV 27 D), though it should be said that similar technical problems occur in the Middle Minoan period when tubular drills were first applied to harder materials.[40]

I believe 245, 272 and probably 322 to be genuine but maintain grave doubts about 323.

Middle Minoan to Late Minoan I Seals

Some features of engraving during and towards the end of the Middle Minoan period, drill marks of various kinds, the straight cuts of the so-called 'architectural' motifs and the combination of both on seals of the 'talismanic' group, are not difficult for the modern engraver to imitate with accuracy once he has mastered the techniques. I have heard, for instance, of a passable copy of an 'architectural' discoid in hard material produced with modern tools in as little as thirty minutes. The style is often so simple, the repertoire of motifs so limited and, especially, for 'talismanic' seals, the shapes and materials so clearly defined that good modern copies may well go undetected. Three unique pieces are noted here and some 'talismanic' seals which have unusual features.

The metallic substance which formed the material for 53 is unique and the base with foliate or scalloped edges most unusual but the stem of the signet (*Petschaft*) is authentic enough and there are examples (e.g. *CS* no. 142) where its base varies from the usual circular form; a seal with a similar scalloped edge and running spiral border was used as early as Early Cycladic/Early Helladic II to stamp the rim of a clay hearth at Agia Irini (*CMS* V 464). The motif (drilled circles) and the material (semi-translucent green steatite) of 55 are right for the period but the shape, which may be an adaptation of earlier foot amulets (see footnote 38 above), is unique and worked with over-elaborate details; there is suspiciously little sign of wear.

Bronze, used for 69, is an unusual material for seals (see footnote 12 above) and is unique for a lentoid seal. The unusually fine shallow engraving suggested to Kenna that it was intended for metal inlay of the kind used on bowls and daggers.[41] But,

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[40] e.g. *CMS* II_1 118, 366, 462 and 468.

[41] V.E.G. Kenna, 'Design for a Minoan Water Garden', in *Marburger Winckelmann-Programm* (1968) 1 ff., fig. 2.

with the possible exception of a bronze ring – *CS* no. 251 – there is no parallel for the technique on so small an object. The composition of the motif is perhaps related to that of the seal which impressed a sealing from the Hieroglyphic Deposit at Knossos but the subject has no real parallel in the Minoan repertoire and may well have been adapted from a Near Eastern cylinder.[42]

81 and 82 both make use of a tubular drill much smaller in size than that generally used on seals of the 'talismanic' group; 81 is larger than many of the group and 82 has a somewhat unusual shape, a flattened cylinder (cushion) with rounded corners; both are of material rare in the group, 81 of amethyst and 82 of an opaque pink and cream agate (also used for 50 – see footnote 10 above). 99 is in an unusual finely cut style and the zig-zag lines, often found below the 'ship' in this motif, here curiously create what may be a pair of 'horns of consecration' with an upright, perhaps representing foliage, between them; the combination of these features and the two thick vertical lines with diagonal cross-strokes at one end of the engraved surface are unusual. The 'three-columned shrine' depicted on 101 has on the 'columns' tubular drilled semi-circular 'lunettes', which cannot be exactly paralleled in other examples of the motif; and the material is an unusually dark red-brown carnelian. Engraving on both sides of a 'talismanic' amygdaloid, as on 113 is rare; the goat on side b has some naturalistic features not otherwise found on its close parallels within the 'talismanic' group, e.g. penis and beard clearly included; and the 'lunettes' with cross-hatching above the goat have no close parallel on other versions of the motif. But there is nothing too improbable about the piece and when both sides of a 'talismanic' seal are engraved, one of them is often in a more naturalistic style than the other.[43] The 'talismanic' goat of this type usually faces left (in the impression) as on 113; on 114 it faces right and the engraver has also made an error in using four, rather than the usual three, drilled circles for the body,[44] while his foliage is clumsily executed; add that the head of the goat is squashed up against the edge of the stone, that the long angular shape of the amygdaloid is unusual and the material (grey steatite) unprecedented for the motif which is almost invariably engraved on carnelian, and 114 seems clearly false.

The combination of a bird in typical 'talismanic' style with wings spread and a water-bird with one wing raised in a more naturalistic style on 248 is unique.[45] The style and technique of each, however, is in its own right unquestionably sound. The same may also be said for the combination of vase and 'star' on 266. It may be that part of the engraving on 275 was done around existing damage to the stone; it is also an exceptionally large piece (L. 2.96) but other outsize amygdaloids occur within the 'talis-

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[44] The feature is found elsewhere only once, on the amygdaloid seal which impressed a sealing from Gournia – H. Boyd Hawes, *Gournia* (1908) 54, fig. 30, no. 7.

[43] e.g. *CMS* XII 150 (birds) and 201 (fish); *CMS* VII 65, on which one side has a single-handled jug between 'horns of consecration' and the other a completely naturalistic bull.

[42] For the sealing, see *PM* I 273, fig. 202a and *CS* no. 5S; for the cylinder, H. Frankfort, *Cylinder Seals* (1939) 26, fig. 11.

[45] For a seal with 'talismanic' bird on one side and a more naturalistic bird on the other, see *CMS* XII 150.

manic' group – e.g. 81 (L. 2.60), *CMS* V 303 (L. 2.75) and *CS* no. 221 (L. 2.80). Of these three, the last is in many respects close enough to have served as a model for 275 but I prefer to regard them both as by the same or a related Minoan hand; both made use of the smaller tubular drill for the eyes of the small central crab/marine creature. A similarly small drill was used under the tentacles of the cuttlefish on 282 and it has other features which may represent either a modern misinterpretation or a Minoan over-elaboration of the stock motif, e.g. the vertical lines on the creature's ink-sack and the foliage-like elements growing out of its top and tentacles; but even so the technique seems sound and the shape and material are correct.

Of the seals discussed in this section I have grave doubts about 55, 69 and 114; the others may well be genuine.

Late Minoan/Late Helladic Seals

The naturalistic motifs or cult scenes prevalent in the Late Minoan/Late Helladic period are immediately attractive to the collector as *objets d'art* and their often precious or semi-precious materials highly valued. They therefore present a direct challenge to the modern engraver who has a wide range of readily comprehensible subjects to act as models and the prospect of more lucrative rewards if his products can pass as genuine.

A number of engravers who were, by any standards, first class craftsmen came into the field early this century and were responsible mainly for gold rings. Some had not had the opportunity to absorb the Minoan-Mycenaean style sufficiently to remain undetected in the light of our present knowledge. For instance, the superb but misguided engraver of the gold rings and beads of the Thisbe treasure used a style inconsistent with those of genuine Minoan-Mycenaean artists but was, in his day, able to elude the trained but sometimes gullible eye of Sir Arthur Evans, even when he included elements wholly at variance with the Minoan repertoire.[46] In this volume 219 is an unusually thin lentoid of an unparalleled pinkish brown stone (jasper?) with a suspiciously high polish and a perhaps deliberate attempt to create the illusion of natural wear at the ends of the string hole. Its motif seems more suited to a rectangular area rather than the circular field of a lentoid and elements of the composition, particularly the lion's head and mane and the bull's emphasized penis and wide tail with diagonal cross-strokes, suggest that the engraver may have had in mind an ivory plaque from Spata, while his style is not dissimilar to that of at least one of the Thisbe beads.[47]

Another craftsman who had absorbed insufficient of the Minoan-Mycenaean style and repertoire of shapes produced the superbly engraved carnelian piece in the Sangiorgi collection and his hand can be detected in a large group of pieces including two which

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[46] *PM* IV 452, n. 1, 515 and 817, n. 2; *CS* pl. 21.

[47] For the plaque, see *PM* IV 533, fig. 484; the bead is Ashmolean Museum 1938.1120 – *CS* pl. 21.

arrived early this century in Leningrad, two in Munich and others in private collections in Bern and Basel.[48] One of his pieces has a duplicate in black glass and the same process can be detected in the case of the carnelian amygdaloid 146, which has three known glass duplicates of elliptical shape.[49] They share with the carnelian piece the same curious mark on the edge of the minotaur's body just above the waist and were probably moulded from an impression of 146. It seems likely that 146 is itself an imitation rather than a genuine Minoan piece in view of the similar instance cited in the case of the Sangiorgi craftsman and the fact that the contorted minotaur is a motif more suited to the lentoid and ill-fitted for the amygdaloid. This final point may also serve to cast doubts on 232 on which the poor quality engraving has an uncertain and indistinct outline.

The unique haematite cylinder said to come from Agia Pelagia, with 'goddess' riding a 'Minoan dragon' through a thicket of papyrus, has been doubted by both Biesantz and Gill but defended by Kenna.[50] The piece came to light as early as 1906 and part of Gill's argument depends on the forger having had access to models among the Agia Triadha sealings which came to light in 1904 but remained unpublished until 1926. If such an argument can be accepted or if a successful forger could work from the indistinct drawings of the Agia Triadha sealings after their publication, then doubts may also attach to 268 which, along with two lentoids also of haematite, may have taken its inspiration from another sealing from the site with heraldic griffins either side a papyrus stem which seems to stand on a camp-stool shaped 'altar'.[51] All three pieces depict pairs of rampant griffins with similar tubular-drilled circles on the wings; 268 and the Fogg piece have the altar, the former with a papyrus stem on it and the latter with a stem topped by a minute headless goddess holding a 'snake-frame' in angular raised arms; the Ashmolean piece seems to confuse similar angular arms with an incipient 'snake-frame'. The long dress of the 'god' on 268 could have been drawn from other Minoan representations and his pin-like head observed from seals with closely related motifs.[52] The two haematite lentoids and the cylinder 268 are certainly all unusual but comparison of their style and motifs with, for example, the Ialysos piece and one more recently

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[48] For the Sangiorgi piece, see *PM* IV 540, fig. 491 bis; and for those in Munich, *AGDS* I-1 23, nos. 41 and 42, pl. 6. The pieces in Swiss collections have been excluded from this volume but the whole group will be published elsewhere by the present author.

[49] One is in private hands in London, one in the Giamalakis collection (HM 3685) and one in Patras (*CMS* V 632). A study of these seals will be prepared by I. Pini.

[50] H. Biesantz, *Kretisch-Mykenische Siegelbilder* (1954) 117, no. 4, pl. 10.57; M.A.V. Gill, 'Note on the Hagia Pelagia Cylinder', in *BICS* 8 (1961) 7ff.; *CS* 139, no. 357.

[51] The sealing in question is D. Levi, 'Le Cretule di Hagia Triada', in *ASAA* 8–9 (1925–6) 115f., no. 96, fig. 113, pl. XII. The two lentoids are: Ashmolean Museum 1938.1073, condemned by Biesantz, *op. cit.* 117f., no. 6, pl. 10.58, Kenna, *CS* pl. 20 and Gill, *op. cit.* 9, n. 24, where she also condemns the Seyrig cylinder 268; and *CMS* XIII 39 (Fogg Museum, Cambridge, Mass.), which is not mentioned by Biesantz or Gill and is accepted as genuine by Kenna in both *CMS* XIII and *AJA* 68 (1964) 6 and 11, pls. 1.41 and 2.32.

[52] For the dress, cf. e.g. *PM* IV 412ff. figs. 341–343; and for the head, e.g. *PM* IV 169, especially fig. 131, a seal from Ialysos (*CMS* V 654).

found in an excavation context near Siteia[53] suggests that all three haematite seals may be genuine; the postulated forger's dependence on a sealing unpublished or published only in an inadequate sketch seems unlikely. All three pieces discussed here are surely by the same hand, whether ancient or modern, and must stand or fall together (perhaps taking the Agia Pelagia cylinder with them). A related motif with a similar pin-headed goddess holding a 'snake-frame' between lions appears on 242 and the piece is exceptionally well preserved but even Gill has accepted it as genuine[54] and I can see no real reason for doing otherwise, despite the fact that it is exceptionally well preserved.

A number of pieces with animal motifs display unique or unusual features. The horned sheep on 122 is clumsily engraved with long upright neck and unsteady forelegs; it fits rather uneasily into the field. The clumsiness might however be paralleled on *CMS* I 113 and the off-centre composition on *CS* no. 200 which are both unquestionably genuine, though less elegant than another example of the motif on *CMS* XII 136. The crisply cut style of engraving used for the seated lion on 133 with its tubular drilled eye is close to that of the unique monster on *CMS* IV 33D which need not be false. The row of zig-zags beneath the lion on 133 is, however, unusual in not continuing right across the foot of the design. The lentoid shape and the technique of the bull on 142 cannot be faulted but the elements added to the composition, the extra head growing from the bull's belly, the additional raised foreleg and the peculiar object above the bull's back, are all hard to accept. The last feature may be a misinterpretation of the 'sacral knots' which appear with a bull on *CMS* XIII 32 which came into the Boston Museum of Fine Arts in 1901 along with *CMS* XIII 35. Between them, these last two pieces may also have provided the inspiration for one of the Thisbe beads.[55] In view of this evidence, the material (an unusually deep red carnelian), and the chipping at the ends of the string hole, which may represent an attempt to simulate natural wear, 142 seems highly suspect.

The rather ungainly bull on 143 with head bent down and turned full face and one of its forelegs hooked over or confused with its horns has parallels on at least three other seals – *CMS* IV 267, *CMS* I 265 and *CMCG* no. 268 (if this depicts a bull rather than a lion). Of these the second is from a secure excavation context at Tragana, the third, like 143, is of rock crystal and the first two include tree-elements comparable with the palm on 143. The composition on 143, however, is exceptionally clumsy and the eyes are not created with a drill as on the other three examples. The lion on 154 is probably by the same hand as that on *CMS* XIII 19D and I see no reason to doubt either piece; there would indeed be little point in a forger using such poor material and subjecting it to so much natural-looking wear. The lion on 231 is in a cursorily cut style which has some Bronze Age parallels (e.g. *CMS* I 56) but none so carelessly

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[53] *Praktika* (1955) pl. 110γ; M.A.V. Gill, 'The Minoan "Frame" on an Egyptian Relief', in *Kadmos* 8 (1969) 94, fig. 4d.

[54] Gill, *op. cit.* 95, fig. 5d.

[55] Ashmolean Museum 1938.1114; *CS* pl. 21; see also J.G. Younger, review of *CMS* XIII, in *JHS* 96 (1976) 255.

executed and it may rather be related to a group of (archaic?) seals discussed by Pini.[56] 241, with a lion attacking a bull, is a completely unique shape but the style and technique are excellent and a forger of this ability would hardly have been foolish enough to pick so unlikely a shape. The pose of lion attacking bull on 301 is more suited to the circular field of a lentoid than to the elongated amygdaloid on which it appears here. The outline of the motif is somewhat indistinct; Minoan engraving of haematite unusually produces a crisper outline.

The pose of the griffin on 220, its dotted wings and the foliage below its hind legs are all paralleled on *CMS* IV 287, said to come from the Mesara; both are probably of genuine Minoan workmanship. 147 is in a tentative style and the engraver seems to have been unsure whether he was engraving a bird with wings spread or a griffin; the amygdaloid he uses is rather elongated and angular; but similarly clumsy pieces are not unknown (e.g. *CMS* IV 248). 224 has two water birds, one with its wing-raised, amongst foliage of which the stalks curl under the birds. Again the shape is curiously angular and the material has a suspiciously high polish with little sign of wear or damage. It has a very close parallel in *CMS* IV 246, said to come from Mochos, except that the birds face in the opposite direction; it might have been copied from an impression of the Mochos piece and that would account for the more summary treatment of the plumage and the apparently unfinished legs of the spread-winged bird at the point where the original model was chipped. It should, however, be said that variations on this common motif continue to occur from excavation contexts (e.g. *CMS* V 439 from Karpophora). The curled head and large, clumsy beak of the water bird on 305 may also raise minor doubts; similar features occur on *CMS* XIII 121. The bird (or griffin?) on 289 is in a poorly cut technique with indistinct outline on an unusual, low quality agate.

There are two pieces depicting helmets. 149 has two rows of dots around the cap, a feature not found on any of the parallels on which vertical strokes usually represent the original boars' tusks. The helmet on 243 is also unique in its treatment of the trailing crest which usually stands proud, curling over the top of the cap.[57] 149 is remarkably well preserved, considering the soft material but it is hard to see why a forger would have taken the trouble to produce so worn and undistinguished a piece as 243.

The two profile heads on 278 are extremely unusual and have been engraved off-centre over some other worn or incomplete motif. In style and treatment, especially the hair, earrings and beard of one, they seem closely related to the head on *CMS* VIII 110 which, though itself a unique piece, was for a long time in the R.M. Dawkins collection (see footnote 4 above) and is almost certainly genuine. On the other hand three more exceptional profile heads on a three-sided prism have been doubted by H. and M. van Effenterre and another example on a similarly shaped three-sided prism has been rejected by Kenna.[58] 278 remains open to doubt but could well be genuine.

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[56] I. Pini, 'Eine Gruppe von "Inselsteinen"?', in *Marburger Winckelmann-Programm* (1975) 1ff.

[57] e.g. *CMS* IX 166 and 167; *CMS* VII 195; and, more elaborate in harder stones, *CMS* I 153 and 260.

[58] *CMS* IX 6D; Metropolitan Museum New York no. 26.31.218 formerly in the R.B. Seager collection and presumably excluded as a forgery from *CMS* XII. Though unusual, both pieces could be genuine.

The elaborate cult scenes on gold rings and some engraved stones have always been a tempting target for forgers. The large size and unusually coloured material of 135 showing a man with a lion has sufficient models to be a forger's work,[59] but the style cannot easily be faulted and the damage to the edges of the piece looks natural enough. There is no precise parallel for the composition on 161, a small lentoid of steatite on which a man holds a lion on a leash, and the shape is unusually elliptical. There are several depictions in Minoan art of a man holding a fish, as on 144,[60] but none on a sealstone of hard material is so ungainly; the man's legs in particular are straight V-section gouges, a technique more often used on Middle Minoan three-sided prisms, on later soft-stone pieces from the Mainland and on archaic Melian seals. The cult scene, on 261 with a 'goddess' seated on rocks, greeted by a 'worshipper', could have been copied from one of several related representations on gold rings or from the well-known matrix and associated sealings from the Archives deposit at Knossos and from Zakro.[61] There are, however, occasional examples where the cult scenes from the gold rings are simplified and transferred to soft stone lentoids,[62] and 261 is probably genuine. The scratched line around the edge of the stone, which appears on some other soft stone pieces, may be evidence of some kind of original mounting, as on *CMS* VII 168, or even a gold leaf cover, such as that surviving on another black steatite seal (*CS* no. 203).

Of the pieces discussed in this section my severest doubts attach to 142, 143, 144, 146, 147, 161, 219 and 232. The others, despite their unique features, I would, without surer evidence, prefer to accept as genuine Minoan-Mycenaean workmanship.

Re-Engraved Pieces

In some instances a later engraver has reworked an earlier piece. There seem to be cases where both were Bronze Age craftsmen and others where the second may belong to a period after the Bronze Age, representing either ancient or modern attempts to 'improve' an existing or worn motif.

121 is an unusually fat discoid-cum-lentoid of deep red steatite, which seems to have been unevenly filed down to take its present engraving. The material and original thickness

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[59] e.g. *CMS* I 512; HM 1317 (Mavrospelio) – *BSA* 28 (1926–7) 253, pl. XIX, no. III.13; *CMS* VII 169; *CMS* IX 114; *CMS* XII 207, cf. also *History of the Hellenic World, Prehistory and Protohistory* (1974) 214 lower (HM 839). Of these, the first is, like 135, a large agate lentoid and the others amygdaloids, two of carnelian and one each of jasper and chalcedony.

[60] e.g. *CMS* VII 88.

[61] For rings, see e.g. *CMS* I 17 and 101; and for the matrix and sealings, *PM* II 767f., figs. 498 and 499, also *PM* IV 395, fig. 331.

[62] e.g. *CMS* IX 163; *CMS* XII 264; HM sealing 157 from Wooden Staircase B at Knossos was impressed by a lentoid with a 'goddess' seated on rocks approached by a lion – M.A.V. Gill, 'The Knossos Sealings: Provenience and Identification', in *BSA* 60 (1965) 82, no. R91, pls. 7 and 16 and the same motif occurs on *CMS* V 253, a steatite lentoid from Armeni.

suggest that it may have been an imported Hittite *bulla* re-used by a Minoan engraver. These bullae have occasionally been found in Bronze Age contexts in Greece, though usually on the Mainland and at a period later than this piece was re-engraved.[63] The existing engraving is in a Late Minoan IA style and has several close parallels (e.g. *CMS* VIII 66; HM 1272).

What was originally a bull on 171 seems to have been very worn and retouched at a later stage, turning the remaining part of the bull's rump into a bird-like object. The animal on 182 seems to have been given its new, stumpy legs at a later stage. The circles with central dot on 187 seem inconsistent with the very simple linear style of the animal and may be a later addition, since there is some indication that they were engraved after the string hole became worn and damaged the engraved surface at its upper end. On 192 the circles with central dot (side a) are genuine Bronze Age workmanship, probably of the Late Helladic III B period, but the bird with wings spread (side b) is a later, probably modern, attempt to enhance the value of the piece.[64]

The Sealing with Linear A Signs

Of the two sides of the sealing nodule (120) which bear Linear A inscriptions, one has two signs L55 and L32 very clearly written.[65] This sequence would read *ru-ja* in the Linear B script, but there is no guarantee that the phonetic values are the same in both scripts. The sequence is not found elsewhere in the surviving corpus of Linear A inscriptions but a ligature of the same signs appears on HT 6a.3. The other side also has two signs but they are less easy to identify with certainty. It is conceivable that the first represents an eccentric version of L60, but the second resists satisfactory analysis at present.

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[63] e.g. *CMS* I 156 from chamber tomb 523 at Mycenae; and for one of the same material from Perati, see S. Iakovidis, 'An Inscribed Mycenaean Amulet', in *Kadmos* 3 (1965) 149ff. For the late arrival of *bullae* in Greece, see *GGFR* 64.

[64] For a similar case, see *CMS* IX 188 where the original is probably of Middle Minoan III.

[65] Sign numbers are taken from G. Pugliese Carratelli, *Le Epigraphi di Hagia Triada in Lineare A*, Supplementos a *Minos* III (1963).