

SEALING STUDIES IN THE MIDDLE BRONZE AGE, III: THE MINOAN HIEROGLYPHIC DEPOSITS AT MALLIA AND KNOSSOS

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INTRODUCTION

This paper sets out to explore the Hieroglyphic administrative system especially as it relates to the use of hieroglyphic seals. In order to set the stage, let me remind you of what a contemporary non-hieroglyphic deposit looks like, that is, the sealings and written documents found in Room 25 at the Palace of Phaistos. This massive deposit of over 6,500 sealings, stamped by 327 different seals, plus a scatter of written documents, was sealed in the ruins of the third phase of the First Palace.¹ Enrica Fiandra was able to make a detailed analysis of 1544 of the best preserved of the sealings.² She discovered that about 10% had secured various kinds of identifiable goods, such as jars or rush matting, while about 90% had sealed either flaring wooden pommels or small wooden cylindrical pegs; pommels and pegs were identified as having sealed doors, boxes or chests.

Since, obviously, neither doors nor very large chests can be considered moveable goods those seal-owners who had sealed the pegs and large pommels must have been resident in the palace. This seems to be confirmed by the highly-intensive pattern of seal-use, that is, relatively few seals were responsible for a disproportionately large number of sealings: just 44 of the 327 seal-owners — 13% of seal-owners — accounted for 70% of all sealings, a kind

* Parts I and II of these Sealing Studies are to be found in P. Ferioli et. al. (eds.), *Archives before Writing* (1994) 261ff.

I would like to thank Dr. J.-P. Olivier for having so generously allowed me to see his transcriptions of Knossos hieroglyphic documents before publication in CHIC.

NB: in *Figs. 4–7*, all hieroglyphic texts are normalized and no attempt is made to reproduce their physical appearance; texts are written from left to right unless an initial 'x' indicates otherwise. Drawings of non-hieroglyphic seals are meant solely as *aides-mémoire* and are neither accurate reproductions nor to scale.

¹ Stratigraphy defined in E. Fiandra, *KretChron* 15/16, 1963, 118ff.; MM IIB dating: P.M. Warren — V. Hankey, *Aegean Bronze Age Chronology* (1989) 47ff. 131ff. 169. Their seal-types, almost all engraved with geometric or early naturalistic designs (with one possible exception [*infra*, n. 10]) are discussed in Weingarten, *Sealing Studies II*, 282ff.

² E. Fiandra, *Pepragmena* 2, 383ff.

of concentrated sealing authority best explained by resident seal-owners repeatedly sealing and unsealing on-the-spot (Weingarten, SSMC I, 13).

In the sealing deposit was also a surprisingly heterogeneous lot of written documents: seven two-sided bars, four tablets, a mini-tablet, two irregular shapes, some fragments, and four or five roundels.³ Some tablets were clearly written in proto-Linear A but the script on the bars is more problematic; originally published as hieroglyphics, these have since reappeared in the corpus of Linear A inscriptions.⁴ While it would certainly be neater to have a single script in use at any one time at Phaistos, the uncertainty is in itself instructive: clearly, two scribal traditions were at work in the Palace.⁵ Although we cannot read any of the texts, we can follow the gist through their ideograms, some of which continued with little change into deciphered Linear B: these refer to MEN, VASES, WINE?, FIGS and GRAIN (PH 8b.2; 12a; 14a; 15a; 7b.3?), sufficiently diverse concerns to prove a developed scribal administration of goods and personnel.

Room 25 also contained a few noduli, those 'sealings that do not seal', perhaps docketts of some sort,⁶ and also the first roundels. Roundels have been convincingly interpreted as receipts, the recipient of goods acknowledging units of 'debt' by marking the edge of the roundel with the equivalent number of seal impressions.⁷ The early roundels from Room 25 refer by ideogram to WINE (Wc 42, 43) and possibly SHEEP (Wc 44), but they lack the indispensable seal impressions; however, canonical roundels quickly appear elsewhere in the palace, and these are stamped by one or even two different seal impressions.⁸

When Erik Hallager presented his definitive study of roundels in ASSA, this respondent noted that 'roundels are, strangely enough, our closest approach to the sealed written documents known from the Near East'. I now wish to modify that statement: roundels are not just close to sealed written documents, they *are* sealed written documents, but they are documents written for a functionally illiterate bureaucracy.⁹

For if I were to codify the rules of bureaucracy, surely the very first rule would be: 'Never sign a blank cheque'. When the Minoan seal-owner signed with his seal for palatial property, he must have known what he had put his seal to: the preservation of his ears, nose and perhaps his life depended on it. That is why, on roundels, each seal impression equals one unit — so the scribe cannot cheat the seal-owner regarding numbers — and that is why, too, the vast majority of roundels are inscribed with simple ideograms, which even the barely

³ G. Pugliese Carratelli, *ASAtene* 35/36, 1957/58, 363ff.; see Weingarten, *Sealing Studies II*, 276ff., for further discussion of these texts.

⁴ Hieroglyphics: Carratelli (*supra* n. 3) 363ff.; Linear A: GORILA I, PH 7–28.

⁵ Doubts have again been raised by the publication of a Phaistos MM IIB vase inscription which is clearly hieroglyphic: P. Militello, *Sileno* 16, 1990: Frammento B.

⁶ J. Weingarten, *Kadmos* 25, 1986, 1ff.; addenda: ead., *Kadmos* 26, 1987, 38ff.; *Kadmos* 29, 1990, 16ff.

⁷ E. Hallager in: ASSA 121ff.

⁸ The development of roundels at Phaistos is discussed in Weingarten, *Sealing Studies II*, 276ff.

⁹ Response to E. Hallager in: ASSA 143f. If functional literacy is 'the ability confidently to understand and use the written word in one's job' (E. Bolton in: *Financial Times*, 19/10/91), functional illiteracy would describe as much a lack of confidence as an absolute inability.

literate could understand. It is a simple system which allows the functionally illiterate to transact palatial business with confidence.

THE HIEROGLYPHIC DEPOSITS

With these remarks in mind, we turn to the Hieroglyphic Deposits of north central Crete where a dramatically different picture confronts us. What I find most intriguing about these deposits is not just the use of a hieroglyphic script at Knossos and at Mallia, less than 60 kilometres away from the proto-Linear A of Phaistos,¹⁰ though that is striking enough, but rather that, for the first and only time in Minoan history, seals inscribed with written texts were in common use: almost half of the seals impressed at Knossos and Quartier Mu were engraved with hieroglyphic inscriptions while another 15% had single signs which also appear in the hieroglyphic script (though whether these were intended to be read is most uncertain). Why does the use of inscribed seals correlate almost exactly with — and only with — the use of the hieroglyphic script? Why were these seals not 'translated' into Linear A? Who used the hieroglyphic seals and why? It has often been asserted that they were official seals, whereas gems with ornamental or naturalistic designs belonged to individuals who stamped on their own behalf. The evidence from Mallia, to start with, does not entirely support this common view.

Mallia: Quartier Mu

Twenty-four (uninscribed) sealed documents plus three hieroglyphic bars and 12 medallions were found in Building A, the main administrative complex at MM IIB Quartier Mu.¹¹ Three bars and 12 medallions might be considered an unassuming scribal effort, were it not that one of the bars, MALLIA 6, records 7,000 units of some property; this is the largest single number recorded on hieroglyphic texts.¹² Obviously, an administration dealing with such a quantity (of whatever it may be) must have been more extensive than the surviving records suggest. Likewise, the twelve medallions, inscribed with short two- to four-sign inscriptions, also hint at a slightly greater scribal potential since they were probably

¹⁰ The contemporaneity of the hieroglyphic and linear scripts was (I think rightly) restated by W.C. Brice, *Kadmos* 29, 1990, 5; pace Pini in: ASSA 45f. The geographic distribution of hieroglyphic sealstones is also quite telling: despite the easy portability of seals, neither hieroglyphic seals nor their impressions (with but one possible exception at Phaistos) are found outside of eastern and north-central Crete in MM II/III. The exception which may prove the rule is CMS II,5 No. 239, perhaps intended as an inscription; see CHIC.

¹¹ a) J.-Cl. Poursat — L. Godart — J.-P. Olivier, *Le Quartier Mu I*, *EtCrét XXIII* (1978) 11ff.;
b) B. Detournay — J.-Cl. Poursat — F. Vandenabeele, *Le Quartier Mu II*, *EtCrét XXVI* (1980) 192ff.;
c) J.-Cl. Poursat in: ASSA 25ff.

¹² J.-P. Olivier in: *Pepragmena* 6, 69ff.











Cat. No.	Mu No.	Type	Room	Seal Impression
261	R3	Nodulus	3	
267+268	R7	Noduli	3	
269	R33	Nodulus	3	
262	R13	Nodulus	9	
281	R15	Peg	9	
282	R16	Peg	11	
271	R14	Nodulus	D/E	
263	R31	Nodulus	17	
270	R10	Nodulus	17	
272	R17	Nodulus	17	

Fig. 1.1 Mallia Quartier Mu. Sealings and Noduli from Building A (not to scale; from Mu II)












Cat. No.	Mu No.	Type	Room	Seal Impression
273	R5	Nodulus	17	
284	R26	Pommel(?)	16/17	
285	R22	Pommel(?)	16/17	
283	R12	Pommel	16	
277+278+279	R11	Crescents	16	
276	R30+R11	Crescent	16	 
275	R30	Crescent	14	
264	R34	Nodulus	14	
265	R19	Nodulus	14	
266	R4	Nodulus	14	

Fig. 1.2 Mallia Quartier Mu. Sealings and Noduli from Building A (not to scale; from Mu II)

written by two or three different hands.¹³ We must imagine at least three or four individual scribes working in Building A.

Almost half of the 24 sealed documents (*Fig. 1*) were stamped by hieroglyphic seals and half by purely geometric designs ... with a single naturalistic gem impression as the inevitable exception. Their supports varied: five pommel or peg sealings (of types known from Phaistos), five of the new crescent-shaped sealings, and 14 noduli, those 'sealings that do not seal', presumably a form of mini-document. Two of the peg sealings had secured cylindrical pegs of a type which almost certainly functioned as door-locks.¹⁴ This means that we can pinpoint two seal-owners who were doorkeepers, a role of some importance in an archive or storeroom complex: after all, he who locks the door is ultimately responsible for all the goods or records within (to us, it is a modest clay sealing; to them, the key to their stored wealth); so it follows that the seals which closed the doors in Building A belonged to persons having some official status, probably of high rank within the administrative hierarchy. Neither door-sealing is stamped by a hieroglyphic seal. Rather, it is of some interest to discover that both sealings — though found nowhere near each other — were stamped by similar geometric designs, two variations on the theme of rotating S-spirals (*Fig. 1: R 15, 16*).¹⁵ Thus, the two doorkeepers (for so we may call them), the only identifiable resident officials of Building A, both carried seals with similar geometric designs, not hieroglyphic seals.



Fig. 2a.b Crescent Sealing Partners (R 11 + R 30): Building A, Quartier Mu, Mallia.

There was also an intact sealing of a pommel type which could have secured either a chest or a door. It is a pity we cannot be sure of its function because this sealing was indeed stamped by a hieroglyphic prism (R 12). In the room with this pommel-sealing were also found four crescent sealings, each stamped by another prism (*Fig. 2a: R 11*), possibly a

¹³ Poursat – Godart – Olivier (*supra* n. 11a) 56.

¹⁴ For a good description of how these pegs functioned, see A. Malamat in: K.R. Veenhof (ed.), *Cuneiform Archives and Libraries* (1986) 160ff.

¹⁵ Two similar S-spiral seal impressions (R 13, R 14) on noduli were in the same area as R 15, in and near Room 9 (cf.: CMS IV No. 140, another nodulus 'from Mallia', with a seal impression almost identical to R 13).

second facet of R 12.¹⁶ Whether or not this was the case, it is noteworthy that all documents in Room 16 had been stamped by hieroglyphic seals. Are we to imagine R 11+R 12 as the resident official in charge of the goods once stored above Room 16? That would be altogether too simple for Minoan bureaucracy: for one of the crescents in Room 16 had also been stamped by a second seal, a naturalistic gem depicting a rather primitive animal hunt scene (Fig. 2b: R 30). This naturalistic gem-owner had, in turn, sealed another crescent, quite by himself this time, found some distance away in Room 14. This at least clarifies two points: first, since both seal-owners must have stamped their joint crescent while its clay was still wet, the parsimonious explanation is that they were both in residence at that time; second, the fact that the owner of the naturalistic seal had also stamped a crescent by himself, quite independently, means that he was as competent to act on his own as was the prism. In so far as the sealing record can tell us, he conducted precisely the same business as the prism, albeit a little less frequently.

Noduli: Seal Impressions



267+268

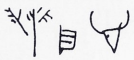


261



269

Medallions: Inscriptions



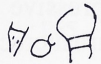
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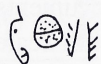
12



18



14



15



16



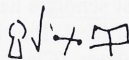
19



9



17



10



11



13

Fig. 3 Mallia Quartier Mu. Noduli and Medallions from Building A/Room 3

¹⁶ J.-Cl. Poursat (supra n. 11b) 222; stamping with different facets for different tasks (supra n. 11c) 28. However, there appear to be slight differences in dimensions (supra n. 11a) 86f.: R 11 = 1.70 x 0.55 cm; R 12 = 1.50 x 0.60 cm.

Nonetheless, there is a hint that certain tasks may have been reserved for hieroglyphic seals or at least for seals with signs from the Hieroglyphic script. All twelve medallions in Building A were found together with four noduli within the same square meter in Room 3 (*Fig. 3*), an unexpected association of documents. Each gem stamped on the noduli depicts one or more animal heads (calf or possibly dog, ox, goat); similar signs were written, generally at the start or end of inscriptions, on six of the twelve medallions.¹⁷ This is rather an accumulation of signs representing the same category of objects and an ideogrammatic interpretation quite naturally springs to mind. If this is justified, it would establish a meaningful relationship between the texts on the seals and the texts on the medallions.

The Knossos Hieroglyphic Deposit

Unlike the finds from Quartier Mu, the Hieroglyphic Deposit at Knossos is beset with problems of dating (no ceramic evidence)¹⁸ and of the definition of the Deposit itself. Most of the material was excavated from beneath a staircase at the north end of the Long Gallery in 1900 but, as Margaret Gill has pointed out, it is uncertain how many documents were found there and how many picked up in nearby magazines (Gill, *KSPI* 66). A number of strays were, however, recorded in Mackenzie's Day Books:

— in 1900, an isolated find in Magazine 4 of one nodulus and one medallion (interesting support for the association of such documents at Mallia);

— in 1901, two more sealings from Magazine 12 and three plus a broken tablet from Magazine 13. The description of the sealings leaves no doubt that these were inscribed crescents — though we don't know which crescents — so it was hardly unreasonable of Evans to have associated them with the main deposit excavated the previous year.¹⁹

Given the documents that we do have, what is most remarkable is their greatly expanded bureaucratic notation. It is not the number of written documents that is impressive — 20 bars and tablets; 18 medallions — but rather the sense of a full-scale literate bureaucracy at work in the Palace:

¹⁷ Including a two-sign match (bull's head, gate) on the medallion *Fig. 2,8* and *HM 267. 268*.

¹⁸ *MM IIB*: following Evans, *PM I* 271ff. and Yule, *ECS* 215ff., most scholars have accepted this date for the main deposit. *MM III*: J.J. Reich, *AJA* 74, 1970, 406ff. *MM II* and *MM III*: I. Pini in: *ASSA* 37ff., dividing the sealings into two groups: *MM II* crescents, and *MM III* document sealings (Class IV–V) plus 'advanced seal motifs'.

¹⁹ It is going too far to claim that the 'Hieroglyphic Deposit' is merely an assemblage of material found in the general vicinity (J.G. Younger, rev. of Yule, *ECS*, *GGA* 230, 1988, 193). Also, Pini's division of the sealings into two chronological periods (*supra* n. 18) means that, first, we must separate a document sealing P-66 from the crescent P-67 although both were stamped by the same hieroglyphic prism (remarked by J.-Cl. Poursat in his response to Pini in: *ASSA* 55) and, secondly, we must assume that, while the Day Books record collecting nearby inscribed crescents, Evans added in unrecorded and incongruous stray sealings and 'advanced motifs' as well.

HM/AM No. SM I No. Seal 1 + Seal 2 + Inscription

A. CRESCENTS (* more or less intact crescents)


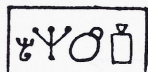

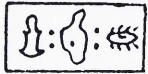
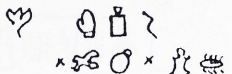

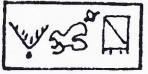

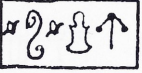


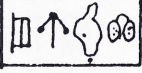

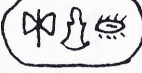

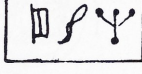




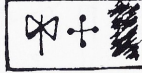

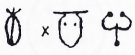


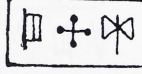

192*	P69		+			
174*	P54		+			
175*	P75		+			
178*	P74		+			
185*	P67		+			—
1938.940*	H3		+			—
179*	P71		+			—
172*	P64		→		→	
207*	P65		+			
191*	P50		→	→		
181*	P59		→	→		

Fig. 4.1 Knossos: Sealings and Noduli (not to scale; hieroglyphics normalized)

HM/AM No. SM I No. Seal 1 + Seal 2 + Inscription

CRESCENTS (*more or less intact crescents)








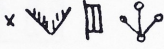







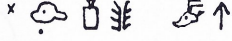



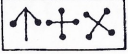

182*	P60		→	
200	P56			
189	P70			
194	P58			
198	P61			
190	P72			
173*	P52			
177*	P57			
176*	P62 (H4)			
170*	P53 (H2)			
171*	P68			


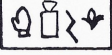

Fig. 4.2 Knossos: Sealings and Noduli (not to scale; hieroglyphics normalized)

HM/AM No. SM I No. Seal 1 + Seal 2 + Inscription

CRESCENTS (*more or less intact crescents)

184	P55			
202	H(?)			
249	H(?)			
183*	P77			
187*	P78			
1910.206*	P76			
206*	P63			

B. NODULI


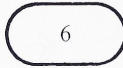



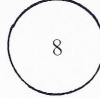



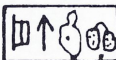
131	Pe			
107	P51			

[NB: discovered in Magazine 4]

Fig. 4.3 Knossos: Sealings and Noduli (not to scale; hieroglyphics normalized)

HM/AM No. SM I No.

C. 'DOCUMENT' SEALINGS

<p>132 P73 (crescent-shaped)</p>				
<p>180 Pf (irregular unicum)</p>				
<p>144 Pd (class IV)</p>				
<p>126 Pa (class V)</p>				
<p>1938.982 Pa (class IV)</p>				
<p>195 P66 (class IV)</p>				

D. OTHER SEALING TYPES



<p>128 Pb (class VII)</p>	
<p>140 Pi (pseudo-V)</p>	

Fig. 4.4 Knossos: Sealings and Noduli (not to scale; hieroglyphics normalized)

SM I No.	Seal 1	+	Seal 2	+	Inscription
P65					
P50					
P52					
H4					
P74					
P57					
P60					
P54					
P58					
P56					

Fig. 5 Knossos Hieroglyphic Deposit: Isolate Signs on Crescents and Inscriptions (not to scale; hieroglyphics normalized)



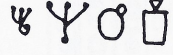
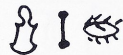


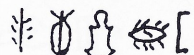














Formula	SM I No.	Seal 1	+	Seal 2	cf.
	P69				
	P54				
	P61				
	P56				
	H3				
	P57				
	P74				
	P73				
	P67				
	P66				
	P76				
	P51				

Fig. 6.1 Knossos Hieroglyphic Deposit: Suggested Two-sign Formulae on Seal Impressions (not to scale; hieroglyphics normalized)

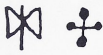
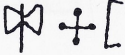












Formula	SM I No.	Seal 1	+	Seal 2
	P65		[
	P59		→	
	P63			
	P50		→	
	P71			
	P64			

Fig. 6.2 Knossos Hieroglyphic Deposit: Suggested Two-sign Formulae on Seal Impressions (not to scale; hieroglyphics normalized).

	A	B	C	D	E	cf.
108						
101						
90						
102						
118						
89						
103						
109						
104						

Legend:
 Prism
 Impression
 Tablet
 Medaillon
 Crescent

Fig. 7.1. Knossos Hieroglyphic Deposit. Two groups of Interlocking Hieroglyphic Documents (text extracts; hieroglyphics normalized)

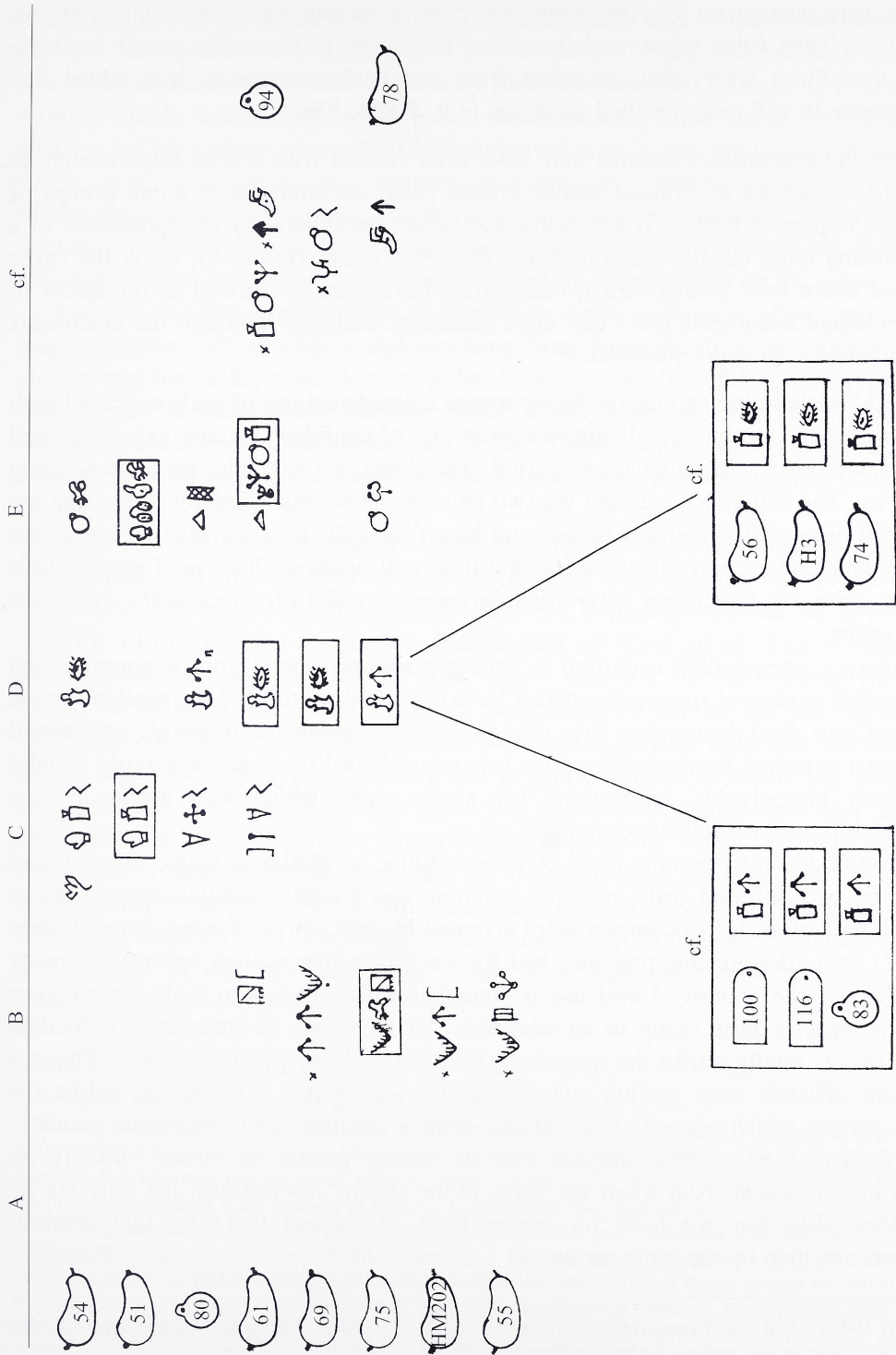


Fig. 7.2 Knossos Hieroglyphic Deposit. Two Groups of Interlocking Hieroglyphic Documents (text extracts; hieroglyphics normalized)

1. Scribes were writing on clay in fluent near-cursive hieroglyphic script which argues habitual practice. They filled three- and four-sided bars with text, usually on all available faces, while medallions were often inscribed front and back, sometimes with added line dividers to squeeze in still more detailed messages (e.g. P 83b, 85a).

2. The new and diagnostic crescents may have been created with scribal requirements in mind: these most spacious of Minoan sealing shapes easily accommodated whole groups of signs (*Fig. 4A*). Expanded literacy is also witnessed (albeit negatively) by the appearance of a second new sealing type, the flat-based nodules (*Fig. 4C; classes IV and V*), fairly flat cakes of clay pressed down over leather strips; these strips have been interpreted as the traces of leather or parchment documents (so I call them document sealings) although the documents themselves, of course, have not survived.²⁰

When we add to these indications the by-no-means coincidental use of seals engraved with hieroglyphic signs, the strong overall impression is one of confident literacy extending well beyond that of any other Minoan palace or period. There was, for example, no equivalent big bang at Phaistos. The difference between the two palaces can be quantified by comparing the density of script on even fragmentary tablets and bars (*Table 4*): Knossos scribes wrote four times as many signs on each available cm² as did their colleagues at Phaistos. *I would argue that there is a close and significant correlation between expanded literacy and the use of the hieroglyphic script.*

There is also a corresponding evolution in sealing practices. The diagnostic pommels and pegs of the ancient system of storeroom control have now disappeared and we shall never see them again on Crete. Seal-devices too have changed (*Fig. 4*): geometric or purely ornamental seals have almost vanished from administrative use; instead, seal-types are now fairly equally divided between hieroglyphic inscriptions (or single signs which also appear in the hieroglyphic script), and naturalistic designs.

Glyptic practice has also become more complex. While, at Mallia, a single crescent had been stamped by two different seals, multiple stamping was a regular administrative habit at Knossos: over half of sealed documents were stamped by two, three or even four different seals (*Table 1*). Yet, despite this practice, and the necessary interactions between so many different seal-users, the pattern of seal use is remarkably flat: only two seals appear even twice in our records, a little bump in an otherwise flat landscape of completely individual transactions. This is totally unlike the intensive pattern of seal use which we saw at Phaistos (where resident officials were sealing and resealing on-the-spot); it is just as unlike the non-intensive pattern which suggests external seal-owners sending lots of moveable goods to the Palace. Rather, it is a most singular sort of sealing pattern in which virtually no transaction is ever repeated. And when we factor in the sealing inscriptions, not only are no two inscriptions alike but we have no reason even to suspect that any two crescent inscriptions were written by the same scribe.

²⁰ I. Pini, AA 1983, 559ff.; J. Weingarten, *Kadmos* 22, 1983, 8ff. Also, one (uninscribed) crescent was pressed over such leather strips, perhaps an intermediate type (HM 132 = P 73).

This is not to say that seal-users did not occasionally deal in the same commodities: a few crescent inscriptions include ideograms for GRAIN, OLIVES and WINE (*Fig. 5*). But those who dealt in these commodities apparently made up their own rules as they went along: some wrote a single isolate sign, while others added details; some sealed by themselves, others found a sealing partner; some used seals engraved with hieroglyphic inscriptions, some just a single sign, and others the curious blob-and-line patterns perhaps meant to mimic hieroglyphic prisms.²¹ Simply put, there is no common denominator. Even the repetition of animal-head texts (as on the medallions at Mallia) is not limited to these commodity transactions nor, in any case, were they matched by animal heads on the seals.

And yet another puzzle: while crescents are large nodules — often more than 3–4 cms long and about half as wide — and can hang from fairly sturdy cords, they almost certainly did not seal the sacks, wine skins or pithoi in which GRAIN, OLIVES or WINE would have been stored or transported. Anyway, what would have been the point? Each seal-owner would have delivered exactly one sack or jar, hardly provisions on a grand palatial scale. What then had the crescents sealed, and why should they list commodities which they did not secure?

Seventeen of the crescents are impressed by at least one intact or at least legible hieroglyphic seal (marked with asterisk on *Fig. 4*); their inscriptions may be divided, very tentatively, into eight or nine groups based on a possible system of two-sign formulae (*Fig. 6*), a formula being a repetitive, independent and fixed group of signs. Not surprisingly, the largest two groups include the most common of all hieroglyphic formulae, TROWEL:ARROW and TROWEL:EYE. As Jean-Pierre Olivier has convincingly proposed, TROWEL:ARROW and TROWEL:EYE must represent two venerable Minoan institutions; he has suggested temple and palace. I find it a little difficult to accept this proposal because both formulae can appear on the same seal and even on the same seal face; while an individual can, of course, hold both religious and secular titles, one does not expect such contradictory institutions to be named on the same seal, at least not on seals used for administrative purposes.²² I am thus inclined to drop the temple and interpret TROWEL:ARROW and TROWEL:EYE as two main branches of palatial administration; perhaps one as the royal estate, the other as a department of bureaucracy (such as the Treasury or Central Storehouse).²³

²¹ *Fig. 3*: P-57, P-72 (cf.: CMS II,5 No. 247 at Phaistos).

²² Cf.: of nearly two thousand seals published by G.T. Martin, *Egyptian Administrative and Private-name Seals* (1971) not one secular title relating to palace affairs or central administration is combined with a religious title; the few overlaps that do occur refer to local officials, e.g., 'mayors', whose seals also declare their local temple responsibilities (I am grateful to Prof. G.T. Martin for this information; per litt. 15.10.92).

²³ I suggest that the 'temple' is represented by another very common hieroglyphic formula, DOUBLE AXE:SEPIA (transcribed as A.SA), perhaps bureaucratic 'shorthand' for the full formula of A.SA-SA.GLOVE.VASE (CHIC H-042-019-009-052). Precisely *not* found among the palatial documents of the Knossos Hieroglyphic Deposit, A-SA is elsewhere inscribed on roundels, engraved on seals and stamped on sealings (E. Hallager — J. Weingarten, BCH 117, 1993, 2f. *Fig. 1*: MA WC [5]). Seals of the prepalatial Arkhanes script (EM III–MM IA) iterate A.SA-/SA.GLOVE.VASE, perhaps indicating that the 'temple' was an

Some other proposed formulae, such as LEG:GATE, are also very common or, such as ANIMAL HEAD:FENCE, at least occur elsewhere but several, if correctly identified, are not especially prominent. Whether or not such formulae actually spelt out words (or were combinations of bureaucratic ideograms) is not our question here. Rather the point is that, as far as sealings can tell us, all formulae were doing precisely the same work as TROWEL:ARROW and TROWEL:EYE seals. It seems a reasonable working hypothesis that they too represent administrative sections or, in the case of less common formulae, sub-sections.

The precise function of such formulae is most uncertain, but there can be little doubt that the use and repetition of specific combinations of signs is common in hieroglyphic administration. In a provocative series of articles over 30 years ago, Ernst Grumach reached the conclusion that the hieroglyphic script must be basically ideographic; although perhaps including phonetic elements, it appeared mainly built up of combinations of complicated ideographs combined because they belonged to the same spheres of thought.²⁴

This may be too extreme a viewpoint but it does seem explanatory of two groups of interlocking documents from the Knossos deposit (*Fig. 7*). Grumach had, in fact, singled out for study (Grumach, *Ancient Scripts* 371–374) the family of signs in *Fig. 7*, Column B, with ANTLERS as prefix and commonly with the suffix of the HUMAN BUST, with or without an added 'holy' BRANCH. He demonstrated that these were related ideographic signs, combined together because they dealt with a single subject (whatever that may have been).

Not only the ANTLERS group, but also the signs in Column C illustrate a series of typical hieroglyphic pirouettes with signs changing their positions and alternating with each other in ways that hardly seem phonetic. Rather, this has the feel of administrative shorthand. The two 'departments of state', TROWEL:EYE and TROWEL:ARROW are listed in Column D while, in Column E, we find other echoes from seals and crescent inscriptions such as the formulae HORNS:THRONE, ANIMAL-HEAD:FENCE, PLOUGH:ANIMAL-HEAD and the related SPEAR:ANIMAL-HEAD. It may be here (if it is anywhere) that we would find toponyms or the names or titles of individuals concerned in the administration.

Grumach compared the SPEAR:ANIMAL-HEAD sign-group to such known Carian composite names, as, for example, 'spear-bearer of a god or goddess'; he also pointed out the apparent identity between the SPEAR:ANIMAL-HEAD formula plus crouched human figure on the hieroglyphic prism, P 29 (*Fig. 8*), and the same elements on a naturalistic seal impression from the Hieroglyphic Deposit, where the entire animal replaces the ANIMAL-HEAD (*Fig. 9*).²⁵ Once we allow that the latter scene may be at least partly translated into hieroglyphics, we admit the possibility that other seemingly naturalistic seals are, in fact, lurking hieroglyphs. This obviously affects our interpretation of the seals with single signs:

established institution before the foundation of the palaces. The full A.SA formula is likely to be the precursor of the Linear A libation formula, A-SA-SA-RA-ME (independently suggested by J. Hooker, *Kadmos* 31, 1992, 106).

²⁴ Grumach, *Ancient Scripts* III, 346ff.; id., *Kadmos* 2, 1963, 7ff.; *ibid.*, 84ff.; id., *Kadmos* 1, 1962, 153ff.

²⁵ Grumach, *op.cit.*, 350f. The latter was interpreted by Evans, *PM I* 273 as the goat Amaltheia suckling the infant Zeus... a somewhat unlikely explanation since the animal seems to be male.



Fig. 8 Hieroglyphic Prism (P 29 – CMS I Nr. 425c).



Fig. 9 Sealing (Pf – HM 131).



Fig. 10 Sealing
(P 72 – HM 190).



Fig. 11 Sealing
(H3 – AM 1938.940)



Fig. 12 Sealing
(no SM I No. – HM 132d)

a moufflon head such as P 72 (*Fig. 10*), for example, is not a sign known in the hieroglyphic syllabary; there are thus good grounds for separating it from the bucranium, H3 (*Fig. 11*), which, if accompanied by a second sign or reiterated (i.e., an 'inscription') will be allowed entry to CHIC. Again, a seal impression of a bird-headed woman (*Fig. 12*) is classed as a naturalistic engraving but a similar robed lady discovered by J.-P. Olivier sketched on a hieroglyphic bar (H-4 on P-100d) will probably be accepted as a sign in the syllabary. We may wonder if any Minoan would have understood the one as on and the other as beyond the borderline of seals meant to be 'read'.

If the hieroglyphic bureaucrat did move in a world of pseudo-naturalistic seals, how did he regard the famous portrait gems, Evans's so-called priest-king (*Fig. 13*), or the young prince (*Fig. 14a*), or the profile of an Egyptian-eyed man (*Fig. 14b*); the latter in fact, the partner of



Fig. 13a.b Crescent Sealing Partners (P 71 – HM 179a. b).



Fig. 14a.b Crescent Sealing Partners (Pf – HM 180a. b).

the young prince.²⁶ Were they so many elaborated HUMAN BUSTS — with or without the holy branch? We cannot hope to judge but we can at least compare them functionally to their glyptic peers. For example, the priest-king belongs to a small sub-group of three crescents, the only crescents without added scribal inscription (*Fig. 4A*); each is stamped by a formulaic hieroglyphic seal plus a second seal: in one case that is by the priest-king, the second by the bukranium already allowed as a hieroglyph, and the third by a round-faced seal with hieroglyphic inscription. It is difficult to divorce the glyptic function of the priest-king from that of these other sealing partners.

²⁶ Evans, PM I 271 and Evans, SM I 271 pair the 'king' with the 'prince'; however, Prof. I. Pini corrects this combination to the 'prince' plus an 'Egyptian-eyed' man.

Beyond the simple fact that both seal-owners must always have been present for the task, the relationship between such sealing partners is opaque. Yet perhaps not entirely opaque. The sealing of intact crescents, while variable, fluctuates within strict limits. We can define these limits as from zero to four seal impressions, stamped by zero to two different seals (*Table 2*). Note that, when intact crescents are multiply stamped by different seals, each partner stamps once or each partner stamps twice. No one ever stamps thrice, which implies that the number of seal impressions, unlike those on roundels, is probably not counting anything, nor is it the result of personal inclination or enthusiasm. Rather, it seems structured.

First, on intact crescents, there is always quantitative equality between sealing partners; secondly, no one ever leaves his partner to join another sealing combination (two conditions, incidentally, which remind us of the later Multiple Sealing System at Zakro). Thirdly, no hieroglyphic seal ever stands alone: if it has no sealing partner, it will itself be stamped twice ... as if its repeated impression compensates for the absence of a partner; drawing attention (as it were) to an explicit acceptance of sole responsibility. This implies that the ideal glyptic act was that of two seal-owners joining together to stamp a joint crescent transaction.

This hypothesis, combined with our earlier observations on possible administrative formulae, suggests that ideally (though not always) the perfect Knossos crescent was stamped, first, by a hieroglyphic seal with a two-sign administrative formula, and, secondly, by a seal that we cannot normally identify as belonging to the same — or perhaps to any — administrative section. Thus, the second seal seems to have had a different function from that of the first seal, even if, as is commonly the case, it is also a hieroglyphic seal. In other words, there appear to be different levels of hieroglyphic seals. Although we know nothing of these levels, we can at least be reasonably sure that TROWEL:ARROW and TROWEL:EYE and, by extension, those in the same sphragistic situation served some official administrative purpose. Not, perhaps, as office seals in the strict sense but rather as seals of office sufficiently personalized to allow the identification of the individual using them; that is, they are institutional seals with a built-in Minoan PIN code. That, in my view, is the function of the decorative ornaments and fillers that have so bedeviled the work of CHIC. That there was some such individualizing system is perhaps implied by the many TROWEL:ARROW and TROWEL:EYE seals reproduced in *Scripta Minoa* and the CMS volumes: no two are alike; all are clearly distinguished by added decorations or even by the shifting orientation of signs. Decorative elements thus have meaning, a meaning perhaps quite independent of the sign-groups themselves.

There is yet another factor to be considered before the ideal crescent transaction is completed: the scribal inscriptions also added while the clay was still wet (*Table 3*). The inscriptions increase the already strong sense of individual transactions: all are different, their structures inconsistent, with not even a hint of any scribe being responsible for more than a single crescent. When we take together

- this individuality of inscriptions,
- plus individuality of seal impressions, and

— an absolutely flat pattern of seal-use

we are drawn to the conclusion that the 30 crescent transactions were not executed in the Palace by resident officials and resident scribes, but elsewhere, conceivably in 30 different districts.

If each formula-seal-owner was resident in a territory, he could not possibly have utilized 'The Great Seal' of the Royal Estate or of the Treasury or Stores. Rather, it would have sufficed to have had at hand an institutional seal that pointed to him personally (for proper recording when the crescent arrived at the Palace or in case of legal challenge). If we are on the right track and the 'formula-official' was in the field, then this holds equally for his scribe (if he was not his own scribe) as well as for the sealing partner who stamped the same crescent. This partner could have been either another official representing a different bureaucratic level or department, or possibly the responsible person of the district, that is, the bureaucrat's local counterpart. We would expect two bureaucrats always to seal in the same way and this is clearly not the case on the crescents. If, however, one seal-owner represented the Palace and the other the local jurisdiction, that might account both for the underlying glyptic pattern and its not infrequent blurring.²⁷ We know nothing of the status of any district — potentially from royal estate to semi-independence — but exactly such conditions would alter sealing patterns: major districts or those nearest Knossos would not necessarily interact with the centre in the same way as more remote areas; the chief of Arkhanes (say) could exercise very different sphragistic options than a village elder.

If palace and district authorities were jointly involved in crescent transactions, a number of which included commodity ideograms, the most likely explanation is that those transactions dealt with tax or tribute payments (with ideograms marking some of the commodities collected). I have argued that the crescents did not actually secure goods — at least not such goods as grain, olives or wine — but they could have indirectly sealed them; that is, crescents could have hung from the boxes used to transport written tax records to the Palace.²⁸

Summing up, it seems probable that the bureaucratic activity reflected in our records was not concerned with daily accounts, but rather a single, specialized administrative activity; there are reasons to think of tax returns,²⁹ but other explanations are perfectly possible.

²⁷ This might also explain why one formulaic prism took a sealing partner for his crescent P-67 but not for his document sealing P-66: a local seal need not be involved in his correspondence with the Palace.

²⁸ I am not able to combine this hypothesis with Ingo Pini's discovery of traces of gold in the clay of six crescents (ASSA 53). He suggested that they had sealed boxes containing gold — which would support tax/tribute receipts — but one of these sealings (HM 207) is inscribed with the GRAIN ideogram; the others (HM 185, 198, 184, 204, 187) are a remarkably mixed lot.

²⁹ In this paper, we have sensibly not much discussed the written documents, but it is noteworthy that numbers listed on the bars frequently add up to very high totals — not uncommonly thousands of units (Olivier, *supra* n. 12). Also, round number are surprisingly common: 20, 30, 40 etc., 100, 110, etc., 250, 300, 450, 1,300, 2,300, 6,400 and Mallia's contribution of 7,000. Because the bars have no commodity ideograms, Olivier suggests (p. 74f.) that they might be census records, but it is hard to accept such perfect attendance in any human population (sheep may well be counted in round numbers [Olivier, *supra* n. 12], yet herd tabulations hardly need the complex administration demonstrable on the Knossos bars). One must not forget that the bars have 'string

What does seem certain, however, is that the Knossos hieroglyphic bureaucratic system has almost nothing in common with day-to-day storeroom accounting as expressed by the sealing system at Phaistos. While the huge disparity in sealing numbers is undoubtedly due to the hazards of preservation, I doubt that chance is responsible for the absence of pommels and pegs at Knossos. In return, among the thousands of sealings at Phaistos, there is not a single crescent sealing and, even more important, with only one possible exception (*supra* n. 10), none is stamped by a hieroglyphic seal. If, as I propose, crescents were at least partly developed for scribal reasons, they belonged to the general hieroglyphic expansion of literate notation, the same movement that led to the engraving and administrative use of hieroglyphic seals. Even if these seals do not proclaim individual names or titles, or are not dedications or commemorations, the way was open for such developments. What a strange twist to discover instead that inscribed seals completely died out.

Can you imagine Palace officials hanging up their inscribed seals and giving up the hieroglyphic script without a struggle?³⁰ Yet, when we next view administrative debris at Knossos in the Temple Repositories, scribes are writing in Linear A,³¹ officials are stamping semi-literate roundels, and there is good reason to associate a decline in literate instruments with the imposition of a separate seal-owning class of officials (*Sealing Studies II*; cf. *Table 4*). The only remaining traces of the hieroglyphic system were in glyptic: occasionally seen in the stamping of roundels,³² (although it is uncertain if this reflects an enduring administrative convention or merely the survival of some gemstones), but especially in the habit of multiple stamping which continued at the Temple Repositories and down (at least at Zakro) into LM IB (*Weingarten, SSMC I, 289–292*). This multiple sealing system, however,

holes' which could mean that they were attached to other documents that could have clarified their contexts. Given the evidence from Mallia, it is not likely (however tempting) that bars were attached to medallions. Neither were they likely to have been attached to crescents, for the limited evidence of scribal 'hands' suggests that bars (but not crescents) were probably written in the Palace: it looks as if the same hand wrote the tablets P-103 and P-107 (*Olivier, personal communication*) and possibly also the medallion P-91.

So, while the bars theoretically could refer to anything at all, their even accounting rather looks like tax records, with perhaps even a whiff of tribute about them, enough (at least) to make one think about levels of imposed obligations. Since there is nothing a palace likes better than collecting taxes, I suggest that it is a fair assumption that the high numbers mean goods coming in. The converse also is usually true: relatively low numbers hint at goods going out, and that is what we usually (though not always; e.g. P-83) find on medallions; I am inclined to interpret medallions as records of goods taken out of storage, i.e., as the literate, hieroglyphic equivalent of Linear A roundels.

³⁰ In seeking to explain the change of script, we should avoid our alphabetic bias which assumes that syllabic scripts are naturally superior to Hieroglyphics (the staying power and flexibility of a logographic system is well illustrated by Chinese). One could as easily argue that a highly pictorial script, with naturally recognizable hieroglyphs and extensive use of set formulae, actually would have been more accessible to a larger group of readers (see *S. Houston – D. Stuart, Current Anthropology 33, 1992, 589ff.*).

³¹ It is uncertain whether or not the scripts briefly coexisted on any one site. Hieroglyphic and Linear A documents are found together in the MM IIIB Mallia 'Hieroglyphic Deposit' (*L. Godart in: H. van Effenterre, Le palais de Mallia et la cité minoenne [1980] 579ff.*; *O. Pelon, BCH 107, 1983, 703*). However, this 'deposit' was a mixed dump, which could simply indicate that scribes worked in this part of the palace over a fairly long period; cf.: the mixed scribal traditions at Phaistos (*supra* n. 4), possibly an accumulation of documents over ± 15 years (*Weingarten, Sealing Studies II, 290*).

³² *E. Hallager, BSA 82, 1987, 64ff.*

was no longer an active bureaucratic adjunct to writing but an aliterate semiological code which may have had nothing to do with the Linear A administration in the Palaces.

Table 1 Knossos: Number of Different Seals by Sealing-types

	Crescents	Noduli	'Documents'	Molars
0 seals	3	0	0	0
1 seal	7	1	4	1
2 seals	12	1	0	0
3 seals	0	0	1	0
4 seals	0	0	1	0
Uncertain (Sealing broken)	9	—	—	—

Table 2 Knossos: Number of Seal Impressions on \pm Intact Crescents

0 seal impressions	3
1 seal impression only	3
2 impressions same seal	4
1+1 seal impressions	10
2+2 seal impressions	1

Table 3 Knossos: Seal Impressions & Inscriptions on \pm Intact Crescents

	Number of Seal Impressions				
	0	1	1 x 2	1+1	2+2
no inscription	0	0	0	3	0
1 sign or sign-group	1	2	2	3	0
2 signs/sign-groups	1	1	2	3	0
3 signs/sign groups	1	0	0	1	1

Table 4 Comparative Density of Cretan Scripts (space calculated on all available sides)

	No. Characters/Signs per cm ²
	<hr/>
MM IIB Phaistos: tablets and bars	0.33
MM IIB Mallia: bars	0.18
MM IIB/IIIA Knossos: tablets and bars	1.12
LM IB Ayia Triada: tablets (random sample)	0.60
MM IIIB/LM I Knossos: Linear A tablets	0.87
LM IB Arkhanes: Linear A tablets	0.54
Linear B Knossos: tablets (random sample)	0.58
[ditto, if weighted for single-sided use	1.16]