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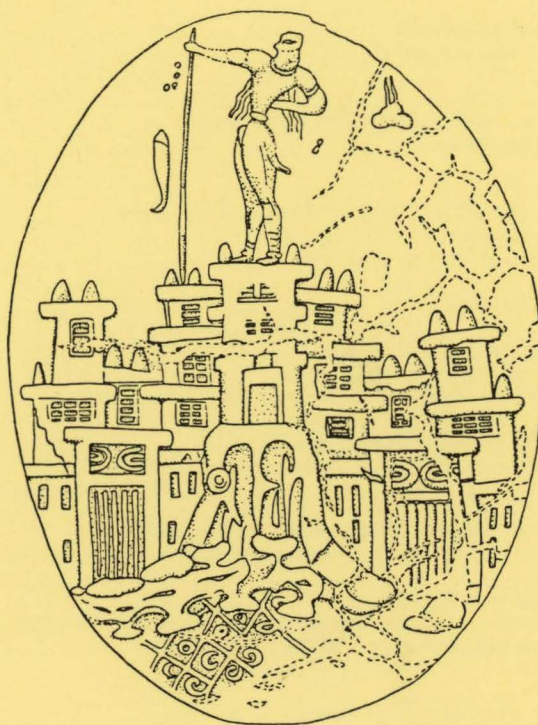
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The Function of the Minoan Palaces

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Preliminary Comparative Textual Evidence for Palatial Control of Economic Activity in Minoan and Mycenaean Crete

by
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Abstract

The Linear A and Linear B inscriptions provide data about the palatial and regional administrative systems that *monitored* economic activity throughout the island of Crete in Minoan and Mycenaean times. Despite problems presented by the non-decipherment of Linear A and the uncertain chronology of the Linear B tablets from Knossos, one can analyze the distinctive features of the respective record-keeping systems by stressing points of comparison or contrast evident from the archival nature of the records and from the fundamental differences between and among phonetic and ideographic characters. In this paper I examine differences between the Linear A and Linear B systems in five categories: (1) extent of use; (2) document typology; (3) numbers, concentration, percentages; (4) nature of inscriptions; (5) regional interest in specific commodities. The results suggest a wholesale alteration of the basic methods by which economic data were gathered, processed and stored from the Linear A to the Linear B period. Precisely how and why such a transformation took place is a larger question. Here it is enough to stress that the textual evidence suggests that there was a new organizational structure to the Cretan economy in the Linear B period.

I do not think that an epigrapher ought to be criticized too severely for asserting that Linear A (LA) and Linear B (LB) inscriptions constitute our main source of information about the function of palatial and regional centers in the economy of Minoan and Mycenaean Crete.¹ The epigraphical data do offer us our best means of reconstructing particular aspects of the administrative systems that *monitored*—we should not assume *totally controlled*—economic activity in separate regions of the island of Crete in the LA and LB periods. Still, an epigrapher should be expected to explain what he means, to substantiate his assertions, to define their limits. Hence the rest of this paper in which I offer a preliminary analysis of the distinctive features of LA and LB record-keeping on Crete and consider how these features relate to two important topics:

(1) the chronology and mechanics of the transition from a Minoan to a Mycenaean economic system;

(2) the general organizational structure of the Cretan economy and its record-keeping administration in the two periods.

Before I proceed hysteron-proteron, let me emphasize two necessary restrictions that must be observed in interpreting the epigraphical data. First, we must keep in mind that we have an unbalanced view of the two periods. The LB documents have been deciphered; the LA have not. There are far more LB tablets from Knossos (KN) than there are LA tablets from throughout Crete; and certain series of KN tablets, e.g. L-, D-, have been studied so intensively that we know more about some industries monitored by LB Knossos than we may ever know about corresponding industries in LA times.

Second, I do not wish this paper to contribute to the general trend of using the LA material far beyond the reasonable limits of probable inference and certain knowledge. A case in point: despite two thorough refutations (*Kadmos* 19, 1980, 12–23; *Minos* 18, 1983, 7–32), one still finds references to a fully established Minoan fractional system (*Kadmos* 11, 1972, 1–21) and to the intricacies of wages for Minoan labor (*Minos* 14, 1975, 7–16) and land-tenure systems (*Kadmos* 17, 1978, 16–25, 91–101; *Kadmos* 20, 1981, 7–25), which are based on this unproven fractional system and on unfounded assumptions about the identification of sign-groups and the phonology of LA.² Therefore I shall stress points of

¹ Three notes of thanks: (1) Robin Hägg and Nanno Marinatos Hägg for suggesting the topic; (2) Malcolm Wiener and Richard Janko for constructive criticisms on an early version of the first half of this paper at the New York Aegean Bronze Age Colloquium; (3) Cynthia W. Shelmerdine for closely reading and criticizing the final draft. References to Linear A texts are made to L. Godart, J.-P. Olivier, *Recueil des inscriptions en linéaire A*, vols. 1–4 (ÉtCrét 21, 1–4, Paris 1976–82 [= *GORILA* I–IV]). References to Linear A signs and abbreviated names of sites conform to the system of J. Raison, M. Pope, *Index transnuméré du linéaire A* (BCILL 11), Louvain 1977 [= *ITLA*]. Abbreviated reference is also made to *PCA* = C.W. Shelmerdine, T.G. Palaima, eds., *Pylos comes alive: Industry and administration in a Mycenaean palace: Papers of a symposium of the Archaeological Institute of America and Fordham University*, New York 1984.

² See, for example, the minor use of such “conclusions” in L.V. Watrous, ‘Aya Triada: A new perspective on the Minoan villa’, *AJA* 88, 1984, 123–134.

comparison or contrast that can be deduced from the archival nature of the records themselves and from the fundamental distinctions between and among phonetic and ideographic characters.

The significance of the two topics under examination is best understood by making a journey to and from the territory of Messenia and the Palace of Nestor within it. The distance from Pylos to Crete is considerable, whether one puts in at Khania or Amnisos. First, there is a distance in time, an unknown distance because of chronological problems associated with the KN tablets.³ Dating of the tablets had been argued on narrow archaeological grounds until W.-D. Niemeier recently brought wider issues to bear on the subject.⁴ Approaching the problems of chronology strictly in terms of palaeography, I strongly resist the trend to take the redating of the tablets to LM IIIB as an established fact.⁵ A principal supporting argument for a later date involves an assumption about the economic operation of a Cretan palace, namely that a centralized administration at Knossos controlled economic activity throughout LB Crete. To some, myself included, this assumption seems at least unnecessary, if not improbable. Textual and archaeological evidence suggests that sites within the separate regions of Crete had some degree of economic autonomy in the LB period.⁶ Here then we come to another distance to traverse.

The distance from Pylos to Crete is especially great in regard to what we know about palatial control of regional economies in the late Mycenaean and Minoan periods. In Crete we must try to explain a transformation in which uncertain chronology and undeciphered texts are just two of the variables. We know that in the middle and early late Bronze Age Crete had a spread of regional centers, whether palaces or villas, that were linchpins of a redistributive economy.⁷ The widespread use of LA accounting records attests to rather intensive regional exploitation: 11 palace or villa sites have yielded LA administrative documents. By region these are: *Western*: Khania (KH); *Central*: Tylissos (TY), Knossos (KN), Arkhanes (AK), Hagia Triada (HT), Phaistos (PH); *North Central*: Mallia (MA); *East Central*: Gournia (GO), Pyrgos (PYR); *Eastern*: Palaikastro (PK), Zakros (ZA).⁸ The documents indicate keen interest in regional production. In LA times, too, we have large caches of sealings at ZA, HT and elsewhere that were once attached to leather documents or small parchment messages.⁹ Whether these messages were *inter-* or *intra*regional, they still attest to a considerable degree of centralized bureaucratic administration of and within individual regions. How these regions related to one another is not yet fully clear.

In LB Crete—I use LB to evade the grasp of the chronological hydra—the epigraphical picture changes radically, despite an appearance of relative prosperity throughout the island.¹⁰ We have only the large corpus of tablets (3373) from KN and some inscribed stirrup jars, 22 (plus 3 other inscribed vases) from KH, 1 (plus another inscribed vase) from KN. How are we to understand the process of Mycenaeanization that led to this new picture? Is Knossos now really monitoring or controlling the production capacities of the entire island, which in the previous LA period may have been apportioned among the major record-

ing centers situated in various districts of the island?¹¹ We are tracing a development from an imperfectly understood α (LA Crete, its economy and administrative system) to, depending upon the chronological position of the KN tablets, a nearer o or further ω (LB Knossos and its role within the Cretan economy). Again let us take hysteron proteron: o - ω .

Our one sound model for regional economic activity in the late Mycenaean period is the economic system of Messenia in LH IIIB. Here we have a consensus view of the extent and geographical arrangement of the territory controlled by a

³ All but 5 of the 1112 tablets from Pylos are securely dated to the final destruction of the Palace of Nestor in late LH IIIB. For details see T. G. Palaima, 'Scribal organization and palatial activity', *PCA*, 32 and references in nn. 2–3.

⁴ W.-D. Niemeier, 'Mycenaean Knossos and the age of Linear B', *SMEA* 23, 1982, 219–287. For a comprehensive survey of the dating controversy with bibliography complete to 1978, see A. Heubeck, *Schrift* [= *ArchHom*, chapter X], Göttingen 1979, 26–32.

⁵ T. G. Palaima, 'Evidence for the influence of the Knossian graphic tradition at Pylos', *Concilium Eirene* XVI, Prague 1983, 80–84, pls. 1, 2; and paper abstract, 'Linear B palaeography and the destruction of the Palace of Minos', *AJA* 87, 1983, 249 f.

⁶ T. G. Palaima, 'Inscribed stirrup jars and regionalism in Linear B Crete', *SMEA* 25, 1984, 189–203. See also H. W. Haskell, 'From palace to town administration: The evidence of the coarse-ware stirrup-jars', in *Minoan society*, Bristol 1983, 121–128, esp. 123 f.; and A. Kanta, *The Late Minoan III period in Crete* (SIMA 58), Göteborg 1980, 318–321.

⁷ A. C. Renfrew, *The emergence of civilisation*, London 1972, 307.

⁸ For the find-places of the Linear A material, see *GORILA* IV, xxiii, and specific commentary in *GORILA* I–IV. Administrative documents include texts inscribed on tablets, bars, "scellés", nodules and roundels; but *not* on religious or ornamental artefacts (libation tables, ladles, miniature double axes, rings or pins in gold, silver and bronze, etc.), pottery (pithoi, pithoid jars, jugs, cups, lamps, two-handled vases), wall materials in stone or plaster, and miscellaneous objects such as stone and terracotta weights and figurines. The pottery inscriptions may rightly be thought to bridge these two general categories since some are plainly economic and therefore administrative in a very fundamental sense. For example, the lengthy inscription of ca. 25 signs on the pithos ZA Zb 3 records in some way 32 units of the commodity *82a (VIN); while KN Zb 35 records a quantity of *89 (OLE) together with amounts of other commodities. Other vase inscriptions come closer to potters' or owners' marks (e.g., KE Zb 4, MI Zb 1), which, though having an economic significance, are not intimately linked to palatial economic administration. One might compare the distinction between the reasons for the inscriptions on the Linear B inscribed stirrup jars and those on the few vases of different forms incised or painted in Linear B (KN Z 1715, PY Za 1392).

⁹ J. Weingarten, 'The use of the Zakro sealings', *Kadmos* 22, 1983, 8–13; and I. Pini, 'Neue Beobachtungen zu tönernen Siegelabdrücken von Zakros', *AA* 98, 1983, 559–572. Bibliography is found in Weingarten, who informs me (personal communication 1 Nov. 1984) that 83 % of the HT sealings are not flat-based and, therefore, do not exhibit the same traces as 92 % of the ZA sealings. However, 64 % of the KH sealings are flat-based with similar traces.

¹⁰ For a general description of conditions during the LM III post-palatial period in Crete, see Kanta (*supra* n. 6), 319–323. For the increase in settlement density and population in LM Crete, see Renfrew (*supra* n. 7), 232–251.

¹¹ Renfrew (*supra* n. 7), 259, fig. 14.14, presents a graphic illustration of the position of these regional administrative centers within their respective districts. Watrous (*supra* n. 2) offers a detailed analysis of the function of a single regional center.

securely dated, well-excavated Mycenaean palatial center.¹² Within the limits of our present knowledge, this is the largest region over which a mainland palace exercised documented control. In late LH IIIB, when the Palace of Nestor was extremely sensitive about control and protection of its production capacities,¹³ the territory under its administration had a maximum length of 75 km., a maximum width of 50 km., a total area of roughly 2200 km.² of very fertile land. The Aigaleon ridge, while presenting a formidable barrier, did allow access, at the north, center and south, between the two administrative districts under palatial control.

Crete by contrast is 250 km. long with a maximum width of 57 km. and a total area of ca. 8300 km.², almost four times the area of Pylian-controlled Messenia. The island is predominantly mountainous, and its production capacities are concentrated in well-separated districts.¹⁴ One might consider what the limits for extra-regional control by a Mycenaean palatial center in Crete might have been. At PY we have 1112 tablets that list approximately 200 place-names compared to 168—189 identified late Bronze habitation sites.¹⁵ There are three times as many KN tablets (3373); and, although the average KN text contains much less information than the average PY text,¹⁶ the KN tablets list just over 100 place-names, or only one-third of the identifiable late Bronze settlements on the island.¹⁷ What alternative hypotheses might explain the much smaller proportion of toponyms to known sites in the KN texts?

Renfrew has suggested that "Knossos controlled economically about one-fifth of the populated lands of Crete."¹⁸ Knossos then even in the LB period would have focused on its own surrounding territory and perhaps the Mesara, and dealt with other regions only for materials that its own territory could not sufficiently provide. Thus the smaller number of place-names in the tablets and the occasional references to outlying, mainly western, locales.

A second explanation is that Knossos monitored the entire economy of Crete, but through subsidiary regional centers, e.g., *ku-do-ni-ja* (Khania), *pa-i-to* (Phaistos), which controlled their own districts. Thus there is no need to list in the KN records all the minor settlements that were under the supervision of regional centers.

A third hypothesis would blend the first two explanations and allow a mixture of control, independence and interaction among regional centers, Knossos included, settlements and districts. John Bennet's paper examines these problems more thoroughly. Yet it was essential to establish the extremely problematical nature of our basic equation before bringing additional variables and equations into the attempted solution. What follows are preliminary observations on the differences between Linear A and Linear B record-keeping in Crete. These differences document a substantial transformation of administrative procedures and undoubtedly reflect significant changes in the general structure of the Cretan economic system. Interpreting these changes in a broader archaeological context, however, is another matter. Full interpretation depends on identifying the real values of α , o , ω ; choosing between o and ω ; and deciding what mathematical operations, addition, subtraction, division, multiplication or even mere equivalence, to perform with them. Here I shall

rest content with providing clues to the identification of the variables.

COMPARISON OF LA AND LB ECONOMIC ADMINISTRATIVE SYSTEMS ON CRETE

I. Extent of use:

- a. *LA: administrative records* at 11 major sites; one unexcavated find from Papoura (2 sites outside the island: Melos, Kea).
other documents: 17 sites on Crete (2 outside: Kythera, Thera).¹⁹
- b. *LB: administrative records:* 1 site (Knossos) on Crete.
other documents: 2 sites (Knossos, Khania).

II. Types of documents:

- a. *LB:* invention of palm-leaf shape, most suitable for recording single transactions; found in full use at Knossos.
- b. *LA:* consistent distinction among counter-inscribed sealings by form, shape, and apparently function: nodules, "scellés", roundels.²⁰ In *LB* all counter-inscribed sealings are of the nodule type (series Wr—PY; Ws—KN; Wt—MY; and now Wu—TH).²¹ *LB* alone makes use of clay labels for identifying sets of tablets in transport or filing baskets (Wa—PY; Wb—KN).
- c. In the *LA* period the finds of large numbers of sealings that were originally attached to leather messages, so far unknown in *LB*, represent a far different use of sealings from that in the Linear B system.²²

¹² J. Chadwick, 'The interpretation of Mycenaean documents and Pylian geography', in *Mycenaean geography*, Cambridge 1977, 36—40 with references and discussion.

¹³ T.G. Palaima, J.C. Wright, 'Ins and outs of the archives rooms at Pylos: Form and function in a Mycenaean palace', *AJA* 89, 1985, 251—262.

¹⁴ The distribution of Crete's production capacities and natural resources is thoroughly documented in L.G. Allbaugh, *Crete: A case study of an underdeveloped area*, Princeton 1953.

¹⁵ W.A. McDonald, G.R. Rapp, Jr., *The Minnesota Messenia Expedition*, Minneapolis 1972, 102, 141.

¹⁶ KN: 7.7 signs per tablet; PY: 25 signs per tablet. The KN tablets contain a slightly larger total number of signs. See J.-P. Olivier, 'Administrations at Pylos and Knossos: What differences?', *PCA*, 13.

¹⁷ A.L. Wilson, 'Preliminary considerations on the Knossos place-names', *Minos* 16, 1977, 75.

¹⁸ Renfrew (supra n. 7), 254 f., discussing the geographical arrangement in Crete in general.

¹⁹ *GORILA* IV, xxiii, xli. See also T.G. Palaima, 'Linear A in the Cyclades: The trade and travel of a script', in *TUAS* 7, 1982, 15—22.

²⁰ *GORILA* II, xvii—xix. *Nodules* generally have three faces; a thin cord hole through the center; and, with two exceptions, a single seal impression. "Scellés" are packets of clay with a single seal impression pressed onto the surface; few are inscribed. *Roundels* are round discs of clay bearing 1—15 impressions ordinarily of the same seal; they have inscriptions of varying length on front or back and show no visible means of attachment to other objects.

²¹ V. Aravantinos, 'The use of sealings in the administration of Mycenaean palaces', *PCA*, 43, 47 f.

²² The Linear B sealings relate closely to commodities: Aravantinos, *PCA*, 48.

- d. The diversity and profusion of non-administrative documents in *LA* (supra note 8) attest to a common, habitual use of writing so far not documented for *LB*.

III. Numbers, concentration, percentages:

- a. *LA*: largest numbers of tablets and fragments at Hagia Triada: 147; and then in descending order Khania: 85; Zakros: 31; Phaistos: 26.
LB: Knossos has far more tablets and fragments: 3352 plus 21 inscribed sealings.
- b. *LA*: very large caches of counter-inscribed nodules and roundels found in well-defined areas at different sites: KH: 81 roundels (Wc), 20 nodules (Wa) in O. Katré;²³ HT: 862 nodules (Wa) and 21 roundels (Wc) principally from a single E-W corridor in the villa.²⁴
LB: at Mycenaean sites much smaller caches and only of counter-inscribed nodules: Thebes: a recently discovered group of 55; Mycenae: 7 (House of Sphinxes); Pylos: 5 (NE Workshop, Rm. 98); Knossos: 4 (Room of the Chariot Tablets).²⁵
- c. *LA*: large percentage of nodules at particular sites counter-inscribed, e.g., HT ca. 70 %.²⁶
LB: lower percentage counter-inscribed, e.g., Pylos: 23 of 147 (15.6 %); Knossos: 21 of an undetermined large number, because unpublished.²⁷

IV. Differences in the nature of inscriptions:

- a. *LB*: The Knossos *LB* records consist almost exclusively of short, leaf-shaped records. Of 66 series of tablets, 50 are of leaf-shaped classification;²⁸ but even within the other 16 series only 54 tablets contain 5 or more lines of recorded information. The large number of specialized series, each dealing with a separate aspect of a particular industry, e.g., 22 series of wool and livestock records, is indicative of the absence of a central or even subsidiary archives where processing of such records would have taken place.²⁹ Thus the KN records average only 7.7 signs per tablet, while the PY tablets have 25. In their relative brevity the KN records come closer to *LA* records.
LA: The *LA* inscriptions, almost exclusively small page-shaped, a few bar-shaped, generally contain multiple entries consisting of either: (1) successive entries of single sign-groups and numbers relating to one identifiable ideogram in the heading (e.g., HT 7a, 9a, 17 etc.) or (2) quantities of several commodities (e.g., HT 18) or variants of the same commodity (e.g., TY 3a) relating to single sign-group(s). Tablets directly corresponding to *LB* single-entry texts are rare: PYR 1, PA 1. Most sites offer examples of fairly long tablets, although none apparently matches the fuller *LB* tablets from PY in their syntactical complexity (e.g., Eb 297, Ep 301, Jn 829, Ta 711, Tn 316). The *LB* texts from KN appear syntactically simpler than the PY tablets and closer to *LA* documents in their frequent alternation of one or two sign-groups with ideograms and/or numerals in list format.³⁰
- b. *LA*: nodules (Wa) fall into set groups according to

shared inscribed texts (normally 1 or 2, but up to 4 [KH Wa 1001, PH Wa 32] signs).³¹ None of the inscriptions on the 883 nodules from HT, PH and KH contains an identifiable ideogram,³² whereas ideograms are frequent upon roundels (Wc) from *LA* sites: HT Wc 3015—3017, 3019—3020; MA Wc (5), Wc 7; PH Wc 41—43; almost all roundels from KH (Wc 2001—2114; exceptions Wc 2005, 2100).

LB: nodules (Wr, Ws, Wt) also can be grouped by related texts and find-spots, but exactly duplicated texts, as in *LA*, are uncommon.³³ A high percentage of inscriptions on nodules have ideograms with or without accompanying word-groups.³⁴

V. Regional interest in specific commodities:

- a. *LA*: Four *LA* ideograms (and their corresponding variants)³⁵ are most probably equivalent to *LB* ideograms for basic commodities.³⁶ These are found on *LA* tablets from centers throughout the island, as follows:

²³ *GORILA* III, xix—xxiii.

²⁴ *GORILA* II, xvii—xix. Watrous (supra n. 3) gives a detailed breakdown.

²⁵ J.-P. Olivier, 'La série Ws de Cnossos', *Minos* 9, 1968, 179. I list maximum numbers for any single group at each Mycenaean site in order to obviate the argument that low numbers and percentages at Knossos are dependent on such factors as the early excavation of the site and a corresponding lesser degree of care in excavation.

²⁶ *GORILA* II, xvii. By contrast a very low percentage of "scellés" is counter-inscribed, *GORILA* II, xviii. 50 % of the prism-shaped nodules at KH are inscribed (J. Weingarten, November 1, 1984).

²⁷ Aravantinos, *PCA*, 45. As an example of sealings found in specific locations, it is worth noting that only 4 of 54 sealings from Rooms 104—105 (Wine Magazine) at Pylos were counter-inscribed.

²⁸ Treating series Dm, Dn, Do, Dp, Dq, Dv, D, Fs, Gm, Np, Pp, etc. as thoroughly leaf-shaped. Excluding sealings, labels, and the very fragmentary X- series from consideration.

²⁹ Pylos alone has an administrative archives: Olivier, *PCA*, 16.

³⁰ One might wish to see a chronological development from Linear A to KN Linear B to Pylos Linear B in palaeography, record-keeping sophistication, and archival techniques. Yet the characteristic features of each period might be related to other factors: regional, cultural, even architectural.

³¹ *GORILA* II, xxiv—xxv, provides a breakdown of the HT material. The KH nodules are grouped as follows: KH Wa 1001—1002; 1003—1004; 1005—1010; 1011—1012; 1013—1016.

³² The only possible ideograms occur on KH Wa 1003, 1004, identified in *ITLA* as *190c, and HT Wa 1021 bis, known only from a drawing, and which might have contained a syllabogram, ideogram and numerical entry.

³³ For example, only 2 pairs (4 total) of the 23 inscribed nodules from PY share identical texts: Wr 1330 and 1333; Wr 1358 and 1361; 2 pairs (4 total) of the 21 from KN: Ws 1704 and 8495 (with different disposition on the faces of the nodules); Ws 8713 and 8752; 0 of the 8 from MY.

³⁴ PY: 11 of 23; KN: 14 of 21; MY: 1 of 8.

³⁵ Some variants are simply ligatures of commodity and fractional signs (*502, *504, *506—*508, *511); others are commodity signs combined with phonograms, possibly phonetic abbreviations as in *LB* (*503, *505, *509). The first group may refer to standard units handled; the second to varieties of the basic commodity, whether natural (*42[?]) or processed (82a, *89[?]).

³⁶ M. Ventris, J. Chadwick, *Documents in Mycenaean Greek*², Cambridge 1973, 34—36; Heubeck (supra n. 5), 34, n. 250.

- *49: AK, HT, PH, TY, ZA.
- *42: AK, HT, KH, KN, PH, TY.
variants of *42:
*501—*508: HT.
*509: HT, KH, ZA.
*511: HT.
- *82a: AK, HT, KH, KN, PH, PYR, ZA.
variants of *82a:
*537: HT.
*619: ZA.
*632: ZA.
*644: HT, KH, PH.
- *89: AK, HT, KN, PH.
variants of *89:
*89+ [: HT, KH, TY.
*512—*514, *516, *518, *523, *528, *621: HT.
*515: HT, TY, ZA.
*517, *521, *522: HT, TY.
*524, *622: HT, KH.
*583a, *583b, *584: TY.
- b. *LB*: The Linear B tablets from KN also indicate an interest in these basic materials, but with a decided focus on production in the center of the island and little or no interest in the east and decreased interest in the west.³⁷

COMMENTARY

Besides the obvious differences in extent of use, there are changes in the procedures for record-keeping in the LA and LB administrative systems that should be stressed. I would consider most significant the changes in document typology, for they point to a wholesale alteration of the basic methods by which economic data were gathered, processed and stored. Despite all the variables, we should try to understand why and how the transition from Minoan to Mycenaean Crete brought about the following typological changes:

- (1) the invention of the palm-leaf single-entry tablet as a vital component of administrative record-keeping [IIa];
- (2) the abandonment of two of the three functionally distinct types of counter-inscribed sealings [IIb, IVb];
- (3) the discernible change in the categories of information recorded on the surviving nodule class of sealing [IVb];
- (4) the abandonment of the practice of using and collecting sealings attached to leather messages [IIc];
- (5) the use in LB of clay labels to identify sets of tablets inside transport or filing baskets [IIb].

The LB documents from KN by their numbers [IIIa], typology [IIa], and nature [IVa, b] suggest a more systematic approach to recording fuller and more specialized kinds of information than is found in the LA period. The information on LB sealings [IVb] and even labels [IIb] is not as simple or redundant, and seems to be far more specific than the information on their LA counterparts. The specialized series of tablets from KN reinforce this impression. Yet we should not assume that this arises from a heightened concern for administrative control or from the demands of controlling larger areas from fewer administrative centers. The LA system is more complex in its functional categories of sealings [IIb] and in its use of sealed leather documents or parchment

messages, albeit for unknown purposes [IIc]. These in themselves certainly raise the possibility of the use of ephemeral materials for records of a higher archival status in the LA period.³⁸ It is also possible, although highly speculative, that the single pieces of information collected at HT and ZA in LA times by means of such sealed messages were kept in the LB period upon the newly invented, and extremely practical, palm-leaf tablets. However, the change may have to do with practical considerations, e.g., availability of writing materials, and not with any real shift in administrative interests. The survey of specific commodities [V] demonstrates that the LA regional centers kept careful track of the same kinds and range of varieties of materials that LB Knossos monitored.

Finally, we should ask whether the differences in record-keeping systems favor sudden change (*o*) or gradual development through a longer interval to the next period (*ω*). Might we not expect for *o* that certain typological features of the LA system would have survived briefly and partially into the LB phase, just as proto-Linear A copied the four-sided hieroglyphic seal for the shape of its clay documents?³⁹ Again we are dealing with different variables. The development of LA from hieroglyphic took place within a single culture and to satisfy new record-keeping needs. Moreover, the proto-Linear A clay bar was soon replaced by new types of LA records, despite the continued use of hieroglyphic on seals until the end of LM IB.⁴⁰ The invention of LB from LA takes place across cultures; and, if *o* is placed at the end of LM IIIA:1, enough time would certainly have elapsed to adopt new forms of writing materials suited to the new economic system of Mycenaean Crete.

CONCLUSION

The textual evidence suggests that there was a new organizational structure to the administration of the Cretan economy in the LB period. So much can be cautiously deduced from the present epigraphical data. So long as LA remains undeciphered and the archaeological dating of the Knossos tablets continues to be disputed, it will be difficult to understand exactly how and why the transformation from the LA to the LB administrative system took place. Our journey hysteron-proteron-hysteron has left open many problems to consider. Still I would like to recall the lesson of Kavafy's "Ithaca". The fun is in the travel. Thank you, Robin and Nanno, for providing the reason for this journey.

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³⁷ Palaima (supra n. 6); J.T. Killen, 'The Knossos texts and the geography of Mycenaean Crete', in *Mycenaean geography*, 45; J. Chadwick, 'Relations between Knossos and the rest of Crete at the time of the Linear B tablets', *Proc 3rd Cret Congr*, Athens 1973, 45.

³⁸ M. Pope, 'The cretulae and the Linear A accounting system', *BSA* 55, 1960, 200—210.

³⁹ Heubeck (supra n. 5), 3.

⁴⁰ Heubeck (supra n. 5), 4.

Discussion

N. Marinatos: After hearing this interesting and thorough paper, my impression that the Minoan and Mycenaean societies were different is reinforced.

S. Hiller: Did this really emerge from T. Palaima's paper?

T. Palaima: By observing typological features, I could demonstrate that there were significant changes in the methods of record keeping. Whether these have to do with historical changes or cultural factors is not for me to say.

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