

THE LINEAR B INSCRIBED STIRRUP JARS AS LINKS IN AN ADMINISTRATIVE CHAIN*

I. INTRODUCTION

As a body of evidence pertaining to many different topics of Late Bronze Age studies, the inscribed stirrup jars (ISJs) have received considerable attention over

* I began this paper in a graduate seminar taught by Thomas G. Palaima at the University of Texas at Austin during the spring semester 1998. For his numerous comments, suggestions, and corrections on earlier drafts as well as his constant encouragement, I owe Palaima my deepest gratitude. I also thank Jan Driessen and Ilse Schoep, visiting lecturers for the seminar, for the conversations which helped to solidify some of the ideas presented here. Several others deserve recognition for comments on earlier drafts: John Bennet, Lisa Kallet, Artemis Karnava, and Jason Railsback. Finally, to Julia Solis I owe special gratitude for her keen editorial eye, and to Taras Pevny for his drafting skill. All shortcomings, of course, remain my own. In general discussion, I have omitted subscript notation in the transcription of some Linear B words and have presented the most probable reading. This is done for the sake of simplicity. Subscript dots are used when the details of a particular inscription are significant. I use the following abbreviated references:

- Bennet 1992: J. Bennet, «Collectors or Owners? An Examination of Their Possible Functions within the Palatial Economy of LM III Crete,» in J.-P. Olivier, ed., *Mykenaiika*, BCH Suppl. XXV, 1992, pp. 65-101.
- Bennett 1986: E. L. Bennett, Jr., «The Inscribed Stirrup Jar and Pinacology,» in *Philia Epe eis Giorgion E. Mulonan*, Athens 1986, pp. 136-143.
- Hallager 1987: E. Hallager, «The Inscribed Stirrup Jars: Implications for Late Minoan IIIB Crete,» *AJA* 91, 1987, pp. 171-190.
- Haskell 1983: H. Haskell, «From Palace to Town Administration: the Evidence of Coarse-Ware Stirrup Jars,» in O. Krzyszkowska and L. Nixon, eds., *Minoan Society*, Bristol 1983, pp. 121-28.
- ISJWC: H. W. Catling *et al.*, «The Linear B Inscribed Stirrup Jars and West Crete,» *BSA* 75, 1980, pp. 49-113.
- Killen 1995: J. T. Killen, «Some Further Thoughts on 'Collectors',» in R. Laffineur and W.-D. Niemeier, *POLITEIA: Society and State in the Aegean Bronze Age*, *Aegaeum* 12, Liège-Austin 1995, pp. 213-226.
- Melena 1983: J. L. Melena, «Olive Oil and Other Sorts of Oil in the Mycenaean Tablets,» *Minos* 18, 1983, pp. 89-123.
- «Malia»: A. Farnoux and J. M. Driessen, «Inscriptions peintes en linéaire B à Malia,» *BCH* 115, 1991, pp. 71-93.
- Palaima 1984: T. G. Palaima, «Inscribed Stirrup Jars and Regionalism in Linear B Crete,» *SMEA* 23, 1984, pp. 189-201.
- Palaima 1987: T. G. Palaima, «Mycenaean Seals and Sealings in their Economic and Administrative Contexts,» *Tractata Mycenaea*, 1987, pp. 249-266.

the last three decades, more so to date than their uninscribed stirrup jar (SJ) sisters.¹ What makes this group of nearly 180 inscribed jars applicable to so many different aspects of Mycenaean studies are the painted Linear B inscriptions themselves. Not only are these the sole examples of extant Late Bronze Age writing known to have traveled the distance between Crete and the mainland, but they are also the only preserved documents in Linear B that were painted with a brush rather than inscribed with a stylus.² Moreover, the fact that these inscriptions appear on items that were used in trade,³ however we might define trade in this period,⁴ rather than placed in an archive is also significant.

- Palaima 1988: T. G. Palaima, «The Development of the Mycenaean Writing System,» in J.-P. Olivier and T. G. Palaima, eds., *Texts, Tablets and Scribes: Studies in Mycenaean Epigraphy and Economy Offered to Emmett L. Bennett, Jr.*, *Minos Suppl.* 10, 1988, pp. 269-342.
- Palaima 1998: T. G. Palaima, «A Humble Archives, But Our Own: Information Hierarchy in the Linear B Records from the 'Archives Complex' of Mycenaean Pylos,» paper given at the Centre for the Study of Ancient Documents. Oxford University. September 17-19, 1998.
- Palaima forthcoming: T. G. Palaima, «The Transactional Vocabulary of Mycenaean Sealings and the Mycenaean Administrative Process,» in M. Perna, ed., *Acts of the International Sphragistics Conference Naples 29 February to 2 March 1996*, forthcoming.
- Shelmerdine 1985: C. W. Shelmerdine, *The Perfume Industry of Mycenaean Pylos*, Göteborg 1985.
- «Trade»: P. M. Day and H. Haskell, «Transport Stirrup Jars as Evidence for Trade in Late Bronze Age Greece,» in C. Gillis, C. Risberg, and B. Sjöberg, eds., *Trade and Production in Premonetary Greece: Aspects of Trade*, SIMA-PB 134, Jonsered 1995, pp. 87-109.
- VIP: J. Raison, *Les vases à inscriptions peintes, Incunabula Graeca* 19, Rome 1968.

I use the abbreviations: TN = toponym (place name); CN = collector's name; PN = personal name.

- ¹ The fullest account of both ISJs and SJs is still in preparation: H. W. Haskell, R. E. Jones, P. M. Day, H. W. Catling, and J. T. Killen, *Transport Stirrup Jars of the Bronze Age Aegean and East Mediterranean* (Fitch Laboratory Occasional Papers 1, British School at Athens), Athens.
- ² There are also seven examples of Linear B inscribed domestic vessels: MY Z 712, TI Z 28, 52, KN Z 1715, KH Z 23-25. See *infra* n. 48, and A. Sacconi, *Corpus delle iscrizioni vascolari in lineare B*, Rome 1974, for all but the vessels from Khania.
- ³ Although not all agree that ISJs and SJs were traded (see VIP, pp. 193-209), Haskell and others have argued convincingly that such was the case. H. Haskell, «Pylos: Stirrup Jars and the International Oil Trade,» in C. W. Shelmerdine and T. G. Palaima, eds., *Pylos Comes Alive*, New York 1984, pp. 97-107; and «Trade,» *passim*.
- ⁴ Defining the nature of 'trade,' especially international trade, in the Late Bronze Age is a vexing problem. The scope of this article does not permit me to engage in the discussion, but only to say that in my judgment exchange systems during this period were more complex than some, e.g., A. Snodgrass («Bronze Age Exchange: A Minimalist Position,» in N. Gale, ed., *Bronze Age Trade in the Mediterranean* [SIMA

For this reason and several others (e.g., the nature of the inscriptions themselves, the personal names and toponyms that appear in the inscriptions, and the use of ceramic analyses on the jars to locate a region for their production) the ISJs have been key evidence for many arguments concerning politics, literacy, palaeography, and trade in LM IIIB.⁵

While most studies, either those on the ISJs themselves or those that use the ISJs for wider argumentation, do briefly address the possible *function* (as opposed to meaning) of the inscriptions on the jars, this is a topic that has not been fully investigated. The fact that the inscriptions were painted on large coarse-ware SJs (a context that bears its own associations with trade and vase painting) and the terseness of the inscriptions themselves pose numerous problems for interpretation. Are these inscriptions 'art,' or do they carry a specific, language-borne message? One school of thought sees the inscriptions as having basically no communicative value, i.e., they serve as a form of decoration much like the gibberish found on some later classical vases.⁶ Scholars who do see a communicative value in the inscriptions posit two different readers: the inscriptions were either (a) meant for the ultimate consumer of the jars' contents and so functioned as labels guaranteeing quality and source,⁷ or (b) were somehow used and meant to be read during the process of production and distribution, although exactly how the inscriptions were so used is not fully explained.⁸ My purpose here is to address specifically the function of the ISJ

90, 1991], pp. 15-20), have proposed. For a view quite different from that of Snodgrass, see A. and S. Sherratt, «From Luxuries to Commodities: The Nature of Mediterranean Bronze Age Trading Systems,» in the same volume. More recent discussions of Bronze Age trade by various authors can be found in C. Gillis, C. Risberg, and B. Sjöberg, *Trade and Production in Premonetary Greece: Aspects of Trade*, SIMA-PB 134, Jonsered 1995.

- ⁵ *Communis opinio* dates the ISJ phenomenon to roughly LM IIIB (see *ISJWC*, pp. 93-103 for a detailed discussion of the dating problems). Cretan context dates range from LM IIIA2 (for KH Z 27) to LM IIIB2 at Mallia (see A. Farnoux and J. M. Driessen, «Mycenaeans at Mallia?,» *Aegean Archaeology* 1, 1994, pp. 54-64). Politics and ISJs: Hallager 1987, Haskell 1983, H. Haskell, «LM III Knossos: Evidence beyond the Palace,» *SMEA* 28, 1989, pp. 81-110, and Palaima 1984; Literacy/Palaeography and ISJs: Bennett 1986, Hallager 1987, E. Hallager, «The Greek-Swedish Excavations at Kastelli, Khania 1980: The Linear B Inscriptions,» *AAA* 16, 1983, pp. 1-20, «Malia»; T. G. Palaima, «Comments on Mycenaean Literacy,» in J. T. Killen, J. L. Melena and J.-P. Olivier, eds., *Studies in Mycenaean and Classical Greek Presented to John Chadwick. Minos* 20-22, 1987, pp. 499-510, and Palaima 1988.
- ⁶ *ISJWC*, p. 91; «Trade,» p. 97; Bennett 1986, p. 141, raises the issue of whether or not certain inscriptions were more decorative than communicative. Also, J. Driessen and A. Farnoux argue in a forthcoming article on a third ISJ from Malia (MA Z 3) that the inscriptions served primarily a decorative function. I thank Driessen for allowing me to see a draft of this paper.
- ⁷ J. Chadwick, *The Mycenaean World*, Cambridge 1976, p. 18; one of two explanations for their use presented by Farnoux and Driessen («Malia,» p. 90). Also see *ISJWC*, p. 91.
- ⁸ *ISJWC*, p. 90; «Malia,» p. 91; Bennet 1992, p. 80.
- ⁹ With a handful of possible exceptions, ISJs seem to be a product of Crete, specifically

inscriptions without elaborating upon the greater issues of LM IIIB Crete.⁹ I am proposing that the inscriptions do have a function, namely in the process of monitoring production, specifically as an administrative tool used to trace and record the fulfillment of an individual's obligation to provide the contents of the jars to a higher authority. The closest analogy to this function found in the Linear B corpus is the use of sealing nodules. First, however, a few words are needed on the positioning and appearance of the inscriptions on the jars themselves.

II. THE CHARACTERISTICS OF THE INSCRIPTIONS

The characteristics of the individual inscriptions and signs on the ISJs vary a great deal. Some inscriptions, EL Z 1 particularly, in terms of sign formation, layout and legibility, do not differ a great deal from the writing found in the tablets.¹⁰ Conversely, we find inscriptions, such as TH Z 847 and TH Z 855, that have 'illegible' elements. Between these two extreme poles of legibility lie inscriptions with individual signs showing considerable deviation from more canonical sign formation.¹¹ Depending on the degree of elegance shown in the signs, the amount of relevant deviation, and the degree of assertiveness in the brush work, scholars are apt to label one inscription the work of a literate scribe, here wielding a brush, another the work of an illiterate vase painter.¹² Any of the

⁹ With a handful of possible exceptions, ISJs seem to be a product of Crete, specifically West Crete (see *ISJWC*, pp. 53-85, and «Trade,» p. 98) and thus are potentially indicative of Cretan administrative practices. Scholars who debate the nature of Cretan administration and the relationship between Knossos and other communities following the final (?) destruction of the Knossos palace in LM IIIA2 have not yet reached a general consensus. Some such as Haskell (Haskell 1983, and Haskell 1989, *supra* n. 5) and Palaima (Palaima 1984) have argued for decentralization and greater, if not entire, independence of outlying communities from Knossos following the destruction. Others, such as Hallager (Hallager 1987) and J. Bennet («The Structure of the Linear B Administration at Knossos,» *AJA* 89, 1985, pp. 231-249) have sought a continuing centralized role for a Knossian administration. The discovery in 1989 of Linear B tablets at Khania (E. Hallager, M. Vlasakis, and B. Hallager, «The First Linear B Tablet(s) from Khania,» *Kadmos* 29, 1990, pp. 24-34; and «New Linear B Tablets from Khania,» *Kadmos* 31, 1992, pp. 61-87) elevated the already suspected importance of this town as a possible first- or second-order administrative site and has only increased the complexity of arguments for or against Knossian centralized administration in LM IIIB Crete. A summary discussion of arguments for Knossos continuing to function as an administrative center in LM IIIB and its relationship with Khania can be found in T. G. Palaima, «Ten Reasons Why KH 115 ≠ KN 115,» *Minos* 27-28, 1992-1993, pp. 261-279.

¹⁰ Bennett 1986, p. 143, comments that EL Z 1, of all the ISJ inscriptions, seems most influenced by the pinacological tradition of the Linear B script.

¹¹ Hallager 1987, p. 173, provides a useful diagram of canonical signs and the examples found on the ISJs.

¹² Farnoux and Driessen («Malia,» p. 81), for example, note concerning MA Z 1: "Le premier signe atteste que l'auteur de l'inscription savait écrire en linéaire B ou qu'il avait à sa disposition un modèle original du signe *ma*." See also «Trade,» p. 98.

sign-painters who were not fully literate would simply have copied the simple texts from a model of some sort, with varying success. What matters, I believe, is that *all* of the inscriptions were intended to be read and this is shown partly by the arrangement of the inscriptions on the jars.

Nearly two-thirds of the ISJs bear their inscriptions, generally a single word, in a carefully demarcated field on the upper shoulder of the jar between the handles and behind the false neck.¹³ A few things must be noted about this arrangement. First, the vantage point from which these inscriptions were intended to be read as well as the size of the signs are an important indication of their function; an inscription placed on this part of the jar can easily be read when the line of sight falls anywhere from horizontal to the jar (0 degrees) to directly above the jar (i.e., vertical or 90 degrees)(FIG. 1). Furthermore, only when the reader's line of sight is level with the jar and directly in front of it, i.e., opposite the spout, or approximately 90 degrees to each side of the spout, is the inscription obscured. Also, almost every inscription found in this shoulder field on the jars is composed of large (monumental) signs. They often extend vertically, e.g., in the case of the tall *nu* found on TH Z 865, from the decorative band above to the band below. Both the size and position of the inscriptions facilitate reading by making the signs legible even at a distance. If one imagines a large collection of jars set next to one another on the ground, anyone (e.g., a scribe whose task was to record the information of the jar inscriptions onto a tablet) walking around the group would be able to read the inscriptions at a glance without having to handle the jars individually or even approach them too closely. That the inscriptions were meant to be read from above is also suggested by the two ISJs (KH Z 3 and TI Z 30 + fr. + fr.) that bear a painted inscription on the disk atop the false neck.¹⁴ However, signs written on the small disk would by necessity be much smaller than the signs found on the shoulder and could only be read with ease from a position nearly directly above the disk. Although the placement of large signs on the shoulder, as well as the manner in which most of these signs were finished, does have an inherent aesthetic appeal (e.g., TH Z 866), this arrangement seems intended primarily for practical reasons. In the case of at least a couple of intact ISJs (cf. TH Z 847, 858) that have inscriptions in the shoulder field, the bellies were left undecorated which would have presented the sign-

¹³ There is a close 2:1 ratio of shoulder inscriptions to inscriptions located elsewhere, primarily the bellies, on the jars. The ISJs with this shoulder arrangement are: MY Z 715, 717; TI Z 1, 2, 3, 4, 5, 6, 7, 8 + 26, 12 (?), 24, 25 (?), 27; EL Z 1; TH Z 840, 841, 842, 843, 844, 845, 847, 848, 856, 857, 858, 863, 864, 865, 866, 867, 869, 870, 871, 872, 876, 877 (?), 879, 881, 883 (?), 961 (?), 975; KN Z 1716; KH Z 1, 2, 4, 5, 6, 7, 8, 9, 11, 17 (?), 19, 22; MA Z 1, 2; MAM Z 1; MI Z 2

¹⁴ A third ISJ, KH Z 16, has a single sign *wa*, which was incised, not painted, atop the disk before the vessel was fired (see E. Hallager and M. Vlasakis, «KH Inscriptions 1976,» AAA, 9, 1976, pp. 215-18, and Y. Tzedakis and E. Hallager, «The Greek-Swedish Excavations, Kastelli, Khania 1976 and 1977,» AAA 11, 1978, pp. 43-44). Since it is a sole and curious example of an incised mark and a single sign in isolation, I have not included this ISJ in the discussion of the two mentioned in the text above.

painter, had he not decided beforehand, with a choice of where to place the inscription. That the inscriptions appear on the shoulder again seems to indicate practical reasons for this placement.

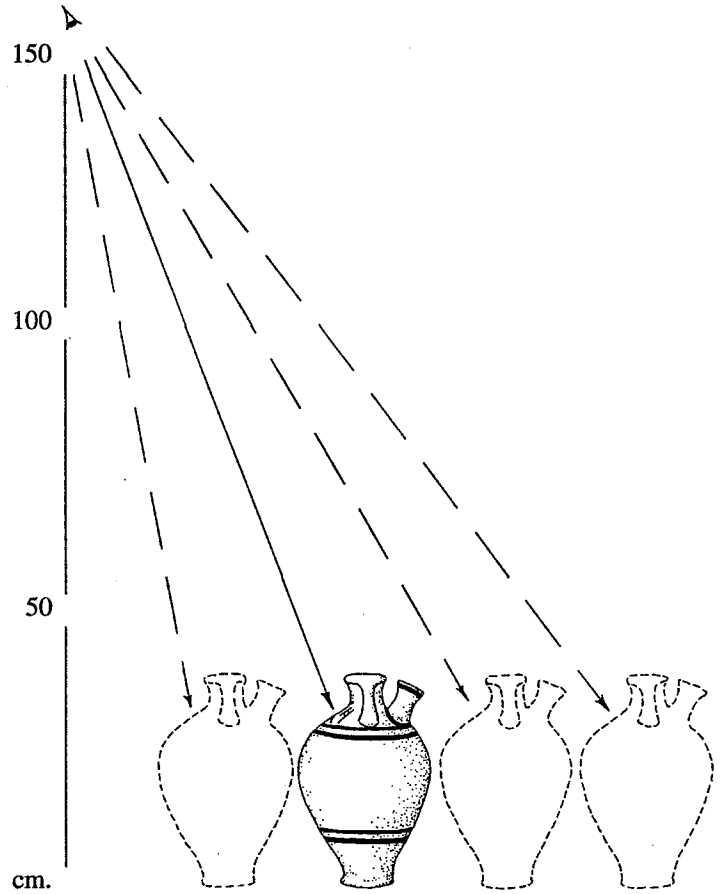


Figure 1: *Lines of sight for a stirrup-jar.*

Of course, the placement of inscriptions on the shoulders and disks of the vessels are only two of the several arrangements of signs and fields found on the jars. With the exception of EL Z 1, all of the inscriptions containing more than one word appear on the belly of the jars, generally written in large signs that wrap around the vessel.¹⁵ This arrangement is physically more difficult to read

¹⁵ ISJs with inscriptions on the belly of the jar, whether of one word or more, are: MY Z 202, 664; TI Z 11 (?), 14 (?), 15, 18 (?), 19 (?), 29; OR Z 1; TH Z 839, 846, 849, 850, 851, 852, 853, 854, 855, 880, 882.

than the two arrangements just mentioned. To read such an inscription the reader would have to move counterclockwise about an isolated jar in order to grasp the complete group of signs, or he would have to lift the jar and rotate it manually, an unlikely, but not impossible, prospect if the jar were full.¹⁶ But does this imply a function more decorative than communicative? Although EL Z 1 does show that longer inscriptions could be placed on the jars without sacrificing the ease of reading and accessibility, other inscriptions located on the belly and elsewhere do not seem to serve solely a decorative purpose.

Most notable is the inscription *a-ma-ti* (TI Z 9) composed of small signs painted with a fat brush tucked in a small field to the side of the spout. The positioning and writing of these signs seem to be the result of an afterthought; someone realized, after the jar had been decorated without an inscription, that it did in fact need one.¹⁷ A random open space was found on the jar and the painter then used a brush aesthetically ill-suited for the size and legibility of the signs.¹⁸ At least one other instance of 'inscriptional afterthought' might exist: MI Z 4. In this case, the signs (*wi-na-jo*) are again rather small and located on the belly within a sinusoidal curve encircling the jar.¹⁹ The loop enclosing the inscription in no way differs from other loops around the jar; therefore the decorative motif was not modified in order to accommodate the inscription. Interestingly, the same name, *wi-na-jo*, is found on two other jars (AR Z 1, KN Z 1716) and all three inscriptions are thought to be from the same workshop.²⁰ However, the inscriptions AR Z 1 and KN Z 1716 are located in the more common spot on the shoulder behind the spout. With TI Z 9 and MI Z 4 the appended inscriptions suggest that they were not planned to be a decorative elements of the vessels; the inscription was necessarily placed on the jar for another reason —presumably its communicative value.

One other factor —one that has little to do with aesthetics or communication— that may have determined the position of an inscription on a stirrup jar was the position of the sign-painter in relation to the pot. Since most of these vessels are comparatively large (c. 40 cm. tall) and would have been awkward to move in a leather-hard or bone-dry (i.e., pre-fired) state without damage, the sign-painter would be somewhat at the mercy of where and how the jar itself was positioned before he set to work. For example, many of the band decorations and sinusoidal curves found on these jars would be most easily painted if the jar were placed on a wheel. The sign-painter could easily turn the

¹⁶ Most of the ISJs are of a capacity around 14 l., which when full of oil would weigh nearly 20 kg. See Shelmerdine 1985, p. 146.

¹⁷ Both the belly of this intact vessel and the field behind the false neck are decorated, *VIP*, pl. CVI.

¹⁸ Bennett 1986, p. 141, notes that "the brush strokes are too fat in proportion for clarity."

¹⁹ K. Demakopoulou and N. Divari-Valakou, «New Finds with Linear B Inscriptions from Midea (MI Z 2, Wv 3, Z 4),» *Minos* 29-30, 1994-1995, pl. II.

²⁰ *Ibidem*, p. 327.

wheel to have access to the belly field while writing the longer inscriptions; with the jar placed on an immovable bench, turning the jar, or moving about the jar, in order to paint the inscription would be difficult. That some of the single-word inscriptions (e.g. TI Z 15, *no-di-zo*) appear on the belly rather than the shoulder may have also been due to convenience; the jar might have been placed in such a way to make access to the shoulder difficult, e.g., on a high bench or table.²¹ The four signs of the inscription OR Z 1 (*ti-sa-ri-[.]*), which run obliquely to the decorative bands above and below, again suggest that the sign-painter was not in an ideal position in relation to the jar when the sign group was painted. TH Z 868 is highly instructive. Its two sisters, TH Z 866 and 867, are similarly decorated with deep wavy lines on the belly and both bear the inscription *i-ru* in the shoulder field. In contrast, the inscription on TH Z 868 (*ru-i*) is found on the belly.²² The compression of the wavy lines on both sides of the inscription make it clear that the decorative lines were added after the inscription had been painted. Here the sign-painter worked first, placing the small inscription on the belly possibly because the shoulder was inaccessible as it had not been on the other two jars. Later, the decorative lines were painted perhaps by a different person, a potter, not a 'scribe,' using a larger sized brush and possibly working at a wheel. Often, in fact, brushes smaller in size than those used to paint the bands and other decorations seems to have been used to paint the inscriptions. Might this also point to a division in labor, sign-painter vs. decoration-painter? In all the cases mentioned above, one gets the impression of workshops wherein there was not always coordination between those who decorated and those who wrote. Sometimes one finished his task first, leaving the other to cope with the jar at hand as best he could.

Even in cases where there may have been more coordination and large open fields may have been planned in the scheme of decoration and left empty for the inscriptions, the care taken in forming the signs or positioning them in relationship to surrounding decorative elements is sometimes lacking, especially when compared to those jars that do show obvious care taken. For example, in addition to the inscription OR Z 1 mentioned above, the identical signs *ku-ja-ni* found on TH Z 844 and TH Z 848 are positioned haphazardly, albeit not because

²¹ Palaima 1988, p. 312, n. 48, observes that in the archaic and the Bronze Age periods (e.g., Linear A inscriptions on libation vessels), writing was often done for the convenience of the writer without much thought for the reader.

²² These three jars, TH Z 866-68, form a well recognized trio for paleographical and decorative reasons. Clay analysis by Catling *et al.* (*ISJWC*, p. 88) suggested that these three were produced in Thebes, their find spot. The odd shape of the *ru* and the reverse order of the characters in one of the inscriptions has been explained by the questionable state of Theban literacy at the time the jars were produced. Thus the inscriptions have been dismissed as decorations (*ISJWC*, p. 91, and cf. Hallager 1987, p. 174). However, more recent clay analysis posits a central Cretan origin for all three («Trade,» p. 97), which raises serious questions about the inscriptions' function as decorations.

of the position of the sign-painter in relation to the jar. Here both inscriptions exhibit nearly identical sloppy sign formation and positioning which would be due more to the idiosyncrasies of the sign-painter than anything else. Such lack of care points to a priority of message over aesthetics. Several other inscriptions (TI Z 3, 27; TH Z 847, 961; KH Z 8) contain signs, portions of which cross over surrounding decorative bands again indicating disregard for decorative aesthetics. Still others have been taken to be gibberish (TH Z 847, 855, 966, OR Z 1).²³ Their partial illegibility may be due to the fact that they were written without care or in haste and with the confidence, as with many people with bad handwriting (e.g., medical doctors writing prescriptions for pharmacists and university professors writing comments on papers), that their texts could or would or must be understood. The signs in these four examples, TH Z 847, 855, 966, and OR Z 1, are for the most part legible with only one or two of the characters written so carelessly that they cannot be read with certainty, at least by modern scholars.²⁴ However, in the context within which these inscriptions were written, a production process as will be argued below, there would be only a limited number of possible words these signs could represent, all of which would be known to the writer and his expected reader(s). Thus there could be a tolerable level of ambiguity of form for each of the signs in a word. This, in fact, is parallel to the handwriting of a doctor on a prescription s/he assumes the pharmacist, in context, will be able to read, no matter how illegible the prescription's text appears to the layman patient who is not regularly involved in the process of prescription writing and filling. Within such a closed system, the limited range of potential messages makes even the worst handwriting functional. One must also keep in mind that unlike a scribe working with a clay tablet and a stylus, the inscription painter could not erase his mistakes or badly formed signs easily or at all: *omnia remanebunt per saeculum saeculorum*.

It seems that for the longer inscriptions found on bellies of ISJs, aesthetic concerns carried more weight than the accessibility of the entire inscription. This factor in their composition, however, should not preclude our seeing their primary function as communicative rather than decorative. In nearly all of the longer inscriptions, the signs are well-formed, even elegantly formed, and, despite some notable variations from sign forms found in the tablets, highly legible, even at a distance. Moreover, every other example of Linear B inscriptions found on SJs can be shown to have communication as its primary function. Should these be exceptional? The accessibility of the inscription was not always a great concern, although perhaps for the sake of efficiency and ease of recording information, there was a preference for convenient placement.²⁵ Now we will turn to the meaning of the inscriptions.

²³ Killen (*ISJWC*, p. 91), for example, remarks that "[i]t would be misleading to describe OR Z 1... as a particularly impressive example of Linear B."

²⁴ Sacconi (*supra* n. 2) has transcribed the inscriptions as follows: *e-[-]-ra* (TH Z 847), *wo-[-]-da* (TH Z 855), *]wā-wō[* (TH Z 966), *ti-sa-ri-[-]* (OR Z 1). I thank Tom Palaima for his comments on the "legibility" of these particular inscriptions.

²⁵ Again, I note Palaima's observation (Palaima 1988, p. 312, n. 48) that writing was often done for the convenience of the writer, not the reader.

III. THE FUNCTION OF THE INSCRIPTIONS

By far the most frequent type of inscription found on the ISJs are single personal names (PNs) in the nominative case. Next in number are the longer three-word inscriptions, generally of the formula PN (in the nominative) + toponym (TN) + PN (in the genitive). Lastly, there are a couple of occurrences of single TNs and a single sign *wa* (KH Z 16) that may be an abbreviation for *wa-na-ka-te-ro*.²⁶

Because of their inherent worth as longer inscriptions, the presence of TNs and the parallels between this formula and the 'collector' formula found on the D-series of tablets from Knossos, the longer inscriptions have been dealt with more extensively than the enigmatic single-word inscriptions. This collector formula, in its fullest manifestation, PN + TN + PN (+ ideogram + number), as it appears on the Knossos Da/Dg tablets (those that deal with sheep) is interpreted as follows: the first PN, in the nominative, is the shepherd responsible for a flock of sheep at a particular location (TN), a flock which is owned by a collector (CN), who appears as the second PN often in the genitive; an ideogram for sheep followed by a numeral indicates the number of sheep in the shepherd's control or those delivered to the collector.²⁸ On the ISJs the collector formula may be interpreted in a similar fashion: the first PN is someone who works for the CN and is responsible for delivering the SJ and its contents from the place of manufacture (TN).²⁹ Of course, there are no ideograms or numbers on the ISJs because, as will be argued, these are a different type of document serving a different purpose from the tablets.

On the tablets from Knossos and Pylos that deal with collectors and commodities besides sheep (KN D- series, PY Cn series) there are numerous variations of the full collector formula as summarized by Bennet.³⁰ Depending on the level in the administrative chain at which the recording occurs and how much information is already known about the transaction or monitoring process, the formula may be pared down to a single CN, a single TN, or TN + CN. This

²⁶ Hallager 1987, p. 177, n. 61, addresses the question of *wa* as an abbreviation for either *wa-na-ka-te-ro* or even the possibility of using this sign as an alternative form of the ideogram for wine. See also Hallager and Vlasakis, *supra* n. 14, pp. 216-18. The isolated *wa* that appears on one face of a sealing nodule from Pylos (Wr 1480) is thought to be an abbreviation for some form of, or derived from, *wa-na-ka*. See C. W. Shelmerdine and J. Bennet, «Two New Linear B Documents from Bronze Age Pylos,» *Kadmos* 34, 1995, pp. 130-31.

²⁷ Bennet 1992, p. 78; Hallager 1987, p. 179; J. T. Hooker, *Linear B: An Introduction*, Bristol 1980, pp. 179-80.

²⁸ Hooker, *ibidem*, pp. 88-93; J.-P. Olivier, «La série Dn de Cnossos,» *SMEA* 2, 1967, pp. 71-93; «La série Dn de Cnossos reconsidérée,» *Minos* 13, 1972, pp. 22-28; «KN: Da-Dg,» in J.-P. Olivier and T. G. Palaima, eds., *Texts, Tablets, and Scribes: Studies in Mycenaean Epigraphy and Economy Offered to Emmett L. Bennett, Jr.*, *Minos Suppl.* 10, 1988, pp. 219-267.

²⁹ Hallager 1987, p. 179.

³⁰ Bennet 1992, pp. 71-78, with a summarizing table on p. 78.

reduction of the collector formula on the tablets at certain stages of the recording process to individual elements is suggestive for the ISJs since single PNs (in the nominative case) and the rare single TN are the most common type of inscription.

Little interpretation has been offered for the single PNs on the ISJs save for the vague suggestion that these are the names of the producers, which somehow guarantee the quality of the contents.³¹ Two objections can be made to the interpretation of these names as essentially trade-mark labels for the mainland consumer market. One is the large number of names preserved, around 30, which due to the hazards of preservation may only be a portion of the names actually associated with the oil industry, both in Crete and the mainland; the other is their isolated appearance on the jars.³² Even if we accept a diachronic view, positing a span of several decades for the accumulation of ISJs in their find spots, there still are too many contemporaneous names on the ISJs—in Thebes alone around twenty—not to raise some questions concerning this idea of labels. The term ‘label,’ as used here, implies a desire to advertise and to distinguish one’s product from the competition’s, a highly market-driven view which may be anachronistic.³³ To suggest that a large number of (independent?) oil or perfume producers competed with one another seems, particularly in view of the mainland and Crete, incongruent with the evidence for centralized oversight of production and disbursement.³⁴ Such numbers also seem inconsistent with the nature of

³¹ Chadwick, *supra* n. 7, p. 18; Haskell 1983, p. 125.

³² It is almost certain that the ISJs and other large coarse ware SJs were used to transport oil, both scented as well as raw. See Shelmerdine 1985, pp. 51 & 143; H. Haskell, «Coarse-ware Stirrup-jars at Mycenae,» *BSA* 76, 1981, p. 237.

³³ Haskell (1983, p. 125), for example, suggests that Linear B was used on the jars “because producers wished to advertise...in a script which could be understood in the more important mainland markets.”

³⁴ Melena 1983, pp. 103 & 106, n. 49; Shelmerdine 1985, pp. 88-89, and «The Perfumed Oil Industry at Pylos,» in T. G. Palaima and C. W. Shelmerdine, eds., *Pylos Comes Alive*, New York 1984, pp. 81-95. For Knossos before the LM IIIA2 destruction, see E. Foster, «An Administrative Department at Knossos Concerned with Perfumery and Offerings,» *Minos* 16, 1977, pp. 19-51. Palaima (Palaima 1984) argues that oil production following the final destruction of the Knossos palace was more in the hands of independent producers than it had been before. Centralized oversight and control of another major industry—textiles—is well documented for both Crete and the mainland. See J. T. Killen, «The Textile Industries at Pylos and Knossos,» in T. G. Palaima and C. W. Shelmerdine, *op. cit.*, pp. 49-63, and «The Linear B Tablets and the Mycenaean Economy,» in A. Davies and Y. Duhoux, eds., *Linear B: A 1984 Survey*, Louvain-la-Neuve 1985, pp. 252-253. As will be argued below, numerous “collectors” were involved in the production of the ISJs and their contents. Killen (Killen 1995, p. 220) has suggested that collectors may have organized external trade both for the palace and themselves. If so, collectors might be seen as competing with one another in trade. However, it must be remembered that in this scenario collector-trade would still be within the overarching context of palatial (i.e., some form of centralized) control, and the goods traded would be those “released” (an *o-no*-type transaction) by the central authority to the collector.

luxury products (imported oil or perfume can be counted as such) wherein selection is generally limited to a handful of well-known marks. This use of 'label' also indicates that the consumer has some familiarity with the individual product, its origins, its quality. The appearance in Thebes of numerous jars bearing identical inscriptions, for example the inscription *ku-ru-zo* found on TH Z 840, 841, 843, 845, 856, 879, 959 (?), 960 might be due to the accumulation of this one desired product over a period of years. A preference for a particular 'brand' might have developed, but not one necessarily distinguished by the name of the individual manufacturer. Perhaps the product, in this case oil or unguents, was simply seen as generically 'Cretan,' analogous to the tripods and other objects in the Pylos tablets which are sometimes referred to as *ke-re-si-jo we-ke* without specific mention of the producer.³⁵ Again, if this were so, individual names would not matter a great deal, nor would specific mention of a Cretan TN, which may have had little significance for a mainland. The term 'trade-mark' or 'label' should not be used in that sense for any of the ISJ inscriptions. Rather, their use and specificity concerning individuals and places were more focused and meant to be read within the context of the production process.

That some ISJs carry formulaic inscriptions suggests that all ISJ inscriptions, the single PNs and TNs included, were understood in formulaic terms whether or not the formula was spelled out in its entirety. Linear B bookkeeping practice is known for a notoriously formulaic repetition that is tedious both for the modern scholar, and, one can imagine, for the scribes as well.³⁶ For example, four tablets of a series from Knossos, Dc 1117, 1118, Df 1119, and 1120 + fr., all deal with records of sheep 'owned' by the collector *da-mi-ni-jo* whose several flocks are at *ku-ta-to*. Each of these tablets repeats the usual full collector formula, PN + TN + CN, where the only variation between the tablets is in the name of the shepherd and the number and description of the sheep. This full use of the collector formula appears, as Bennet notes, at the initial stage of recording with information coming in over a period of time, which would explain the use of individual tablets.³⁷ Once all of the information available has been collected it might be recorded, again possibly using the full formula, onto a summary tablet such as PY Cn 655. At later stages, the relevant information is expressed in abbreviated versions of the formula. For example, in the composition of the tablet PY Cn 328 (cf. n. 36), the 'master scribe' takes the liberty of truncating the formula in a list most likely compiled from leaf-shaped tablets. With ISJ information, a later recension might list only TNs or CNs, but would follow some formulaic model. Since it is only the collector formula that appears on ISJs,

³⁵ Possible exceptions to this generic view of Cretan goods appears on PY Ta 709.3 and Ta 641.1. In both cases a tripod is described as 'Cretan work' but with the additional noun **a₃-ke-u* which may be the name of the tripod's maker.

³⁶ Cf. Pylos tablet Cn 328 wherein the 'master scribe,' Hand 1, grows tired of tediously repeating the toponymical or descriptive term *a-ka-na-jo* mid-word in line 5 and omits it in lines 6-15. This is a rare example of scribal exasperation!

³⁷ Bennet 1992, p. 81.

we might (and I think should) take this as the model formula for all of the ISJs, meaning that the occurrences of single PNs or TNs were abbreviations of a longer implied formula.³⁸ The abbreviation in this case had less to do with higher levels of recording and their recensions, but rather an initial level wherein all the other information was gathered, learned, or understood from other sources.

Let us imagine a scribe making the initial record of the delivery of a group of newly produced and filled SJs onto clay tablets. Each of the jars has inscribed on it only a single PN which differs from each of the others, *pi-pi*, *a-re-zo-me-ne*, etc. Because he is present at the producers' collection point, possibly some regional center (e.g., *wa-to*) used by a specific collector (e.g., *re-u-ko*), he knows both the TN and the CN. The producers are also aware that the only information needed by the scribe at the collection point is a PN because his role in the production process implies his knowledge of the TN and CN. So they omit this information on the SJs they send forth. For each batch of jars from each producer the scribe makes a tablet taking the PN from the jar, filling in the TN and CN that he knows refer to the jars' origins and ownership, as well as an ideogram denoting the type of product and the number of jars. The majuscule PN and smaller TN and CN with a line separating the two, often found on the KN D-series tablets, are significant in such a scenario. The focus there, as on the ISJs with single PN inscriptions, is on the PN.³⁹

PY Fr 1184 may shed some light on such inter-industry transactions and the way in which they were recorded at other stages. The tablet reads:

- .1 ko-ka-ro , a-pe-do-ke , e-ra₃-wo , to-so
- .2 e-u-me-de-i OLE + WE 18
- .3 pa-ro , i-pe-se-wa , / ka-ra-re-we 38

Kokalos delivered so much (treated?) olive oil
to Eumedes: 518.4 l.
From⁴⁰ Ipsewas oil jars: 38

³⁸ Cf. Palaima forthcoming for a discussion of the accordian-like expansion or contraction of categories of information on inscribed sealings from Pylos and Thebes.

³⁹ The practice of emphasizing a PN, TN, or commodity by writing it in majuscule on the tablets is fairly commonplace in Cretan (KN) Linear B bookkeeping. PN's are so emphasized in the Vc series, TN's in the Lc series, and a commodity, *pa-we-a*, on a number of the Ld tablets. Here again this formatting device would assign relative values to the individual pieces of information, perhaps due to the way the industry or inventories were organized or what information had to be stressed at a particular stage of recording. See Palaima 1988, p. 316.

⁴⁰ I follow here Shelmerdine's (Shelmerdine 1985, p. 24) translation of *pa-ro*, "from"; see also M. Ventris and J. Chadwick, *Documents in Mycenaean Greek*², Cambridge 1973, p. 217. *pa-ro* might also be translated as "alongside" or "in the presence of" (F. Aura Jorro, *Diccionario Micénico*, Madrid 1993, s.v.). However, either way *pa-ro* is taken, the sense remains that these jars were at one time under Ipsewas's control.

Elsewhere in the PY tablets, Kokalos and Eumedes are recorded as 'unguent-boilers' (*a-re-po-zo-o*, Fg 374, Ea 812, 820) so the transaction between the two may simply be a transference of oil for contractual or production reasons.⁴¹ The third line, which is separated grammatically from the other two, is more problematic. The 38 recorded jars would conceivably hold the 518 l. of oil.⁴² Line .3 has therefore been interpreted as an issue of (empty) jars from Ipsewas to Eumedes to contain the oil from Kokalos.⁴³ As an alternative, we could interpret this third line as recording the original issue of the raw oil in 38 jars from Ipsewas, an oil producer, to the unguent-boilers for conversion to unguent. Ipsewas's name, which might have appeared on the jars as a single PN, thus easily identifiable with this group of jars, may be recorded here in order to track the batch of oil through its various transactions.⁴⁴ PN information here would act as a serial or tracking number for the oil. As in the case of the oil transfer from Kokalos to Eumedes, CN and TN information was not required at certain levels of recording.

Of course, one could object that the single PN on the ISJs represents the CN rather than one of his producers. Arguments against a single CN appearing on the jars will be addressed in the next section. In the rare instance of a single TN occurring as an inscription, one can assume the PN and CN were likewise already understood. The omission of certain information on some ISJs was therefore due to the particular use of the jars' inscriptions for administrative purposes and the jar's place in the chain of recording within an administratively closed context.

IV. ISJs AND THE ADMINISTRATIVE PROCESS

It seems most likely that when the ISJs were produced there were at least region-wide centralized administrative processes and economic systems on Crete.⁴⁵ It is beyond the scope of this paper to argue whether a single center like

⁴¹ Shelmerdine 1985, p. 24.

⁴² If the capacity of each SJ is 12-14 l., as seems to be the case for the larger SJs. See Shelmerdine 1985, p. 146.

⁴³ Ventris and Chadwick, *supra* n. 40, p. 481.

⁴⁴ I see little reason to believe in empty jars being delivered to workers in the unguent industry. Rather, it seems more likely that the jars were filled with raw oil at the oil production site, delivered to the perfumers where they were decanted into larger vessels for conversion and then later the scented oil was perhaps poured into the same or different SJs, like the smaller and finer types of SJs which are not inscribed. Such a process and reuse of the jars is suggested by Haskell, *supra* n. 32, p. 236. See also Melena 1983, p. 120. The two tablets KN K 700 and K 778 which together list over 2000 SJs, I also assume to record a transaction involving full, not empty, jars.

⁴⁵ Hallager (Hallager 1987, p. 185) argues that archaeological evidence and the ISJ phenomenon "supports the likelihood of one (or more) administrative center(s) on the island in this period." Also, L. Palmer («Mycenaean Inscribed Vases III. The consequences for Aegean History,» *Kadmos* 12, 1973, p. 61) has asked if it is "permissible to suppose that the Linear B continued to be used independently of a

Khania or Knossos dominated overall or a combination of sites interacted with one another, each with considerable autonomy. It seems highly unlikely that the production of stirrup jars and their contents could be organized and the jars be exported *en masse* to the mainland, mostly through Khania,⁴⁶ without some form of (centralized) bureaucratic control. Without such control the collector formula found on the ISJs would be devoid of meaning.⁴⁷

With the possible exception of a small number of inscribed vessels that are not SJs, but rather domestic pottery, cups and bowls (MY Z 712, TI Z 28, 52, KN Z 1715, KH Z 23-25),⁴⁸ all instances of Linear B served some bureaucratic purpose. The most common type of Linear B document, at least in terms of preservation, is the tablets, which served specific purposes as temporary record-keeping and archival devices. As a specific type of document, the tablets, whether from the mainland or Knossos, show that there were certain accepted and traditional 'rules' pertaining to their usage: marking off different lines of text by a dividing line, for example, or the use of only a few common shapes for the tablets. Aside from such physical traits, one might argue that the type of information and even diction of the tablets were controlled by such rules.⁴⁹ Likewise the Linear B sealing nodules, another type of document, exhibit standard rules for their use, information (via seal impressions and/or inscribed text), and physical characteristics quite different from the tablets. Their primary function was to transmit a basic amount of information pertaining to the item they accompanied. The ISJs might also be seen as a type of Linear B document, with its own rules for usage, information, and physical characteristics, that, like the sealing nodules, transmitted a basic level of information. It remains to define exactly how the ISJs were used as documents.

palatial system of administration?" When precisely these administrative processes and economic systems were active and how they relate to the destruction(s) of the Knossian palace around this period is, again, beyond the scope of this paper. See J. M. Driessen, «Le palais de Cnossos au MR II-III: Combien de destructions?», in J. Driessen and A. Farnoux, eds., *La Crète Mycénienne*, BCH Suppl. 30, 1997, pp. 113-134; J. Bennet, «The Structure of the Linear B Administration at Knossos,» *AJA* 89, 1985, pp. 231-249, and «Knossos in Context: Comparative Perspectives on the Linear B Administration of LM II-III Crete,» *AJA* 94, 1990, pp. 193-211.

⁴⁶ *ISJWC*, p. 92; Hallager 1987, p. 184; «Trade,» p. 98.

⁴⁷ Hallager 1987, p. 186, notes that "[t]he complexity of the distribution pattern of the inscribed stirrup jars may imply that a centralized authority was involved in exporting the jars." This may as well imply a centralized authority involved in the production of the jars and contents.

⁴⁸ All of these inscriptions appear to be PNs in the nominative. To this list might also be added PY Za 1392, a single sign *ti* which appears on the base of a coarse pot. Hallager suggests that occurrence of Linear B on cups and bowls may have served some ritual purpose («The Greek-Swedish Excavations at Kastelli, Khania 1980: The Linear B Inscriptions,» *AAA* 16, 1983, p. 72). Palaima notes these inscribed pots were likely produced and used locally (1987, *supra* n. 5, pp. 502-503).

⁴⁹ The topic of such 'rules' has not been fully covered to date, although Palaima (1988, pp. 313-316) has addressed some of these issues. See also Hooker, *supra* n. 27, pp. 44-45.

In a paper discussing the role of sealing nodules in the administrative process, Palaima has offered a hierarchical schema of the Mycenaean economy to locate the level at which the nodules would be used to transmit information.⁵⁰ Palaima pictures the economic hierarchy of control operating simultaneously at both macro- and micro-levels. In macro-terms, the system is centered at a regional controlling site, with authority descending to second-order centers which control sub-regions, and then to individual settlements within these sub-regions. On a micro-level, the economy flows from officials at the individual settlements (including the palatial center or second-order sites) to the stewards of workshops, collectors, and provincial officials, and lastly to the individual workers in the many industries. At all levels in this system there is need for recording, not only for the sake of inventory, but also because of contractual/obligatory/transactional relationships between each of these levels. Workers owe the collectors, who in turn owe the higher authorities; in the same way, smaller settlements are obliged to fulfill quotas set by the second-order centers which fulfill the palace's ultimate demands for commodities. Keeping track of all the transactions requires extensive record keeping.

As recording documents the extant tablets, coming as they do from palatial centers and their immediate environs, operate mostly at the highest macro-level, acting as funnels for information collected from different sources at lower levels, although many of the tablets do reflect information gathering at other levels. The sealing nodules have a different purpose from the tablets' archival one, namely that of 'contractual performance records of individuals'.⁵¹ They provide official documentation of an individual's fulfillment of a specific delivery or obligation, whether he be a worker or collector. Once the information from a nodule had been recorded in summary form onto a tablet, or otherwise administratively checked and/or processed, the nodule was either kept temporarily for later rechecking or simply discarded. Because of their highly individualized nature, the sealing nodules functioned predominately within the micro-sphere of the economic hierarchy, but with macro-ramifications. That is to say that the fulfillment of an obligation by an individual was strictly personal but contributed to the greater obligation to higher powers of the community to which he belonged. The seal on the nodule also suggests the imprint of a higher authority, someone connected to the greater macro-chain.⁵²

The ISJs may also have provided micro-level information on an individual's performance, much like the sealing nodules. While the two types of documents are analogous in that a PN attached to a commodity might represent that person's fulfillment of the delivery, there are, nevertheless, considerable differences between the two. The only type of information the ISJs bear are PNs and TNs, a

⁵⁰ Palaima 1987, pp. 249-266.

⁵¹ Palaima 1987, p. 259.

⁵² Who or what authority in the sealing process is identified by the seal impression remains an open question. See Palaima 1998, p. 13.

serious dearth compared to the range of sealing inscriptions which can be somewhat informationally richer. A quick review of sealing nodule texts reveals that, in addition to the seal impressions which carried their own meaning and connotations, a nodule might also have a PN, a TN, an ideogram representing a type of commodity, sometimes an adjective describing the state of the commodity, and an economic term representing the type of transaction or obligation fulfilled.⁵³ Not every nodule bore all the possible terms or combinations, some have only one term or ideogram, some even lack the sealing. Such disparity in recording information on the nodules likely arose from situations in which the missing information was already known, was assumed to be known, or might have been indicated in some other manner. The point I wish to make here is that the nodules, much like the ISJs, operated presumably within a closed system, within which much of the information would be readily understood. In fact, like the SJs, only a small percentage of the nodules from the palatial centers of Pylos and Knossos bear any inscriptions at all.⁵⁴ In each example only what might be considered the most essential information for a particular transaction found its way onto the nodules. In most cases the seal impression itself, without any inscription, sufficed as an identifier of personal or institutional responsibility. An aspect of sealing nodule use that distinguishes it from ISJs, is the occasional practice of recording the nature of the transaction involved (*a-pu-do-si, o-pa, po-ro-e-ko-to, qe-te-o*). This is not found on the ISJs.⁵⁵

It should also be remembered that the nodules accompanied a host of different commodities: wine, unguents (not raw oil), foodstuffs, vessels, implements (including arrows and shafts for javelins), wool and woven material, hides and animal products, live animals, men, women, and grain, as well as a few commodities represented by unidentified ideograms. 'Accompanied' is a key word since, unlike the ISJs, the greater number of these commodity types could not be written upon directly. As a type of recording document then, the nodules were a blanket form of sorts covering many related purposes and applications. Not so the ISJs. The lack of transactional vocabulary, adjectives, and ideograms in the ISJ corpus of ca. 180 inscriptions strongly suggests that only one type of transaction was involved and understood when the inscriptions were made, and

⁵³ Some even have numerical signs. C. Piteros, J.-P. Olivier, and J. Melena thoroughly discuss the terms found on the TH Wu series nodules and current interpretation at the date of publication («Les inscriptions en Linéaire B des nodules de Thèbes (1982): La fouille, les documents, les possibilités d'interprétation,» *BCH* 115, 1990, pp. 103-184). More recently, Palaima (Palaima forthcoming) has provided an update on the interpretation of certain transactional terms found on sealings and on tablets and their relationship to administrative practices. See also now, J.-P. Olivier, «Die beschrifteten Tonplomben,» in I. Pini, ed., *Die Tonplomben aus dem Nestorpalast von Pylos*, Mainz 1997, pp. 70-81.

⁵⁴ Cf. the statistics in Palaima 1987, p. 251.

⁵⁵ Palaima (forthcoming) notes the exceptional nature of this use of transactional terminology on the sealing nodules and provides definitions for each.

obviously, since the inscriptions were made on vessels containing only one commodity, an ideogram or description of the contents would not be needed.⁵⁶ The essential information here was simply the PNs and TNs of the collector formula, implied or spelled out.

What type of transaction should we then look for as represented by the ISJs? As noted above, I believe the single PNs on the ISJs represent the first PN of the collector formula, a person I will call the 'manager,' and not the CN. I am basing this on several factors. The first is the number of individual names that occur on the ISJs. As can be seen from the KN D- series, there are multiple shepherds in every collector's domain; by analogy the managers of oil production would outnumber the collectors and one would expect to find a greater number of managers' names than collectors' names in records dealing with ISJs at certain levels, especially at the level of recording I think the ISJs represent.⁵⁷

A second reason lies in the process of production of the jars and their contents. If we can assume, as seems likely from later analogies, that the jars and their oil were produced near each other,⁵⁸ then jar production (or procurement)

⁵⁶ Since there were many different types of *perfumed* oil (Shelmerdine 1985, p. 33) one would assume the contents would be distinguished in some fashion if this perfumed oil were the commodity carried initially in the ISJs. The only possible indication of some vessel's contents is a sealing, PY Wr 1437, which bears the logogram *AREPA*, found in a oil storeroom (Room 24) at Pylos (see Shelmerdine 1985, p. 88). However, no SJs were found in association with the sealing. The lack of written information denoting contents directly associated with ISJs and SJs is again (cf. *supra* n. 44) suggestive of a single type of commodity (i.e., some type of raw oil) filling the jars originally.

⁵⁷ Excluding *wa/wa-na-ka-te-ro*, a total of four CNs are found on the ISJs: *su-ru-no*, *re-u-ko-jo*, *ka-ma-ti-jo-jo*, *ri-*82-ta-o*. Including the ISJs found since Hallager published his list of the names known in 1987 (cf. Hallager 1987, p. 178), there is now a total of 27 manager PNs. While several of the names, both PNs and CNs, appear on tablets from the mainland and Crete (again cf. Hallager 1987, p. 178; Aura Jorro, *supra* n. 40, s.v.), none of the names appears in a context that suggests association with the same or similar names found on the ISJs. For a discussion of the name *wi-na-jo*, a PN frequently attested in the KN tablets and on the ISJs, see Demakopoulou and Divari-Valakou, *supra* n. 19, p. 327.

⁵⁸ D. P. S. Peacock and D. F. Williams, *Amphorae and the Roman Economy*, London 1986, pp. 39-43, note that most Roman amphora production took place on the estate where the oil was produced. Depending on the size of the Late Bronze Age "estate" (or oil production facility using cultivated and/or wild olives), this might also have been the case (see D. Vallianou, «The Potters' Quarter in LM III Gouves,» in *TEXNH. Craftsmen, Craftswomen, and Craftsmanship in the Aegean Bronze Age*, *Aegeum* 16, Liège-Austin, 1997, p. 340). Smaller production facilities within a region might have also shared the services of a single pottery workshop. In some parts of Roman Spain, for example, oil from various orchards (presumably transported in skins) and empty amphorae were brought to a common collection and filling point which lay at a close distance to both the presses and the kilns (see D. J. Mattingly, «Oil for export? A comparison of Libyan, Spanish and Tunisian olive oil production in the Roman Empire,» *JRA* 1, 1988, p. 43). Either way, I do not think the jars were produced at a great distance from where the oil was produced. Also see Hallager 1987, p. 189.

and oil production were likely the ultimate responsibility of one man, the manager. The manpower and organization required for both olive oil production and pottery production or procurement implies its own hierarchy, from manager to foremen to workers in the orchards and workshops. Moreover, if we can assume by analogy (the use of the collector formula in both industries), that the basic structure of the oil industry was similar to that of the livestock industry, the manager would be like the shepherd; the collector of the oil industry would 'own' several oil production sites just as the sheep-collector would 'own' several flocks.⁵⁹ As the shepherd owed a 'finished' flock to the collector, the manager, as the sole person accountable, owed his oil in their jars. To distinguish his oil from those of the other managers, each would likely label his own produce; marking the jars with his own name would be a natural, but not unusual solution. And since every inscription found on the ISJs was painted on before the vessel was fired, namely at a stage during the production of the jar itself, the manager's proximity to the pottery workshop would be advantageous for ordering such inscriptions. The manner in which the name appeared on the jars would be left up to the discretion of the atelier.

Third, the lowest level of recording (putting production information onto tablets) as shown by the KN D- series, occurred at the level of the individual flock, i.e., the individual shepherd. Each of these individual elongated records, as noted above, places emphasis on the PN (in majuscule) of the shepherd. At this fundamental level, the essential information focuses on the individual shepherds. At higher levels of recording and recension of information, the shepherd's importance wanes as the collector's increases.⁶⁰ If we can accept the ISJ inscriptions as documents that, like the sealing nodules, record only the basic and essential information for a given transaction, then the most basic would be the transaction between the manager and his collector, the most basic inscription would be the manager's PN. To an extent this also answers the question: What type of transaction? The manager has the (contractual) obligation to deliver the finished product to the collector; his name on the jar indicates that the obligation has been fulfilled. How this transaction was actually defined, as an *a-pu-do-si-*

⁵⁹ Killen (Killen 1995, p. 217) has suggested already that collectors had a role in the oil industry. However, in his arguments for identifying *ku-pi-ri-jo* as a collector in this industry, he remarks that "whereas in the sheep and wool industries a number of different 'collectors' are active, in the oil and unguent-boiling industry only one major 'collector' has responsibilities." The ISJs name at least four different collectors (see *supra* n. 57 and *infra* n. 63), all of whom may have been active in the same region (*wa-to*) simultaneously (cf. TH Z 849, 850, 853, 854). For collectors (and managers) in the oil industry see also Melena 1983, p. 104, n. 44, and L. Godart, «La série Fh de Cnossos, vingt ans après,» in J. T. Killen, J. L. Melena, and J.-P. Olivier, eds., *Studies in Mycenaean and Classical Greek Presented to John Chadwick, Minos 20-22*, 1987, p. 207, n. 13.

⁶⁰ Bennet 1992, p. 81.

type or *i-je-si*-type or as something else, is not known to us, but it is known to parties within this closed system, and therefore need not be recorded.⁶¹

The longer inscriptions, however, require more explanation. It is likely that they represent the same type of transaction, but not necessarily between the manager and collector. Bennet has suggested that the reason for these longer inscriptions and their more explicit mention of TN and CN is due to the distance between the oil production/canning facilities and the central administration.⁶² Presumably these more remote areas, at some distance perhaps from even a second-order center or a collection point where scribes would be present who knew already the TN and CN, would not have the ability to record the incoming jar information at the lower manager level. Thus more information critical to the recording process would have to be included. This then elevates the level of exchange and transaction implied. With the examples of the single PN, the initial recording process would take place within the presence of or close to the collector and would record the initial transaction, manager to collector; TN and CN information on the jars would be superfluous. The inclusion of TN and CN information in the longer inscriptions implies a transaction between the collector and the next level in the economic hierarchy, whether the palace or a second-order center, in which the collector would want his name and locality to appear on the product, again to denote an obligation fulfilled. The initial recording of this information onto tablets would then take place at a level one step removed from that of the manager. Those managers who were aware that the initial recording would take place farther down the line could then order ISJs from the atelier with all the relevant information included (PN, TN, and CN) in order to clearly mark the fulfillment of the lower order obligation (manager to collector), as well as the higher order obligation (collector to central authority). Moreover, specification of managers and collectors would be critical in such cases where there were several different collectors and their managers within one region that did not have the benefit of recording at the lowest level, as the eight ISJs (TH Z 846, 854, 878, 852, 849, 851, 882, 853) that share the TN *wa-to* suggest. Since at least three different collectors⁶³ presumably had oil industries in the *wa-to* region, maintaining a distinction in their contributions would be a serious matter.

Three of the longer inscriptions also include the problematic and politically suggestive adjective *wa-na-ka-te-ro* or what is likely an abbreviation for this, *wa*,

⁶¹ Suggestive of how this transaction may have been defined is the term *a-pu-do-si* which appears on a number of the KN Fh series tablets (Fh 340, 349, 366 [+5503?], <374>, <379>, 5434+5438, 5451+5496, 5459+5482). Each of these tablets seems to record the "contribution" (*a-pu-do-si*) of large amounts of oil by various regions (*a-mi-ni-si-ja*, Fh 5451+5496) or specific localities (*ka-ro*, Fh 340; *ru-ki-to*, Fh 349). See Melena 1983, p. 106, and Godart, *supra* n. 59, p. 202. Also cf. *a-pe-do-ke*, the aorist form of the verb related to *a-pu-do-si*, on PY Fr 1184.1.

⁶² Bennet 1992, p. 80.

⁶³ Palaima suggests (personal communication), given sign spacing, formulae, and text disposition, that the TN *wa-to* is probably to be restored on TH Z 850. This would add a fourth CN, **ka-ma-ti-jo* at *wa-to*.

as the third element in the three word inscription (EL Z 1, TI Z 29, TH Z 839).⁶⁴ The inscriptions in which this term appears also use either the collector formula or what may be considered a modified collector formula of the form PN + TN + *wa(-na-ka-te-ro)*. This term *wa-na-ka-te-ro* in place of a CN does likely reflect production of oil under palatial control or ownership rather than production in the hands of collectors.⁶⁵ Palatial centers no doubt did own or control directly orchards and oil processing facilities in various locations without the intermediary collectors or other such individual owners.⁶⁶ Again, in this situation, recording would take place at a higher level, perhaps at a collection point some distance from the production area, and thus there would be a need to record the location of the facility and the overseer's name in addition to the ownership. On the inscription found on EL Z 1, the placement of the TN on a line above the two other words (PN + *wa*) may denote greater concern for monitoring and recording a region's production, e.g. several royal production facilities within one area, than with the performance of individual overseers.⁶⁷

There is one final issue⁶⁸ relating to the function of ISJ inscriptions that has been mentioned, but not fully treated: the relatively low proportion of ISJs to SJs.

⁶⁴ Hallager 1987, p. 177, n. 61. Cf. *supra* n. 26.

⁶⁵ Bennet 1992, p. 80. Palaima notes the record of the 'royal' *temenos* on PY Er 312

⁶⁶ Direct palatial oversight of the number of olive trees and harvests in outlying areas is suggested by some of the KN F-series tablets, although names of possible collectors are noted on a few of the tablets (see Melena 1983, pp. 105-106). By analogy with the wine industry, the olives harvested from those palace olive groves located some distance from the center may have been processed on the spot, the finished product (oil) being more desirable and perhaps more efficiently transported than whole olives (see R. Palmer, *Wine in the Mycenaean Economy, Aegaeum* 10, Liège-Austin, 1994, p. 22). Stone implements suitable for pressing olives have been found near LM III palatial centers which indicates that olive processing did take place at the centers as well (see H. Blitzer, «Olive Cultivation and Oil Production in Minoan Crete,» in M.-C. Amouretti and J.-P. Brun, *La production du vin et de l'huile en Méditerranée, BCH Suppl.* XXVI, 1993, p. 167). Perhaps these implements were used to process oil from groves closer to the palaces.

⁶⁷ As may be the case with the KN Fh series (see *supra* n. 61). Palaima (personal communication) suggests that the word dividers in EL Z 1 might imply a reading of line .b first, so that the whole collector's formula is inverted. In his opinion, the size of the characters in *da-pu₂-ra-zo* indicates that the emphasis, as in the KN D-series, is on the PN of the manager. Whatever the intended emphasis may have been, the placement of the TN (*da-*22-to*), like the inscription itself, is exceptional.

⁶⁸ One other possibly related issue is the use and significance of the so-called 'potter's marks' on a large number of SJs (TH Z 859, 860, 861, 862, 873, 874, 875, 885, 928; MY Z 201, 300). Raison (*VIP*, p. 215) has offered some suggestions for their use. Nevertheless, their function and relationship to the clearly Linear B inscriptions remain open. In her forthcoming University of Texas at Austin dissertation on Bronze Age pot marks, Nicole Hirschfeld will address this issue more fully. There are also a number of incised marks on pots found recently at Kommos, including some SJs, that may be Linear B characters, though this is not certain. See J. Bennet, «Marks on Bronze Age Pottery from Kommos,» in J. W. Shaw and M. C. Shaw, eds., *Kommos: An Excavation on the South Coast of Crete*, vol. I, part II, Princeton 1996, pp. 313-321, and «Two New Marks on Bronze Age Pottery from Kommos,» *Kadmos* 33, 1994, pp. 153-159.

Generally, the explanation for this discrepancy is the theory that only one jar per batch was marked with an inscription to serve for the whole batch.⁶⁹ This may well have been the case and might explain the stylistic similarities among many ISJs and SJs noted by Raison.⁷⁰ However, there is very little supporting evidence for this theory, or even for a conclusive alternative. Moreover, the distribution of the ISJs may in some ways cloud the issue. It should be kept in mind that by the time they arrived in their find spots, the ISJs were already several steps removed from the production process. Once the jars left the context of the oil and/or unguent industry, wherein the inscriptions on the jars had served their purpose, many of the jars entered a distribution context for shipment to the mainland. Within this distribution context, individual jars from one batch may have been isolated or added to jars from other batches. For various reasons, perhaps for the very reason that they were inscribed,⁷¹ selection of the single ISJ from each batch over the uninscribed SJs may have occurred for export to the mainland. Or, conversely, selection may have taken place at mainland sites such as Thebes: older jars from previous shipments (or uninscribed jars from more recent shipments) may have been distributed regionally and these inscribed jars kept as replacements. Thus, the manifestation of numerous ISJs found at Thebes which share identical texts⁷² could be the result of a concentration of ISJs due to factors within the distribution context. Conversely, it may also be that this concentration simply reflects concerns within the production and administrative processes. If the jars, for example, were to be delivered to a collection point where it might be difficult to keep the jars of any one batch separated from other batches long enough for the recording process to be completed, why not take the added precaution of inscribing the entire batch? While this hypothesis might make explaining the similar inscriptions that appear in Thebes easier (the jars were simply kept together throughout the stages of production and distribution), it appears unsatisfactory because it does not explain Raison's stylistic groups containing both ISJs and unmarked SJs.

If it was not the case that one or all the jars of a batch were marked, an analogy again with the sealing nodules may provide some clues as to why some jars were inscribed in the production process and others were not. Sealing nodules that bear no writing (i.e., actual words⁷³), but only a sealing and an ideogram suggest that there would have been situations in which an inscription

⁶⁹ For example, Bennet 1992, p. 80.

⁷⁰ *VIP, passim*.

⁷¹ Driessen and Farnoux, forthcoming, *supra* n. 6, discuss the political and social message that writing *per se* may have borne on ISJs exported to the mainland.

⁷² *ku-ru-zo*: TH Z 840, 841, 843, 845, 856, 879, 959 (?), 960 (?); *ku-ja-ni*: TH Z 844, 848, 971 (?); *a-re-zo-me-ne wa-to re-u-ko-jo*: TH Z 849, 851, 852, 882; *di-no-zo*: TH Z 857, 858; *a-nu-to*: TH Z 863, 864, 865, 961 (?); *ta-de-so/ta-*22-de-so*: TH Z 869, 870, 871, 872, 876; *i-ru/ru-i*: TH Z 866, 867, 868.

⁷³ There are also many uninscribed sealing nodules just as there are many uninscribed SJs. See Palaima 1988, p. 13.

on a SJ would not have been needed for recording purposes if all the required information were known from other sources. Moreover, there may simply have been situations in which no information or record keeping of any sort was necessary. Some of the relationships between managers and collectors, or collectors and higher authorities, could have been so traditional or even personal that obligations and transactions were understood, accepted, and fulfilled without bureaucratic legalese.⁷⁴ In such a situation, verbal communication and an individual's memory would serve to 'record' the transactions, thus there would be no need for actual inscriptions on some products or 'receipts' of the transactions on tablets. Greater complexity either in scale or the nature of the relationships would, on the other hand, necessitate some form of recording. Both recorded and "unrecorded" transactions (which could have been indicated in some manner not preserved for us) may have occurred simultaneously. In the case of SJs, this would result in some jars, or batches, being produced with inscriptions and some without.

V. CONCLUSION

Given the (almost?) exclusive use of Linear B as a bureaucratic/economic tool,⁷⁵ there is every reason to see the examples of Linear B on SJs as serving some similar bureaucratic/economic purpose. An explanation for their use, as suggested here, would be for monitoring and recording the production and delivery of oil owed to successively higher entities in the economic hierarchy: manager to collector to palace. Their function as documents would be analogous to the use of sealing nodules. In this respect it is of interest to note that there are no preserved sealing nodules that deal directly with raw oil, no doubt because the jars themselves served this purpose.⁷⁶ The only LM/LH SJ stoppers known (from Mycenae and Attica, not Crete) that have sealings bear no writing in addition to the sealing.⁷⁷ The use of a clay stopper, aside from the obvious practical function

⁷⁴ If some collectors were prominent members of the palatial élite (Killen 1995, p. 218), recording some types of exchange between various members of this circle may not have occurred, at least not officially. For collectors as élites, see also J. Driessen, «'Collector's Items.' Observations sur l'élite mycénienne de Cnossos,» in J.P. Olivier, ed., *Mykenaiika*, BCH Suppl. XXV, 1992, pp. 197-214.

⁷⁵ Palaima 1998, pp. 6-9.

⁷⁶ Shelmerdine (1985, p. 88) has suggested that the sealing nodule PY Wr 1437 and another 'clay nugget,' PY Wr 1247, may have served as a labels for incoming jars of oil (not unguent?) due to their find spot in an oil (again, not unguent?) store room at Pylos (Room 24). However, neither of these labels mentions raw oil: Wr 1437 bears the logogram *AREPA*, a type of unguent, Wr 1247 a PN in the genitive. No SJs were found in Room 24.

⁷⁷ Haskell, *supra* n. 32, p. 230; see also Palaima 1987, p. 258.

of forming a hermetic seal, would provide an obvious soft surface for an official to place a sealing on a jar if the situation required it; writing upon the stopper would not be necessary if the jar itself already bore the required information.⁷⁸

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⁷⁸ This arrangement of placing a sealing directly on the stopper, as well as writing directly on the jar (though this is a specifically Mycenaean feature), might be seen as an improvement of possible older methods of attaching information to SJs. Haskell has suggested that the third handle and horns found around the spout of early (i.e., MM III-LM I) SJs were used to attach labels with a cord. Such loosely attached labels might easily have been lost. This would not be the case with the ISJs («The Origins of the Aegean Stirrup Jar and its Earliest Evolution and Distribution [MMIII-LB I],» *AJA* 89, 1985, p. 223).