

MARITIME MATTERS IN THE LINEAR B TABLETS

“Unfortunately, we know nothing about the nature and type of organization of the Aegean seaborne trade”¹.

Even in the two years that this statement has been in print, it has become hyperbolic, if not untrue, especially in regard to trade with Minoan Crete². It is my aim in this paper to

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- 1 A. ALTMAN, “Trade Between the Aegean and the Levant in the Late Bronze Age: Some Neglected Questions”, in M. HELTZER and E. LIPINSKI eds., *Society and Economy in the Eastern Mediterranean* (Leuven 1988), 231. I use the following abbreviated references:
AR: *Archaeological Reports*;
CollMyc: E. RISCH and H. MÜHLESTEIN eds., *Colloquium Mycenaeanum* (Geneva 1979);
DicEt: P. Chantraine, *Dictionnaire étymologique de la langue grecque* (Paris 1968-1980);
DMic: F. AURA JORRO, *Diccionario Micénico* (Madrid 1985);
*Docs*²: M. VENTRIS and J. CHADWICK, *Documents in Mycenaean Greek*, 2nd ed. (Cambridge 1973);
Evidence for Trade: G.F. BASS, “Evidence for Trade from Bronze Age Shipwrecks”, in N.H. Gale and Z.A. Stos-Gale eds., *Science and Archaeology: Bronze Age Trade in the Mediterranean* (SIMA forthcoming);
Interp: L.R. PALMER, *The Interpretation of Mycenaean Greek Texts* (Oxford 1963);
LCE: R. TREUIL, P. DARQUE, J.-C. POURSAT, G. TOUCHAIS, *Les civilisations égéennes du Néolithique et de l'Age du Bronze* (Paris 1989);
MG: R. HOPE SIMPSON, *Mycenaean Greece* (Park Ridge, NJ 1981);
Muster: J. CHADWICK, “The Muster of the Pylian Fleet”, in P.H. ILIEVSKI and L. CREPAJAC eds., *Tractata Mycenaea* (Skopje 1987), 75-84;
MycStud: E.L. BENNETT, Jr. ed., *Mycenaean Studies* (Madison 1964);
Nature of Minoan Trade: M.H. WIENER, “The Nature and Control of Minoan Foreign Trade”, in N.H. Gale and Z.A. Stos-Gale eds., *Science and Archaeology: Bronze Age Trade in the Mediterranean* (SIMA forthcoming);
PGP: E.B. FRENCH and K.A. WARDLE eds., *Problems in Greek Prehistory* (Bristol 1988);
436 Raccords: E.L. BENNETT *et al.*, “436 Raccords et quasi-raccords de fragments inédits dans KT 5”, *Minos* 24 (1989), 199-242;
SC: J.-P. OLIVIER, *Les scribes de Cnossos* (*Incunabula Graeca* 17, Rome 1967);
SP: T.G. PALAIMA, *The Scribes of Pylos* (*Incunabula Graeca* 87, Rome 1988);
Studies Bennett: 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, Salamanca 1988);
Thebes Nodules: C. PITEROS, J.-P. OLIVIER and J.L. MELENA, “Les inscriptions en linéaire B des nodules de Thèbes”, *BCH* 114 (1990), 103-184;
TM: P.H. ILIEVSKI and L. CREPAJAC eds., *Tractata Mycenaea* (Skopje 1987);
TraffMic: M. MARAZZI, S. TUSA and L. VAGNETTI eds., *Traffici Micenei nel Mediterraneo* (Taranto 1986).
- For readings of the Pylos texts, I have checked the transcriptions in progress made in 1987-89 by Emmett L. Bennett, Jr. for the definitive corpus volume. Readings which differ from those in E.L. BENNETT, Jr. and J.-P. OLIVIER, *The Pylos Tablets Transcribed Part I* (*Incunabula Graeca* 51, Rome 1967) are indicated by the initials ELB. Knossos readings are from J.T. KILLEN and J.-P. OLIVIER eds., *The Knossos Tablets*, 5th ed. (*Minos* Suppl. 11, Salamanca 1989) or more recent joins where noted.
- 2 For the Minoan Aegean, see the forthcoming comprehensive treatment by M.H. WIENER, *Nature of Minoan Trade*, which discusses the archaeologically and textually documented materials and products that

examine the Linear B evidence for the nature and organization of trade with the Mycenaean mainland and Mycenaean Crete. I have tried to collect and interpret all textual references pertaining, even secondarily and indirectly, to the general process of trade as conducted by the Mycenaeans of the full palatial period and to other ways in which the Mycenaeans made use of the sea. Let me first describe what this has entailed.

The evidence furnished by the Linear B inscriptions about various aspects of Mycenaean society, economy and material culture is notoriously uneven; and overseas trade is no exception. The texts inscribed on clay tablets and painted on transport stirrup jars recorded, within condensed formats and formulae, information of immediate and short-term concern to individuals or officials within the Mycenaean regional administrative systems³. Thus our knowledge about any economic activity or industry is severely limited overall and site to site. The principles of organization of important branches of the Mycenaean economies, especially those requiring systematic and centralized control (e.g., the production of wool and woollen cloth at Knossos; the production of flax and linen cloth and the manufacture of perfumed oil at Pylos), are fairly well documented and understood⁴. Yet even for so important an activity as bronzeworking, we have only a small number of indirect references at Knossos and a single full series of texts at Pylos the purposes of which are so particular that general conclusions about the normal operation of this industry remain tentative. For specialized trades and crafts, whether aimed at essential or luxury products (e.g., pottery production, ivory working, gold working, the manufacture of furniture), we are often reduced to the few inferences we can draw from isolated secondary references, i.e., from the occurrence of materials or individuals connected with a trade or craft in records produced for administrative purposes fundamentally unrelated to the specific concerns of that trade or craft⁵. Finally, I must stress the problems associated with negative evidence. It is often difficult to know what exactly the complete or nearly complete absence of references to a subject in the Linear B tablets implies about its place and importance within the Mycenaean regional economic systems. And it is therefore essential to form a clear idea beforehand about what kinds of references one *would* expect to find in the texts.

Unfortunately these limitations apply all too well to the question posed in this paper: what evidence do the Linear B tablets provide about how the Mycenaeans made use of the sea? There are very few single texts (PY An 1, An 610, An 724; PY Vn 46[?], Vn 879[?], Wr 1415[?]; PY Vn 865; PY An 723[?]; KN U 736) and only one series of relatively laconic leaf-shaped texts (KN V(5)[?]) which can be interpreted with some reasonable probability as dealing exclusively or primarily with maritime activities⁶. Possible maritime items, mainly personnel or

formed the basis for Aegean-Near Eastern trade and reasonably stresses the crucial role of the Minoan palace centers in providing the infrastructure for foreign trade. For a treatment of recently published sources from Mari connected with Minoan trade, see M. HELTZER, "The Trade of Crete and Cyprus with Syria and Mesopotamia and Their Eastern Tin-Sources in the XVIII-XVII Century B.C.", *Minos* 24 (1989), 7-27.

- 3 For a brief survey of Linear B materials, see P. DARQUE, "Les documents épigraphiques", *LCE*, 386-394.
- 4 Cf. J.T. KILLEN, "The Linear B Tablets and the Mycenaean Economy", in A. MORPUGO DAVIES and Y. DUHOUX eds., *Linear B: A 1984 Survey* (*BCILL* 26, Louvain-la-Neuve 1985), 253-254 and nn. 42-44. The Linear B data for Mycenaean oil and cloth production are conveniently discussed in S. HILLER and O. PANAGL, *Die frühgriechischen Texte aus mykenischer Zeit* (Darmstadt 1976), 126-141, 155-169, 183-192.
- 5 On this problem, see T.G. PALAIMA, "Perspectives on the Pylos Oxen Tablets", in T.G. PALAIMA, C.W. SHELMERDINE and P. Hr. ILIEVSKI eds., *Studia Mycenaea* (1988) (*Živa Antika* Suppl. 7, Skopje 1989), 92-95. For a summary appraisal of the textual and archaeological evidence for Mycenaean crafts and industries, see P. DARQUE, "L'organisation et les productions économiques", *LCE*, 496-522.
- 6 References to texts will use conventional abbreviations, e.g., KN = Knossos; PY = Pylos; TH = Thebes; MY = Mycenae; TI = Tiryns. A question mark "?" (sometimes reinforced with exclamation points, thus

officials, occur on other texts where these items are recorded in secondary association with other economic or administrative subjects (PY Ad 684: personnel; PY Na 568 and Xn 990: flax and undetermined; PY Nn 831[?] and Na 284[?]: flax; PY Cn 1197[?]: livestock; PY Jn 881[?]: bronze; KN M 757: linen cloth; PY Ad 686[?]: personnel). As we shall see below, it is also possible to make some indirect inferences from the texts in support of archaeological evidence for Mycenaean overseas contacts and interests.

Because the pertinent texts for the most part do not form unified sets or series, we are deprived of the specific contextual controls which help in limiting etymologically possible interpretations or choosing the most likely among those which can be proposed. Still one of the virtues in studying a thematic topic like maritime matters is that it compels us to assemble what I would call a 'universal dossier' of all possible references to a given subject. This can then provide a clearer perspective from which to assess theories based originally on a limited number of isolated textual references. Many of the particular textual interpretations require considerable discussion—not only of linguistic details, but of such features as assignment to sets, textual formatting, scribal hands, find-spots and even the actual reading of the texts—in order to determine the degree of probability with which individual textual references should be considered real evidence for Mycenaean use of the sea. Consequently I have decided to present first a general analytical survey of pertinent information in clearly defined categories and to reserve fuller discussion of problems pertaining to individual texts for the latter part of this paper. I must stress, however, that it was impossible to maintain a hard and fast division between these two sections. They should be read together in order to comprehend fully the strengths and weaknesses of the Linear B evidence.

Before I begin my analytical survey, let me make some final remarks on the purpose of this paper. It is an act of scholarly temerity to address any general question in Aegean prehistory. By so doing, one falls into the less flattering of Blake's two categories, "To generalise is to be an Idiot. To particularise is the Alone Distinction of Merit"⁷. Two things make this paper a tale told by an Idiot: geography and chronology. The Mycenaean world was divided into many palatial territories, and differences in development and organizational systems must have existed at least between the territories on the Mycenaean mainland and those on Mycenaeanized Crete⁸. Linear B data are distributed geographically and chronologically. In regard to maritime matters, we are dealing with so small a dossier of textual references that it is impossible to determine on most points how the view we develop of systems and activities in one region and narrow time period applies to other regions and periods. It is extremely dangerous to generalize. The reader is therefore advised to take note of the site from which evidence is being cited. Because of the same limitations, I have also decided not to discuss the problematical chronological layers that have now been shown to exist in the Linear B material, except when the date of certain tablets forms the basis for scholarly theories about the conditions or circumstances that prevailed when the tablets were written. For example, in the first instance below, I make use of textual references from Thebes, Mycenae and Knossos. Fortunately, the pertinent Thebes and Mycenae tablets probably belong to the end of the same

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7 Quoted from P. GREEN, *Classical Bearings* (London 1989), 33.

8 The very word "those" here has been the focus of a long-raging scholarly controversy about regionalism in LM III Crete, of which H. HASKELL, "LM III Knossos: Evidence Beyond the Palace", *SMEA* 27 (1989), 81-110, provides a recent balanced treatment. See also J. BENNETT, "Knossos in Context: Comparative Perspectives on the Linear B Administration of LM II-III Crete", *AJA* 94 (1990), 193-211. The discovery now of at least 4 Linear B tablets from LM III B contexts at Khania would seem to indicate that it indeed was a major administrative center in late Mycenaean Crete. We should note here that the scribal systems of Knossos and Pylos seem to differ considerably: *SP*, 187-189.

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- 13 A specific place name could be widespread. In the Mycenaean repertory of toponyms we find, for example, that the toponyms *ko-ri-to* (Corinth) and *re-u-ko-to-ro* (Leuktron) refer to sites in the Further Province of Pylos, not on the Isthmus of Corinth or in Achaea or Arcadia.
- 14 Cf. Thucydides 1.13.5 for an emphasis on the importance of early land trade in the history of Corinth as a commercial power, and note 12 for traces of road networks associated with ports on the northern side of the Corinthian Gulf. There is good textual and archaeological evidence for the use of asses (cf. GALLAGHER, *art. cit.*, *infra* n. 93 and discussion there in the text) and oxen (cf. PALAIMA, *art. cit.*, *supra* n. 5) in such transport.

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in MY X 508, one wonders why a relatively common type of cloth *pu-ka-ta-ri-ja*¹⁵ would be shipped from Mycenae to an obviously rich pastoral district capable of producing its own wool cloth. Yet many unknown material, economic or cultural factors could explain such a shipment. These range from the quality and nature of Argolid wool or the technical skills of Argolid wool workers to the specific nature of this recorded transaction, e.g., possible gift exchange, reciprocal trade for special foreign goods, or shipment connected with religious offering. The last possibility is to be preferred here if we restore *ma-ri-ne[-we vel sim]*. On Knossos tablets Ga 674, Gg 713 and As 1519 **ma-ri-ne-u* is the name of a divinity connected with spices, honey and male personnel; while on two Thebes tablets Of 25 and Of 35 women designated **ma-ri-ne-we-ja* or ‘servants of **ma-ri-ne-u*’ are explicitly connected with wool (LANA and ku LANA)¹⁶.

On the material or economic side, we know that *pu-ka-ta-ri-ja* cloth at Knossos is in some cases dyed fully purple, and also that the wools of different breeds of sheep will receive dyes differently¹⁷. Since purple-dyeing was a highly specialized operation which greatly increased the value of cloth products, there would have been a demand for any cloth dyed or able to be dyed this color. The Argolid cloth¹⁸ might have been attractive to other palatial territories for this reason. There is also now clear textual documentation that wool described as ‘Cypriote’ was present in Mycenaean Crete (cf. *infra* nn. 39, 42 and § II.1.b). This *might* be an even more remarkable example of Bronze Age “owls to Athens”¹⁹, which should make us less surprised that cloth was transported the comparably short distance from the Argolid to Boeotia. Finally we must consider the archaeological context. The materials found in the House of the Shields (many pieces of worked or half-worked ivory; stone, faience and alabaster vases) suggest that it had a special connection with import and export trade²⁰. It is worthwhile to stress here that the above-mentioned categories of transactions are neither exhaustive nor mutually exclusive. It is possible to imagine a situation in which members of the palatial elite, who would have been the chief ultimate beneficiaries of trade in precious foreign objects and materials, directed the operators of the House of the Shields that a shipment of cloth be made to Thebes in the interests of a Mycenaean divinity and in response to having received goods and materials from Boeotia. Such a transaction would include elements of gift exchange, religious offering, and reciprocal trade, all of which are unexpressed in the document MY X 508, because they are irrelevant to its relatively simple and locally focused purposes.

b. The most secure direct evidence for short-distance sea transport of goods now seems to be the texts of the following sealings from Mycenaean Thebes²¹.

15 *Interp.*, 295-296.

16 J.T. KILLEN, “The Knossos Ld(1) Tablets”, *CollMyc.*, 177-178, presents the alternatives to viewing *ma-ri-ne-u* as divine.

17 J. MELENA, *Studies on Some Mycenaean Inscriptions from Knossos Dealing with Textiles* (Minos Suppl. 5, Salamanca 1975), 105-106. L.B. JENSEN, “Royal Purple of Tyre”, *JNES* 22 (1963), 111.

18 The extensive Oe series from the House of the Oil Merchant provides reasonable evidence for production of wool in the Argolid.

19 In fact, as with the large quantities of oil described as *ku-pi-ri-jo*, it is possible that the adjective indicates the market for which the wool is destined, not that from which it has come.

20 KILLEN, *art. cit.*, *supra* n. 4, 268-269. DARCOQUE, *LCE*, 522, rightly questions Killen’s proposal that Mycenae somehow managed foreign trade for other mainland palatial territories.

21 Cf. V. ARAVANTINOS, “The Mycenaean Inscribed Sealings from Thebes: Problems of Content and Function”, in T.G. PALAIMA ed., *Aegean Seals, Sealings and Administration* (Aegaeum 5, Liège 1990), 149-174 with tabular summary of texts (p. 167), discussion, and response by R. PALMER. See also now *Thebes Nodules*, 116-133.

	Seal No.	SIDE A	SIDE B	SIDE C
Wu 51	4	SUS ^f	te-qa-de	qe-te-a2
Wu 65	4	OVIS ^f	te-qa-de	qe-te-a2 _
Wu 96	4	SUS ^m	te-qa-de	qe-te-a2
Wu 55	12	SUS ^m	ka-ru-to	<i>vacat</i>
Wu 58	3	SUS	o-pa/qe-ri-jo-jo	a-ma-ru-to

The whole collection of 56 inscribed sealings from Thebes deals with livestock or livestock products associated with economic transactional vocabulary. Several of the sealings feature Euboean toponyms (*ka-ru-to* = Karystos; *a-ma-ru-to* = Amarynthos) as well as the allative *te-qa-de* ('to Thebes'). These brief texts then document activities involving to some extent shipments of animals or materials across the water from Euboea to Boeotia ²². On Thebes tablet Of 25, some 18 kg. of wool are listed as 'to Amarynthos' ²³. Here then would be another instance of shipment of a basic commodity beyond the natural geographical territory of a Mycenaean palace center.

For textual evidence of longer-distance maritime contacts, there are two categories of evidence which we can exploit. First it is possible to identify

c. the commodities, whether raw materials or luxury items, listed in the tablets which probably derived originally from non-native sources, especially those designated by definite Semitic or Anatolian loan words (e.g., spices: sesame *sa-sa-ma*, cumin *ku-mi-no*; ivory: *e-re-pa* and adjectival forms *e-re-pa-te-jol-ja*; blue glass paste: *ku-wa-no*; gold: *ku-ru-so*; and garments: *ki-to*) ²⁴ or loan words of unknown or debated origin (copper and tin for bronze: *ka-ko* and its

22 Cf. Thucydides 2.14 and A.W. GOMME, *A Historical Commentary on Thucydides* (Oxford 1956) vol. 2, 48, for the organized transport of Athenian sheep and oxen across to Euboea and other islands off the coast of Attica in 431 B.C. The shipping of animals longer distances is well documented in such practices as the Panathenaic festival to which all Athenian colonies had to send an ox (schol. Aristophanes *Clouds* 386; *IG* I² 45; reference to this practice for the Athenian colony of Brea) and the expenditure of 8419 drachmas by authorities on the island of Delos in 377/76-375/74 B.C. for the purchase of sacrificial oxen and additional expenditure for their sea transport and maintenance: *SIG*³ 153.31-40 = M.N. TOD, *A Selection of Greek Historical Inscriptions* (Oxford 1948), vol. 2, no. 125 and p. 80.

23 The conjunction of *a-ma-ru-to* and *ka-ru-to* along with *te-qa-de* on the Thebes sealings would seem to remove the properly cautious reservations about the Euboean location of *a-ma-ru-to* on Of 25 expressed in T.G. SPYROPOULOS and J. CHADWICK, *The Thebes Tablets II* (*Minos* Suppl. 4, Salamanca 1975), 94. Surface sherds suggest that Amarynthos was a site of moderate size, but important throughout the Late Helladic period: *MG*, 55-56. Early Helladic and Geometric remains have been reported at Karystos: *AR* (1987-88), 18; but no Middle or Late Helladic from the area: L.H. SACKETT *et al.*, "Prehistoric Euboea: Contributions Toward a Survey", *BSA* 61 (1966), 80-81. D.H. KELLER, *Archaeological Survey in Southern Euboea: A Reconstruction of Human Activity from Neolithic Times Through the Byzantine Period* (Diss.: University of Indiana 1985), 175-179 and 237, proposes that the site to be connected with Karystos in the Homeric catalogue might actually lie outside the areas so far surveyed.

24 See most recently Y. DUHOUX, "Les contacts entre mycéniens et barbares d'après le vocabulaire du linéaire B", *Minos* 23 (1988), 75-83, who isolates 8 words (nos. 4-8, 9-11) for goods or materials definitely borrowed from Semitic or Anatolian languages. Duhoux's item no. 10 κέρασος = cherry-wood is highly suspect since the sign-group *ke-ra-so* occurs only twice in texts from Mycenae (V 659 and Fo 101.4) where the contexts imply that it is a feminine proper name. This means that its connection with a foreign material and loan word rests solely on a chosen orthographical reconstruction without any contextual

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many related forms; purple dye: *po-pu-re-ja*; and special woods: boxwood *pu-ko-so*, false ebony *ku-te-so*)²⁵. Another class is represented by substances like the dye-mordant or fire-proofing substance alum (*tu-ru-pte-ri-ja* = */struπτῆρια/*: PY An 35, Un 443; TI X 6; and perhaps KN X 986: *tu-ru-pe-te*). This term can be connected to roots in the Greek lexicon of unclear etymology, but its later and probable Bronze Age sources lay outside Mycenaean Greece in regions as diverse as Spain, Sardinia, the Lipari islands, Africa, Egypt, Syria, Cyprus, Macedonia and the Black Sea²⁶. One can also mention the perfume ingredient *pistacia terebinthus* = Mycenaean *ki-ta-no* (KN Ga 1530, Ga 1532, X 1385) the identification of which depends on its textual contexts (large quantities designated by AROM, the ideogram for spice) and a gloss from Hesychius κρίτανος · τερμινθος, in which this rare term of uncertain etymology is glossed by an Aegean substrate word²⁷. Terebinth resin has been found in massive quantities on the Bronze Age shipwreck at Ulu Burun, most likely as a raw material originating in Syro-Palestine and useful in perfume-making²⁸. In the same way most of the non-perishable items noted above are also attested in the archaeological shipwreck record.

d. non-local ethnics—although it is not always an easy matter to identify the exact location of the place from which a specific ethnic is derived²⁹—and non-local toponyms. For ethnics, leaf-shaped tablets of the A- series from Pylos provide the fullest evidence. Women workers are described by ethnics linking them to *ti-nwa-si-ja* (an area controlled by Pylos, but not a regular administrative district) and to Miletus, Knidos, Khios, Kythera, Lemnos,

corroboration. For a further discussion of loan words, see J.T. HOOKER, "The Coming of the Greeks", *Historia* 25 (1976), 143-145.

- 25 L. FRENCH, "Mycenaean Greece and the Mediterranean World in LH III", *TraffMic*, 280, observes that the Mycenaean economic system required imported raw materials "particularly metal (except silver/lead) and exotica" as shown by the presence in the archaeological record "of items made from foreign materials and the mention of such materials in the texts". Problems associated with *po-pu-re-ja* are discussed in part II.1.a.
- 26 J. CHADWICK, "Pylos Tablet Un 1322", *MycStud*, 23. L. BAUMBACH, "Mycenaean *tu-ru-pte-ri-ja* and Herodotus II.180", *TM*, 47-54, esp. 50-51.
- 27 J.L. MELENA, "La producción de plantas aromáticas en Cnoso", *Estudios Clásicos* 78 (1976), 180-181; "KI-TA-NO en las tablillas de Cnoso", *Darius* 2:1 (1974), 45-55 with typewritten 'consideraciones suplementarias' in the PASP offprint collection.
- 28 C.W. HALDANE, "Shipwrecked Plant Remains", *Biblical Archaeologist* 53:1 (1990), 57-60.
- 29 For example, the woman workers designated as *mi-ra-ti-ja* at Pylos might be connected with either a site on the N. coast of Crete (cf. Hom. *Il.* 2.647 for *Milātos* listed in the sequence: Knossos, Gortyn, Lyktos, M., Lykastos, Phaistos and Rhytion; for LM III chamber tombs at this site, see R. HOPE SIMPSON and J.F. LAZENBY, *The Homeric Catalogue of Ships* [Oxford 1970], 113) or the predecessor of later Ionian *Milāos*. J. CHADWICK, "The Women of Pylos", in *Studies Bennett*, 81, stresses the association of this term with other East Aegean ethnics (*ki-ni-di-ja* [Knidos], *ki-si-wi-ja* [Khios], *ze-pu₂-ra₃* [Halikarnassos]) in the Pylos A- series in preferring the second alternative. But only the identification of *ki-ni-di-ja* is reasonably certain. C. MEE, "Aegean Trade and Settlement in Anatolia in the Second Millennium B.C.", *Anatolian Studies* 23 (1978), 133-137, concisely discusses the Bronze Age archaeological remains at Miletus and their interpretation. In C. MEE, "A Mycenaean Thalassocracy in the Eastern Aegean", *PGP*, 303-304, he reservedly accepts the notion of Mycenaean settlers in the eastern Aegean especially in LH III A: 2. K.B. GÖDECKEN, "A Contribution to the Early History of Miletus", *PGP*, 307-315, argues for a vital Mycenaeanized community at the site of Miletus in the late Bronze Age, but her conclusions about the local knowledge of Mycenaean linear script are untenable. The preservation of *-ti-* in *mi-ra-ti-ja* and other ethnics at least can be interpreted as stemming from a non-assibilating dialect group in contrast with the normal South Greek dialect which predominates in the Pylos tablets. Cf. E. RISCH, "Die griechischen Dialekte im 2. vorchristlichen Jahrtausend", *SMEA* 20 (1979), 99-100.

Halikarnassos, and perhaps even to the area later known as Lydia³⁰. It is remarkable that seven of the eight sites are located overseas, mainly in or along Anatolia; and Chadwick has argued that these women were “virtually if not legally slaves, many of them acquired through Greek trading posts in the Aegean”³¹. It is reasonable to conclude that these women or their ancestors were brought to Messenia sometime during the Mycenaean period. On Knossos tablet Fh 5432 + FR I/2 + FR I/2 + FR I/2-29 the ethnic adjective *na-u-pi-ri-jo-i* = */Nauplioihi/* referring to men of *Nauplia* may refer to a site in the Argolid—the toponym occurs nowhere in the full list of Cretan place names in the Knossos corpus—and thus it may provide proof of an overseas population group that must have arrived on Crete by ship³².

e. Personal names derived from foreign toponyms also attest to overseas contacts at some stage prior to the dates of the tablets on which they are recorded³³. An individual named *a3-ku-pi-ti-jo* (ethnic from Αἴγυπτος = the Egyptian site of Memphis) is in charge of a flock of 80 sheep at the Cretan site of *su-ri-mo* (KN Db 1105 + 1446)³⁴. The tablet entries of 80 animals mark him as someone of no great status even within his relatively lowly profession³⁵.

f. The ethnic adjective *ku-pi-ri-jo* (probably Κύπριος = ‘of Cyprus’ rather than *Γυβλιος ‘of Byblos’ which is, however, linguistically possible³⁶) specifies individuals associated with sheep, bronze-working and mixed commodities, including alum, at Pylos³⁷. According to

30 CHADWICK, *Studies Bennett*, 78-84: *a**64-*ja*, *ki-ni-di-ja*, *ki-si-wi-ja*, *ku-te-ra3*, *mi-ra-ti-ja*, *ra-mi-ni-ja*, *ze-pu2-ra3*. See also the possible association of *ka-ru-ti-je-ja-o-qe* (PY Ad 671.A) with the site of Karystos in the Thebes sealings *Thebes Nodules*, 153-154.

31 CHADWICK, *Studies Bennett*, 91-93.

32 *436 Raccords*, 215-216. Nauplia may occur in the list of Aegean toponyms from the temple of Amenhotep III (14th century) in the sequence: Kydonia, Mycenae, Thebes, Messene, Nauplia, Kythera, thus corroborating its location in the Argolid. See A. BARTONĚK, “The Name of Thebes in the Documents of the Mycenaean Era”, *Minos* 23 (1988), 43-46.

33 As with group ethnics, one must allow for the possibility that the names were brought into the Mycenaean sphere before the extant Linear B texts were written and then passed down through one or more generations. The working women may have been brought back from Anatolia during the first period of intensive Mycenaean contacts with the area: LH III A:2. See MEE, *art. cit.*, *supra* n. 29. It is even possible, as José Melena has suggested to me in private conversation, that all workers performing a specialized industrial task would be described by the ethnic of a place originally or primarily associated with that specialty, regardless of their actual ethnic origins.

34 *DMic*, s.v. For a discussion of linguistic particularities of the borrowing of the Egyptian term for Memphis into Mycenaean Greek, see F. CREVATIN, “Note di linguistica egiziana”, *Aegyptus* 55 (1975), 10-13, who makes the salient point that by the time of the Knossos tablets this ethnic was already established in Mycenaean *Namengebung*.

35 See J.-P. OLIVIER, “KN: Da-Dg”, *Studies Bennett*, 223, 248-249, 263, 266, for the position of this shepherd in the Knossos sheep-herding dossier.

36 The alternative identifications of *ku-pi-ri-jo* are considered by O.J.L. SZEMERÉNYI, Review of *Documents in Mycenaean Greek* vol. 1, *Classical Review* NS 8 (1958), 60. Of course, we confront here the difficult problems of determining what the general Bronze Age name for Cyprus (Alasia?) was—the earliest attestation of Κύπρος for the island being in Homer—and whether the Mycenaean could have used a different name from that prevailing in the Near East, a phenomenon for which sound historical examples exist, e.g., the name the Romans used for the Greeks.

37 The PY tablets are: (1) Cn 131, a list of twenty-five shepherds at the site of *pi**82. *ku-pi-ri-jo* has 50 male sheep, the second lowest number among 19 individuals with numbers of male sheep ranging from 30 to 200. On line .7 of this tablet occurs a shepherd *ra-pa-sa-ko* = */Lampsakōi/* probably to be connected with the site of Lampsacus, according to P.H. ILIEVSKI, “Observations on the Personal Names from the Knossos D Tablets”, paper presented at the 9th International Mycenaean Colloquium held at the École Française d’Athènes October 2-6, 1990. (2) Cn 719, a livestock tablet dealing with four different locations and 12 entries. *ku-pi-ri-jo* is listed here along with five other shepherds at *pi**82. It is interesting to note that the shepherd entered before him bears the name *ra-mi-ni-jo* “Lemnian”. (3) Jn 320, a fragmentary tablet

evidence provided by the latest joins of Knossos fragments, *ku-pi-ri-jo* directly modifies wool, oil, honey, vases and unguent ingredients at Knossos³⁸. In addition, the phonetic abbreviation *ku* modifies wool at Thebes and cloth at Knossos; and J.L. Melena has proposed what is to my mind the most compelling and internally consistent interpretation of this abbreviation: it designates these materials as *Cypriote* (cf. § II.1.b)³⁹. The ultimate foreign connections implied by these ethnic adjectives are intriguing. Mycenaean and earlier Minoan contacts in the Late Bronze Age with the major administrative capital of northern Egypt, with the copper-rich island of Cyprus, and with the major Syrian site of Byblos are certainly strong enough to explain the presence of these names in the Minoan-Mycenaean onomasticon. The occurrence of *ku-pi-ri-jo* as applied to:

- (1) diverse materials and products on Knossos non-RCT tablets (probably dating to the end of LM III A: 1),
- (2) individuals and perhaps an imported material (alum) on the Pylos tablets (end of LH III B), and possibly
- (3) wool on the Thebes Of tablets (LH III B)

offers evidence for continuing contacts between the Near East and separate regions of the Mycenaean world⁴⁰.

g. Confining ourselves to the Aegean proper, we are much more secure with such toponymic adjectives as *ke-re-si-jo* ('Cretan' PY Ta 641, Ta 709), *za-ku-si-jo/-ja* ('Zakynthian' PY Sa 751, Sa 787; PY An 610; MY Oe 122), and *te-qa-ja* ('Theban' KN Ap 5864; PY Ep 539). *ke-re-si-jo*, *we-ke* (= 'of Cretan workmanship') is applied specifically in the Pylos inventory series to ideograms of bronze tripods with a distinctive cylindrical shape attested archaeologically only in Crete and Thera (MM III-LM III A: 1). Vandenaabeele is therefore justified in concluding that here we are dealing with costly objects manufactured exclusively on Crete⁴¹. These had to be transported by sea to Thera and Messenia, unless one posits that Cretan bronzesmiths were imported to these areas to produce vessels in their own exclusive style. I should mention here that on separate lines of the newly joined tablet Od 667 + 5898 + 8292 + *fr.*, larger and smaller quantities of wool are described as 'Cypriote' (*ku-pi-ri-ja*) and 'Cretan' (*ke-re[-] -ja* restored as *ke-re-si-ja*) thus marking a clear dichotomy between local materials and those which have been imported or are intended for the export market⁴². *za-ku-si-ja* ('of Zakynthos') is used on Pylos tablets Sa 751 and Sa 787 to describe in each case 32 pairs of chariot wheels, which are 'of Zakynthian type'. In addition, the masculine ethnic (now read as *za-ku-si-jo* ELB) is used to describe a group of 7 (ELB) rowers (*e-re-ta*) on the lengthy catalogue of rowers An 610. *za-ku-si-jo* also appears as a man's name on MY Oe 122. Zakynthos is mentioned in the Homeric Catalogue of Ships (*Il.* 2.634). The identification of the

listing small quantities of bronze held by smiths as part of the *ta-ra-si-ja* system. *ku-pi-ri-jo* holds an average quantity (4 kg.). (4) Un 443 [+] 998, a tablet on the first line of which *ku-pi-ri-jo* is listed along with *tu-ru-pte-ri-ja* (alum) and the economic term *o-no* and relatively large quantities of wool and *146 (*we-a2-no* cloth). The standard interpretation of *ku-pi-ri-jo* (as the name of an unguent boiler) may now have to be modified in light of the new Knossos joins.

38 436 *Raccords*, 202-203, 216-217. The new joins seem to me to make less likely the theory of L. GODART, "Kupirijo dans les textes mycéniens", *SMEA* 5 (1968), 64-70, that the term specifies a functionary.

39 436 *Raccords*, 204-205.

40 Again we must keep in mind that the use of the term to designate individuals might be attributed to a conservative repertory of Mycenaean names across geographical divisions and through time.

41 J.-P. OLIVIER and F. VANDENABEELE, *Les idéogrammes archéologiques du linéaire B (Études Crétoises* 25, Paris 1979), 225-233.

42 436 *Raccords*, 204.

Mycenaean place name with “by far the most fertile of the Ionian islands” is made plausible by the archaeological remains on Zakynthos: a cemetery of Mycenaean rock-cut pit graves with LH III A: 2 - LH III B vases; 2 or possibly 3 tholos tombs at other locations; a Mycenaean house; and a well deposit and settlements of the LH III A - B periods⁴³. Of course, it is reasonable to assume contact between Messenia and the Ionian islands along the sea route to Italy. Reins for chariots are described as *ro-u-si-je-wi-ja* (‘of *ro-u-so*’) on PY Ub 1315 from the Northeast Workshop. An area connected with *ro-u-so* delivers 100 saplings and axles to a chariot workshop on PY Vn 10. These references provide us with a parallel for a geographical area providing specialized products for a particular sector of the Mycenaean economy, in both instances here chariot manufacture, assembly and repair. Perhaps Zakynthos had developed a chariot-wheel industry based on local wood resources. The 7 Zakynthian rowers certainly strengthen the impression of close overseas connections between Mycenaean Pylos and Zakynthos. However, an *advocatus diaboli* could construct an argument from the whole complex of toponymic references on these texts that **za-ku-to* is a minor district in Messenia and, therefore, like *ko-ri-to* another example of a wandering place name.

h. *te-qa-ja* (‘of Thebes’) occurs as a woman's name on KN Ap 5864 and PY Ep 539. The Pylian woman is a *te-o-jo do-e-ra* (‘cult servant of the god’ *vel sim.*) in the *pa-ki-ja-na* land series⁴⁴. The Knossian woman appears on a fragment which probably belongs to a long tablet Ap 639 that records women (and some children), subsequently check-marked, who, according to the known interests of the scribe Hand 103⁴⁵, were involved in the well-organized central Cretan cloth production industry. Other women in the list have names derived from known Cretan toponyms (*pa-i-ti-ja*, *e-ra-ja*). These occur in the main body of the Knossian tablet separate from *te-qa-ja* in our fragment. In both instances we could propose that **te-qa* was the name of now-vanished minor local sites in Messenia and Crete. However, there are such remarkable links between Thebes and Knossos in the sphere of wool production (e.g., shared names not only of categories of textile workers, but also of collectors)⁴⁶ that the more economical hypothesis is to accept the presence of a Theban woman in Crete. Furthermore, the inscribed stirrup jars found at mainland sites bearing Cretan toponyms (and personal names attested in the Knossos tablets) offer simultaneous archaeological and textual confirmation of a Mycenaean-controlled system of contacts by sea between central and western Crete and the Greek mainland⁴⁷. Provenience studies based on clay analyses and other factors have demonstrated that most of these jars probably come from midwestern to western Crete⁴⁸. Since, at a time of Mediterranean-wide trade and local imitation of Aegean stirrup jars, the

43 R. HOPE SIMPSON and J. LAZENBY, *The Catalogue of Ships in Homer's Iliad* (Oxford 1970), 104; P. AGALLOPOULOU, “Mycenaean Shaft-Graves Near Cambi in Zakynthos”, *AAA* 5:1 (1972), 63-66; *MG*, 155; *AR* (1971-72), 16; *AR* (1975-76), 18.

44 M. LINDGREN, *The People of Pylos II* (Uppsala 1973), 36-39, assesses the different theories about the exact meaning of *do-e-rol-ra*.

45 *SC*, 44-50, 106, 122.

46 Complete discussion in KILLEN, *art. cit.*, *supra* n. 16, 176-178, who goes so far as to attribute the shared names of collectors to dynastic connections between the regions with a common repertory of traditional names. Cf. S. HILLER, “Die Stellung Böotiens im mykenischen Staatenverband”, H. BEISTER and J. BUCKLER eds., *Boiotika* (München 1989), 61.

47 Place names attested as Cretan in the Knossos tablets are found on stirrup jars at Mycenae, Tiryns, Eleusis, and Thebes. For the distribution of place names and personal names on stirrup jars, see the convenient table in E. HALLAGER, “The Inscribed Stirrup Jars: Implications for Late Minoan IIIB Crete”, *AJA* 91 (1987), 178.

48 HALLAGER, *art. cit.*, 171-172, nn. 3-6 with references. This pattern may be contradicted by two inscribed stirrup jars which were discovered at Mallia in summer 1990.

Mycenaean place name with “by far the most fertile of the Ionian islands” is made plausible by the archaeological remains on Zakynthos: a cemetery of Mycenaean rock-cut pit graves with LH III A: 2 - LH III B vases; 2 or possibly 3 tholos tombs at other locations; a Mycenaean house; and a well deposit and settlements of the LH III A - B periods⁴³. Of course, it is reasonable to assume contact between Messenia and the Ionian islands along the sea route to Italy. Reins for chariots are described as *ro-u-si-je-wi-ja* (‘of *ro-u-so*’) on PY Ub 1315 from the Northeast Workshop. An area connected with *ro-u-so* delivers 100 saplings and axles to a chariot workshop on PY Vn 10. These references provide us with a parallel for a geographical area providing specialized products for a particular sector of the Mycenaean economy, in both instances here chariot manufacture, assembly and repair. Perhaps Zakynthos had developed a chariot-wheel industry based on local wood resources. The 7 Zakynthian rowers certainly strengthen the impression of close overseas connections between Mycenaean Pylos and Zakynthos. However, an *advocatus diaboli* could construct an argument from the whole complex of toponymic references on these texts that **za-ku-to* is a minor district in Messenia and, therefore, like *ko-ri-to* another example of a wandering place name.

h. *te-qa-ja* (‘of Thebes’) occurs as a woman's name on KN Ap 5864 and PY Ep 539. The Pylian woman is a *te-o-jo do-e-ra* (‘cult servant of the god’ *vel sim.*) in the *pa-ki-ja-na* land series⁴⁴. The Knossian woman appears on a fragment which probably belongs to a long tablet Ap 639 that records women (and some children), subsequently check-marked, who, according to the known interests of the scribe Hand 103⁴⁵, were involved in the well-organized central Cretan cloth production industry. Other women in the list have names derived from known Cretan toponyms (*pa-i-ti-ja*, *e-ra-ja*). These occur in the main body of the Knossian tablet separate from *te-qa-ja* in our fragment. In both instances we could propose that **te-qa* was the name of now-vanished minor local sites in Messenia and Crete. However, there are such remarkable links between Thebes and Knossos in the sphere of wool production (e.g., shared names not only of categories of textile workers, but also of collectors)⁴⁶ that the more economical hypothesis is to accept the presence of a Theban woman in Crete. Furthermore, the inscribed stirrup jars found at mainland sites bearing Cretan toponyms (and personal names attested in the Knossos tablets) offer simultaneous archaeological and textual confirmation of a Mycenaean-controlled system of contacts by sea between central and western Crete and the Greek mainland⁴⁷. Provenience studies based on clay analyses and other factors have demonstrated that most of these jars probably come from midwestern to western Crete⁴⁸. Since, at a time of Mediterranean-wide trade and local imitation of Aegean stirrup jars, the

43 R. HOPE SIMPSON and J. LAZENBY, *The Catalogue of Ships in Homer's Iliad* (Oxford 1970), 104; P. AGALLOPOULOU, “Mycenaean Shaft-Graves Near Cambi in Zakynthos”, *AAA* 5:1 (1972), 63-66; *MG*, 155; *AR* (1971-72), 16; *AR* (1975-76), 18.

44 M. LINDGREN, *The People of Pylos II* (Uppsala 1973), 36-39, assesses the different theories about the exact meaning of *do-e-rol-ra*.

45 *SC*, 44-50, 106, 122.

46 Complete discussion in KILLEN, *art. cit.*, *supra* n. 16, 176-178, who goes so far as to attribute the shared names of collectors to dynastic connections between the regions with a common repertory of traditional names. Cf. S. HILLER, “Die Stellung Böotiens im mykenischen Staatenverband”, H. BEISTER and J. BUCKLER eds., *Boiotika* (München 1989), 61.

47 Place names attested as Cretan in the Knossos tablets are found on stirrup jars at Mycenae, Tiryns, Eleusis, and Thebes. For the distribution of place names and personal names on stirrup jars, see the convenient table in E. HALLAGER, “The Inscribed Stirrup Jars: Implications for Late Minoan IIIB Crete”, *AJA* 91 (1987), 178.

48 HALLAGER, *art. cit.*, 171-172, nn. 3-6 with references. This pattern may be contradicted by two inscribed stirrup jars which were discovered at Mallia in summer 1990.

inscribed stirrup jars only circulate within this system, it is reasonable, but not absolutely necessary, to propose that Mycenaean-operated vessels were transporting them.

Likewise a thorough skeptic could maintain that these oblique references through imported materials and ethnics do not prove that the Mycenaeans themselves were actively trading for and acquiring these materials by means of their own ships. First, some few of the items identified by loan-words or non-local toponymic references might be domestically or locally obtained or produced by the period of our texts. This is certainly the case with the cloth garment *ki-to*; and we have mentioned a similar possibility for the *ke-re-si-jo* tripods. We could even extend such an argument to the *za-ku-si-ja* chariot wheels, since any product which is technologically or stylistically distinctive tends to inspire local imitations in other regions⁴⁹. There is suggestive, but inconclusive evidence that a purple-dye industry was native to Crete and perhaps developed there. So we need not imagine that the dye or the murex from which it was extracted were imported into the Aegean. (See *po-pu-re-ja* in § II.1.a.).

Second, on the Ulu Burun shipwreck, datable within the Mycenaean palatial period, were found ingots of copper, tin and blue-glass paste (= *ku-wa-no*) and other raw materials needed for specialized Mycenaean industries: ostrich eggs, Egyptian ebony (cf. *ku-te-so*), elephant and hippopotamus ivory (= *e-re-pa*), and, as noted above, *pistacia terebinthus* resin useful in perfume manufacture⁵⁰. Yet, given the mixed cargo of Cypriote, Canaanite, Syrian, Egyptian, Aegean and generally Near Eastern pottery and artifacts, there is no absolute consensus of scholarly opinion about the nationality of either this vessel⁵¹ or the earlier excavated Gelidonya wreck⁵², nor is there likely to be. But I should confess here to being absolutely flabbergasted, in reading *Evidence for Trade*, that the theory of a “Mycenaean monopoly” over Late Bronze Age trade was ever seriously proposed. Now, at least, Heltzer's identification, if correct, of a middle to late 13th century Ugaritic merchant whose ship was expected to arrive from Crete furnishes textual proof that a Near Eastern ship sailed and traded in Aegean waters⁵³.

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- 49 A good example is the local imitation of Mycenaean pottery in 12th century Cyprus, whether or not it was influenced by the settlement of actual Mycenaeans in Cyprus during this period: B. KLING, “Mycenaean IIIc:1b Pottery in Cyprus: Principle Characteristics and Historical Context”, in V. KARAGEORGHIS and J.D. MUHLY, *Cyprus at the Close of the Bronze Age* (Nicosia 1984), 29-38.
- 50 For these finds, see G.F. BASS, “A Bronze Age Shipwreck at Ulu Burun (Kaş): 1984 Campaign”, *AJA* 90 (1986), 281-284; C. PULAK, “The Bronze Age Shipwreck at Ulu Burun: 1985 Campaign”, *AJA* 92 (1988), 6-11; G.F. BASS, C. PULAK, D. COLLON, and J. WEINSTEIN, “The Bronze Age Shipwreck at Ulu Burun: 1986 Campaign”, *AJA* 93 (1989), 10-11.
- 51 PULAK, *art. cit.*, 37, favors slightly a Mycenaean over Levantine nationality for the Ulu Burun wreck. He bases his hypothesis on artifacts considered to be personal possessions of the crew members—and therefore indicative of their nationality—rather than on the mixed cargo which may have been picked up at a number of foreign ports. In contrast in *Evidence for Trade*, BASS emphasizes the Near Eastern-Cypriote style of the ship's stone anchors and the remarkable wooden diptych found on board, the best comparanda for which are also Near Eastern.
- 52 G.F. BASS, *Cape Gelidonya: A Bronze Age Shipwreck* (*Transactions of the American Philosophical Society* NS 57:8, Philadelphia 1967), 164, proposes that the Gelidonya ship “sailed with a Syrian merchant from a Syro-Palestinian port”, also based on what seem to be the personal possessions of her crew. A retrospective on the controversy raised by this opinion and a reappraisal of the evidence and the opposing arguments for the ship's Near Eastern-Cypriote or Mycenaean nationality is furnished by *Evidence for Trade*.
- 53 M. HELTZER, “Sinaranu, Son of Siginu, and the Trade Relations between Ugarit and Crete”, *Minos* 23 (1988), 7-13. LH/LM III Mycenaean and Minoan trade contacts with the west are, of course, a separate issue. See E. HALLAGER, “Aspects of Aegean Long-Distance Trade in the Second Millennium B.C.”, in *Momenti Precoloniali nel Mediterraneo Antico* (Rome 1988), 94-99, for a survey of the archaeological data and a proposal that the Mycenaeans substantially controlled trade to the west during this period, even trade in goods brought into the Aegean by Near Eastern ships.

However, it is just as difficult to imagine a total Near Eastern monopoly. We do have sufficient textual evidence (see § I.3 and § II.2-.3) that the Mycenaeans had organized systems for building, manning and doubtless therefore sailing their own ships, particularly in the region of Messenia. The geography (the Gulf of Messenia; the Bay of Navarino and Ox-Belly Bay; the sandy coast-line in northwestern Messenia) and natural resources (especially flax and linen for sails and cords; leather for thongs, strapping, and sail trim; special woods for construction) of Messenia would make it a likely location for an active ship-building industry, even without any corroborating Linear B data. The Mycenaeans certainly were exporting archaeologically visible (e.g., pottery) and invisible (e.g., perfumed oil and cloth products) goods; and they were obtaining in exchange the array of essential raw materials (e.g., copper and tin) and luxury items documented on the two Bronze Age wrecks as well as invisible goods (such as cloth and spices) attested in the Linear B tablets⁵⁴. In the absence of textual evidence for longstanding embargoes against Mycenaean vessels using Near Eastern ports or vice versa, it seems to me commonsensical that ships from both cultural spheres were circulating throughout the principal markets of the eastern Mediterranean, although perhaps not with absolutely equal frequency.

i. A final point in favor of the active involvement of Mycenaeans in sea trade is the very repertory of personal names formed from roots pertaining to nautical activities. We can recognize at least seven such names⁵⁵: *na-u-si-ke-re[-we]* ‘Ship-Famous’ (KN X 214); *e-u-na-wo* ‘Fine-Ship’ (KN As 1520.9, B 799 v.2, Dv 1206.B, Np 5725 + 5886 + 8515); *o-ku-na-wo* ‘Swift-Ship’ (KN V(2) 60 [+] 151.4); *o-ti-na-wo* ‘Ship-Starter’ (PY Cn 285.14); *na-wi-ro* ‘Shipman’ (KN Db 1507.B); *e-u-o-mo[]* ‘Fine-Harborer’ (KN Xd 127); *e-u-po-ro-wo* ‘Fine-Sailing’ (KN V 7620.3, PY Jn 601.2, Jn 693.8). These attest to an active familiarity of the Mycenaean Greeks with sea travel. It is interesting to note that most individuals bearing these names are involved in herding—perhaps a mere reflection of the large pool of anthroponyms provided by the numerous and/or lengthy livestock tablets from Knossos and Pylos. The one notable exception is *e-u-po-ro-wo* which is a name entered twice for bronzesmiths on the Pylos Jn tablets. This total number of names is much smaller than those connected with many other spheres of Mycenaean social, political, economic, religious or military life. But the number might be expected to increase, if we had more texts registering names of personnel concerned with maritime subjects.

2. Fishing:

There are no references in the Linear B tablets to fish or fishermen. Here, too, we may be dealing with an activity which was either not controlled by Mycenaean administrators or not controlled via the kind of bureaucratic apparatus which monitored other activities of interest to the writers of clay records. It is worth noting that this occupation is also little attested in later historical texts since it was considered of low status⁵⁶. We might well conclude that it lay outside the regular interest of the Mycenaean palaces. The term *de-ku-tu-wo-ko[]* on Un 1322.2 seems to designate a tradesman involved in the manufacture of nets⁵⁷. Unfortunately the

54 *Nature of Minoan Trade* cites Near Eastern and Egyptian textual references to wood, leather products, and medicinal herbs described as Cretan (using the terms “Kaptara” or “Keftiu”). There is sufficient Linear B documentation for all three of these items to support the assumption that trade in these items continued in the Mycenaean period.

55 O. LANDAU, *Mykenisch-Griechische Personennamen* (Göteborg 1958), 157, 162, 180, 197, 210-211, 254.

56 M. AMIT, *Athens and the Sea* (Collection Latomus 74, Brussels 1965), 116.

57 *Docs*², 505-506; *Interp*, 413.

immediate context is ambiguous (entries of GRA, *NI*, and *146); and the word δίκτυον⁵⁸ can mean a net for fishing or for hunting (for which activity there is a relatively certain Mycenaean attestation: *ku-na-ke-ta-i* ‘hunters’ on PY Na 248). One should, however, note the concurrence of probable cloth manufacture terminology on Un 1322.2, .3, .4 (*de-ku-tu-wo-ko*, *i-te-we*, and *we-a₂-no*) and the association of *i-te-ja-o* (the feminine occupational term for ‘weavers’ corresponding to *i-te-we*) with the sons of rowers on Ad 684.

3. Organization of a Military or Commercial Fleet:

3.1 Military fleet:

Given the paucity of references to commercial transactions, it is perhaps no surprise that we have limited evidence regarding the building, maintenance, operation or control of commercial ships. However, there is considerable systematic treatment of military matters in the Linear B tablets, e.g.:

(1) texts recording the repair, storage and/or production of chariots, armor, swords, spears and arrows (PY Sa, Sh; KN Ra, R⁵⁹, Sc, Sd, Se, Sf, Sg, Sk, So);

(2) registers of personnel (KN As 1516⁶⁰);

(3) records of the regional disposition of military groups (PY *o-ka* tablets; KN B 1055, As <4493>, the Ld(1) set⁶¹).

So it is remarkable that there are so few texts which can be interpreted as dealing with Mycenaean war-fleets, especially in the archives of the palace at Pylos which controlled a region for which a naval defense presumably would have been vital.

3.2 Personnel for manning a fleet:

At Pylos secure information is provided by a few texts (PY An 1, An 610, An 724) which list large numbers of rowers (*e-re-ta*) with specific military, administrative and geographical associations. An 610 goes a very long way toward compensating for the paucity of tablets by listing ca. 600 rowers, conservatively estimated by restoration⁶². These rowers (enough to man 12, 20, or 30 ships, using Homeric figures and/or the total in PY An 1) are associated with important coastal centers and with several individuals of prominent status in the Pylian social and political hierarchy. An 724 lists smaller numbers of rowers who are absent (perhaps due to official exemption) at *ro-o-wa*, a coastal site that might be the main port of Pylos. These men are also associated with key individuals, in one instance with the *ra-wa-ke-ta* or military commander⁶³. An 1 lists 30 rowers from 5 coastal districts. They are being dispatched to a specific location, perhaps as the full crew of a single ship⁶⁴.

Most importantly, J.T. Killen has demonstrated with brilliant clarity and irrefutable logic, by using parallels with Ugaritic registers of seamen and by internal analysis of Mycenaean taxation records, that these nautical ‘recruitment records’ reflect levies organized according to

58 *DMic s.v.* and *DicEt, s.v.*

59 6010+2630 arrows on KN R 4482.

60 J. DRIESSEN, “Quelques remarques sur la ‘grande tablette’ (As 1516) de Cnossos”, *Minos* 19 (1985), 169-193, proposes that As 1516 might register members of a royal guard corps.

61 See J. DRIESSEN and C. McDONALD, “Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C.”, *BSA* 79 (1984), 49-56.

62 *Muster*, 77.

63 *Muster*, 79-80. An 724 also includes the puzzling form *a₂-ri-e*, for which J.-L. PERPILLOU, “La tablette PY An 724 et la flotte pylienne”, *Minos* 9 (1968), 213-218, has proposed an identification with *halieus* ‘man of the sea’. The textual difficulties of An 724 make any definite identification impossible.

64 *Muster*, 79.

normal principles of Mycenaean taxation. This supports the idea that a *regular system* was in place by which communities on a yearly basis supplied naval personnel for a fleet controlled by the palace center ⁶⁵. In fact, key phrases and terms applied to the rowers in these texts (such as *ki-ti-ta o-pe-ro-ta e-re-e* ‘landholder who owes service as a rower’; *ki-ti-ta* ‘settlers’; *me-ta-ki-ti-ta* ‘new settlers’; *po-si-ke-te-re* ‘immigrants’) imply that, on the individual level, their service was obligatory in return for the use of land granted to them by the palace center or by or through the local communities. One Ugaritic text in particular (UT, 83) lists the crew members contributed by various villages for each of three ships designated by the individual in charge of the ship, a stunning parallel for PY An 1. Killen’s article should be obligatory reading for all scholars interested in the nature and type of organization of Mycenaean trade. Finally it should be pointed out that these three tablets are the work of the ‘master scribe’ or main archivist at Pylos Hand 1, undoubtedly in keeping with the administrative importance of these naval registers ⁶⁶.

An important site listed on both An 1.6 and An 610.10 is *a-po-ne-we*. In an alternative spelling *a-pu-ne-we* ⁶⁷, the term recurs on tablet Ad 684 (by Hand 23) in a *lat. sup.* annotation to a record of the sons of weaving women at the site of *pu-ro*. The annotation specifies, with typically infuriating record-keeping brevity, ‘the sons of rowers (*e-re-ta-o ko-wo*) at *a-pu-ne-we*’. We know that in Classical Athens, the salaries of rowers were high enough to allow for the support of their families while they were in service ⁶⁸. It is possible that tablet Ad 684 reflects an arrangement whereby, in the Mycenaean period, at least some of the families formed by liaisons between rowers and dependent woman workers were maintained by the palace during the active service of the rowers. This would be consistent with the palatially dependent status of the rowers indicated by the An texts.

In addition, it is possible that the term *e-re-e-u* mentioned in Nn 831, Na 284, Cn 1197, An 723 and Jn 881 could refer to an official in charge of rowers. J. Chadwick has proposed a nautical interpretation for the term *po-ti-ro* (= *lpontiloil* or ‘seamen’) which occurs in the Knossos V(5) tablets ⁶⁹. Chadwick thinks that the leaf-shaped V(5) tablets might list ships designated by their major provincial center of origin and by the names of two men in charge, i.e., again in a way remarkably similar to the Ugaritic system. Because of the intricate textual arguments involved, I reserve full discussion of these texts for § II.3.b and II.3.c.

New joins have produced an extraordinary document from the site of Knossos:

KN U 7700 + 8284 + FR IV-26 + FR VI-0 + FR VII-0

][. . .]-re-ta *259 ! |

Traces of the sign immediately before *re* are consistent with *e*, although *wo* cannot be entirely ruled out. Spacing suggests, but does not prove, that this sign began a discrete word-unit: *e-re-ta*. The new ideogram *259 has a shape resembling a ship (see Pl. LXIII, a) ⁷⁰.

65 J.T. KILLEN, “PY An 1”, *Minos* 18 (1983), 71-79.

66 *SP*, 35-36, 47-48, 50-58, 188-189.

67 *SP*, 88-89, n. 129.

68 AMIT, *op. cit.*, *supra* n. 56, 51-52.

69 J. CHADWICK, “A Cretan Fleet?”, *Antichità Cretesi Studi in onore di Doro Levi* (Università di Catania 1978), 199-201. I thank John Bennet for this reference. Tablets in this series have a standard format providing limited information: a toponymic adjective as a heading followed by two personal names linked by *-qe* and apparently described as *po-ti-ro*, which is therefore classified as an occupational designation in *Interp.*, 448. There is thus little contextual evidence with which to judge Chadwick’s etymological interpretation.

70 The ideogram is clearly drawn in *436 Raccords*, 230.

Unfortunately the tablet cannot be attributed to a scribal hand or a fuller set, so one has simply the possible association of a rower or rowers with a ship ideogram. But the existence of a sign for ship within the Linear B ideographic repertory would indicate that nautical matters were handled on a fairly regular basis by Mycenaean scribes. This new reading is made all the more remarkable by a reexamination of Pylos tablet An 724 by J.L. Melena, E.L. Bennett, Jr., and myself in the National Museum in Athens on October 1, 1990. It is now clear that the design on the verso of the tablet, previously thought to resemble phonogram *35, is in fact also a sketch of a ship (see Pl. LXIII, b), executed no doubt by the scribe whose imagination drifted seaward because of his assignment on the recto: recording rowers missing at *ro-o-wa*.

3.3 Personnel for ship construction and maintenance:

The relative absence of textual references to activities and materials connected with building and maintaining ships may imply that ships were constructed and repaired in seaside areas (cf. Minoan Kommos) remote from the palatial workshops (NE Workshop at PY and Sa 1313: chariot wheels) and arsenals (the Arsenal at Knossos and the S- series of Hands 128-131, 206 and Ws 8495: chariot assembly and spears; also from the Arsenal come Ws 1704 and 1705 dealing with *pa-ta-ja* [javelins] as *o-pa* items) where the palatially controlled military equipment which is recorded in the surviving tablets was worked on or stored. Administrative matters might have been handled at such locations, although I would expect to find more indirect reflections of such a process in the texts from palace centers proper than we have. The palaces monitored closely other activities which took place in remote locales (livestock, agriculture, bronzeworking, regional taxation), but any direct evidence that the administrations at the Mycenaean palace centers supervised an organized system for keeping a war-fleet manned and in working order is minimal.

In the Pylos corpus, *na-u-do-mo* ('ship-builders') are mentioned on two fragmentary texts (PY Vn 865, Na 568), unfortunately without any completely extant place designations. On Vn 865 the word *na-u-do-mo* itself comprises the sole explanatory heading for a list of 12 extant masculine personal names, each followed by the number '1'. The heading is probably to be taken as a nominative plural description of the men listed: 'ship-builders' in either a specialized or non-specialized sense (see below). It is less likely, although possible, that the heading is dative singular 'for the ship-builder', and that the men listed are assigned to the individual so designated. The same ambiguity occurs on the heading of An 723 in regard to a term identifying an official in charge of rowers. On Na 568, *na-u-do-mo* are recorded as a group at a location the name of which is only partially preserved. These *na-u-do-mo* are in the category of being exempted from contributing (*o-u-di-do-si* = 'not giving') 50 units of flax. This constitutes by far the largest exemption offered to any group in this entire series of 101 tablets, undoubtedly a reflection of a relatively current need for the *na-u-do-mo* to be performing their occupational service of ship-building⁷¹. Other groups given exemptions on these tablets include bronzesmiths (*ka-ke-we* Na 106, Na 252, Na 425, Na 529), hunters (*ku-na-ke-ta-i* Na 248), and a group connected with the military leader: *ma-ra-te-we ra-wa-ke-si-jo* (Na 245) who just might have some association with maritime matters⁷². It is attractive, given the importance of rowers at the port of Pylos in An 724, to restore the place name *ro-o]-wa* on

71 T.B.L. WEBSTER, "Pylos Aa, Ab Tablets—Pylos E Tablets—Additional Homeric Notes", *BICS* 1 (1954), 15, was the first to connect the flax exemptions with the use of the flax in the important crafts or trades of the groups being granted exemptions.

72 A possibly related word-unit *ma-ra-te-u* (nom. sing.) occurs in PY An 657, Aq 218, and Cn 328. The first edition of *Docs* called attention to the gloss of Hesychius μαλακῆρες · ναῦται. The suggestion is suppressed in *Docs*², but we might recall the association of rowers (*e-re-ta*) with the *ra-wa-ke-ta* on tablet An 724.

Na 568, especially since the epigraphical commentary notes that at most two signs precede the preserved *wa*⁷³. The term for ship-builders also occurs once on a fragmentary Knossos tablet (KN U 736) with a lexical item and ideogram that can be given plausible nautical interpretations (*infra* § II.2.b).

Unfortunately it is impossible to determine whether the Mycenaean *na-u-do-mo* are the equivalent of shipwrights (= Classical ναυπηγοί), i.e., the technical specialists in ship construction who in the role of master planners would each supervise the construction of a single ship, or whether they are skilled woodworkers used in the labor of ship assembly, i.e., merely ship carpenters. In Classical inscriptions, the ναυπηγοί were associated individually with the ships whose construction they oversaw⁷⁴. On the basis of his technical experience with ancient ship remains and without any information about the Mycenaean documentation, J.R. Steffy of the Institute of Nautical Archaeology has estimated (*per vocem*) that a Bronze Age ship could be built in about 6 months by a ship's architect and a team of a dozen persons skilled in woodworking. Thus the list of 12 personal names on Vn 865 under the heading *na-u-do-mo* might plausibly be the record of a team of carpenters assigned to the construction of a single ship (*na-u-do-mo* = 'skilled workers involved in ship construction' or 'for the shipwright') or it might be a register of 12 'shipwrights' each of whom would be in charge of a work group for a single ship (12 ships total). Of course, as Robert Stieglitz has pointed out to me on the basis of Ugaritic parallels, the mention of individuals *by name* in Vn 865 makes it more probable that they are more highly skilled professionals, i.e., shipwrights. Either way the palace administrators are concerned here and elsewhere with *na-u-do-mo* individually and as a group and exempt them from the normal tax contribution of a material useful in their occupation. We can thus imagine that these shipwrights or ship carpenters were part of the pool of specialized manpower controlled by Near Eastern and Aegean palatial bureaucracies⁷⁵.

3.4 Direct records of materials for use on ships:

The interpretation of *ka-ko na-wi-jo* on PY Jn 829 as 'ship bronze' has been universally and correctly rejected. KN tablets M 757 and U 736 refer to linen 'straps' or turn-loops used in rowing. There is a possibility that PY Vn 46 and Vn 879 might record the structural elements, mainly wooden, for building a ship⁷⁶. These tablets will be discussed in § II.2.b and § II.2.c.

3.5 Extenuating factors explaining the paucity of references:

References to activities, personnel or materials connected with a commercial fleet are also rare. This is somewhat less surprising given the possibility that private entrepreneurs independent of the palace could have played a significant role in conducting overseas trade⁷⁷. As an example of the imbalance in documentation, we might consider the archaeologically and

73 *Docs*², 473, recognizes *ro-o]-wa* simply as an alternative restoration. It is worth pointing out that the three principal tablets involved in supporting this restoration (Na 568, An 724 and Nn 228) were all written by the major scribe of Pylos, Hand 1.

74 B. JORDAN, *The Athenian Navy in the Classical Period* (Berkeley 1975), 50-53.

75 For palatial control craftsmen in the Near East, see C. ZACCAGNINI, "Mobility Among Near Eastern Craftsmen", *JNES* 42 (1983), 245-264. S. HILLER, "Dependent Personnel in Mycenaean Texts", in M. HELTZER and E. LIPINSKI eds., *Society and Economy in the Eastern Mediterranean (c. 1500-1000 B.C.)* (Leuven 1988), 60, includes *na-u-do-mo* among the palatially dependent groups who "were granted plots of land upon which they could subsist, and for the holding of which they were obliged to fulfil a twofold service: they had to deliver natural products and they had to practice their special trade".

76 H. VAN EFFENTERRE, "Un Navire Mycénien (?)", in M. MOLLAT ed., *Sociétés et compagnes de commerce en Orient et dans l'Océan Indien* (Paris 1970), 45-53.

77 M.H. WIENER in *Nature of Minoan Trade* argues that the existence of "an independent maritime or merchant class" in the Minoan neo-palatial period is "plausible, if quite unproven".

textually important site of Amnisos, the main port of Knossos⁷⁸. *a-mi-ni-so* is mentioned 37 times in the Knossos tablets in connection with many subjects textile production, agriculture (30 units of oil on Fh 5451 + 5496 + *frr.*) and sheep-herding (11,900 sheep registered on Dn 1319 + 5307 + 5568), chariots and armor, cultic functions, and general personnel. Not a single allusion is made to nautical activities at this site, commercial or military.

One might also propose that seasonal factors have limited the number of references to ship construction and maintenance. References in the Pylos tablets to rowers (An 1, An 610, An 724, Ad 684) and rowing officials (An 723), the month 'of sailing' (*po-ro-wi-to-jo* / *po-ro-wi-to* on PY Fr 1218, Fr 1221, Fr 1232 and Tn 316), and measures connected with a possible, but by no means definite, naval emergency in the region all imply that the sailing season was underway. J. Chadwick's tentative interpretation of the KN V(5) set, if correct, would offer proof that the sailing season was at hand when at least this part of the corpus of inscriptions from Knossos was written⁷⁹. Thus, at the time of the destructions which preserved our texts, activities connected with ship construction, repair or maintenance might no longer have been a main interest for the surviving tablets with their acutely contemporary focus. This could explain why we have only one extant register (Vn 865) of individual *na-u-do-mo* from the Pylos archives and that by an unidentifiable hand (Ci). The tablet might be a left-over from an earlier season of the year or the *na-u-do-mo* at this point in the year might be functioning as ship's carpenters on sea-going vessels (a known meaning of the Classical term ναυπηγοί)⁸⁰.

II. Detailed Discussion of Texts

As noted several times above, I have reserved for this section any lengthy discussion of the interpretation of particular texts. In order to provide some coherent structure, I have grouped the texts into three categories already familiar from § I, according to whether they refer to: (1) trade products; (2) materials possibly used in ship construction; or (3) personnel connected with ships. This section is not exhaustive, in the sense that I do not necessarily repeat here subjects discussed in § I. Also the groupings are not procrustean.

1. Trade Products:

a. One important item connected with Mycenaean trade products and not discussed at length in § I is purple murex dye, which would have been a prized substance in at least the Mycenaean-controlled Cretan cloth industry. I discuss the textual references fully here, since participants in the *Thalassa* conference were eager to know exactly what the Linear B evidence was. First, however, it is important to determine whether the Mycenaeans could rely on local sources or had to trade for this substance, as they did for the copper, tin, perfume resins, spices and other raw and processed materials vital to their other key industries. Since the word *πόρφυρα* has no convincing Greek or Near Eastern etymology, an argument could be made that it is a loan word from a Minoan source, especially since the word for another special dye-substance *pa-ra-ku* seems to be of Minoan origin (see § II.1.b). Is this consistent with the archaeological evidence? David Reese, after surveying the evidence of shell remains from sites in the Aegean

78 For the archaeological evidence, see J. SCHAEFER in this volume. For a thorough study of the Amnisos dossier, see S. HILLER, "Amnisos in den mykenischen Texten", *Kadmos* 21 (1982), 33-63.

79 For further hypotheses about the time of year for the destructions of the palaces at Pylos (early spring: late March onward) and Knossos (June), see J. CHADWICK, *The Mycenaean World* (Cambridge 1976), 188-192. As mentioned above, it now seems probable that the Knossos tablets are not chronologically unified: see DRIESSEN, *op. cit.*, *supra* n. 9.

80 JORDAN, *op. cit.*, *supra* n. 74, 50-53. On the Ulu Burun shipwreck, some of the metal tools may have been for use by crew members in ship repair. Cf. PULAK, *art. cit.*, *supra* n. 50, 16.

and the Near East concludes: “The archaeological evidence available to date suggests that the shell purple-dye industry began in middle and late MM (c. 1700-1600 BC) in eastern Crete (Palaikastro, Kouphonisi, Mallia), Keos, and Kythera and possibly was introduced to the Argolid and Aegina late in the Middle Helladic period. The earliest evidence in the Levant is about a century later, suggesting that the Minoans developed the industry later to be associated more with Tyre and the Phoenicians”⁸¹. However, the earliest archaeological evidence for use of the dye proper comes from Sarepta on the Lebanese coast (1450-1275 B.C.); and the earliest textual references to this precious dye are also Near Eastern (Tell el-Amarna, Ugaritic and Hittite documents of the 15th-14th centuries B.C.)⁸². Thus it must remain an open question whether the limited amounts of murex-shell remains from 17th-16th century contexts in the Aegean prove that the Minoans were the first to discover and exploit the dye and that they then disseminated knowledge of the process to potential trade competitors.

In the Linear B tablets, all 4 instances of forms related to *πόρφυρα* come from Knossos. Two are directly and securely connected with cloth. One is preserved in an erasure. The last is on a tablet without a surviving ideogram, but found in an area which has yielded other cloth-related texts (*infra* n. 85). The absence of the term in our records from other sites may simply result from the disparity between the overwhelming number of cloth production texts from Knossos and the limited number from mainland sites, or it may point to a Cretan monopoly of purple-cloth dyeing even in the Mycenaean period. Here is the dossier of lexical items in the Mycenaean corpus relating to *πόρφυρα*. I have highlighted the terms in italics in the texts for convenience.

TEXT	HAND
KN Lc(1) 561	
.a [[<i>po-pu</i>]] e-pi-qe ʔe-si	(103)
.b e-ra-ja/ TELA ¹ +TE 1	
KN L(7) 474 + <i>fr.</i>	(211)
<i>po-pu-re-ja</i> , / pu-ka-ta-ri-ja TELA ³ +PU 21	
KN X 976 + 8263	(225)
.1a da-*83-ja <i>po-pu-re-jo</i> [
.1b to-so / wa-na-ka-te-ro [
.2 vacat [
KN L 758	(-)
.a]re-ne-o , <i>po-pu-ro</i> 2	
.b]o-no TELA ² +PU 2	

.a Probably *o-]re-ne-o* (cf. L 593.Ab *o-re-ne-a*)

po-pu-re-ja on KN L(7) 474 + *fr.* is interpreted as a nom. plur. fem. or neut. *porphurei-ai* or *-a* modifying the *pu-ka-ta-ri-ja* cloth (TELA³+PU). The same scribe Hand 211 on a parallel tablet L(7) 471 records 10 TELA⁴+PU described again as *pu-ka-ta-ri-ja* (type of cloth) and *re-u-ka* (color: *leukos*= ‘white’) and *me-zo-e* (*medzohes* = ‘greater’). A third tablet L(7) 592 + 663

81 D.S. REESE, “Palaikastro Shells and Bronze Age Purple-Dye Production in the Mediterranean Basin”, *BSA* 82 (1987), 203-206.

82 REESE, *art. cit.*, 205-206.

+ 8310 + *frr.* (3) is tentatively ascribed also to hand 211. It lists 30 units of *161 TELA³ with lexical entries *pa-we-a* (cf. Hom. φάρος) and *nu-wa-i-ja* an obscure term describing this kind of cloth.

po-pu-ro₂ on KN L 758 seems to be nominative dual feminine (or neuter) modifying the 2 units of TELA²+PU. For both these, see Gk. πορφύρεος Aeol. πορφύριος.

On KN Lc(1) 561 some form of the same term seems to have been begun and then erased: [[*po-pu*]]. The text of this tablet is obscure, although the heading term *e-ra-ja* seems to be a feminine ethnic adjective derived from the Cretan toponym *e-ra* and used in other instances on texts defining stints of work by women cloth workers, e.g., Lc(1) 528 *pa-we-a ko-u-ra* and *tu-na-no* cloth⁸³. Given the fact that in the two texts where the type of cloth is extant it is *pu-ka-ta-ri-ja* cloth, it is perhaps significant that the final text on KN Lc(1) 561 deals with another type of cloth, which was not or could not be dyed purple: hence the erasure of the term for purple.

On KN X 976 + 8263 we have an adjectival form *po-pu-re-jo*. The other terms in the text are *to-so* 'so many' or 'so much' and *wa-na-ka-te-ro* 'of the *wanax*', i.e., 'royal'. Unfortunately no ideogram remains on the text to make certain that the adjectives for 'purple' and 'royal' are connected with cloth in this instance. *po-pu-re-jo* may be a nominative plural masculine or a dual of any gender. It may also be neuter singular and mean 'workshop of purple dye'. *da-*83-ja* is most plausibly interpreted as an ethnic adjective used as a toponym; and Killen argues for both toponyms *da-*83-ja* and *e-ra* being part of a group in a region associated with Tyliisos⁸⁴. The only other tablet by hand 225 is V 832 + 961 + 8666 + *fr.*, which, like X 976, was found in I3, the Area of the Bull Relief⁸⁵. It unfortunately is merely a list of masculine personal names, eight of which are identifiable to a degree, but only one of which is certainly attested elsewhere in the Knossos corpus⁸⁶. *pa-we-a* cloth is described as having variegated or white elements (*po-ki-ro-nu-ka* = ποικιλο-*nu-ka*; *re-u-ko-nu-ka* = λευκο-*nu-ka*) while *pu-ka-ta-ri-ja* cloth is listed as fully colored itself (*re-u-ka*, *po-pu-re-ja*). Thus, in the latter case, the dyeing would follow the weaving; in the former case, the separate color elements would have had to have been themselves dyed ahead of time⁸⁷.

Our conclusions from such meager evidence must be tentative. On Mycenaean Crete, purple dye was applied to a particular kind of cloth which therefore was in demand (this same kind of cloth was exported from Mycenae to Thebes). In at least one instance, some type of purple material or workers of purple dye or purple-dye workshop was designated as 'royal', thus suggesting that the dye considerably enhanced the value of cloth products. There may have been a center of production for purple-dyed cloth in the district of Tyliisos.

b. In the opening section of this paper, I discussed at greater length the term *ku-pi-ri-jo* as evidence for trade connections with Cyprus. Here I wish to elaborate on that discussion. The Knossos tablets relevant here, several with new joins, are:

83 KILLEN, *art. cit.*, *supra* n. 16, 153-155.

84 J.K. MCARTHUR, "A Tentative Lexicon of Mycenaean Place-Names. Part I. The Knossos Tablets", *Minos* 19 (1985), Anexo, 28-29. J.T. KILLEN, "Piety Begins at Home", *TM*, 165-170.

85 Component V 832 was ascribed to hand 102 before the join was made. From the area I3 come also cloth-related tablets by scribes 114 and 207. SC, 42-44, 56, 89-90, 96. P. CARLIER, *La royauté en Grèce avant Alexandre* (Strasbourg 1984), 51-52, nn. 276-277, proposes the possibility that the men listed on V 832 may be 'royal workers of purple' or 'royal fishers of murex'.

86 *u-ta-jo*, a collector associated with many sites. Cf. J.-P. OLIVIER, "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, Salamanca 1988), 253-254.

87 MELENA, *op. cit.*, *supra* n. 17, 105-106.

Od 667 + 5898 + 8292 + *fr.*

.A 'ku-pi-ri-ja' LANA 1 M 2 P 4[
 .B][. .]-ku / ke-[]-ja M 2 P 1[
 lat. inf.]sa-mu[] 1 qo-ja-te P 1[

Fh 361 + 9069 + 9096 + FR I/2-0

.a OLE 21 S 2 [] *vac.*
 .b ku-pi-ri-jo / o-no zo-a OLE 3 V 3

Fh 5447 + 5452 + Fh 5466 + 7787 + *frr.* (12)

]-ki-ro / ku-pi-ri-jo o-no OLE 9 S[] MU 7

Fh 347

.1 ma-ro-ne / ku-pi-ri-jo OLE 6 S 2 MU 5
 .2 we-we-ṛo , / o-no OLE 1 a-ri-to-[.]jo OLE V 2

Fh 371 + 5448

]o-se-ko-do / ku-pi-ri-jo OLE 13 S 1 MU 10

Fh 5446

.1 ku-pi-ri-jo / u-ne[
 .2 to-ro-qa / a-nu-[

Fp (2) 5472 + 5476 = *frr.* (5)

.1 ku-pi-ri-jo / su-ko-ne OLE [
 .2 si-ja-ma[] OLE 1 S [
 .3]*vest.*[]de OLE 2 [
 .4] *vacat*]

Fh 5246 + 8504 + *frr.* (4)

 ku-pi-ri-jo / ma-ro-ne OLE 100 [

Fh 372 + Fh 5440 + 5474 + *frr.* (3)

 ku-pi-ri-jo / o-no OLE 150

Fh 367 + 5460 + 9083 + 9106

 to-so-ku-su-pa OLE 330 S 1

Fh 5503.

]OLE 339 V 5

Fh 5503 is probably connected with Fh 366: to-so / a-pu-do[-si].

Od 667 is important because here the adjectives for ‘Cypriote’ and ‘Cretan’ are clearly describing the wool listed on the tablet, not referring to individuals as ‘the Cypriote’ or ‘the Cretan’⁸⁸. Thus *ku-pi-ri-jo* is functioning like other toponymic adjectives specifying particular places with which products are associated (e.g., *za-ku-si-jo/-ja* and *ke-re-si-jo* in the Pylos texts, *supra* § I.1.d). Od 667 is unascribed to hand, and the quantities of wool listed on the tablet can be contrasted with the generally much larger amounts of wool recorded on tablets of the Od sets of hands 103 and 115. It is possible to read the beginning of line .B as]pa-ṛa-ku, plausibly interpreted by Melena as a Minoan substrate loan word (with related adjectival forms *pa-ra-ku-ja* and *56-*ra-ku-ja*) referring to a blue or bluish green coloring substance for cloth⁸⁹. The tablet might be distinguishing between wool dyed this special color originating respectively in Cyprus and in Crete⁹⁰. Alternatively the adjectives might be indicating the intended destinations of this rare dyed wool, the amount being allocated to a Cypriote market being two times that destined to stay in Crete. This second interpretation would be consistent with the interpretation of *ku-pi-ri-jo* in the Fh oil texts now to be discussed.

All the Fh tablets listed here belong to the full Fh series by hand 141 (107 tablets and fragments, ca. 60 tablets being reasonably full)⁹¹. Fh 367 lists a grand total of oil (ca. 9513.6 liters). Fh 366 [+]? 5503, if correctly connected with one another, would give another slightly larger total designated as *a-pu-do-si. ku-pi-ri-jo* is associated on the Fh tablets with rather large quantities of oil, with an important economic transactional term *o-no*, and with a special phonetic abbreviation *MU* found only in this series. For *MU*, two main interpretations have been proposed: (1) the abbreviation stands for a container for the liquid oil; and (2) the abbreviation stands for the spice *myrrh*⁹². In the two cases where numbers are entirely preserved, the ratio between the amount of oil and the number of *MU* is S 4 (ca. 38.4 liters): *MU* 1. Exactly the same proportion can be achieved on Fh 5447 by restoring S 1 (only the restorations S 1 or S 2 are possible). The specification of the number of containers used for a shipment of oil is paralleled in PY Fr 1184 where 18 stirrup jars (*ka-ra-re-we*) are listed against OLE 38. The absence of any metrical unit for measuring *MU* weighs against the interpretation as *myrrh* as does the complete absence of any other spice ingredients or description of oil scent on the ca. 60 appreciably intact Fh tablets. I therefore accept as a working hypothesis that *MU* is a special container with a much larger capacity than the standard stirrup jar of ca. 12-14 liters, although Hal Haskell has informed me (*per litteras*) that a few earlier stirrup jars from the Greek mainland are large enough to hold approximately 40 liters of liquid. *o-no* has recently been interpreted as ‘ass load’⁹³ and assigned a value in absolute terms equal to the Mycenaean large liquid measure (i.e., in the present instance *o-no* = OLE 1 = S 3 = ca. 28.8 liters). Although this line of interpretation is not without problems (for example, the paradox that *o-no* is thought to appear mostly where its normal value does not apply—i.e., where its standard quantity is in

88 Unless, of course, one wishes to argue that the word-units are fem. dat. sing. and specify the wool as ‘for the Cypriote woman’ and ‘for the Cretan woman’. But the second phrase hardly would seem useful in a Cretan context.

89 J.L. MELENA, “On Untransliterated Syllabograms *56 and *22”, *TM*, 225-226. See especially the Hesychian gloss βαρακίς · γλαύκτινον ἱμάτινον.

90 *436 Raccords*, 205, cites textual evidence for the association of dyed cloth with the island of Cyprus.

91 Hand 141 writes only Fh oil texts, original Fp 5475 now being reclassified as Fh 5475.

92 *MU* = container: L.R. PALMER, Review of *Docs*², *Gnomon* 48 (1976), 434, and J.L. MELENA, “Olive Oil and Other Sorts of Oil in the Mycenaean Tablets”, *Minos* 18 (1983), 121-122 [*MU* = leather containers]; *MU* = myrrh: A SACCONI, “La mirra nella preparazione degli unguenti profumati a Cnosso”, *Athenaeum* 47 (1969), 286-289.

93 W.R. GALLAGHER, “A Reconsideration of *o-no* in Mycenaean Greek”, *Minos* 23 (1988), 85-106.

conflict with some other system of measure, e.g., the *MU* unit—and otherwise to be tacitly employed where it does not appear), it does make reasonable sense of our Fh texts.

Accepting the above interpretations of the two key textual items *MU* and *o-no*, we can make good sense of the term *ku-pi-ri-jo* by viewing it as applied to the oil in order to indicate that it is destined for Cypriote markets, an interpretation which J.L. Melena would apply to the term in all of its applications: wool, spices, coriander, honey and vases (perhaps for honey ?) ⁹⁴. Favoring this interpretation are the large quantities of oil listed in each instance and even the designation of the oil in terms of special container sizes which may imply a specialized market (or if *MU* = skin-sacks, hauling to the port for export). A further point in favor of this view is the carefully developed hypothesis of N. Hirschfeld that the discovery of LH III/LM III pottery with Cypriote marks in the Aegean indicates the presence of persons knowledgeable in the Cypriote marking system and concerned with the shipment of products to Cyprus ⁹⁵. J.-P. Olivier objects that the oil is not specifically noted as being perfumed and that, unless it is perfumed, one cannot imagine why it would be exported to Cyprus, an island presumably with sufficient native oil supplies ⁹⁶. This line of argument involves us in the sort of speculation about “sending owls to Athens” that we touched upon in the opening section of this paper in regard to Argolid wool being shipped to Boeotia. We do not know what particular economic conditions, markets and tastes prevailed in Late Bronze Age Cyprus. For example, specialization in the extraction of ores may have led to a less than full exploitation of the island's agricultural resources, especially when commodities could be obtained easily and regularly through trade. In regard to markets and tastes, returning from Greece nowadays, most recently in early October, 1990, I usually make sure to bring with me Greek olive oil and coffee beans from the Brazil Cafe on Voukourestiou Street despite the ready and cheap availability in the United States of Italian, Spanish and California olive oil and excellent South and Central American coffees. We certainly should reckon with some Cretan and Mycenaean settlers on the ethnically mixed island of Cyprus who themselves would highly desire a home product. My point here is not frivolous: we have little way of knowing precisely why unperfumed oil might have been shipped to Cyprus; but this does not mean that we should rule it out, especially when we can offer any number of probable reasons and historical or acceptable contemporary analogies.

Moreover, this line of argument also assumes that the oil is not perfumed because it is not explicitly noted as perfumed. This is a dangerous assumption in working with the Linear B tablets wherein so much information about persons, places, qualities of products, and the nature of transactions is simply understood by the scribal administrators in performing specific record-keeping tasks. The designation of perfumed scents of oil is in fact a feature of only a limited number of special tablets of the Fr series at Pylos which deal usually with allotments of small quantities (0.8 to 9.6 liters normally, with three exceptions in the range of 80-160 liters) of scented oils in the context of divinities and regional sanctuaries ⁹⁷. The inscribed stirrup jars do not indicate in their formulae the special scents, if any, of the oils contained within. It is also not beyond possibility that the oil on the KN Fh tablets, if it is plain, would have been altered somehow before it was shipped to Cyprus and that our texts represent an initial distribution of raw oil supplies. There must have been some recording of allocations of oil to unguent-makers

94 *436 Raccords*, 203.

95 N. HIRSCHFELD, “Incised Marks on LH/LM III Pottery” (M.A. Thesis Institute of Nautical Archaeology forthcoming).

96 *436 Raccords*, 217.

97 *Docs*², 476-483.

before it reached the stage of being designated by scent or by its processed state as an unguent (*a-re-pa*, *a-ro-pa*, or OLE + WE as on PY Fr 1184) ⁹⁸.

In sum, I prefer the interpretation of *ku-pi-ri-jo* as a designation of products bound for Cypriote markets. However, given the nature of the documentation, the matter is beyond absolute proof or refutation. Alternative interpretations of merit exist.

2. Materials for ship construction:

a. It is worth mentioning here that the phrase *ka-ko na-wi-jo*, at least in terms of etymological reconstruction, could be interpreted as ‘ship bronze’ ⁹⁹. It occurs on PY Jn 829 in the opening heading (lines .1-.3) which stipulates: ‘Thus the *ko-re-te-re* and the *du-ma-te* and the *po-ro-ko-re-te-re* and the *ka-ra-wi-po-ro* and the *o-pi-su-ko* and the *o-pi-ka-pe-e-we* will give *ka-ko na-wi-jo* as points for javelins and spears’. There follows a list of small quantities of bronze (0.75 to 3.75 kg.) associated with the *ko-re-te* and *po-ro-ko-re-te* of important communities, nine in the Hither Province, seven in the Further Province of Pylos. Two convincing arguments support the interpretation of the phrase as ‘temple bronze’: (1) the definite religious associations of the *ka-ra-wi-po-ro* and the localized concerns of the other officials (‘mayors’, ‘vice-mayors’, ‘fig overseers’, ‘overseers of digging’); and (2) the absence of any evidence for the use of bronze in the construction of Bronze Age ships ¹⁰⁰.

b. The term *e-to-ro-qa-ta* with an accompanying ideogram *181 in the form of an upturned loop and the ideogram itself occur on two Knossos tablets in contexts which make their interpretation as ‘turn-loops’ or straps used to fasten oars against thole-pins highly probable ¹⁰¹:

M 757

] *146² 250[

lat. inf.] *181 10 [

U 736

.1]na-u-do-mo

.2]93 e-to-ro-qa-ta *181 10

Trace before 93, probably not a numeral.

Neither text can be ascribed to a scribal hand. U 736 comes from an archives above the Throne Room at Knossos and is unconnected with texts found elsewhere. M 757 comes from the Spiral Cornice Room, part of an ensemble of bureaus representing the work of some 27 identified scribes on a whole range of subjects. The main surface of M 757 preserves a

98 *Docs*², 476-477, and MELENA, *art. cit.*, *supra* n. 92, 113, for succinct discussion of the vocabulary used to describe oil. See particularly also *DMic*, s. *a-re-pa*, *a-ro-pa*.

99 On this whole topic, see S. HILLER, “*ka-ko na-wi-jo*, Notes on the Interdependences of Temple and Bronze in the Aegean Bronze Age”, in *CollMyc*, 189-195; A. LEUKART, “Autour de *ka-ko na-wi-jo*: quelques critères”, *CollMyc*, 183-187.

100 HILLER, *art. cit.*, 190 and n. 6; LEUKART, *art. cit.*, 183-184 and n. 6. Confirmed by J.R. Steffy (*per vocem*).

101 MELENA, *op. cit.*, *supra* n. 17, 50-63.

reference to 250 units of flax cloth. Thus it is likely, though by no means certain, that the 'loops' recorded on the bottom edge of the tablet are made of the same material. On U 736 these loops are also assigned to last position in a list. They are preceded by at least 93 units of some no longer preserved item. Thus the 10 units of *181 in both cases stand in marked disproportion with prior listed items: flax cloth (250 units) and the unknown commodity (93 units). Reference to *na-u-do-mo* (singular dative 'for the ship-builder' ? or nominative singular or plural in the syntax of the unpreserved portion of the tablet ?) in U 736.1 confirms the nautical association of this ideogram. If we then recall that the *na-u-do-mo* on Pylos tablet Na 568 are given the largest exemption of flax payment of any of the specialized craftsmen listed in the full Na series, we see that the flax cloth on M 757 can also by transitive association be brought within the nautical sphere¹⁰². It is worth pointing out that the references to *na-u-do-mo* on KN U 736 and PY Na 568 both may be by-products of the flax and linen cloth-production industry, i.e., the texts do not belong to series concerned directly with the management of ship-building operations, but these particular texts happen to be concerned with channeling materials to personnel connected with ship-building. Again the paucity of references in the Knossos corpus may be due to the fact that these two isolated tablets are 'left-overs' from fuller series handling such operations at an earlier season of the year.

c. PY Vn 46 (and PY Vn 879) contains a long list of items (all listed non-ideographically) in widely varying quantities. H. van Effenterre long ago proposed that these items be interpreted as the materials for constructing a ship, in contrast to their normal interpretation as building elements connected with the architecture of a Mycenaean megaron *vel sim.*¹⁰³. There is no close contextual association by find-spots of Vn 46, Vn 879, or the *na-u-do-mo* register Vn 865. Vn 46 and Vn 879 belong to palaeographical Class ii, Vn 865 to Class i.

Vn 46

.0 *supra mutila*
 .1 pi-ṛa3-
 .2 ka-pi-ni-ja , a-ti-ta , 6] (ELB)
 .3 ka-pi-ni-ja , e-ru-mi-ni-ja , 4 [
 .4 ka-pi-ni-ja , ta-ra-nu-we 12]
 .5 *35-ki-no-o 81 o-pi-ṛa3-te-re 40]
 .6 e-to-ki-ja 23[]-ke-te-re 140
 .7 pi-ri-ja-o , ta-ra-nu-we 6
 .8 qe-re-ti-ri-jo 2 me-ta-se-we 10
 .9 e-po-wo-ke , pu-to-ro 16
 .10 *35-ki-no-o , pu-to-ro 100
 .11 ta-to-mo , a-ro-wo , e-pi-*65-ko 1
 .12 e-ru-mi-ni-ja 2 ki-wo-qe 1

102 HILLER, *art. cit.*, *supra* n. 78, 47-48, notes a similar association of flax and linen with defensive gear for military personnel. It is just possible that the meager fragment Nc 4448 once contained a record of linen cloth associated with *a-mi-ni-so* (Amnisos) because of ship-building activities at that port.

103 VAN EFFENTERRE, *art. cit.*, *supra* n. 76, 43-53. Standard interpretation in *Docs*², 503-505; *Interp*, 366-367. *Docs*² rightly remarks that, since the heading is missing, we cannot know for what particular structure these materials would have been used.

Vn 879

.1	a-ti[], pe-*65-ka	8
.2	ko-ni-ti-ja-ja , pe-*65-ka	24
.3	e-to-ki-ja , qa-ra-de-ro	10
.4	pa-ke-te-re , qa-ra-de-ro	86

Since the time of van Effenterre's article, the readings of several portions of the troublesome text Vn 46 have been clarified. I have noted those that differ significantly from his text in *italics*. The main starting point for both schools of interpretation is the identification of the key lexical item *ka-pi-ni-ja*. The standard interpretation is *καπνία* which, according to the Atticist lexicographer Moeris, is the general Greek word for the ceramic device through which smoke escapes, equivalent to Attic *ὀπαία* (*καπνία* is related to *κάπνη* and the term *καπνοδόκη* in the meaning of 'smoke-container', i.e., 'chimney')¹⁰⁴. Proceeding with etymological reconstructions and in keeping with the context established by this item which appears three times, apparently in the genitive, in the opening lines of the text, the standard interpretation can make good sense of many of the other lexical items listed: *e-to-ki-ja* = *entoikhia* 'fittings for insertion in walls'; *ta-to-mo* = *σταθμός* 'pillar', as in *Od.* 1.333; *pi-ri-ja-o* = *phliāōn* 'door-posts'; *ta-ra-nu-we* = '(cross) beams' in the sense of *θρᾶνος*; *pa]-ke-te-re* from *πήγνυμι* in the sense of 'wooden pegs'; *e-ru-mi-ni-ja* = Hes. *ἐλύμνιαι* · *δοκοὶ* ὀροφῆναι 'roof beams'; and *ki-wo* = *κίφων* 'pillar'. *35-*ki-no-o* and *o-pi-ra3-te-re*, both of which appear in large numbers, can be reasonably interpreted as wooden fittings. None of these interpretations is far-fetched; and they harmonize well with one another, making coherent sense of the whole list. But I must stress again that they are purely etymological, since there are no ideograms or confirming tablet parallels or tablet associations to assist us.

Van Effenterre's approach, given the limited information, is fair to the data, as it then existed, and to the traditional reconstruction, the main elements of which he reviews without dispute. He simply raises an alternative, based on the orthographical flexibility of the Linear B script and possibly different specialized meanings of key lexical items. His interpretation also tries to make sense of the specific numbers of the items listed. Again the point of departure is *ka-pi-ni-ja*, which he relates to *σκάφος* in its later sense 'ship' (**σκαφος* from a root **sqebh* paralleling **καπνός* from **quēp* ?, citing Latin *scam/num*)¹⁰⁵. He cites as support for the

104 Moeris: *ὀπαία* κεραμῖς δι' ἧς ὁ καπνὸς ἔξεισιν Ἀττικοὶ, *καπνία* Ἑλληνες. *Interp.* 434, disagrees with this identification on the grounds that timber would not be used for a 'smokestack'. However, *Docs*² rightly counters that the timbering here has to do with cross-beams (*ta-ra-nu-we*) and roof beams (*e-ru-mi-ni-ja*) used around the central clay chimney. In addition, it is fair to point out that in Mycenaean architecture we are not dealing with heat-intensive modern fireplaces and chimneys, but raised smoke-vents.

105 VAN EFFENTERRE, *art. cit.*, *supra* n. 76, 46 n. 1. *DicEt.*, s. *σκάπτω* and *καπνός*, for etymologies and support of the view of Mycenaean *ka-pi-ni-ja* as 'chimney'. The use of *σκάφος* in the sense of 'hull of a ship' is met with first in Herodotus. Homer has only the *hapax* *σκάφος* 'bowl'. Van Effenterre's interpretation has the perverse merit of linking the Mycenaean word-unit at one stage to a relatively rare and unproductive noun-class (thematic derivatives in *-no-*) which is attested mainly in late and hard-to-interpret archaisms. Cf. P. CHANTRAINE, *La formation des noms en grec ancien* (Paris 1979), §148-§164. One might then posit that this particular form and semantically specialized meaning fell out of the Greek lexicon after the end of the Mycenaean Bronze Age. Major problems are: (1) the later attested feminine nouns in *-ια* are most often *abstract nouns*; (2) they generally are formed either in tandem with adjectives in *-ιος*, directly from basic noun stems, or from compounds. But there are enough examples of *-ια* derivatives with concrete meanings (e.g., *οἰκία*, *κονία*, *ἀντλία*) formed directly from *-ος* nouns to make the interpretation possible. One would have to posit a double-stage of development for the term, first a formation in *-no-*, then a further derivative in *-ια*. But I think this is in fact the course of development one has to posit for the Mycenaean term **o-pi-ke-re-mi-ni-ja* (if related to *κρημνός* from root **krem*) found

Mycenaean stem **ka-p-* having such a meaning *o-pi-ka-pe-e-we*, the name of an official found in the heading of Jn 829, the *ka-ko na-wi-jo* tablet. While related to σκάφος, an interpretation of *o-pi-ka-pe-e-we* as relating to ‘overseeing of ships’ *vel sim.* is no longer supportable¹⁰⁶; and the term is now interpreted according to a literal sense of the meaning of the stem, ‘overseers of digging’ in an agricultural sense. For contextual and general archaeological reasons, as we have seen, *ka-ko na-wi-jo* is no longer interpreted as ‘ship bronze’. Thus the rendering of *ka-pi-ni-ja* as ‘of the ship’ *vel sim.* must stand on its own linguistic merits as a starting point for interpretation¹⁰⁷. Other terms (*ta-ra-nu-we* = ‘cross-beams’ and therefore ‘benches of a ship’; and **e-pi-65-ko* = ? ἐπίζυγος Hes. ἐπιζύγιον · μέρος τῆς νεώς ‘a part of a ship’) have attested nautical meanings, and van Effenterre follows up on these meanings. In brief, the following identifications and the numbers then read in the text of Vn 46 are crucial to his argument¹⁰⁸:

- e-ru-mi-ni-ja* = the stringers ? (Fr. ‘longerons’ or ‘serres’) which run longitudinally inside the hull of a ship / number: 4 (these provide, according to van Effenterre, the main structural support for frames and cross-beams—stressing the basic meaning of the term rather than the later semantically specialized meaning cited by Hesychius);
- ka-pi-ni-ja ta-ra-nu-we* = horizontal crossbeams (Fr. ‘barrots’) between the wales / number: 16 (restored from original reading 14 so as to yield 15 spaces between the 16 crossbeams for 15 rowers on each side of the ship—and thus 30 rowers to a ship, as on An 1);
- pi-ri-ja-o ta-ra-nu-we* = master frames (Fr. ‘maîtres-couples’) / number: 6 (these were used to reinforce the framing at regular intervals);
- me-ta-se-we* = ‘intermediate’¹⁰⁹ frame-pieces / number: 10 (these were used 2 apiece in the 5 intervals created by the 6 master frames);
- *35-ki-no-o* = half-frames / number: 80 (these were fixed in pairs on the keel and wales);
- o-pi-te-te-re* = ‘chocks’ (Fr. ‘varangues’) / number: 40 (triangular pieces of wood used to reinforce and cover the joint of the 40 pairs of half-frames on the hull);
- e-to-ki-ja* = pieces fixed to the walls of the hull, i.e., the gunwale (Fr. ‘plat-bord’) / number: restored as 16;
- pa-ke-te-re* = not mere fixing pegs—because these should then be listed with other structural elements requiring fastening, not just with the *entoikhia*—but a series of

in instrumental form on PY Ta 707 as a description of ‘overhanging’ ivory elements of an ebony chair; for *e-ru-mi-ni-ja* (from root **elu?*) in Vn 46; and for *de-mi-ni-ja* / *de-mi-ni-jo* ‘bedding’ (from root **dem*) in PY Vn 851, PY Wr 1326 and MY V 659. These would provide Mycenaean parallels. The last two terms survive into later Greek. All of the terms fall into the same semantic sphere of woodworking and carpentry.

106 See the full discussion of this term and its context in R. PALMER, *Wine in the Mycenaean Palace Economy* (Diss.: Univ. of Cincinnati 1989), 47-49. Even at the time, *Interp.*, 283, translated the term as “those in charge of (sacred) vessels [i.e., implements]”.

107 There is nothing *per se* against a Mycenaean spelling having two meanings, e.g., *pa-te*, or a root in the Mycenaean period having some of the same range of meanings attested in later times.

108 Van Effenterre does not provide a plan or text-figure of his reconstruction, and his descriptive vocabulary is not always perfectly clear. On occasion, it is difficult to understand exactly to what technical component of ship-architecture he is referring. For our discussion the main difficulty lies in his discussion of the *e-ru-mi-ni-ja* which he terms ‘longerons’ or ‘serres’ of the ‘carène’ and seems to describe as if they were the ‘préceintes’ (‘wales’) of the hull. For a technical discussion of ancient hull construction with a glossary of terms, see J.R. STEFFY, “The Kyrenia Ship: An Interim Report on its Hull Construction”, *AJA* 89 (1985), 71-101.

109 Both *Interp* and *Docs*² also stress the only recognizable element in this word-unit (*me-ta-* = ? μετα-).

- vertical small bars of wood fixed so as to rise above the planking, as seen in artistic representations of Creto-Mycenaean ships / number: 140 ¹¹⁰;
- qe-re-ti-ri-jo* = a pair of jutting top elements of the frame located at the stern where the steering oars were located (dual of *βλήτρια) / number: 2;
- ta-to-mo* = a cabin (lit. σταθμός as 'a place where one can stand') / number: 1;
- e-ru-mi-ni-ja* = girdle beams (Fr. 'bauquière') used to support the deck for the cabin / number: 2;
- ki-wo* = not a column, but a stanchion (Fr. 'épontille') supported on the keel and in turn supporting the deck / number: 1.

I must leave to experts in Bronze Age ship reconstruction the problem of judging whether the individual structural elements, as identified by van Effenterre, work according to the principles of ancient ship-building, as they have become known during the twenty years since his article was published. I have discussed some of his interpretations with Fred Hocker of the Institute of Nautical Archaeology at Texas A&M University who has kindly permitted me to present here a few key problems in advance of a joint article we propose to write on all of the technical details. First, let me say that none of the later readings does much damage to van Effenterre's hypothesis. In three of the cases where readings of numbers now differ, his restorations or readings are still possible: 12[*ta-ra-nu-we* might still be restored as 16; 40[*o-pi-ra3-te-re* might still be 40, or close to 40; and 23[*e-to-ki-ja* might still be 13[and therefore restorable to 16. The change from 80 to 81 *35-*ki-no-o* would only mean that a spare piece was among the materials, and the proportion between the *35-*ki-no-o* and the *o-pi-ra3-te-re* would still be remarkably close to 2: 1. By way of caution, I can only call attention to all the *might's*. If the *ta-ra-nu-we* are less than 16 in number, then 15 benches for van Effenterre's 30 rowers no longer exist. If there really are 23+ *e-to-ki-ja*, then the gunwale pieces no longer can be fitted in exact numerical relation to the cross beams. The new reading *o-pi-ra3-te-re* for *o-pi-te-te-re* still allows the term to be interpreted as items fitted 'onto' something else.

As with the standard interpretation, which views these technical terms as architectural elements for the construction of part of a building, individual identifications may prove to be incorrect. But van Effenterre's approach has the great merit that the items are ordered in a rational way, from the most fundamental structural elements of the ship's keel and hull, to the gunwale, vertical bars, cabin and deck. The weakest point remains the identification of *ka-pi-ni-ja*, but even this is hardly unfeasible (see n. 105). The use of *ta-ra-nu-we* both for framing elements (*pi-ri-ja-o ta-ra-nu-we*) and for cross beams (*ka-pi-ni-ja ta-ra-nu-we*) troubles me. Also troublesome is the very contrast between *pi-ri-ja-o* (without precise definition in this context) and *ka-pi-ni-ja*. This creates a real imbalance if *ka-pi-ni-ja* is made to refer to the entire ship, while *pi-ri-ja-o* refers to some specific part thereof. Perhaps *ka-pi-ni-ja* would be better interpreted as hull *vel sim.* (lit. 'the hollowed out' part of a ship) to bring it down to a parallel level with *pi-ri-ja-o*.

The results harmonize well enough, but not completely, with the evidence we now have from the study of ancient, especially Bronze Age, shipwrecks. The Gelidonya ship is ca. 10 m. in length ¹¹¹ and the Ulu Burun ship ca. 15 m. ¹¹². The 4th-century Kyrenia wreck has an overall length of 13.86 meters. Its hull is constructed with 41 frame stations spaced at a center-

110 In support of this close functional connection, van Effenterre calls attention to the close contextual association of *e-to-ki-ja* and *pa-ke-te-re* on Vn 46.6 and Vn 879.3-4 and the similar proportions between the two items: 16, 140 (his restoration) and 10, 86. This is undercut somewhat now by the new, but still doubtful, reading 23[for the first figure on Vn 46.

111 BASS, *art. cit.*, *supra* n. 52, 45 (based on the spread of cargo).

112 The wreck covers an area of 10 x 18 m.: BASS, *art. cit.*, *supra* n. 50, 274.

to-center average of 25 cm., i.e., the frames covered ca. 10 m. of the ship's hull. If we apply similar spacing and principles to the theoretical ship of Vn 46, we would have 56 frame stations (40 units of half frames + 6 master frames + 10 intermediate frame pieces) ¹¹³ and thus the frames would cover 13.75 m. of the ship's hull. This would yield a ship slightly larger than the Ulu Burun ship. One major problem with this interpretation, according to Fred Hocker (*per telephonicam vocem*), is that we do not have any positive evidence from the Bronze Age for a system of such closely spaced half-frame units or for the use of chocks. The portion of the hull of the Ulu Burun wreck (ca. 1 m.) so far uncovered preserves no traces of either. Moreover, there seems to have been a tendency over time for the framing to become more developed and the spacing between the frames narrower—for example, the Early Bronze Age Cheops vessel has a mere 15 poorly attached frames over a length of some 40 meters—but Hocker would not expect a point of development comparable to the much later Kyrenia wreck to have been reached by the late Bronze Age. Consequently, it seems more logical to propose, in terms of numbers, that the 6 *pi-ri-ja-o ta-ra-nu-we* are 'floors' or structural framing elements at the level of the keel which would then provide space for 10 *me-ta-se-we* or 'intermediate frame-pieces', 2 in each interval between the 'floors'. These sixteen elements would then constitute the entire framing system for the theoretical Vn 46 ship in accordance with the Bronze Age 'shell first' method of ship construction. Some other solution would have to be sought for the 80 or 81 *35-*ki-no-o* and 40 *o-pi-ra3-te-re*. In any case, there is no etymological basis for linking the *35-*ki-no-o* with half-frames. Finally we can cite two points in favor of interpreting Vn 46 as materials for a ship. The first two items on the related tablet Vn 879 are described as *pe-*65-ka*, for which the most likely interpretation is 'of pine wood'. Pine timber was used for the keel, planking, frames, chocks, beams, mast steps, and treenails of the Kyrenia ship ¹¹⁴. The *e-to-ki-ja* (gunwale ?) and *pa-ke-te-re* (some kind of fastening or fastened elements) on Vn 879 are described as *qa-ra-de-ro*, probably indicating another type of wood. On the Kyrenia wreck, fastening elements (tenons and tenon pegs) as well as the false keel were also of a different type of wood, oak.

Since we have clear textual evidence at Pylos for palatial supervision of ship-builders or ship-carpenters and regular levies of palatially dependent rowers, the existence of two texts with detailed information about building materials for ships is not surprising. As a parallel, Va 1323 and Va 1324 (from the Northeast Workshop) and Vn 10 (from the Archives Complex) record, again non-ideographically, wooden *a-ko-so-ne* used in chariot manufacture and repair. These were written by an unidentified scribe and a scribe (Hand 3) who otherwise had nothing to do with the extensive Sa chariot series; and these tablets were found in the Northeast Workshop, where the chariot repair probably took place, and in the Archives Complex, where Vn 46 and 879 were also discovered ¹¹⁵. These finds prove that there is nothing unusual about materials for building and repair being recorded on texts from the Archives Complex, remote from the actual locations where such activities took place. At the same time I should stress that the tablets also provide evidence for palatial control of carpenters (*te-ko-to-ne*) and wall-builders (*to-ko-do-mo*) ¹¹⁶, so that Vn 46 and 879 also have a secure environment according to the standard interpretation. Given the ambiguities in the etymological identifications and the uncertain readings of numbers on Vn 46 and 879, I doubt whether van Effenterre's

113 Again, since van Effenterre has not provided a figure, I am assuming he intends the master and intermediate frames to be interspersed at regular intervals among the half frames. If this is not the case, then the theoretical ship of Vn 46 would require 40 frame stations for the half frames and be almost exactly equal to the Kyrenia wreck.

114 STEFFY, *art. cit.*, *supra* n. 108, 87. The timbering of the Gelidonya wreck included oak (*quercus*) and a conifer species (*cupressus*): BASS, *art. cit.*, *supra* n. 52, 168-169.

115 SP, 68-70, 119-126.

116 See the tabular chart of occupations in HILLER, *art. cit.*, *supra* n. 75, 66.

reconstruction is correct in all points. Even with the significant advances in our understanding of Bronze Age and ancient ship construction in the last quarter century, there are still problematical gaps in our knowledge of the development of ancient ship architecture. To cite three examples, it would affect our interpretation of these two tablets to know for the Mycenaean period: (a) whether hull planking was joined by lashing or by tenons (with or without pegs)—and if the latter, whether special hardwoods were already preferred and used for pegs and tenons; (b) what type of framing system was used and how widely the frames were spaced; (c) whether Mycenaean ships—or at least the Mycenaean ship(s) possibly dealt with on these tablets—had keels or central strakes. But van Effenterre's analysis is not unreasonable in its general approach to interpreting these enigmatic tablets. It should at least be given due attention by experts in ancient ship-building.

3. Personnel connected with ships:

a. The term *e-re-ta* ('rowers') has been discussed in § I.3.2. In addition to the occurrences of *e-re-ta* discussed there, the term is found four times on two other Knossos tablets (As 5941.1, .2, .3 and C 902.11). In As 5941, the term qualifies the ideogram for man in a second column of this fragmentary tablet. That the first column lists individual men in each line increases the likelihood that we are dealing here with individual *e-re-ta*. As 5941 is written by Hand 103 who on other As tablets catalogues men individually and in groups. Unfortunately many of his As tablets are fragmentary, but references to]u-ko-ro (perhaps restorable as 'oxherd') on As 5609 and to larger numbers of men listed in aggregate as 'Knossian' and 'of Amnisos' on Am 600 and Am 601 would create an environment in which an interpretation of *e-re-ta* as 'rower' would not be out of place.

On C 902, however, individual sites (e.g., *wa-to*, *o-du-ru-we*, *56-ko-we, *a-pa-ta-wa*) and one definite official name (*ko-re-te*) are listed opposite entries of BOS 1 ne *170 12. On line .11, *e-re-ta* is listed at the site *re-ri-jo*. While in isolation it might seem surprising to find the two terms *ko-re-te* and *e-re-ta* juxtaposed, other parallel terms on the tablet (*si-pe-we*, *e-ra-ne*, *da-nu-wo*, *u-wo-qe-we*, *we-re-we*) might all be interpreted as nominative plural groups in contrast to the single *ko-re-te* or 'district mayor'. Thus there is no compelling reason to interpret *e-re-ta* here as an official title homographic with *e-re-ta* = 'rower'.

b. The term *e-re-e-u* appears in various forms on four Pylos tablets. It has been interpreted as either a masculine personal name derived from a toponym (*'Ελεθεύς) or as a title derived from the same verbal stem as the agent noun *e-re-ta* ('rower') and meaning 'official in charge of rowers' (*'ἑρηεύς· cf. Classical κελευστής and κυβερνήτης)¹¹⁷. I think the archival and contextual evidence favors 'official in charge of rowers', at least in some instances. Here are the relevant texts:

An 723

.1	e-re-e-we	
.2	a-ri-qo , e-u-ka-ro	VIR 1
.3	ra-wa-ra-ta , e-pa-re	VIR 1
.4-.5		<i>vacant</i>

117 *DMic*, s.v.

Cn 1197

.1	a-si-ja-ti-ja	[
.2	wa-e-ro	OVIS ^m 1[
.3	ti-ko-ro	OVIS ^m 1 [
.4	e-sa-re-we	OVIS 3[
.5	e-re-e-we	OVIS ^m [
.6		<i>vacat</i>	[

Na 284

.A	e-re-]u-te-ra	SA 10
.B	to-]sa-de , e-re-e-wo	

Nn 831

.1	ko-ri[]no , [[do-so-mo]]
.2	u-re[] SA 4
.3	a-mo-ke-re[]	SA 1
.4	e-re-e-u	SA 2
.5	qo-u-ko-ro []	SA 2
.6	a-ro-je-u []	SA 1 [
.7	a-mu-ta-wo []	SA 4
.8	e-po-me-ne-u[]	SA 4
.9	ko-re-te[]	SA 24
.10	po-me-ne []	SA 2
.11	ka-ke-u[]	SA 1
.12-.15		<i>vacant</i>

Jn 881

.1	e-re-e-we , o-pi-ko-wo	AES M 1
.2	o-pi-su-ko	AES M 4 N 2
.3		<i>vacat</i>
.4]qa-te[] , ke-ro-te	AES M 2
.5]ja , [. .]	<i>vacat</i> [] <i>vacat</i>
.6]jo , a-to-mo[
.7		<i>infra mutila</i>

An 723 is by Hand 1. In An 723, *e-re-e-we* in the heading can be: (a) dative singular ('for the **e-re-e-u*') or (b) nominative dual. In case (a), the two men (*e-u-ka-ro* and *e-pa-re*) listed in lines .2-.3 at the places *a-ri-qo* and *ra-wa-ra-ta* (one of the principal centers in the Further Province) would somehow be under the control of the **e-re-e-u*. In case (b), the heading would specify that each man is an **e-re-e-u* in the same way as the *na-u-do-mo* are probably identified on Vn 865 (by an unidentifiable hand of Class i). That the meaning of the term here is 'official in charge of rowers' is supported by the fact that this tablet was found in the same archaeological context as An 724 (by Hand 1)¹¹⁸, which lists single rowers (also using VIR 1) or groups of rowers who were obliged to row, but were missing at the possible harbor site of

118 SP, 196: An 723 from grid location 5432; An 724 component from grid location 5433.

ro-o-wa. It would be in keeping with the careful monitoring of individual rowers, who, as we have seen, were levied from individual towns, to have recorded the persons responsible for the crews of ships in those towns (case b) or the assignment of individuals to a ‘rower-supervisor’ (case a). An **e-re-e-u* is recorded at the local sites of *a-si-ja-ti-ja* (Cn 1197) and *ko-ri-to* (Nn 831).

On Cn 1197 the term occurs in the dative singular in a fragmentary list of 1-3 rams associated with two individuals identified by personal name and then two identified by title or ethnic (**e-sa-re-u* and **e-re-e-u*). The recorded assignment of such small numbers of animals to individuals must be an indication of their special status. Unfortunately the number of animals associated with the **e-re-e-u* is not preserved. But the structure of the text suggests that he might have received more than one animal, as did the individual listed in the line before him. The individuals identified simply by proper name are associated with single animals. In another text Cn 1287, nine single she-goats and one pair of she-goats are listed against individuals apparently in the nominative case. These individuals are identified by personal name and in six cases by an occupational designation: *a-ke-ro* (messenger), *ka-na-pe-u* (fuller), *ke-ra-me-u* (potter), *pe-re-ke-u* (‘ax-man’ or ‘weaver’), and two religious ‘servants’. This increases the probability that **e-re-e-u* in Cn 1197 is an occupational designation rather than an ethnic.

On Na 284, the **e-re-e-u* at a location which is not preserved is granted an exemption of 10 units of flax. This kind of exemption would be in keeping with those granted to other special professions (*na-u-do-mo* ‘ship-builders’ as well as bronzesmiths and hunters). It is possible that this quantity would be used by the ship-supervisor to supply whatever items produced from flax or linen were not provided by the *na-u-do-mo* in building a ship. On Nn 831.4 an **e-re-e-u* at the site of *ko-ri-to*¹¹⁹ is again connected with flax, here a contribution of 2 units. On Nn 831 similar quantities are associated with several apparent personal names and the occupations of bronzesmith (*ka-ke-u* : 1 unit), shepherd (*po-me-ne* : 2 units) and cowherd (*qo-u-ko-ro* : 2 units). A much larger quantity is listed against the local administrative official (*ko-re-te* : 24 units). *e-re-e-u* is listed between a ‘speaking’ personal name (line .3: *a-mo-ke-re[-we* = * Ἀρμωκλέφης = ‘Chariot-wheel-famous’) perhaps indicating that the individual is a wheelwright¹²⁰ and a person identified as ‘shepherd’ (line .5). The identification of *e-re-e-u* here as ‘supervisor of rowers’ would not be out of place in a tablet dealing with such occupations and an official at a local level. A further piece of evidence in support of this identification is provided by the fragmentary entry *u-re* on Nn 831.2. This sequence of phonograms begins only one other lexical item in the entire Mycenaean corpus: *u-re-u*, the last personal name listed on the *na-u-do-mo* tablet Vn 865 (cf. § I.3.3). Given the rarity of this initial sequence, it would be remarkable if this is not the same individual on Nn 831. Thus the tablet would begin with references to ‘ship-builder’, possibly a ‘wheelwright’ designated by his significant name, and ‘supervisor of rowers’. The *na-u-do-mo* is listed against 4 units of flax, perhaps indicating his status relative to the *e-re-e-u*.

The final reference to *e-re-e-u* also supports an interpretation as ‘supervisor of rowers’. Jn 881 is a fragmentary text from the series dealing with the allocation and collection of bronze. As we have already seen (§ II.2.a), on tablet Jn 829 by the same scribe (Hand 2), a number of officials, including the *ko-re-te-re* and *o-pi-su-ko*, are recorded as contributing ‘temple bronze’ for military purposes. The *ko-re-te-re* each contribute between 2 and 3.75 kg. of bronze; the *po-ro-ko-re-te-re* each contribute 0.75 kg. On Jn 881 we have a listing of 1 kg. of bronze connected with the term *e-re-e-u* in an ambiguous form (either dative singular or nominative plural) that is further qualified as *o-pi-ko-wo*. On the following line, we find *o-pi-su-ko* in an

119 Restoration of the heading as *ko-ri-[to-jo]* or *ko-ri-[si-jo]* is virtually certain. Cf. *Docs*², 472.

120 But cf. § I.1.i and n. 55 for the number of names connected with ships and the sea that are held by shepherds.

even more ambiguous form (nominative or dative singular and nominative plural being possible here) listed against 4.5 kg. of bronze. This is the only occurrence of *o-pi-su-ko* other than on Jn 881.2, so unfortunately we have no way of knowing what a typical contribution from a single *o-pi-su-ko* might have been. The amount, however, exceeds the largest quantity for a *ko-re-te* on Jn 829. Since the contribution of flax by the *ko-re-te* on Nn 831 in turn far exceeds that of any other individual or profession, it is not unreasonable to assume that on Jn 881.2 we are dealing with an amount listed against a plural number of *o-pi-su-ko*. This makes it more likely that the *e-re-e-we* on Jn 881.1 is also plural. If we use the ratio (12:1) of the flax contributions of the *ko-re-te* and the *e-re-e-u* from Nn 831 as a guideline for their bronze contributions¹²¹, we would expect a single *e-re-e-u* to contribute between 0.16 kg. and 0.3125 kg. of bronze. Thus the amount listed here (1 kg.) would represent a contribution from 3-6 *e-re-e-u*. The qualifying term *o-pi-ko-wo* seems to be an alternative form of *e-pi-ko-wo*, for which several meanings have been proposed¹²². On KN As <4493> the term means 'those who are in charge of the κορφοί' (*ko-wo* = 'sons' or 'young men')¹²³. Some such meaning makes very good sense in the present context, if we recall the listing of 'sons of rowers' (*e-re-ta-o ko-wo*) at the site of *a-pu-ne-we* on Ad 684 *lat. sup.* (§ I.3.2). That annotation indicates that the palatial administrators were interested in these young men, and it would be logical to have the interests of an *e-re-e-u* extend to them as well.

The *e-re-e-u* then seems to have been an official operating at the level of the local communities. *a-si-ja-ti-ja* and *ra-wa-ra-ta*, as proved by their occurrences on Jn 829 and On 300, are two of the principal centers of the Further Province of Pylos¹²⁴; *ko-ri-to* is probably to be located there also. *a-ri-qa*, however, is a *hapax* and may provide evidence for an *e-re-e-u* functioning within a community of less overall administrative importance. The etymological interpretation of this term as 'supervisor of rowers' is consistent with the organized system for levying rowers from such local communities and is further supported by the fact that the short list of *e-re-e-we* An 723 was discovered in the same context as the full rower tablet An 724. Striking also is the textual concurrence of a person who is probably a *na-u-do-mo* with the *e-re-e-u* at *ko-ri-to* (Nn 831.2 and .4). It is likely that the *e-re-e-u* also was responsible in some manner for the supervision of young men who were either sons of rowers or young rowers in training.

c. 14 tablets and tablet fragments have been assigned (11 securely) to the V(5) set of hand 115 at Knossos. The more completely preserved tablets all have the same format and formulaic contents. A key word in the formula is *po-ti-ro* which John Chadwick (*supra* n. 69) has interpreted as */pontiloi/*, literally 'seamen'. All the tablets and fragments share physical features to such a degree that there is little doubt that they form a coherent set. The find-spots for 5 of the tablets are known (areas I1 and I3 of the northern deposit)¹²⁵. Chadwick had available nine sizable tablets and two further fragments. Here I present, with epigraphical commentary, a new organization of the full set based on recent studies of joins and a fresh examination of the tablets in the Herakleion Museum. I have marked with an asterisk (*) the tablets now to be added to Chadwick's original group.

121 While the reading of the sign-sequence in Nn 831.9 would allow restoration of a plural form, the pattern of Jn 829 implies that each community had a single *ko-re-te* and *po-ro-ko-re-te*. We must keep in mind that the proportions of amounts due of different commodities could differ because of the specialized concerns of a particular occupation. Thus a bronzesmith might be expected to contribute proportionally more bronze than flax, a 'supervisor of rowers' just the opposite.

122 *DMic*, s.v. In the Pylos *o-ka* series, it means something like 'lookouts' or 'auxiliaries'.

123 MELENA, *art. cit.*, *supra* n. 17, 42.

124 *Docs*², 466-468.

125 *SC*, 108, 166, 175-176.

1a. V(5) 756 + 7806

.A '[po-]ti-ro' , wa-wi 1 a-mu-ta-wo-qe[
 .B da-*22-ti-ja /

 .A wa-wi 1 over erasure
 .B da-*22-ti over erasure

1b. V(5) 1002 + 5766 + 7650

.A 'po-ti-ro' , pi-ra-ki-jo 1 pe-ri-jo-ta-qe 1
 .B da-*22-ti-ja /

This whole tablet is probably a palimpsest, but *pi-ra-* is over a genuine erasure. A second bolder word-divider replaced a first at the left limit of this erasure, separating the newly written *pi-ra-* from *po-ti-ro*.

2a. V(5) 1003 + 5898

.A] 'po-ti-ro' , [
 .B]ka-di-ti-ja / [

This tablet fragment shows no signs of erasure. To the same original tablet belongs with virtual certainty the following tablet fragment:

***V(5) 7797**

.1]ra-tu[
 .2 *inf. mut.*

On line .1 there is a trace of a stroke to the right. Perhaps the reading should be:

]ra-tu ![

There would seem to be about 3 cm. missing between the left edge of *V(5) 7797 and the right edge of V(5) 1003. No other personal name in the Mycenaean onomastic lexicon ends with the sequence *-ra-tu*. According to my estimate of the missing space, it should be the first name in the pair listed on line .A of the original tablet and be filled out by two or three initial signs. These physical details support the conjectured reading, since the first of the two names in the formula of line .A is followed always by '1' without the enclitic conjunction *-qe*. The full original text would read:

.A] 'po-ti-ro' , [. . . ?]ra-tu[
 .B]ka-di-ti-ja / [] *inf. mut.*

2b. V(5) 1583 + 7747 + 7887 + *frr.*

.A 'po-ti-ro' , si-mi-te-u 1 a-ra-ko-qe !
 .B]ja /

To the same tablet probably belongs:

*V(5) 9320

sup. mut.
ka-di-ti-ja[

This produces a fuller fragment:

.A 'po-ti-ro', si-mi-te-u 1 a-ra-ko-qe 1
.B ka-di-ti-ja /

Thus we have a pair of *ka-di-ti-ja* tablets (**2a** and **b**) and a pair of *da-*22-ti-ja* tablets (**1a** and **b**).

3. V(5) 1005 + 7530 + 7567 + *fr.*

.A 'po-ti-ro', e-wa-ko-ro 1 pi-ra-ka-wo-qe 1
.B ki-ra-di-ja /

4. V(5) 1043 + 7709 + *fr.*

.A 'po-ti-ro' da-i-wo-wo 1 to-no-qe 1
.B]-pa-si-ja /

The whole tablet is over an erasure. Line .B perhaps]k_u-pa-si-ja. Chadwick originally followed this reading. What is important is that enough of the word-unit can be read to make certain that yet a fourth different toponymic adjective is in this slot.

5. V(5) 7577 + 7734

.A po-ti[-ro
.B di-pi-ja / *vac.* [

From the right hand portion of the same original tablet could be:

*V(5) 9715

.A a-]mu-ta-wo[
.B *inf. mut.*

*V(5) 9715 has traces of erasure in line .A.

6. V(5) 7670 + 7746

.A *vest.* [
.B a-pa-ta-wa-ja / *vest.* [

α. *V(5) 9006 + *fr.*

.A]pe-re-ta 1 [
 .B] *vac.* [

In line .A there are traces to the right, a small curved stroke opening rightward at about mid-height of the signs *pe* and *re*. This sign is possibly a *ku* as on V(5) 1004 or even a *tu* as on V(5) 7797. To the same original text probably belongs:

*V(5) 9318

.A]je-u-qe[
 .B] *vac.* [

Both fragments have pin holes at the top of their surfaces. We might imagine a restored second name like *tu-ti-je-u* or *tu-si-je-u* which is attested at Pylos.

β. V(5) 7964

]po-ti-ro[
inf. mut.

From an original set, we have 8 tablets on which the heading words are legible enough to distinguish 6 different adjectives. Two are recognizable as toponymic adjectives derived from the important Cretan communities of *da-*22-to* and **a-pa-ta-wa*. Chadwick argues that the other four adjectives are also from place names. According to evidence from historical times, *ka-di-ti-ja* can be linked with the name of a mountain on the north coast of Crete referred to in Scylax 47 and Pliny *NH* 4.60; *ki-ra-di-ja* with the Skiradian promontory in Salamis where was situated a temple to Athena Skiras; *ku-pa-si-ja* with a town named Kupasis on the Hellespont (Scylax 67). His argument then proceeds that since *a-pa-ta-wa* (Aptera) is a known coastal site and three of these names in later times are connected with coastal communities (even though two are not even on Crete!) that “there is no reason why *da-*22-to* too should not have been on the coast”¹²⁶. This is obviously very strange and tenuous reasoning, especially since, even in its own terms, the connection of *di-pi-ja* with a later inland Arcadian toponym undercuts it¹²⁷. Chadwick, however, wants these communities to be coastal because of his interpretation of *po-ti-ro*. According to the layout of the tablets, this term must describe the two patent personal names which follow it on line A. The names are not exceptional, occurring elsewhere in the Knossian or greater Mycenaean repertory and mostly being analyzable as Greek formations, several adjectival or compound.

A peculiar aspect of the toponyms is that two (**a-pa-ta-wa* and *da-*22-to*) are major second-order centers, while the three that form the basis for *ki-ra-di-ja*, *ka-di-ti-ja*, and *da-pi-ja* occur only here. The sixth (*ku-pa-sa*) occurs elsewhere only on tablet V(2) 145 from the earlier Room of the Chariot Tablet deposit where it is formulaically nested between the well-known west Cretan toponymic forms *u-du-ru-wo* and *ka-ta-ra-pi*. *da-*22-to* and *u-du-ru-wo* are known stirrup-jar toponyms, so it is not unreasonable to connect them with harbors for export. This need not require that the site itself be coastal, but that it control an area which has harbor facilities. The three *hapax* toponyms here are puzzling. Are we to imagine that these are names

126 CHADWICK, *art. cit.*, *supra* n. 69, 200.

127 *DMic*, s.v.

of harbor towns for more prominently recorded communities? For example, Strabo (10.4.13) mentions that in later times Aptera had a port called Kisamos. Or has the paucity of references to nautical activities simply left unmentioned a number of sites that have no interest to a central administration which, as we have seen (§ I.3.5 and n. 78), only records, for example, the site of Amnisos for subjects unrelated to its being a port?

There is no further evidence with which to confirm or refute this interpretation of *po-ti-ro*. If one accepts it, the two individuals mentioned on each tablet can be thought to have some sort of special status within an organized administrative system. It is then not unreasonable to conclude that they are 'seamen' of special rank, i.e., something like the two helmsmen or pilots normally connected with Homeric ships. One can then interpret the ethnic adjectives either as standing for the location, original or current, of ships under the control of these pairs of *po-ti-ro* or as directly modifying the feminine noun 'ship'. In the latter case, Chadwick would see these as the actual names of ships. The fact that two of the adjectives each occur twice would tend to argue against this view. However, Chadwick himself notes that texts **1a** and **1b** were not found in exactly the same location and therefore might belong to different time periods, when the named ships would have different pilots. The erasures under the personal names on these two tablets might indicate uncertainty on the part of the scribes because of changing information. We do not know the find-spot of tablet **2b**, which means the same line of argument could be used for the two *ka-di-ti-ja* tablets. It is, however, more economical to take the adjectives generically: 'ship of *da-*22-to*' etc. The bureaucratic identification of particular ships from a specific locale is achieved by recording the names of the *po-ti-ro*, which may have been the whole purpose of this set.

Within the Knossos tablets we at least have the references to *na-u-do-mo* and *e-to-ro-qa-ta* (§ II.2.b) to prove that nautical matters were of some concern to the central administration. It is therefore possible that the V(5) set also has a connection with nautical matters. But the entire argument depends on the identification of *po-ti-ro*. If it is not 'seamen', the V(5) set would have nothing to do with the sea.

III. Conclusion

The Linear B tablets provide enough evidence to conclude that the central palatial administrations at Mycenaean Knossos and Pylos had organized systems for building, maintaining and manning sizable fleets, at least for military purposes. Both sites make reference to ship-builders (whether ship-carpenters or supervisory shipwrights) in connection with materials of use in ship-building. At Pylos the names of ship-builders even seem to be catalogued individually. Two tablets can be interpreted—with reasonable probability, but not absolute certainty—as listing the precise materials and component pieces for ship construction. Rowers also appear in texts from both sites. At Knossos a reference to rowers can be restored on a tablet that has a clear ideogram of a ship, implying that ships were part of the essential repertory of subjects with which scribal administrators had to work. At Pylos ca. 600 rowers are recorded on a single tablet and other tablets prove that rowers were levied from local communities according to the same standard principles used for general regional taxation. There is direct evidence that these rowers were granted parcels of land according to their status as 'settlers' of various technical types. Such settlement activity perhaps was made necessary by external recruitment—for example, one contingent of rowers is identified as Zakynthian. These land grants created the obligation to serve in the fleet—one tablet entry explicitly links a rower's landholding with an obligation to row—and were also the reward for such service. There are convincing Near Eastern parallels for such a system. Provision may have been made, at least in some instances, for maintaining the 'families' of rowers while they were on active service. The rowers are listed as being 'sent to' or 'absent from' several sites. They are at times connected

with individuals of important status including the *ra-wa-ke-ta* or military commander. Officials known as 'supervisors of rowers' are also recorded by name and operated on the local level alongside other officials and skilled, palatially dependent craftsmen and tradesmen. In one case a 'supervisor of rowers' is linked textually with a known 'ship-builder'. One set of tablets from Knossos may give specific information about individual ships from central and western Cretan communities, identified by the two 'pilots' in charge.

There is, however, still an extreme paucity of references to trade or shipping activities. For example, the major harbor site of Amnisos occurs frequently in the tablets from Knossos, but never directly in regard to maritime activities. The probable Pylian harbor at *ro-o-wa* occurs in the context of rowers for the military fleet. Seasonal chronology may provide some explanation for this lack of trade references, but probably cannot be viewed as the total answer. Still the tablets record foreign trade products and foreign individuals and ethnic groups, proving that overseas contacts were strong. The specialized inscribed stirrup jar trade must have been managed by Mycenaean ships. It is no great leap of logic then to propose that Mycenaean vessels carried materials and people from one region of the Mycenaean world to another, e.g., cloth and cloth-making personnel between Thebes, the Argolid and Crete; Cretan bronzework or bronzeworkers to Messenia; Zakynthian chariot wheels and rowers to Messenia; specialized women workers of servile status from the western coast of Anatolia to Messenia. However, specific Near Eastern imports may have been brought on Near Eastern ships. Cypriote pot marks and references to 'Cypriote' goods in the Linear B tablets indicate that a special directional trade probably existed between that island and the Argolid and Crete. It is impossible to make any deductions from the tablets about the degree to which such trade would have been either palatially controlled or entrepreneurial.

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Acknowledgements: I thank George Bass, R. Steffy, John Bennet, Hal Haskell, Nicolle Hirschfeld and Fred Hocker for discussing with me topics in this paper pertaining to their special areas of research. George Bass and Malcolm Wiener permitted me to read copies of their forthcoming articles cited as *Evidence for Trade and Nature of Minoan Trade* respectively. J.L. Melena gave me a proof copy of the now-published article (referred to as *436 Raccords*) discussing the latest joins made among the Linear B tablets from Knossos. My thanks also to: (1) the director of the Herakleion Museum for permitting me in August 1990 to examine the entire Knossos V(5) series and all the newly joined tablets mentioned in this paper; (2) O. Tzakou-Alexandri and K. Demakopoulou for permitting J.L. Melena, E.L. Bennett, Jr. and me to reexamine relevant Pylos tablets on October 1, 1990; (3) several participants at the Thalassa conference in Calvi for information or queries which led me to a fuller exploration of this topic: L. Basch, H. van Effenterre, S. Hiller, L. Karali, and J. Schäfer. Of course, I alone am responsible for the final contents of this paper.

LIST OF ILLUSTRATIONS

- Pl. LXIII, a : Drawing of 'ship' ideogram *259 from Knossos (after *Minos* 24 [1989], 230).
Pl. LXIII, b : Verso of Pylos tablet An 724 with sketch or 'doodle' of a ship (photo from PASP archives courtesy of University of Cincinnati).



b