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PERSPECTIVES ON THE PYLOS OXEN TABLETS: TEXTUAL (AND ARCHAEOLOGICAL) EVIDENCE FOR THE USE AND MANAGEMENT OF OXEN IN LATE BRONZE AGE MESSENIA (AND CRETE)*

THE COW[1]

Come, children, listen to me now,
And you shall hear about the cow,
You'll find her useful, 'live or dead,
Whether she's black, or white, or red.

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* As this paper expanded and took final form after the Eirene Congress, it benefitted from presentation at Bryn Mawr College (November 1988) and the University of Indiana (September 1989). I thank particularly Haskel J. Greenfield for discussing practical considerations of Balkan livestock management with me, and Kerri Cox for references pertaining to Mycenaean inlay work and Mylonas's identification of glues at Mycenae. I thank Adriana Calinescu, curator of ancient art at the Indiana University Art Museum, for permission to use the photograph of the early second millenium Anatolian model of a team of oxen and cart. A raised bold letter "a," thus **a**, next to a tablet reference indicates that the reader should consult the appendix for its text. I use standard abbreviations, e.g.:

DMic. = F. Aura Jorro ed., *Diccionario Micénico* I (Madrid 1985);

MME = W.A. McDonald and G. Rapp, Jr. eds., *The Minnesota Messenia Expedition* (Minneapolis 1972);

PM I-IV = A. Evans, *Palace of Minos* vols. 1-4 (London 1921-1936);

PN I-III = *Palace of Nestor* vols. 1-3 (Princeton 1966-1973);

PP I-II = M. Lindgren, *The People of Pylos I-II* (Uppsala 1973) etc.

I have thought of Ben Meritt often while working on this paper, and I dedicate its epigraphical discussion to his memory.

[1] Samuel R. Gummere, *The Progressive Spelling-Book, In Two Parts; Containing a Great Variety of Useful Exercises in Spelling, Pronunciation and Derivation Including Extensive Tables of Words Deduced from Their Greek and Latin Roots* (Philadelphia 1854) 44-45.

When milk-maids milk her morn and night,
She gives them milk, both fresh and white;
And this, we little children think,
Is very good for us to drink.

The curdled milk they press and squeeze
And thus they make it into cheese;
The cream skimmed off they shake in churns,
Which very soon to butter turns.

And when she's dead, her flesh is good;
For beef is very wholesome food:
And though in health it makes us strong,
To eat too much is very wrong.

Then lime and bark the tanner takes,
And of the skin he leather makes;
And this we know they mostly use,
To make nice soles for boots and shoes.

Her hoofs with care make glue, so good,
For joiners to cement their wood:
Her fat, with cotton used aright,
Makes candles, which we burn at night.

Her feet we wash, and scrape and boil,
From which we skim off neats-foot oil:
And, last of all, when cut with care,
Her horns make combs, to comb our hair.

Thus you have heard, dear children, now,
All this about the pretty cow;
Then treat her well, and bear in mind,
God made the cow, and all mankind.

This pedagogical poem from a mid-nineteenth century American spelling primer was once memorized by school children even, or perhaps especially, in the remote cattle lands of the American southwest. The particular copy from which I have excerpted the poem was found stored away among other school texts of the same period in a barn in central Texas. Its pages bear evidence of considerable use: pencil markings, underlinings, random jottings, and one or two words dutifully copied and divided by an adult hand according to the principles contained in the many charts of Latinate syllabification. The flyleaves are marked with scribbles and free-form loops and swirls in a characteristically

childish hand. I conclude that the primer was used by at least two generations, although it is possible that they were using it, either as instructor and pupil or as more and less advanced student, at approximately the same time. Whatever the period of use and whatever the age of the readers, the homespun lesson of our poem would have been clear. The cow is a gift of a divine creator, and man has done well to use this tremendous natural resource with ingenuity, respect and care. Necessity is the mother of ingenuity. To settlers in the Texas hill country, where into the 1930's life was impoverished, precarious, and bleak to a degree matching Hesiod's vision of life in late eighth century Askra,[2] the cow "'live or dead" was an important factor in their own life-and-death struggles with a treacherous environment. They could ill afford to waste any part of this precious animal.

I cannot believe that the Mycenaean attitude toward this animal was very different. Of the uses catalogued in "The Cow," most are either directly attested in Mycenaean texts or can be assumed from parallel evidence in roughly contemporary Mediterranean and Near Eastern cultures.[3] The Linear B documents suggest the use of livestock for meat, hides[4] (on Pylos text Ub 1318.4-.5 ox-hides are

[2] A brilliant Hesiodic evocation of the physical and spiritual difficulties of life in the Texas hill country from 1850 to 1940 is furnished by Robert Caro, *The Years of Lyndon Johnson*: *The Path to Power* (Vintage: New York 1983) 502-515.

[3] See most recently the discussion and bibliography by 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 forthcoming). S. Payne, "Zoo-Archaeology in Greece: A Reader's Guide," in N.C. Wilkie and W.D.E. Coulson eds., *Contributions to Aegean Archaeology* (Minnesota 1985) 226, discusses the importance of considering all uses of particular domestic animals in analyzing bone material from prehistoric sites. This point is further stressed by Greenfield's study of the use of domestic animals for secondary products such as milk, wool, traction and other purposes "for which animals may be utilized repeatedly over the course of their lifetimes." H.J. Greenfield, "The Origins of Milk and Wool Production in the Old World: A Zooarchaeological Perspective from the Central Balkans," *Current Anthropology* 29:4 (1988) 573 and n. 2.

[4] For ox-hides specifically, see the occurrences of the ideographic abbreviation *WI* (PY Un 219, Wr 1332) and the ideogram *152 = pictorially "hide" + phonetic abbreviation *WI* = *wi-ri-no* (PY Ma series). The term *wi-ri-no* and related forms *wi-ri-ni-jo*, *wi-ri-ne-jo*, *wi-ri-ne-o* "of leather" and *wi-ri-ne-we* "for the tanner" occur in the contexts of chariot assembly (the adjectives: KN Sd series) and allotments of oil (the tanner: KN Fh series). Although it is not made explicit in all cases that the term and its ideographic equivalents must mean "ox-

specifically used for footwear: sandals and possibly their laces, supports or wrappers[5]), tallow,[6] and tendons.[7] Cheeses are mentioned in the texts (PY Un 718[a]); and, although one must think here primarily of cheese produced from the milk of goats and sheep, one batch of cheeses is listed in the first section of Un 718 along with a male ox. Milk is absent from the texts, as we might expect from the fact that it is an easily spoiled product hardly able to be stored for long periods or shipped across long distances, i.e., it is not easily exploitable within a controlled and centralized economy. But zooarchaeological analysis indicates that post-Neolithic cattle in the Balkan peninsula were being managed for diversified purposes, milk production among them.[8] We do not know whether the Mycenaeans knew that, by boiling the feet and shin bones of livestock of the ox kind, they could produce the leather dressing and fine lubricant known as neat's-foot oil. We have direct reference to the use of horn (*ke-ra-ja-pi*) as opposed to ivory in the construction of fittings connected with Mycenaean chariots (KN Sd 4401 and Sf 4428), but there is no indication as to the type of animal horn being used. Finally, one must imagine that

hide," the fact that on Ub 1318 other leathers are specified as those of sheep, goat, pig and deer seems to support this general identification. There may also be some contrast between "raw hide" and "tanned hide" (*di-pte-ra*) in PY Ub 1318. In a collection of some 800 texts of the First Dynasty of Isin (ca. 2300-2250 B.C.) dealing primarily with leatherworking and leather products, the term 'hide' is used to stand for "ox-hide." Otherwise, the type of animal is specified: e.g., ass, goat, sheep, pig, deer. R.J. Forbes, "Leather in Antiquity," *Studies in Ancient Technology* V[2] (Leiden 1966) 41-43. In these texts, ox-hides were used for doors, shields, chariot seats and chairs, while, for example, sheepskin was used for chariot seats, chairs, thrones, garments, bags, oil bags, musical instruments, and even allotted to goldsmiths.

[5] *Docs*[2], 490-492. We should add a bit of supporting evidence. According to Forbes (supra n. 3) 24, all Egyptian words for "sandal" are derived from the word "calf," thus indicating a preference for calves leather in making footwear.

[6] The ideograms *134 and *190 have been interpreted by P.H. Ilievski, "The Linear B Ideogram *134," *Živa Antika* 15 (1966) 271-280, as animal fat or tallow. Ideogram *190 occurs on five of the inscribed Thebes sealings which are dominated by livestock ideograms (48 of the 55 inscribed sealings bear definite livestock ideograms). It should be noted, however, that *190 occurs on 5 of the sealings that do not have an explicit inscription of livestock and whose seal-groups are associated with sealings referring to SUS and OVIS. See Aravantinos (supra n. 3) tabular summary.

[7] J.L. Melena proposes an identification of the livestock related ideogram *170 as sinews. See infra pp. 91, 101, n. 45.

[8] Greenfield (supra n. 3) 581 and 585-586.

inlaying and other techniques used by specialized craftsmen attested directly or indirectly in the Linear B tablets, such as furniture makers, chariot builders and joiners, wheelwrights and weapons manufacturers (bow-makers, etc.), required the use of glues, just as in Egypt.[9] Mylonas in the craftmen area of the east wing of the palace at Mycenae discovered "a yellowish substance which, when heated, turned into a strong glue of brownish color." This resembled "the brownish matter often seen in inlaid work."[10] And it did not matter to the Mycenaean either whether the oxen were "black, or white, or red," although he took equal note of their colors: the boonyms in the KN Ch series (*ke-ra-no-qe*, *to-ma-ko*, *po-da-ko-qe*, *wo-no-qo-so*, *a₃-wo-ro*) reveal that Mycenaean oxen came in black, white, wine-red, and mixed colors.

Oxen, then, were important to the Mycenaeans. We should note here one other use of these animals in the Mycenaean period which was neglected in our edifying poem because it hymned the female of the species, the cow. Castrated male oxen, generally yoked in pairs, were the primary draught animals for plows and for farm or transport wagons in the Balkan peninsula and Crete at least by the second millenium B.C. onward.[11] The photograph in figure 1 shows a copper model (length 49.0 cm.; max. height 16.0 cm.) of a wagon with a pair of oxen from early second millenium Anatolia,[12] which can supplement the terracotta model of a wagon (without oxen) of the same period from Palaikastro in Crete.[13] This paper represents a first step toward defining the specific nature of the role of Mycenaean oxen and the degree of their importance by

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9 C. Singer, E.J. Holmyard and A.R. Hall eds., *A History of Technology* I (Oxford 1954) 695-696. For Mycenaean chariot inlay work see J.H. Crouwel, *Chariots and Other Means of Land Transport in Bronze Age Greece* (Amsterdam 1981) 66, 69-70, 88-89 and 113, who proposes that ivory may have been glued onto wheels as a decoration (p. 88).

10 G.E. Mylonas, "The East Wing of the Palace at Mycenae," *Hesperia* 35 (1966) 425.

11 Crouwel (supra n. 9) 32, 54-58. It is an interesting indication of the relative neglect of the Linear B oxen records that Crouwel discusses at length (pp. 38-40) the Linear B textual references for the use of equids, but does not refer at all to oxen in the tablets.

12 Indiana University Art Museum 75.107. W.W. Rudolph, *Highlights of the Burton Y. Berry Collection* (Indiana University Art Museum 1979) 6.

13 Crouwel (supra n. 9) plate 49. Crouwel, 54-56, maintains that the Anatolian models resemble "equid-drawn 'battle cars'," but the use with bovids might also be taken to indicate practical, rather than ceremonial, uses of such carts.

examining the relatively scant evidence for the use and management of oxen contained in the Linear B tablets from two late Bronze Age sites: Pylos, the chief center of the region of southwestern Greece known as Messenia; and Knossos, the major palatial center first of Minoan and then of Mycenaean Crete. Here I shall be concerned principally with the evidence of the Pylos tablets. The Knossos oxen references are very different from the Pylos references; and the historical, economic and cultural contexts for their interpretation are different, too. A comprehensive treatment of the Knossos oxen tablets must be reserved for a future study.

Although, because of my own training and specialized interests, the emphasis of this paper will be on the interpretation of textual evidence, work with the Linear B inscriptions—one may say with any inscriptions—is never far removed from a specific or general archaeological context. This is especially true in regard to a study of livestock which were living and moving in the natural environments of LH III B Messenia and LM III A:2[14] Crete. Consequently our interpretations depend upon archaeological surveys and excavations, and upon concomitant geographical and environmental studies in southwestern Greece (Messenia) and in Crete. Interpreted within the framework thus constructed, the textual evidence should add to our understanding of how the Mycenaeans, collectively and individually, managed and used the resources of the territories in which they lived. The Pylos oxen tablets are much fewer in number than those from Knossos, yet they are more secure in immediate and general contexts of all sorts (archaeological, administrative, geographical—not to mention chronological). Although the Pylos oxen texts appear heterogeneous at first view, they can be fit into, and made to contribute important details to, the general picture we have of the economic and administrative organization of the kingdom of Pylos at the close of Late Helladic III B.

Let us first consider the general nature of our evidence. There are roughly 4800 Linear B inscriptions, of which, eliminating the special class of painted vase inscriptions, about 4650 are tablets, labels or sealings upon which reference to oxen could be made either ideographically, i.e., by means of signs which represent

[14] This is my working hypothesis on the date of the Knossos tablets, explained elsewhere and fortified recently by the implications of Weingarten's work with the Knossos sealings in *Oxford Journal of Archaeology* 7:1 (1988) 1-25.

objects, animate or inanimate (BOS, BOS^{f}, BOS^{m})—and this is the more usual Mycenaean record-keeping procedure—or phonetically, i.e., by spelling the word for ox or words pertaining to oxen in Mycenaean characters, thus: *qo-o* which occurs once on PY Cn 3.2^{a} and *qo-u-ko-ro* on PY An 18.9^{a}. By ox, I am referring to BOS TAURUS, descendant of the aurochs, BOS PRIMIGENIUS,[15] and I am using the term in one of its modern American senses to mean "cattle" generically, as distinct from perhaps its somewhat more common modern meaning of "neutered male animal used for plowing or pulling." I do this for clarity since the Mycenaean script differentiated ideographically for most animals (e.g., BOS, BOS^{f}, BOS^{m}) generic from sexed variants. But it is sometimes difficult to tell whether particular scribal uses of these variants are meaningful in the modern sense.

For example, the isolated KN tablet C 902 refers to plain BOS with no other information to indicate whether these are the generic creatures or perhaps neutered animals. Jose Melena in a letter dated Nov. 24, 1988 finds the use here so strange that he interprets BOS as a designation of "hides," i.e., the products of dead animals—an interpretation for which certain sealings from Pylos, tablets from Knossos and now sealings from Thebes provide possible comparanda.[16] Of course, the range of acceptable hypotheses is broadened here by the fact that the adjoining ideograms *170 occur only on this tablet. Melena proposes "sinews" on the basis of the shape of the signs and context. On Ce 7061 we read BOS *ZE* 1, a pair of "generic" oxen. This is thought to be a reference to a team of castrated worker oxen. Yet, to prove that nothing is straightforward in Mycenaean ideography, tablet Ce 59 refers to animals identified as *we-ka-ta*, i.e., "workers," five times as BOS^{m} and once as plain BOS. Is this distinction meaningful? Are five of the groups male animals destined for worker status and therefore to be castrated, whereas animals of the sixth group already have been neutered? Is the generic form of the sixth group—actually the fourth group entered on the tablet—a scribal omission, oversight,

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15 E.P. Walker et al., *Mammals of the World* (Baltimore 1964) vol. 2, 1429.

16 Thebes: Aravantinos (supra n. 3). Pylos sealings (interpreted in context): J.L. Melena, "Further Thoughts on Mycenaean *o-pa*," in A. Heubeck and G. Neumann eds., *Res Mycenaeae* (Göttingen 1983) 275-281. Knossos: J.L. Melena, "On the Knossos Mc Tablets," *Minos* 13 (1972) 29-54, especially 51-54.

or bit of carelessness? Or should we call upon John Killen's analysis of Knossos breeding and wool-producing flocks? In the former, OVIS^{m} stands for potent breeding male sheep. In the latter OVIS^{m} stands indiscriminately for castrated wool-producing wethers.[17] These ambiguities, potential and real, explain why I follow the Mycenaean practice throughout: I refer to these animals as oxen, male oxen and female oxen.

The Mycenaean documents are placed into different classes and series by subject matter: classes A through U contain series of texts (either page or leaf-shaped tablets) on which ideograms are written; class V is reserved for series of texts without ideograms; class W for texts called labels and sealings which are identified by their distinctive shapes and record-keeping functions; class X is used for fragments displaying no identifiable ideogram; and class Z refers to the special group of vase inscriptions—mainly stirrup jars.[18] Oxen could occur ideographically in classes C- or D-, which are used for texts containing livestock ideograms, or in class U-, under which are grouped individual texts which contain a mixed variety of ideograms. Oxen could also appear as ideograms in class W-, since ideograms play a dominant role in the brief texts written on labels and especially sealings.[19] And lastly reference could be made to oxen lexically and as a primary subject in texts of the non-ideographic V- class.

The distribution of tablet series is not uniform site to site. Mycenae and Thebes have no tablets of the C- class; Knossos alone has tablets of the D- class; and only recently has a tablet of class U been found at Tiryns and sealings of class W at Thebes. So the disproportion can also be in terms of numbers of texts. In some cases this unbalanced distribution corresponds to the greater or lesser focus or reliance of individual sites on specific subjects

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[17] J.T. Killen, "The Wool Industry of Crete in the Late Bronze Age," *BSA* 59 (1964) 1-15.

[18] For a general statistical breakdown of Linear B texts, see A. Bartoněk, "The Linear B Texts and Their Quantitative Evaluation," *Res Mycenaeae* (supra n. 16) 15-27. For stirrup jars, see E. Hallager, "The Inscribed Stirrup Jars: Implications for Late Minoan III B Crete," *AJA* 91 (1987) 171-190. For how the stirrup jars fit into the overall applications of Mycenaean writing, see T.G. Palaima, "Comments on Mycenaean Literacy," in J.T. Killen, J.L. Melena, and J.-P. Olivier eds., *Studies Chadwick* (*Minos* 20-22: Salamanca 1987) 499-510.

[19] Cf. the statistics on the Thebes sealings supra n. 6. Two of them have oxen ideograms: Wu 53 BOS^{m} and Wu 76 BOS^{f}.

connected with their regional economies: for example, the far greater number of wool texts from Knossos contrasts neatly with a larger number of flax texts from Pylos and seems to reflect the fact that different primary raw materials were used in the major cloth industries of the two regions.[20] In other cases, this is undoubtedly due to the chance circumstances surrounding both the destruction of the palace centers and the ultimate preservation of the entirely haphazardly baked clay tablets. For example, at Knossos, bronze only occurs secondarily in a few isolated texts as a designation of the material used in connection with the manufacture of: (1) vases and armor platelets (K 740.2.3: the AES ideogram is juxtaposed, in smaller scale, to ideograms for a type of vase and an armor plate as an indicator of material); (2) linen-backed armor (L 693.1: 1 M of AES is recorded following a lexical entry which includes the words *linon* and *khitōn*); and (3) chariot assemblies (Sc 223: the AES ideogram is placed, again in smaller scale, next to and below the ideogram BIG for chariot). The total absence at Knossos of a series providing any details about the organization of bronze-workers or the bronze industry, which was a key element of Mycenaean, and earlier Minoan, palatial economy,[21] must be fortuitous. For in fact several tablets of the minor Oa series, discovered in the antechamber to the throne room at Knossos,[22] redress the balance by referring to relatively large numbers of ingots (e.g., Oa 730: *167 60 L 52 M 2 = 60 ingots averaging 25.165 kg. according to the total weight given by the number of units [L = 29 kg. based on the weight of a gypsum octopus weight from Magazine 15 at KN and

20 J.T. Killen (supra n. 17) and "The Textile Industries at Pylos and Knossos," in C.W. Shelmerdine and T.G. Palaima eds., *Pylos Comes Alive* (New York 1984) 49-63.

21 M.H. Wiener, "Trade and Rule in Palatial Crete," in R. Hägg and N. Marinatos eds., *The Function of the Minoan Palaces* (Stockholm 1987) 261-268, stresses the role of the Cretan palaces of all periods in the organization of overseas trade for bronze, or copper and tin.

22 J.-P. Olivier, *Les Scribes de Cnossos* (Rome 1967) 21 (area H1), 107, 165. L.R. Palmer, *The Find Places of the Knossos Tablets* in L.R. Palmer and J. Boardman, *On the Knossos Tablets* (Oxford 1963) 32, 35, 113-114.

the average weight of 19 copper ingots from HT = 29.132 kg.]),[23] and these ingots are identified on one partially preserved tablet at least (Oa 734) as made of bronze (AES, again in smaller scale, adjoining and above the ligatured ingot sign *167+*PE*).

There should be workers of these bronze ingots in the region controlled by Knossos, and indeed we are fortunate that two references to the Mycenaean word for bronzesmith *ka-ke-u* occur in separate series within the Knossos corpus. One reference is found on tablet Fh 386, which deals with religious offerings of oil. John Killen has demonstrated that the series to which Fh 386 belongs concentrates on sites in the relative vicinity of Knossos.[24] The other tablet containing a reference to *ka-ke-u* deals with an unknown subject; it is from the non-ideographic V- series (V 958.3a). Thus we extract from scattered references at Knossos only some of what is given to us wholesale at Pylos in the nearly 30 long, or once long, tablets of the Jn series. The Pylos Jn tablets document the existence, albeit perhaps under special circumstances, of a system which monitored the amounts of bronze held and not held by large numbers of smiths (*ka-ke-we*), some 300 in all. On Jn 431, one group is associated with a *qa-si-re-u* (.6: later Greek βασιλεύς) whose name ('Αμφιβώτας or Amphiq^{h}oitas) is given, and another group is described as *po-ti-ni-ja-we-jo* (.16: i.e., connected with the goddess *Potnia*). To come full circle, another Knossos Oa text (Oa 7374) lists a number of ingots immediately following the word]*po-ti-ni-ja*. We may speculate then that at both sites the working of bronze fell partly within what one might call the "temple sphere," whatever that precisely means in Mycenaean terms.[25]

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[23] *Docs*^{2}, 55-58, 359 for weights. For actual ingots, cf. C. Zaccagnini, "Aspects of Copper Trade in the Eastern Mediterranean During the Late Bronze Age," in M. Marazzi, S. Tusa and L. Vagnetti eds., *Traffici micenei nel Mediterraneo* (Taranto 1986) 413-424, who discusses the Mycenaean textual evidence in relation to the established weight groups of copper ingot finds (pp. 417-418): 21-23.5 kg.; 25-27.5 kg.; 28-29.5 kg.; 32-35 kg.; 37-39 kg. Most of the Hagia Triada and Zakro ingots fall into the 28-29.5 kg. group. One ingot from Mycenae weighs 23.625 kg.; one from Tylissos 26.5 kg.

[24] J.T. Killen, "Piety Begins at Home: Place-Names on Knossos Records of Religious Offerings," in P. Hr. Ilievski and L. Crepajac eds.,*Tractata Mycenaea* (Skopje 1987) 163-177, especially 169-170.

[25] For a discussion of the connection of bronzeworking with "temple" administrations in the Eastern Mediterranean and specifically with the

This I hope is sufficient illustration that one cannot rely simply on the surviving documentation from each site to build up a picture of differences between various regions or to assess the relative importance of a particular element in the picture of economic, social, political or religious activities at individual sites or in Mycenaean civilization as a whole. One must move back and forth, always keeping in mind the treacherous behavior of chance and the varying skills of archaeologists in preserving or destroying tablets.[26] But we may draw some conclusions, if only tentatively, from complete or nearly complete lacunae, when they concur with interpretations drawn from archaeological evidence. Thus the paucity of references in the Mycenaean corpus, six in all, to the profession of potter must be meaningful. The word occurs on 4 Pylos tablets, 1 tablet from Mycenae, and 1 tablet from Knossos in livestock, landholding, personnel and wool contexts.[27] So from some 3542 non X- series texts from the principal Mycenaean sites of Knossos, Pylos and Mycenae, we know of five individual potters and one woman in a personnel list named "Potteress" (KN Ap 639.7).[28] This must imply minimally that the production of ceramic pottery was not controlled directly by the centralized record-keeping administration, at least not in any way comparable to those economic activities which do find their ways into specialized series of Linear B tablets.

Similarly the complete absence of an identifiable word for scribe, the later equivalent of which lends itself easily to theoretical phoneticization and Mycenaean spelling as **ka-ra-pe-u*, calls for an explanation other than chance omission. After all, palaeographical and archival research has identified at least 33 tablet writers at Pylos; some 60-70 at Knossos; and 4 at Thebes, a number that might soon increase, depending on Aravantinos's work with the new Thebes sealings. Åstrom and Sjöquist even think they have identified the tablet-making assistants of these writers, although of

institutions of the *po-ti-ni-ja* at Pylos, see I. Tegyey, "The Northeast Workshop at Pylos," in Shelmerdine and Palaima (supra n. 20) 77-79.

26 On this point see the closing comments by M.H. Wiener in T.G. Palaima (supra n. 3).

27 *ke-ra-me-u* and derivatives on PY Cn 1287.4 (*ke-ra-me-u*), An 207.7 (*ke-ra-me-we*), En 467.5 and Eo 371.A (*ke-ra-me-wo*); MY Oe 125 (*ke-ra-me-wi*[ ); KN Ap 639.7 (*ke-ra-me-ja*).

28 J.-L. Perpillou, *Les substantifs grecs en -εύς* (Paris 1973) 40.

this I am skeptical.[29] How are we to explain their total absence from the texts? The office itself, or the accomplishment that defines it, may be subsumed by one or another of the many terms for functionaries traced by Lindgren in her prosopographical study of the Pylos texts.[30] The actual inscribers of texts may have had no status, implying a remarkable difference in the role of writing within the Mycenaean and the Near Eastern social and political systems.[31] Or they may have had a special relationship to or within the central authority which left their own obligations to, and rewards from, the prevailing political and religious powers a special item outside the clay tablet records, perhaps in records on ephemeral materials within the central archives.

With these lessons in mind, let us now consider our evidence for oxen. That writers of texts were important to the Mycenaeans we can tell from almost 5000 surviving inscriptions. That potters played a key role in the Mycenaean economies we can tell from thousands of Mycenaean pots and sherds, local and exported. What about oxen, whether bulls or cows? Although I am unqualified to enter into the realm of iconography and I instinctively recoil from any discussion of ancient religion, I am forced like a yoked animal to go where my topic leads. I think it is safe to say that the bull is a central animal in the iconography of power and sacrificial ritual among the Minoans and the Mycenaeans. Nanno Marinatos's interpretation of the role of the bull in Minoan sacrificial ritual is well supported by her sober catalogue of representations, mainly on seals and sealings, of bulls bound on sacrificial tables or otherwise associated with implements of cult sacrifice.[32] Such a catalogue can be extended to other representations of bulls and even into the Mycenaean period in frescoes, metal work and seals and sealings. From the Minoan Palace of Minos at Knossos, we find fragments of painted stucco reliefs of bulls in the northern entrance passage and the northwest quarter of the palace (*PM* III, 172-191, fig. 116; *PM* I, 375-378, fig. 273), a fresco panel of a large-scale

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[29] K.-E. Sjöquist and P. Åström, *Pylos: Palmprints and Palmleaves* (Göteborg 1985) 99-107.

[30] *PP* I-II.

[31] See closing comments by M. Powell in T.G. Palaima (supra n. 3).

[32] N. Marinatos, *Minoan Sacrificial Ritual* (Stockholm 1986). In the discussion that follows, see cited works for illustrations which it would be pointless to reproduce here.

bull's head from magazine XIII (*PM* I, 527-528 and fig. 385), a faience plaque from the Temple Repositories showing a cow suckling a calf (*PM* I, 511-512, fig. 367), and the famous 'Taureador Frescoes' (*PM* III, 203-232). These last have parallels elsewhere in Crete: on a gold signet ring from Arkhanes (*PM* III, fig. 254) and a steatite rhyton from Hagia Triada (*PM* III, fig. 157). The Hagia Triada sarcophagus panel of a dappled bull being sacrificed is dated LM III A:2 and so within the Mycenaean period of Crete.[33] Various representations of bulls in processional, sacrificial or bull-leaping scenes are found among the fragmentary frescoes and restorations from the Mycenaean Palace of Nestor at Pylos.[34] There are comparable or even better executed parallels in buildings at the Mycenaean centers of Mycenae, Tiryns and Orchomenos.[35] Evans himself likened the bull reliefs at Knossos to the gold cups from the Vapheio tholos (*PM* III, 177-189). And there is evidence of an ox being tended together with other livestock from the miniature frescoes of the West House at Thera.[36] On the South Wall fresco from the same building, a calf is being led by two men in procession along the walls of the so-called Arrival Town in a context considered sacrificial.[37]

Oxen were present and important in the Aegean world throughout the Middle and Late Bronze Ages, and their importance is further reflected in later epic literature, including Hesiod's practical advice in the *Works and Days* 405-406:

Οἶκον μὲν πρώτιστα γυναῖκά τε βοῦν τ' ἀροτῆρα
κτητήν, οὐ γαμετήν, ἥτις καὶ βουσὶν ἔποιτο

33 C. Long, *The Ayia Triadha Sarcophagus: A Study of Late Minoan and Mycenaean Funerary Practices and Beliefs* (Göteborg 1974) 11-14 for the date, 61-71 and plate 31 for the scene of the bull scarifice.

34 M.L. Lang, *PN* II, plate 124: 36 H 105; plate 125: Throne Room Wall Sketch; plate 135: 18 C 5. See also L. McCallum, "Frescoes from the Throne Room at Pylos: A New Interpretation," *AJA* 91 (1987) 296.

35 These all have to do with bull-leaping: four fragments from the Ramp House at Mycenae in *BSA* 24 (1919-1921) plate 7, nos. 4-7; and fragments of similar scenes from Orchomenos and Tiryns cited in *PN* II, 236. For a fuller treatment, see J. Younger, "Bronze Age Representations of Aegean Bull Leaping," *AJA* 80 (1976) 125-137, and "A New Look at Aegean Bull-Leaping," *Muse* 17 (1984) 72-80.

36 L. Morgan, *The Miniature Wall Paintings of Thera* (Cambridge 1988) 57 and n. 146.

37 Morgan (supra n. 36) 56-56 and pl. 81.

"First of all, get a house, and a woman and an ox for the plough–
a slave woman and not a wife, to follow the oxen as well"

and the dramatic heroic cattle raids alluded to in the *Iliad* (20.89-93; 6.421-424). Can we track these animals within the Mycenaean records, track their use, their location, their value within the regions associated with the administrative systems of Pylos and Knossos? Their hoofprints are fairly well covered, but we can try.

From a breakdown of tablets from Knossos and Pylos,[38] we can draw some inferences. In regard to Knossos, we can observe that 959 tablets, or over 1/3 of those assignable to definite subject series, are classified C- or D-, i.e., as referring to the use and management of livestock. In addition classes U- and V-, which, as we have mentioned, are potentially open for reference ideographically to oxen or lexically to either oxen or ox-related terms, contain another 201 tablets. This means that nearly 46% (1160 of 2513) of the surviving definable tablets from the Palace of Minos could have referred to oxen. Only 44 (less than 2%), all from series of class C-, definitely do, with 3 more fragmentary possiblities. Of these only 31 (slightly more than 1%) refer exclusively to oxen. In addition, a single tablet, very fragmentary, from the L- cloth series (L 480) contains the sole reference in the Knossos corpus to a *qo-u-qo-ta*, an ox-pasturer (cf. *Od.* 13.221: where Athena is disguised as a shepherd: ἐπιβώτορι μήλων). There is no reference at all to the occupational term *qo-u-ko-ro*, oxherd, which appears a limited number of times at Pylos, but, as we shall see, in reference to large numbers of these men. The term *qo-u-ko-ro* even shows up once in the disjointed corpus of 24 fragmentary texts from Tiryns, referring apparently to an individual oxherd in a landholding context (GRA serves here most likely as a land measure):[39]

TI Ef 2]qo-u-ko-ro *DA* 1 to-sa-pe-mo GRA 6.

The almost total absence of references to this occupation at Knossos seems, at first, as startling as the limited references to potters in the total Mycenaean corpus.

As far as the tablets recording the animals themselves, they are rather specialized and are almost lost among flocks and flocks of

[38] Bartoněk (supra n. 18) 20.

[39] L. Godart and J.-P. Olivier, "Nouveaux textes en linéaire B de Tirynthe," *Tiryns* VIII (Mainz 1975) 43-50.

sheep records, over 900 in all. In fact, in several tablets of the C- series (Ce 50, Co 903, 904 + 8008, 906, 907, 7056) oxen are almost literally lost in flocks and herds, being listed in small numbers (2, 4, 6, and 10) and once as an after-thought, among far larger groups of sheep, goats, and pigs. The number of sheep on these tablets ranges from 217 to 952, goats 179 to 365, pigs an incomplete 50 to 81. One tablet (Ce 152 + 8256) runs counter to this pattern, recording equal numbers (1 or 12) of oxen, sheep, and goats in at least 5 separate entries. The purely sheep tablets, primarily of the D- series, combine with those of the various L- cloth series to present us with detailed documentation of all stages of a cloth production industry that was a central component of the Knossian economy. These texts, which comprise nearly 43% of all definable Knossos tablets, have been studied systematically and comprehensively by John Killen and José Melena.[40] The oxen records, few, scattered, less coherent, have been neglected, except for interpretations of individual tablets (Ce 50),[41] studies of particular lexical items (the boonyms of the Ch series),[42] and their use in analyzing Cretan geography (Co series),[43] despite the fact that some of the most fragmentary tablets seem to refer to by far the largest numbers of oxen in the Mycenaean corpus, e.g., C(1) 5544:] BOS^{m} 91 [.

There are only 8 Pylos tablets which refer to oxen at all (Cn 3, Cn 418, Ua 25, Un 2, Un 6, Un 138, Un 718, Un 1177—see appendix). These constitute less than 1% of all definable Pylos texts (8 out of 959 non-X- series texts). The series prefixes immediately present a striking difference from the Knossos texts. At Pylos oxen references occur, with 2 exceptions, on tablets of the series Ua and Un which are defined by mixed ideograms of different subject classes. Only two tablets come from the livestock series (at Pylos

[40] See Killen (supra n. 17) and "The Linear B Tablets and the Mycenaean Economy," in A. Morpurgo Davies and J.T. Killen eds., *Linear B: A 1984 Survey* (Louvain 1985) 251 with references; J. L. Melena, *Studies on Some Mycenaean Inscriptions from Knossos Dealing with Textiles* (*Minos* Suppl. 5: Salamanca 1975); and entries under these authors in L. Baumbach's two *SMID* compilations.

[41] J.K. McArthur, "A Tentative Lexicon of Mycenaean Place-Names," *Minos* 19 (1985) Anexo 120-121 with references.

[42] M. Lejeune, "Noms propres de boeufs à Cnossos," *REG* 76 (1963) 1-9.

[43] L. Godart, "Les tablettes de la série Co de Cnossos," in M.S. Ruipérez ed., *Acta Mycenaea* II (*Minos* 12: Salamanca 1972) 418-424.

only class C-) and, as at Knossos, they form a very small part of the livestock series: 2 out of 50 texts (4%). These two texts even have, as we shall see, exceptional contents within the livestock series. The Pylos evidence is, therefore, likely to offer us a much different perspective on oxen. We shall have to decide whether this picture is to be contrasted with or supplemented by the Knossos evidence when we eventually consider general Mycenaean practices.

I have already alluded to the fact that words for oxherd (*qo-u-ko-ro* = later Greek βουκόλοι) and ox-pasturer (*qo-qo-ta* = kʷoukʷótas) are found on Pylos tablets. A group of 90 *qo-u-ko-ro* is recorded at the site of *ti-no* in a list of personnel An 18[a] along with "carpenters" (here *te-ko-to-na-pe*), "wall-builders" (*to-ko-do-mo*), and perhaps "men of service" (a case could be made for *te-re-ta* on line .11). On the fragmentary personnel list An 852[a] *qo-u-ko-ro* are (?) associated again with "carpenters" (*te-ko-to-ne*), both apparently in much smaller groups, to judge by the numbers (2-4) of men in other groups extant on the tablet. At least 4 groups of *qo-u-ko-ro*, ranging in size from 18 to 66, are found on another much-damaged personnel list (An 830 [+] 907[a]) having something to do with landholding—the land term *ke-ke-me-no* can be completed in line .2 and appears clearly in line .6 juxtaposed to the ideographic abbreviation *DA*. Since *DA* also occurs in the heading (.8-.9) to the section listing the *qo-u-ko-ro* (.8-.13), we can be confident that the oxherds here had landholding associations. We may recall that Tiryns tablet Ef 2 registered a *qo-u-ko-ro* in a similar context. Note also that An 830 [+] 907[a] preserves the names of three areas where oxherds are located: *ra-wa-ra-ti-ja*, *pi-*82*, and a_2*-ki-ja*. We can add these to *ti-no* from An 18. Ea 781[a] a single-entry land record makes reference to a parcel of land (*ko-to-na ki-ti-me-na*) qualified by *qo-u-ko-ro-jo*, the word for oxherd in the genitive case, implying that an individual oxherd somehow "possesses" or otherwise controls this piece of land. On 4 other Ea records (Ea 270[a], 305[a], 757[a], 802[a]) individuals identified by proper names "hold" (*e-ke*) parcels of land (in Ea 305, 757, 802 clearly *ke-ke-me-na* land) qualified by the word ox-pasturer (*qo-qo-ta-o*) in the genitive case. Finally, on a long, again fragmentary, tablet (Nn 831[a]), an oxherd or oxherds—the form *qo-u-ko-ro* is ambiguous in number, and contextual parallels here are indecisive: *ka-ke-u* in line 11 is nominative singular; *po-me-ne* in line 10 is therefore nominative plural; while *ko-re-te*[in line 9 could be either—is or

are recorded in one of ten entries with quantities of flax (*SA* 1-24). These amounts of flax at one time at least—it is unclear whether the signs in erasure belong to the prior or the final version of the text—were designated in the heading as the *do-so-mo* (= δοσμός) or "contribution" coming from a specific local community partially preserved in line .1. *Docs*^{2}, 472 plausibly suggests restoring *ko-ri*[*-si-jo ri-*]*no* or *ko-ri*[*-to-jo ri-*]*no* in reference to the community of *Korinthos* in the further province of Messenia and the word "linen," which we have seen before on the Knossos linen-backed armor tablet. We have then a fifth location where oxherds are found, a location specifically connected with flax. The other entries on Nn 831[a] include a bronzesmith, shepherds, and *ko-re-te*[. The *ko-re-te*[(singular or plural) gives over half the total contribution of flax (24 out of 45 units)—the oxherd(s) give(s) only 2 units. *ko-re-te-re* are securely identified as local officials known primarily in bronze- and metal-working contexts (Jn, Jo texts from Pylos), but not exclusively.[44] Besides being associated with other subjects at Pylos (in texts of the On series [referring to *154 a kind of hide (?) on On 300], on Aq 64 [*171 = fodder?]) as well as flax, these officials are connected at Pylos with land and oxherds on An 830.6 [*ko-re-te-ri-jo*]. We should note that on Thebes sealing Wu 76 the transactional term *o-pa* qualifies 30 units (ca. 2880 liters or ca. 650 kg.) of *171 (= fodder?) which is listed with a personal name (*a-e-ri-qo*) and BOS[f], thus providing a transitive connection between the *ko-re-te* and oxen:

ko-re-te : *171 :: *171 : BOS[f].

At Knossos individual *ko-re-te-re* are recorded on tablet C 902 at six different locations with single oxen—unsexed—and ideogram *170, the identity of which is unclear. One possibility, besides Melena's sinews, is fodder.[45] Full-grown female oxen nowadays

[44] *DMic.* s.v.

[45] At a seminar of the anthropology department of the University of Indiana on September 28, 1989, a traditional cattle slaughterer and butcher Steve Fender of Fender 4-Star Meat Processing, Spencer, Indiana, declared that there was no way in which the tendons or sinews of a young steer could be reckoned by the number 12. He explained that there were not 12 areas that would produce such fibers and no reasonable way that the sinewy portions or tendons—which are still cut and sold today—could be naturally subdivided into 12 sections. Thus I am more inclined to interpret the Mycenaean ideogram as fodder.

consume ca. 70 kg. of fodder per day.[46] They thus require space or controlled maintenance.[47] If *170 were a measured quantity it would here be found in portions of 12 x 96 liters per animal, or roughly 900 kg. of a grain like wheat (wheat = .772 kg./l.).[48] 96 liters of wheat = 74.112 kg., but here more work must be done on what the normal fodders for these animals would have been in the Late Bronze Age, and what amount of grasses, hay or grain 12 x 96 l. might represent. Modern studies of cattle management practices world-wide indicate that the feeding of grains to oxen is very resource-expensive and not normally adopted except in wealthy and developed countries like the United States which "have the capacity to grow grain in excess of human food requirements."[49] We thus would have to answer two important, and perhaps unanswerable, questions to determine whether the Mycenaeans would have fed grain to oxen. First, would production of grains, otherwise used by the palace to feed its dependent workers, have been sufficient to allow a surplus to be allotted generally to oxen? Second, if not, would a special use of certain oxen have been important enough so that valuable grain would have been used to feed the animals? Here I am thinking primarily of religious and ceremonial uses such as the fattening of the animals in preparation for sacrifice. In modern Spain, young bulls are fed corn and grains in preparation for marketing for slaughter.[50] We should also keep in mind that ideograms like *170 and *171 could be measured in units of bundles or bales. If this were so, it would be very tempting to propose that the quantity (30) of *171 on our Thebes sealing represented a monthly allotment for the feeding of a cow. But this would leave the number 12 here unexplained, unless one wanted to appeal to the unknown Mycenaean-Minoan monthly calendar.

To return to our main point, at Pylos men who tend or pasture oxen are not invisible. They can hold parcels of land, apparently of

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46 Walker et al. (supra n. 15).

47 H. Greenfield informed me *per vocem* that a single ox would require one hectare of grazing land.

48 Conversion factor taken from a paper of Ruth Palmer forthcoming in *Minos* (1989). Whole barley has 2/3 value of wheat because of inedible hulls.

49 J.E. Rouse, *World Cattle* I (Norman, Oklahoma 1970) xvi, and 249, 275, 262, 163-165 for discussion of feeding methods in Spain, Switzerland, Sweden and Greece in the 1960's. The grains typically used as bases for concentrated feeding supplements are barley and oats.

50 Rouse (supra n. 49) 249.

both major categories, and apparently sublease it. That they also are connected with a fairly large area of land at Tiryns (GRA 6) would seem to suggest that the same held true at least of mainland Greece. Different practices may have prevailed in Crete. At the time of our tablets, the island would have been Mycenaeanized for roughly a century, and different arrangements may have been devised *for* and *in* converting Minoan administration and economic arrangements to Mycenaean. The almost complete absence of landholding records from Knossos prevents us from universalizing on this point from what we think we see at Pylos and Tiryns. The holding of land may indicate some relation to the central authority, or even some connection, as in the E- series at Pylos, with what we call, for lack of any clearer definition, religious authorities or communities in the kingdom, such as *pa-ki-ja-na*. When we consider the contexts in which oxen themselves appear on the Pylos tablets, this last speculation will not seem completely far-fetched, and I make it despite my inbred aversion to religious interpretation of prehistoric evidence. The sphere of activity of oxherds and ox-pasturers, as we might expect, seems to be outside the central administrative district, to judge by their associations with bronzesmiths, shepherds, and *ko-re-te-re*, all of whom we know operated in local and even remote locales. The place-names we have so far seen in direct connection with the oxherds: *ti-no*, *ra-wa-ra-ti-ja*, *pi-*82*, a_2*-ki-ja*, *ko-ri-to*, support this conclusion.[51] That the oxherds are obliged to contribute flax, perhaps derived from their own landholdings, is significant for locating them geographically in the kingdom of Pylos and so must be kept in mind.

We can now pursue the Pylian oxen themselves, although even Hermes could not have done a better job of disguising their tracks. The information our 8 Pylos tablets provide about the role of oxen in the economic life of Bronze Age Messenia, about breeding,

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[51] For the location of Mycenaean toponyms in Messenia, see primarily S. Hiller, *Studien zur Geographie des Reiches um Pylos nach den mykenischen und homerischen Texten* (Vienna 1972); J. Chadwick, "The Mycenaean Documents and Pylian Geography," in J. Bintliff ed., *Mycenaean Geography* (Cambridge 1977) 36-39; and further references in C. Shelmerdine, "Nichoria in Context: A Major Kingdom in the Pylos Kingdom," *AJA* 85 (1981) 319-325 and n. 1. Most recently see M. Lang, "Pylian Place-Names," in J.-P. Olivier and T.G. Palaima eds., *Studies Bennett* (*Minos* Suppl. 10: Salamanca 1988) 185-212.

rearing, keeping, distributing, controlling and using these animals, is scant and ambiguous—here, as at Knossos, in clear contrast to the information the texts offer about sheep. Yet we have some context already into which to place any information the tablets may yield.

From tablet Cn 3[a] all one can deduce for certain is that single (generic) oxen were being sent (or offered?) *jo-i-je-si* [52] by groups of men, who themselves have military associations in the well-discussed *o-ka* texts. These men are at several different locations, and they are sending (or offering?) the oxen to a figure, most likely an individual, named *di-wi-je-u*, who here in the Pylos archives is designated an *e-re-u-te* or "inspector." (Cf. ἐρευτήρ: *IC* I *IX*,1 D132 οἱ ἐρευταὶ τῶν ἀνθρωπίνων "inspectors.") This title can be held jointly with that of *e-qe-ta* (Wa 917), which is used on many tablets, mostly military, to designate high officials, "inspectors or comptrollers" responsible to the central ruling authority.[53] *di-wi-je-u* appears on 12 tablets of the Pylos Es series alongside an important individual named **we-da-ne-u*, who has strong livestock associations, as we shall see below. The Es tablets record, as if on a standard form, *do-so-mo*, contributions, of grain to these two figures, to the god Poseidon, and to the inscrutable **34-ke-te-si*, most likely another divine figure. It is safe to say that *di-wi-je-u* himself moves in high company. And so these oxen might, too.

Tablet Cn 418[a] (figure 2) lists "fatted" oxen (BOS+*SI*) singly or in pairs among other livestock. The other animals, it seems, are not described. The oxen are described asyndetically:

in line 2: re-u-ko ¦ a-ko-ro-we-e BOS+*SI* 2
= white, a-ko-ro-we-e *fatted oxen* 2

and in line 3: re[-u-]ḳọ ¦ ma-ra-pi ¦ pe-ko ¦ a-ko-ro-we BOS+*SI* 1
= white, dark on the underbelly, a-ko-ro-we *fatted oxen* 1.

The four-word, three-element description in line .3 seems to be repeated in fragmentary line .7, where the combination of spacing, formatting and formulae makes restoration of identical, or nearly identical, descriptive vocabulary, and of BOS+*SI* conjectural, but

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[52] *DMic.* s. *i-je-to-qe*: the form is either derived from ἵημι "send" or *isēmi (cf. ἱερός) "sacrifice."
[53] *PP* II, 48.

not too incautious: I have inserted these elements in figure 2, while oxen would be written at the right edge where the tablet is now broken away . I restore in line .6 an entry parallel to the heading in lines .1-.2: at (*pa-ro*) / man's name / re-u-ko , a-ko-ro-we(-e) BOS+*SI*. My reasoning is as follows. The traces of writing (*vestigia*) far to the right on line .6 hold the key. Their position would seem to rule out for line .6 an entry exactly parallel to line .1, i.e., only the preposition *pa-ro* MN, as an introduction to a distinct second section. This would not occupy nearly enough space, even if the MN was accompanied by an occupational term or some other qualifier. The *vestigia* are perhaps not too far right to justify an entry parallel to line .2. But then we would have to explain why separate groups of livestock of the same type and condition were being repeated in lines .2-.4 and .6-.8 without any annotation by the scribe serving as an explanatory subheading. It might be that the rightward shift in writing on line .6 is the result of a brief heading for a second group of animals placed at the start of line .6 ahead of a descriptive entry paralleling that in line .2, e.g.:

pa-ro , MN , re-u-ko , a-ko-ro-we(-e) BOS+*SI*.

This would maintain the clear, though not exact, parallelism between sections which continues in lines .3-.4 and .7-.8. There is, of course, also the possibility that another term specifying the place of color markings on the animals other than *ma-ra-pi* "under the belly" is to be restored on line .7.

The three lexical descriptions of oxen preserved in lines .2, .3, and .7 share as first and final elements the words *re-u-ko* "white" and *a-ko-ro-we*. *a-ko-ro-we* has been interpreted in four ways:[54]

(1) *(h)α-χρωης = "of uniform color." This interpretation produces an uneconomical redundancy in line .2, unless the scribe recorded this feature emphatically and proleptically balancing *ma-ra-pi , pe-ko* in line .3. It yields a strained, almost contradictory sense in line .3.

(2) *α-χρωης (cf. ἄχροος) = "pallid, without (color) blemish." This makes better sense in line .2, but produces, if anything, a greater contradiction in lines .3 and .7 because, with the basic sense

[54] *DMic.* s.v.

of the term *pe-ko* in the preceding second descriptive element, the scribe has already recorded that the animals in these lines *are* color-blemished in part.

(3) *ακρ-ωϝης = "with erect or pointed ears." This seems a completely linguistic remedy which makes even less sense in the context of Knossos Ch 7100 + 7703 (+[?] 7937) where the term is used of a pair of BOS in a full set of oxen descriptions by Hand 110 which emphasize primarily the colors of the animals. However, the contents and format of this Ch tablet set it apart from others in the set and allow us to consider some alternative to color description.

(4) *akolowēs (cf. κολούω "dock, curtail, mutilate"). This is L.R. Palmer's suggestion linking the term to later Greek κολούω: "to dock, curtail, mutilate." It has found little favor among Mycenologists (e.g., *DMic.* "menos verosimil"), especially in the extreme significance which Palmer eventually attached to it: "uncastrated."

I think that Palmer is correct here in his etymological explanation, if not his full interpretation. The contradictions and redundancies are removed from Cn 418.2, .3 and .7 if we admit that each descriptive heading pertains to both *color* and *physical condition.* This would certainly make Ch 7100 stand further apart in its series. Moreover, there are good parallels for this in inscriptions from historical times: e.g., an inscription from Magnesia refers to animals offered to Zeus Akraios as τὰ θύμα]τα λευκὰ ὁλόκληρα = "victims white, physically whole."[55] It is perhaps no mere coincidence that the word ὁλόκληρος used here has a meaning opposite to κολοβός which is related to the word κόλος from which interpretation 4 ultimately derives the Mycenaean word *a-ko-ro-we.* Chantraine specifies that κόλος refers to a major defect of bulls: being without horns.[56] Thus the privative Mycenaean form *a-ko-ro-we* (i.e., un-κόλος) would designate that these animals are unblemished in the feature *par excellence* of the bull in Mycenaean and Minoan political and religious iconography.

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[55] J. von Prott and L. Ziehen, *Leges Graecorum Sacrae e Titulis Collectae* (Leipzig 1906) §82.

[56] Chantraine, *Dict. Ét.*, 557: "dits de boeufs, de chèvres...sans cornes, dont les cornes ne sont pas poussées."

The contrast is even more meaningful when one considers that it is fairly standard practice to cut off the horns of worker oxen.

In lines .3 and .7 of Cn 418, the oxen are also described as being *pe-ko ma-ra-pi* , i.e., περκ- = περκνός "on the underbelly" or "on or under the legs." The basic sense of this root and term is not simply "dark" but rather "dark-spotted"—we would say "dappled" or "speckled" depending on the creature to which the term were applied, and it is applied to grapes, olives, serpents, eagles and a type of hawk in later authors like Pollux and Aristotle.[57] Many of the images of Minoan-Mycenaean oxen like those in frescoes from Tiryns and from the Ramp House fresco at Mycenae are white, dark-spotted on their bodies and their legs, and possessed of horns, suggesting that we are perhaps dealing with a familiar Mycenaean-Cretan breed.[58]

The entire text of Cn 418[a] is headed simply *pa-ro* , *we-u-da-ne-we* without any place designation (often, but not necessarily, an indication that reference is being made to the district immediately around Pylos) or other explanatory information. The oxen then are *at* **we-da-ne-u*,[59] clearly the figure mentioned above as associated consistently with *di-wi-je-u* of Cn 3[a] in the religious context of the 13 Pylos Es tabets, where they receive *do-so-mo* of GRA. **we-da-ne-u*'s livestock associations are numerous. He appears some 20 times on 5 other Cn tablets in addition to Cn 418 (Cn 40, 45, 254, 600, and 655). In these texts, large numbers of sheep (generally between 50 and 100) are listed in separate entries: *pa-ro* / man's name / and *we-da-ne-u*'s name in the genitive case. He is a highly placed figure; and shepherds here are tending sizeable flocks which he "possesses" or at least is "responsible for," depending on how we interpret the genitive. On these tablets his sheep are placed at several toponyms: *wa-no-jo wo-wo*, *pu-ro ra-wa-ra-ti-jo*, *a-si-ja-ti-ja*, *ma-ro-pi*, and *ti-mi-to-a-ke-e*, etc. All are

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57 Chantraine, *Dict. Ét.*, s. περκνός.

58 Cf. Morgan (supra n. 36) 56 and n. 138.

59 The *u* is "over erasure, perhaps [[ḍạ]]," *PTT* I, 78. See also Lindgren, *PP* I, 127-129. 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.)* (*Orientalia Lovaniensia Analecta* 23: Louvain 1988) 55, identifies 19 herdsmen for sheep and goats dependent on *we-da-ne-u* whom he considers a high functionary or "priest in Poseidon's estate." For a succinct discussion of alternative interpretations of this figure, see M. Gérard-Rousseau, *Les mentions religieuses dans les tablettes mycéniennes* (Rome 1968) 243-245.

locations in the Further Province of Messenia. *pu-ro ra-wa-ra-ti-jo* is a variant for *ra-wa-ra-ti-ja* and *ma-ro-pi* is closely linked elsewhere with *pi-*82*.[60] *ra-wa-ra-ti-ja* and *pi-*82* we should recall as the place-names where oxherds were located on tablet An 830[a].

**we-da-ne-u* also shows up twice in connection with locales in the Further Province in the Na flax records (Na 856, 1041). One of his flax locations *a_2-ki-ra* (Na 856) combines with a location for oxherds on An 830 [+] 907 (*a_2-ki-ja*) to yield the tongue-twisting composite place-name adjective *a_2-ka-a_2-ki-ri-ja-jo*[61] occurring on Cn 3 as the source of an ox sent to **we-da-ne-u*'s close associate *di-wi-je-u*. **we-da-ne-u* also possesses a contingent of 20 men in line .14 of the rower text An 610. This gives us yet another clue for his geographical sphere of activity (fig. 3). Entries in the Pylos tablets often occur in geographical order—we think—and on earlier and consecutive lines of An 610, contingents of rowers are listed at *a-ke-re-wa*, then at *ri-jo*. The directional movement of this and other texts seems to be down along the coast of the Hither Province and up the other coast along the Gulf of Messenia into the neighborhood of *ti-mi-to-a-ke-e* in the Further Province, where a flock of **we-da-ne-u*'s sheep are grazing. Notice in figure 3 *pi-*82* to the north and *pa-ki-ja-na* near the site of Pylos, names we have encountered before.

Do the other six tablets from Pylos add any pieces to our gradually forming puzzle or clarify the position or shapes of those we now hold? On three texts, oxen occur with other commodities and/or animals in definite offering contexts. On Un 2[a], a single ox (BOS) of unspecified gender is connected with other commodities and/or animals in connection with an important cultic event involving the *wa-na-ka* (*wanax* or king) of Pylos. This event takes place at *pa-ki-ja-na*, the religious district near Pylos. Depending on one's interpretation of the term *o-pi-te-<u>-ke-u*, these offerings could originate either in a secular or in a religious sphere.

In Un 6[a], which is unfortunately fragmentary, a single cow (BOS[f]) is listed with a ewe, a boar, and 2 sows given to the female divinty *pe-re-*82*. Pairs of cows and bulls are recorded in the final section of the tablet along with cloth (*146), oil (*AREPA*), wool

60 Lang (supra n. 51) 194-199, figs. 1 and 1a.

61 L.R. Palmer, *Interp*, 157, and "Military Arrangements for the Defence of Pylos," *Minos* 4 (1956) 141.

and sheep of unknown gender and quantity (OVIS^{x}). This final section, however, has no theonym at its head and therefore these animals and commodities might pertain to either the preceding section (i.e., to *pe-re-*82*) or to both preceding sections (to *po-se-da*[-*o*-*ne*] and *pe-re-*82*). There is, of course, a slim chance that it refers to neither, being simply added information the significance of which the scribe knew himself, or the divine designation for which he accidentally omitted. No additional contextual information remains about the source or sources or the location of these offerings. Un 6 is also inscribed on its back or verso. Here one finds religious officials: *i-je-re-ja* (priestess) and *ka-*]*ra-wi-po-ro* (key-bearer) and a quantity of special cloth (TELA+*TE*).[62]

Un 718[a] continues this pattern of religious associations for Pylos oxen. Three separate sections list offerings (*do-so-mo*) to Poseidon from, in reverse order, the *da-mo* (= later Greek δῆμος), the *wo-ro-ke-jo-ne-jo ka-ma*, and *e-ke-ra*$_2$*-wo*, an individual of some status in the Pylian dossier.[63] Only *e-ke-ra*$_2$*-wo* furnishes any oxen: 1 bull, in addition to grain, wine, cheese, leather and honey.

The remaining three texts are without any incontrovertible religious associations. Un 1177[a] is extremely fragmentary, preserving only 6 units of barley (?) and 1 ox, gender unspecified. The short leaf-shaped text Ua 25[a] lists on the front 2 cows and 8 bulls (a veritable stampede by Pylos standards) together with 3 fatted pigs, 67 rams, and, perhaps related, though on the verso, a large amount of barley. This particular text is by scribal hand 42,[64] who also wrote many Ae texts dealing with religious personnel as well as tablet Un 47 (13 rams, 8 ewes and agricultural commodities [barley, figs, wine, CYP] at the site of *ro-u-so*) and Un 138. The large number of bulls here is at variance with the single or paired oxen listed on other tablets with information pertaining to religious activities, and so the text may not be recording a direct offering. The religious interests of Hand 42, however, connect Ua 25 with this sphere, as does the description of the pigs as fatted (SUS+*SI*). Un 138[a] [65], another tablet by Hand 42, records 1 male ox, 2 cows, other livestock, barley, and olives in an ambiguous

[62] This term is significant for an interpretation we shall propose for KN Ce 50.
[63] *PP* I, 46 with references.
[64] T.G. Palaima, *The Scribes of Pylos* (Rome 1988) 103-105.
[65] *Docs*^{2}, 220-221.

"payment" context[66] involving Pylos and an individual of some prominence named *du-ni-jo*. We know that *du-ni-jo* has religious affiliations because he also appears on Hand 42's Ae tablets. On tablet Fn 79.3 he is connected specifically through an ethnicon with the site of *ti-no*, location of 90 oxherds on An 18.[67] The term used for "payment" on Un 138 (*qe-te-a*$_2$) may also be associated with a male ox on Thebes sealing Wu 53.[68]

Comparative and contextual study of the Pylos tablets reveals then the following essential information about oxen. Oxen appear either in clearly religious contexts like Un 2, 6, 718, where divine names, place names (*pa-ki-ja-na*), or cult vocabulary (the *wanax* ceremony on Un 2) leave little room for doubt, or in texts to which one can with some plausibility ascribe a religious significance, whether by reason of vocabulary (*jo-i-je-si* ? on Cn 3; the descriptive terms for the oxen on Cn 418), by reason of the religious associations of the persons recorded on the tablets (**di-wi-je-u* [Cn 3] in the Es series; *du-ni-jo* [Un 138] in the Ae set; **we-da-ne-u* [Cn 418] in the Es series), or by reason of the known interests of a given scribal hand (Ua 25 ?, Un 138 [Hand 42]).

We can supplement our own textual observations by making use of the regional and zooarchaeological studies of the Minnesota Messenia expedition and Nichoria excavations; the toponymic studies of Sainer, Chadwick, Hiller and others; the studies of Pylos sheep and sheep-related toponyms by Lang; and the general picture of the management of Messenian economy by the central administration at Pylos in the final stages of the existence of the palace. We can try to place our precious information about oxen into the context of the late Mycenaean regional economic system of Messenia, which managed resources and controlled raw materials and production throughout the various districts and sub-districts into which the territory was organized.

The zooarchaeological study done by R.E. Sloan and M.A. Duncan for the Nichoria Excavations provides some very useful

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66 Y. Duhoux, *Aspects du vocabulaire économique mycénien* (Amsterdam 1976) 143-147 for *qe-te-o*, *-a*$_2$.

67 I think that *du-ni-jo* (1), (5) and (6) are the same. See *PP* I, 43-44; *PP* II, 146-147.

68 Aravantinos (supra n. 3). Recall the association of *o-pa* and *171 30 with BOS^f on Wu 76.

information.[69] Although it concentrates on only one small area of the entire territory, the area is itself significant. For it has been identified by Shelmerdine as *ti-mi-to a-ke-e*, one of the seven principal administrative centers of the Further Province of Pylos.[70]

During the MH period at the settlement, pigs and oxen predominated as meat sources, while oxen were slaughtered rather late in life since they were exploited first as dairy and no doubt as plow animals.[71] By the time of our tablets (LH III B:2) pigs and oxen were greatly reduced as meat sources with a corresponding rise in sheep and goats. Pigs and oxen were also proportionally poorly represented at Nichoria for the entire Mycenaean palatial period in Messenia (LH III A-III B:2) in contrast with other well-studied Bronze Age communities, for example, Koruçutepe where twice as many oxen appear. It is suggested by Sloan and Duncan that the LH III B:2 data reflect "a reduction of grazing and an increase of foraging, which would create a situation where both pigs and goats were better adapted." This would certainly explain the overwhelming emphasis in the Cn tablets on herds of sheep and goats. It might also reflect the intensive exploitation of land for other purposes: for flax production (N- series) vital to the palace's cloth export industry; for olives used in the region's perfumed oil industry; and for foodstuffs. We see in the Pylos E-, F- and G-series evidence that the allotment of parcels of land—at least one category of which represents land previously uncultivated (probably *ke-ke-me-na*)—and the careful management of production of cereal, vine and tree crops were necessary to reward and to sustain the many officials, craftsmen and laborers (perhaps even slaves) in various sectors of the highly developed palatial economic system. One thinks here especially of industries which are conspicuously documented in the central administrative archives as employing specialized laborers: cloth production (L-, A- series) with its precise records of specialist workgroups of women and children to whom monthly rations are distributed at

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[69] In G. Rapp, Jr. and S.E. Aschenbrenner, *Excavations at Nichoria in Southwest Greece* (Minneapolis 1978) 60-77, especially 64, 74-77.

[70] C.W. Shelmerdine, "Nichoria in Context: A Major Town in the Pylos Kingdom," *AJA* 85 (1981) 319-325.

[71] For the use of oxen as draft animals in modern Messenia, see S. E. Aschenbrenner, "A Contemporary Community," *MME*, 55 and 57.

locations throughout the two provinces; bronze and metal production (J-, M-, N- series), the workers of which are in some instances exempted from the payment of items of taxation, including agricultural commodities, which required land to produce; the perfumed oil industry (Fr series) and other technical trades: unguent boilers, furniture makers (*to-ro-no-wo-ko*), carpenters, weapons manufacturers (*to-ko-so-wo-ko*), chariot joiners, ship and wall builders, etc. No doubt one even has to consider the support of military forces (*o-ka* troops, rowers) and of members of the large central, regional and local administrative bureaucracies. Certainly political and religious officials also laid claim to reward or support in the form of parcels of land in the E-series texts. S. Hiller has calculated that ca. 4,000 persons are listed on the Pylos tablets as personnel directly or indirectly dependent on the central bureaucracy. Of these ca. one-third were maintained through direct food rations, while the remaining two-thirds supported themselves on landholdings assigned them by the central administration.[72] If we take into account the fact that our surviving tablets do not give us a total picture of such arrangements—e.g., the E- series only deals with the single district of *pa-ki-ja-na*, and only the woman workers in the textile industry are reasonably fully represented as recipients of direct rations—we can understand the complexity of the resource management problems confronting the managers of the LH III B economy in Messenia. We can add the pressures caused by the need: (1) to exploit forest land for the construction of ships, chariots, and buildings, for the firing of pottery, and for bronzeworking;[73] (2) to set aside foraging land to raise sheep and goats for wool, meat and hides; (3) to farm lowland areas for flax and to cultivate the land systematically for vine, tree and field crops (both in competition with cattle grazing); and (4) to build the numerous settlements (some 168 definitely archaeologically attested and up to 250 estimated) required for the increased population of the LH III B period when the number of inhabitants had increased almost exponentially from those of the

[72] Hiller (supra n. 59) 61.

[73] J. Perlin, *A Forest Journey* (New York 1989) 58-68.

EH and MH periods: EH (3,500)—MH (10,000)—early LH (16,000)—LH III B (50,000).[74]

Scholars have sought compensation for the relative neglect of oxen in the tablets in the references in An 18[a] and 830 [+] 907[a] to large groups of *qo-u-ko-ro* (βουκόλοι). Their numbers: 90 at *ti-no*; 66 at *ra-wa-ra-ti-ja*; 60 at *pi-*82*; 60 at a_2*-ki-ja* are so much in contrast with our infrequent oxen references (in all we have no more than 40 [31 preserved] oxen for the 294 oxherds recorded on An 18 and 830 [+] 907 alone), that it has been proposed, as a desperate measure, that *qo-u-ko-ro* in these texts has no specific meaning and stands generically for "herdsmen" of any domesticated livestock.[75] Yet a counter-argument which points to the occurrence of specific and contrasting terms in the Pylos Ea series (*po-me* = shepherd, *ai-ki-pa-ta* = goatherd, *su-qo-ta* = swineherd occur on these single entry tablets alongside *qo-u-ko-ro*) and particularly to the occurrences of *qo-u-ko-ro* and *po-me* on the same tablet, Nn 831, is fairly persuasive, although not absolutely compelling.[76]

What is significant in my view about the *qo-u-ko-ro* references is not merely the size of the groups but their concentration at fixed, single locations. Figure 4 illustrates land-use patterns and land routes in Bronze Age Messenia. I have placed onto this map many of the place names we have already discussed in the positions assigned to them by scholarly consensus. Of the five place names specifically associated with *qo-u-ko-ro*, three (*ra-wa-ra-ti-ja*, a_2*-ki-ja*, and *pi-*82*) are well-fixed. A fourth, *ti-no*, can be placed with some certainty in the general vicinity of *pa-ki-ja-na*, the religious

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[74] *MME*, 136-142. Chadwick's estimates of 80,000-120,000, cited in Hiller (supra n. 59) n. 14, are based on extraordinarily and unacceptably high figures for the populations of individual settlements.

[75] Palmer, *Interp.*, 451 and 133. Hiller (supra n. 59) 59 considers it a viable alternative to include the herdsmen specifically responsible for sheep and goats among the *qo-u-ko-ro*.

[76] The Ea tablets are by Hand 43 and An 18 by Hand 11 and therefore need not follow the same use of terms. But Nn 831 and An 830 [+] 907 are both by Hand 1, so one would think that the precise distinction in the former text would carry over to the list of large numbers of "oxherds" on the latter. Since, however, the series are distinct and unrelated, one could argue that the scribe, whether intentionally or not, was using the term with a precise nuance in one series and generically in the other.

district near Pylos.[77] Perhaps it (and its 90 *qo-u-ko-ro*) is (are) to be located to the north and south of modern Ox-Belly Bay "along the shore" (cf. *thinos* "of the coast"). The fifth place name, *ko-ri-to*, can be assigned generally to the Further Province (FP). Each of the four identifiable sites, with the exception of *pi-*82*, matches up exactly with prime ox-grazing lowland, and it should be stressed that their positions were fixed without considering the oxen evidence at all. For *pi-*82*, we could either extend its territory north along the coast to an extremely large area suitable for ox-grazing—I have chosen not to do this graphically here, but it might be the proper course. Or we can seek a solution on the personal level.

Recall that two important figures were associated with oxen: **di-wi-je-u* on Cn 3 and **we-da-ne-u* on Cn 418. These two individuals were associated with each other consistently in the Es series. I have also mentioned that **we-da-ne-u* plays a prominent role in the management of other livestock: his name occurs some 40 times in the entire PY archives, 20 times in livestock texts, 13 times in the Es series, with other occurrences in the rower text An 610, the two flax records (Na 856, 1041) which we have also already seen, and Un 1193. His flocks are located at 7 places in the FP, including *ra-wa-ra-ti-ja* and *ti-mi-to a-ke-e*. His flax interests connect him with a_2-*ki-ja-*a_2-*ki-ra* The relative position of military manpower under his control also suits placing his primary seat of authority and activity in the SE portion of the FP, an area of flood plains and coastal lowlands ideal for grazing and flax production. However, **we-da-ne-u* has his largest interests in sheep herding at the locale of *ma-ro* where he has an *a-ko-ra* (Cn 655). *ma-ro*, we know from Lang's work with sheep records and toponyms, is closely connected with *pi-*82* throughout the Pylos archives. It may therefore be arrangements like the juxtaposition of areas suitable for cereals, for principal livestock grazing and for supplementary livestock grazing in the relative position of *pi-*82* which allows **we-da-ne-u* to have interests both in sheep and goats and in oxen. Such interests are seen clearly in Cn 418 and are able to be supported by the geography of the southern part of the FP.

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[77] I accept the argument of L.R. Palmer, *Interp.*, 84, 92, 220, based on the dichotomy between *wa-na-ka-te-ro* personnel in the En series at *pa-ki-ja-na* and *ra-wa-ke-si-jo* personnel in the Ea series, including *ke-re-u* (*ke-re-te-u*) and *du-ni-jo* who are explicitly located at *ti-no* on tablets Xa 565 and Fn 79.3.

**we-da-ne-u* is associated with oxen, goat and sheep in Cn 418 because the districts where he managed other types of livestock overlapped those in which the necessarily more limited oxen-raising was concentrated in LH III B:2, when specialized agricultural production put restrictions on grazing land and called for the highly organized and controlled system of pasturage indicated in the Cn texts.

The large groups of *qo-u-ko-ro* focused in specific locales are the result of a similar response to intensive exploitation of regional resources in what we might call a centrally managed economy. It is no mere coincidence that the *qo-u-ko-ro* are associated on the tablets, as we have seen, with carpenters, wall builders, bronzesmiths, herdsmen, provincial officials (*ko-re-te-re*) and perhaps the controllers of land parcels known as *telestai* (An 18.11). On An 830 [+] 907[a] the *qo-u-ko-ro* are connected with land grants (*ke-ke-me-no*). I think that these oxherd references have to do with a conscious policy of settling and cultivating new areas of the region of Messenia. We do not have any Pylos texts comparable to the Knossos Ch tablets that register the assignments by the central administration of paired worker oxen to individuals. But it is reasonable to assume that at least some of these large numbers of Pylos *qo-u-ko-ro* are individuals to whom one or two[78] animals have been assigned for similar purposes. If nothing else, this hypothesis keeps the oxen population within the realm of reason. It also explains the great disproportion between the few oxen listed on our purely religious texts and the large numbers of oxherds in the personnel lists. The two groups of records belong to different administrative spheres. We are simply unfortunate that no Pylos equivalents of the KN Ch worker oxen allotment records have been preserved.

It also is no coincidence that on Cn 3 oxen are "sent" to **di-wi-je-u*, who is otherwise closely linked to **we-da-ne-u* . **di-wi-je-u*'s seat of authority, to judge from *o-ka* tablet An 656 is at *ne-wo-ki-to*, which is located above *a-ke-re-wa* and below *ro-o-wa*, i.e., in the area around the bay of Navarino, which, as the map indicates, is also prime oxen territory and which is also where the site of *ti-no* with its 90 *qo-u-ko-ro* has been placed, again primarily from other

[78] In Messenia during the 1960's when plowing with oxen and cows was still the common mode of plowing, village households would often own a single cow and arrange with one another to borrow a mate for plowing. *MME*, 57.

textual arguments which did not consider the oxen at all. I would place **di-wi-je-u* in charge of a cattle-grazing district in this area and also the individual *du-ni-jo* who (1) contributed a cow and 2 bulls along with other livestock, barley and olives as "payment" to Pylos on Un 138; (2) is found among decidedly religious Ae texts of Hand 42; and (3) is an important figure at the site of *ti-no* as we know from PY Fn 79.3, where he is given the toponymic *ti-ni-ja-ta* as an epithet.

The oxen on Cn 3 are sent from locales otherwise connected with coastal watchers beginning in a cluster in the neighborhood of *ro-o-wa* and *a-ke-re-wa* (An 519, 656, 661 ~ Cn 3.3-.6)[79] and ending with the groups of men described as *u-ru-pi-ja-jo* at a_2-*ka*-a_2-*ki-ri-ja-jo* beyond the *o-ka* station at *ti-mi-to a-ke-e* (An 661 ~ Cn 3.7 *u-ru-pi-ja-jo*).[80] The reason they are sent I think has to do with religious ceremony. This is the overwhelming explanation for references to oxen in the Un texts and, as we have seen, on Cn 418. The single oxen on Cn 3 and the religious associations of **di-wi-je-u* with **we-da-ne-u* also support this idea. This brings us back to the controversy concerning the lead word on Cn 3 *jo-i-je-si* which has been been interpreted as "they send" (ἵημι) or "they offer" (connected with the root of ἱερός, *isēmi). We can now clarify this point.

Leonard Palmer, who supported the second etymology, suggested that these single oxen were simply sacrificed at *o-ka* locales in connection with the state of emergency which many scholars see as prevailing at Pylos in the period for which the tablets provide evidence.[81] Palmer was quite right to object to Chadwick's dismissal of this interpretation of Cn 3 as a religious text on the grounds that it was "picturesque." This is merely cultural narrow-mindedness rhetorically substituted for rational argument, and Palmer's examples from Homer and Xenophon of sacrificial ceremonies before military engagements are decisive. But it is Chadwick, I think, who is right about *jo-i-je-si*. There is

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79 Palmer (supra n. 61) *Minos* 4 (1956) 144, 154; Hiller (supra n. 51) Schema IVb, Schema V.

80 An 661.5 *ka-ra-do-ro*. An 661.10 *ti-mi-to a-ke-i*. An 661.12 a_2-*ka*-a_2-*ki-ri-jo*. An 661.13 *ne-do-wo-ta-de* (River Nedon).

81 For a survey of the data, see L. Baumbach, "An Examination of the Evidence for a State of Emergency at Pylos c. 1200 B.C. from the Linear B Tablets," in *Res Mycenaeae* (supra n. 18) 28-40.

sending going on here: and from areas clearly accessible to the destination: **di-wi-je-u*'s known sphere of activity at *ne-wo-ki-to* in the area of *ti-no*. Our geographical reconstruction removes the difficulty of delivering oxen from points along the southwest coast and from *ti-mi-to a-ke-e* and a_2-*ki-ja-*a_2-*ki-ra* on the Gulf of Messenia. These points lie directly on the main route corridors in the region of Messenia. There are also parallels enough from historical times to override Palmer's objections about sending oxen over long distances:

(1) from Oropus a 3rd century B.C. inscription prescribes sending a βοῦν from the community of Akraiphia to the Ptoon sanctuary (πέμπειν βοῦν ἀπὸ τῆς πόλεως εἰς τὰ Πτώια);[82]

(2) a decree at Asine (*Syll.*^{2} 654) stipulates that the community should send an ox in cooperation with the citizens of Hermione συμπομπεύειν καὶ ἄγειν βοῦν during the festival of Chthonian Ceres;

(3) a scholium on Arist. *Clouds* 386 stipulates that all Athenian colonies sent an ox to the Panathenaic festival: ἐν τοῖς Παναθηναίοις πᾶσαι αἱ ὑπὸ τῶν Ἀθηναίων ἀποικασθεῖσαι πόλεις βοῦν τυθησόμενον ἔπεμπον. The custom of sending an ox and a panoply is attested epigraphically in regard to the Periclean colony of Brea (*IG* I^2 45) which is to be located somewhere in the northern regions of Greece, perhaps on the Thermaic Gulf,[83] and in the general decree on exaction of tribute payments (*IG* I^2 66). There is also clear 4th-century epigraphical evidence for the continuation of this custom by certain Greek communities (e.g., Paros) as a display of ancient kinship and friendship.[84]

Distance, on land or sea, is obviously no impediment to fulfilling an important religious or diplomatic obligation.

On tablet Cn 608 the chief scribe of Pylos carefully records small numbers of pigs (2,3,6) which are to be fattened at the 9 major centers of the Hither Province. Such detailed interest in so

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[82] Prott-Ziehen (supra n. 55) §68, wherein are the references to some of the following parallels. See also C.W. Fornara ed., *Translated Documents of Greece and Rome* 1^2 (Cambridge 1983) §98.42; §100.11; §136.57.

[83] R. Sealey, *A History of the Greek City-States 700-338 B.C.* (Berkeley 1976) 312.

[84] Fornara (supra n. 82) 207.

few animals at each site suggests a special use, and the fattening implies intended slaughter. Since certain place names on the tablet like *pa-ki-ja-si* are clearly in the locative, this tablet does not refer specifically to allocations or contributions. The central bureaucracy, in my view, is interested in these animals because they will eventually be sent to the palace for sacrifice. Finally it might not be inappropriate here to return to our opening secular analogy and mention the long-distance cattle drives of the American southwest in the 19th century.

This is the complete picture from Pylos, on the basis of which we can undertake an interpretation of the different kinds of references in the Knossos archives, of which we have seen a few examples. There we find evidence of: (1) the management of working oxen, something our selective Pylos texts simply fail to show us; (2) the distribution of oxen to major sites in the central and western part of the island, something of which I believe our Pylos *qo-u-ko-ro* references give us an indirect view; and (3) a series which we may consider the most intensively local of all Linear B tablet sets. These are, however, matters for further study.

It is worth stressing again in conclusion that the Pylos Linear B tablets provide only a partial view of the Mycenaean use of oxen. But through careful analysis, we have been able to see how, where, and by whom these animals were used, for both ritual and economic purposes, in the carefully managed regional administrative system of the final bureaucratic period before the destruction of the Palace of Nestor.

POSTSCRIPT:

It may not be altogether too bold to suggest the restoration of a particular personal name in Cn 418.6 (fig. 2) to parallel that of **we-da-ne-u* in Cn 418.1: perhaps *di-wi-je-u* who is so closely associated with **we-da-ne-u* elsewhere. This conjecture rests on no pinacological evidence and we had probably best leave it, like our oxen, out to pasture.

APPENDIX: The Pylos Oxen and Oxherd Texts

OXEN TEXTS:

PY Cn 3

.1 jo-i-je-si , me-za-na ,
.2 e-re-u-te-re , di-wi-je-we , qo-o ,
.3 a_2-ra-tu-a , o-ka-ra_3 , BOS 1
.4 pi-ru-te , ku-re-we BOS 1
.5 e-na-po-ro , i-wa-si-jo-ta , BOS 1
.6 o-ru-ma-to , u-ru-pi-ja-jo , BOS 1
.7 a_2-ka-a_2-ki-ri-ja-jo , u-ru-pi-ja-jo-jo , BOS 1
.8-.9 *vacant*

PY Cn 418

.1 pa-ro , we-u-da-ne-we
.2 re-u-ko , a-ko-ro-we-e BOS+*SI* 2
.3 re[-u-]ko , ma-ra-pi , pe-ko , a-ko-ro-we BOS+*SI* 1
.4]3 CAPm 3 *WE* 3 CAPm 3
.5]2 [ ]3 [
.6] *vestigia* [
.7 re-u-ko[ ]pe-ko , a-ko-ro-we[
.8 OVISm 1 CAPm 1 *WE*[ ] ṢUṢx[
.9] *vacat* [
infra mutila

PY Ua 25

.1 SUS+*SI* 3 BOSf 2 BOSm 8
.2 OVISm 67

Ua 25 *verso*
v. HORD 29 T 8 V 2

PY Un 2

.1 pa-ki-ja-si ¦ mu-jo-me-no ¦ e-pi ¦ wa-na-ka-te ¦
.2 a-pi-e-ke ¦ o-pi-te-ke-e-u
.3 HORD 16 T 4 CYP+*PA* T 1 V 3 *o* V 5
.4 FAR 1 T 2 OLIV 3 T 2 **132* S 2 *ME* S 1
.5 *NI* 1 BOS 1 OVIS^{m} 26 OVIS^{f} 6 CAP^{m} 2 CAP^{f} 2
.6 SUS+*SI* 1 SUS^{f} 6 VIN 20 S 1 **146* 2

PY Un 6

.0 *supramutila*
.1 po-se-da[-o-ne]SUS+*KA* 1 SUS^{f} 2
.2 *vacat*
.3 pe-re-*82 BOS^{f} 1 OVIS^{f} 1 SUS+*KA* 1 SUS^{f} 2
.4 pe-re-*82 BOS^{f} 1 OVIS^{f} 1 SUS+*KA* 1 SUS^{f} 2
.5 *vacat*
.6 **146* 37 **166+WE*[ ]LANA 5
.7 *AREPA* S 1 V 1[
.8 BOS^{m} 2 BOS^{f} 2 OVIS^{x}[

Un 6 *verso*

v. *prior pars sine regulis*
v.1]i-je-re-ja TELA+*TE*[
v.2 ka-]ra-wi-po-ro TELA+*TE*[
reliqua pars sine regulis

PY Un 138

.1 pu-ro , qe-te-a_2 , pa-ro , du-ni-jo
.2 HORD 18 T 5 po-qa OLIV 4 T 3 V 5
.3 VIN 13 OVIS^m 15 *WE* 8 OVIS^f 1 CAP^m 13 SUS 12
.4 SUS+*SI* 1 BOS^f 1 BOS^m 2
.5 me-za-wo-ni HORD 4 T 8 V 1 ka-pa OLIV 7

PY Un 718

.1 sa-ra-pe-da , po-se-da-o-ni , do-so-mo
.2 o-wi-de-ta-i , do-so-mo , to-so , e-ke-ra_2-wo
.3 do-se , GRA 4 VIN 3 BOS^m 1
.4 tu-ro_2 , *TURO*$_2$ 10 ko-wo , **153* 1
.5 me-ri-to , V 3
.6 *vacat*
.7 o-da-a_2 , da-mo , GRA 2 VIN 2
.8 OVIS^m 2 *TURO*$_2$ 5 a-re-ro , *AREPA* V 2 **153* 1
.9 to-so-de , ra-wa-ke-ta , do-se ,
.10 OVIS^m 2 me-re-u-ro , FAR T 6
.11{a -ma
{ VIN S 2 o-da-a_2 , wo-ro-ki-jo-ne-jo , ka-
.12 GRA T 6 VIN S 1 *TURO*$_2$ 5 me-ri[
.13 *vacat* [ ]1 V 1

PY Un 1177

.0 *supra mutila*
.1 HORD 6 [
.2 BOS 1 [
.3 *infra mutila*

OXHERDS:

Py An 18

.1 e-re-u-te-ri-[
.2 te-ko-to-na-pe VIR [
.3 i-na-ni-ja VIR 1[ ]ja VIR [
.4 re-si-we-i VIR[ ]1 a-se-e VIR 1
.5 *vacat*
.6 te-re-ne-we , to-ko-do-mo a-pe-o VIR 1
.7 i-na-ne VIR 1 te-ko-to-na-pe 1
.8 *vacat*
.9 qo-u-ko-ro ti-no VIR 90
.10 *vacat*
.11 pa-ki-ja-si , to-so , te-[
.12 VIR 254[ ] *vacat*

PY An 830 [+] 907 (*pars superior dextra*)

.1] *vacat* [
.2]ke-ke-me[-no
.3 di-ri-wa-[
.4 ma-ra-ti-sa [
.5 *vacat* [ ] *vacat* [
.6a{ -no
b{ a-te-re-wi-ja , e-so , ko-re-te-ri-jo , ke-ke-me- *DA* 30[
.7 *vacat* [
.8 e-sa-re-wi-ja , ro-ro-ni-ja , te-u-po-ro[ ] *vacat* [
.9]no *DA* 50 [
.10]qo-u-ko-ro VIR 18 [ ] *vacat*
.11 qo-]u-ko-ro , ra-wa-ra-ti-ja VIR 66
.12 o-pi-da-mi-jo , pi-*82 , qo-u[-ko-]ro VIR 60
.13 a_2-ki-ja , qo-u-ko-ro VIR 60[
.14 *vacat* [
.15-.16] *vacat* [

PY An 852

.1] qo-u-ko-ro
.2 VIR]4⌋ te-re-ne-wi-ja VIR [
.3 VIR]3 te-ko-to-na-pe[VIR
.4] VIR 2 a-se[-e VIR
.5] VIR 2 ma[VIR
infra mutila

PY Ea 781

{.a [[we-[ ]]]
{ qo-u-ko-ro-jo ko-to-na ki-ti-me-na GRA 2 T4 [

PY Ea 270

{.a ko-to-na
{ a-pi-a_2-ro , e-ke , qo-qo-ta-o⌊⌋pe-re-qo-no-jo GRA T 6

PY Ea 305

{.a qo-qo-ta-o
{ ke-re-te-u e-ke-na-to , to , ke-ke-me-na ko-to-na GRA T 1

PY Ea 757

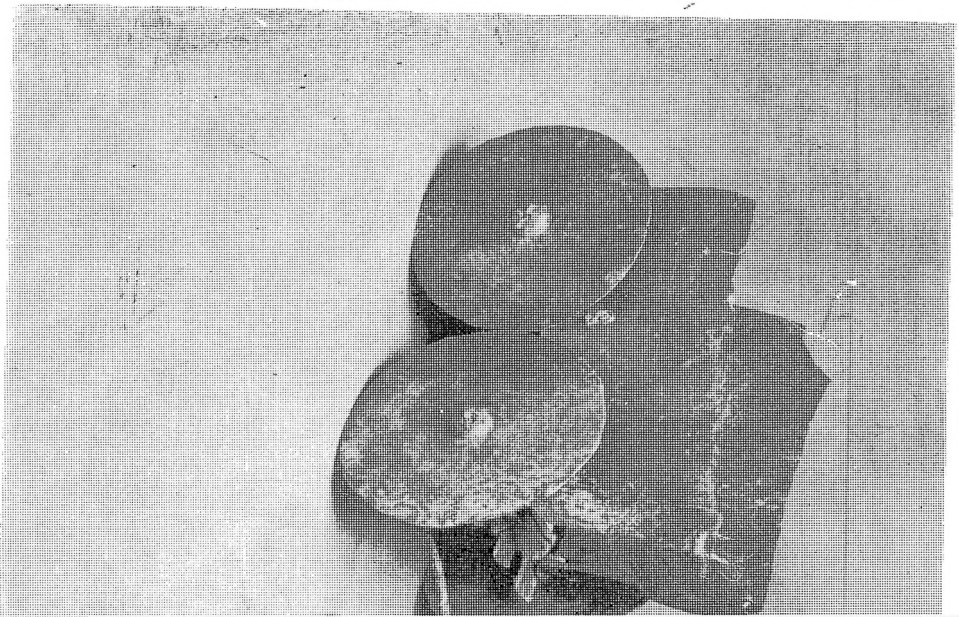
{.a qo-qo-ta-o
{ e-u-me-ne , e-ke , o-na , ke-ke-me-na , ko-to-na GRA T 2

PY Ea 802

{.a qo-qo-ta-o , ko-to-na
{ ra-wo-do-ko , e-ke , ke-ke-me-na , ko-to-na GRA T 3

PY Nn 831

.1 ko-ri[ ]no 1 [[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 *vacat*



ACTUAL

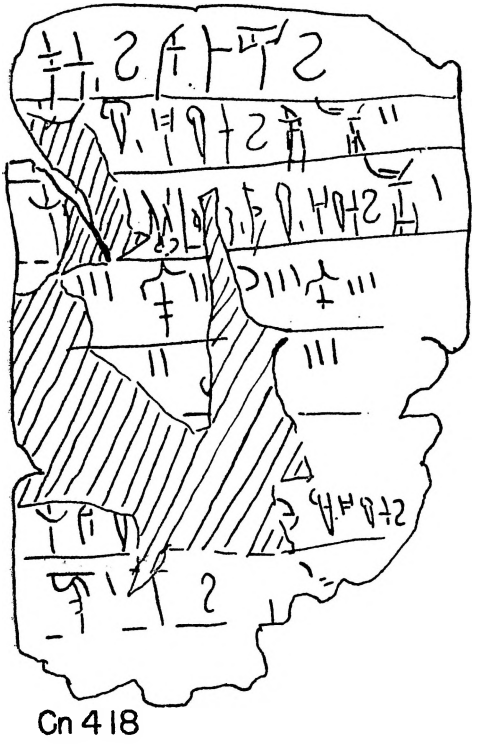


fig. 2

RESTORED (?)

Cn 4 18

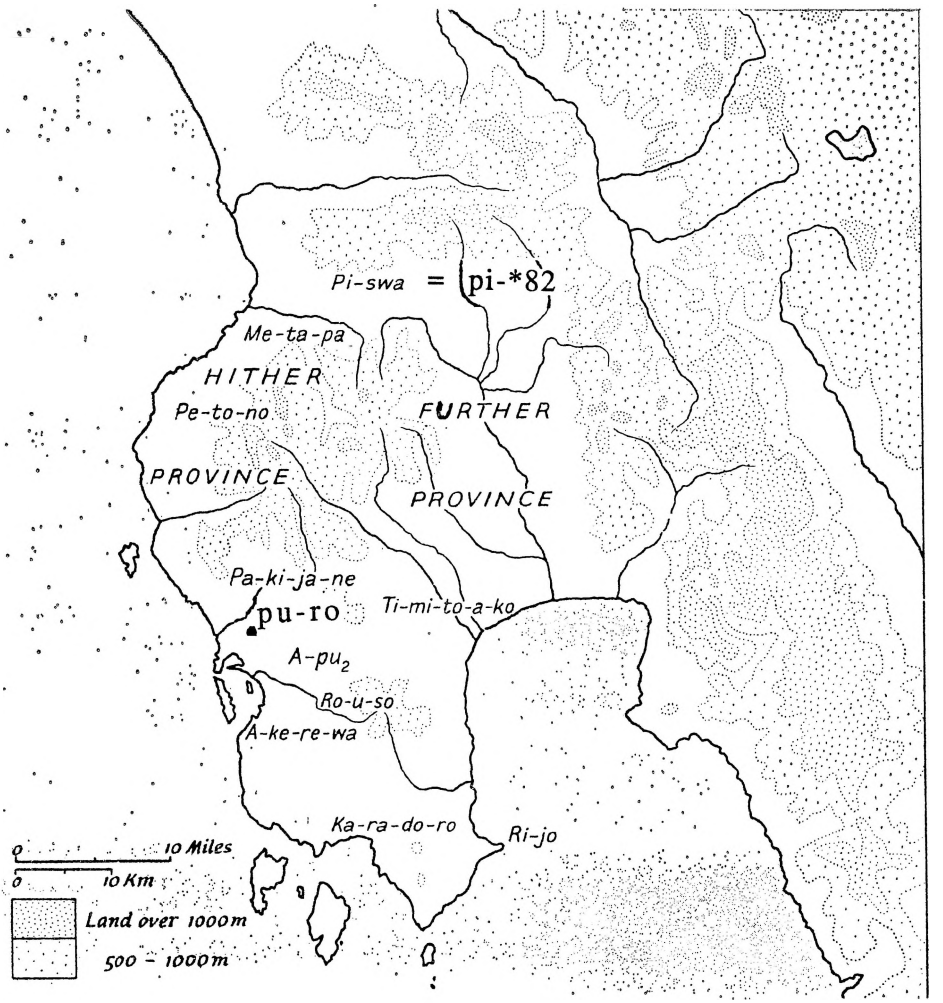

Pi-swa = pi-*82
Me-ta-pa
HITHER
PROVINCE
Pe-to-no
FURTHER
PROVINCE
Pa-ki-ja-ne
pu-ro
Ti-mi-to-a-ko
A-pu2
Ro-u-so
A-ke-re-wa
Ka-ra-do-ro
Ri-jo
0 10 Miles
0 10 Km
Land over 1000m
500 - 1000m

fig. 3

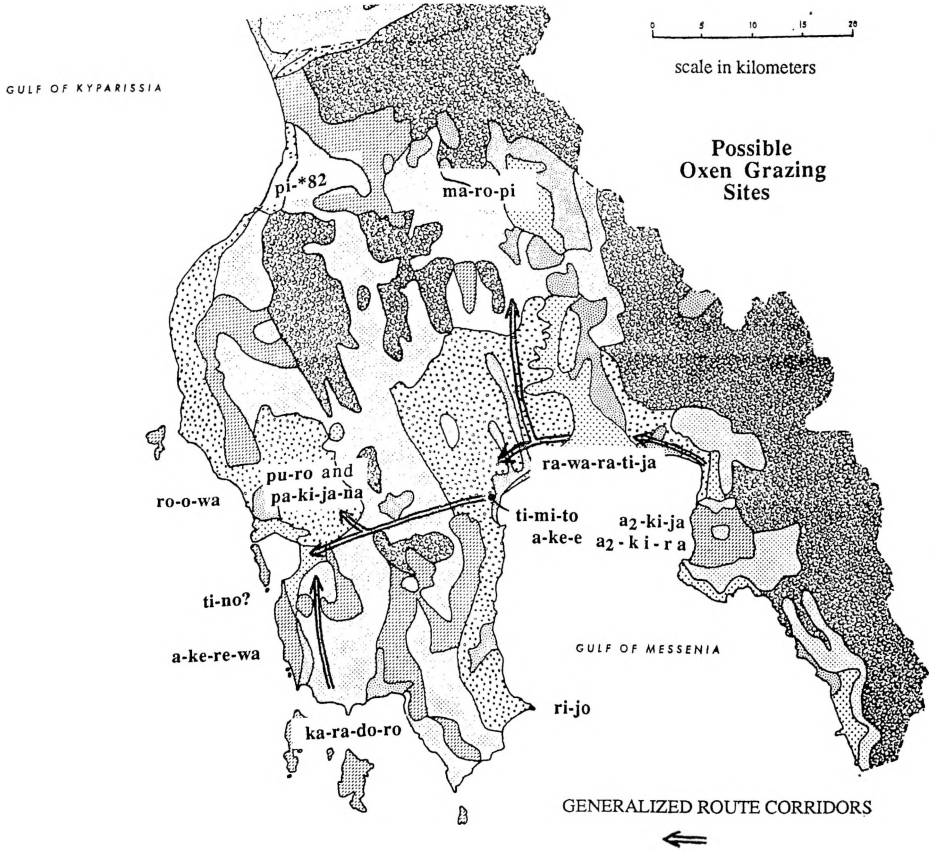


fig. 4

vines and fields (+trees)

trees (+vines and cereals)

cereals (+ trees and vines)

Cereals and Grazing Land
(Sheep)

Grazing Lowland (Oxen)

dense brush or forest