Daniël A. Was

THE LAND-TENURE TEXTS FROM HAGIA TRIADA

I

I. Introduction

In a preceding paper[1], I pointed out that the wheat ideograms ligatured with fraction signs in the Linear A texts[2] may have had a cadastral significance. That conclusion was reached through the following reasoning. As the Minoans, unlike the Mycenaeans, had a system for the notation of numerical fractions[3], their convention for the recording of amounts of wheat and other commodities, harvested, bought or sold, or paid to labourers[4], was to write the commodity ideogram followed by a numerical notation. In such a convention there is no place for ideograms ligatured with fraction signs and followed by whole numbers. Nevertheless, that is exactly what we do find in the case of the wheat sign[5]. At first, I was under the impression that at least part of such ligatures indicated sub-units of the Minoan unit for dry capacity (the medimnos) and that in some instances these ligatures were added for the sole purpose of calculation[6]. However, the cadastral records from Pylos[7] demonstrate that the sizes of plots of land were expressed in the amounts of wheat-seed which they required, and such amounts were noted in multiples of the Mycenaean units for the measurement of dry capacity, the medimnos (of a capacity of 100

---

[1] The Mycenaean units of measure, Kadmos 16, 1977, 26—36.

[2] With one exception occurring in the archives of Hagia Triada only, the exception being MA W 5b, where we find the ideogram ligatured with the fraction sign Lm1.

[3] For the values to be allocated to the fraction signs cf. the author, Kadmos 10, 1971, 35—51.

[4] Mostly introduced by the standard notation $sa.ra_2$, probably two words ('this to let'), cf. the author, Kadmos 11, 1972, 1—21.

[5] Also the ideogram L71 (perhaps millet) is found with the ligatures Lm1 ($= \frac{1}{2}$) and Lm23 ($= \frac{1}{5}$). The latter was used to indicate the monthly ration of 'underpaid' staff, receiving only $\frac{4}{5}$ of a khoinix per diem, instead of the full ration of one khoinix, cf. the author, Kadmos 11, 1972, 12. The reason for the notation 'millet $\frac{1}{2}$' (on HT 12, 110) is still obscure, as is the use of Lc14 'oil $\frac{5}{24}$' (on HT 2, 44).

[6] Cf. the author, Kadmos 11, 1972, 5—7.

[7] Cf. M. Ventris and J. Chadwick, Documents in Mycenaean Greek 1955, 239ff. In this paper further reference will be made to Chadwick's second edition (Docs.²).

khoinikes[8]), subdivided into 10 T units, each of 6 V units, each in turn
of 4 Z units[9]. As one such Mycenaean medimnos of wheat had a weight
of two talents[10], the sub-units corresponded to twelve, two, and
one-half mina respectively. The transposition of the Pylian practice to
the Minoan context, considering the far greater frugality in the recording
of data by the Minoan scribes as compared with their Mycenaean
counterparts, would yield precisely such texts as those in which is
found the wheat ideogram ligatured with fraction signs. In the light of
the relatively small economic extent of Pesaraean agriculture this
frugality is understandable; apart from units and numerals, only
locations, lease-holders and land-titles needed to be recorded.

The pertinent ligatured wheat signs in linear A, which have been
listed in Table I, need not all have been used in cadastral records, and
notable exceptions are Lc11, Lc2 and Lc1[11].

Table I
Ligatured wheat signs of Hagia Triada

| Symbol | meaning | | amount expressed in | | |
			khoinikes	minas	Mycenaean units
Lc11	wheat	1/144	5/6	1	Z 2
Lc2	,,	1/120	1	6/5	— — — — — —
Lc4	,,	1/30	4	24/5	— — — — —
Lc8	,,	1/8	15	18	T 1 V 3
Lc74	,,	1/6	20	24	T 2
Lc7	,,	3/8	45	54	T 4 V 3
Lc106	,,	1/2	60	72	T 6
Lc6	,,	7/12	70	84	T 7
Lc72	,,	DA	90?	108?	T 9?
Lc1	,,	heavy talent	100	120	medimnos

---

[8] Cf. the author, Kadmos 16, op. cit.
[9] Signs no. 112, 111 and 110, respectively.
[10] As to the correlation between weight and volume of wheat, cf. the author, Kadmos
12, 1973, 134—48.
[11] Cf. the author, Kadmos 16, op. cit.

Another indication of the cadastral use. of the ligatured wheat sign is the form of Lc72, 'wheat + DA'[12], which might represent the DA unit[13], basic to the Knossian and Pylian cadaster[14] and requiring 90 khoinikes or 54 Mycenaean V units of wheat-seed.

It seems therefore that a number of Minoan documents dealt with cadastral matters, and it is the purpose of this paper to consider some HT texts which might fall in this category and to enquire what additional information these may render.

II. The interpretation of HT 95[15]

HT 95

face a		face b	
da.du.ma.ta,	wheat	*a.du,*	
da.me	10	*sa.ru*	10 wheat
mi.nu.te	10	*da.me*	10
sa.ru	20	*mi.nu.te*	10
ku.ni.su	10	*ku.ni.su*	10
di.de.ru	10	*di.de.ru*	10
$k^w e.ra_2.u$	7	$k^w e.ra_2.u$	10

This text comprises two lists of the same people[16] alongside amounts of wheat, and it could be considered as a record of deliveries were it

---

[12] To be found on HT 133: *a.du, te* wheat + DA 55.

[13] Perhaps an abbreviation of *damartes*, 'households', cf. Docs.² 242, 447. Yves Duhoux, Kadmos 13, 1874, 27–38 established its size as ca. 48 ares.

[14] In addition to the other, perhaps less important, basic unit, the aroura which required 50 khoinikes or 30 V units of wheat-seed. Cf. the author, Kadmos 15, op. cit.

[15] For the texts analysed in this report cf. Louis Godart and Jean-Pierre Olivier, Recueil des inscriptions en linéaire A, I, 1976, Éc. fr. d'Ath., Ét. Crét. XXI.

[16] *di.de.ru* corresponds to KN Dv 1508 *di.de.ro,* and *da.me* is listed on KN As 1516. The anthroponym *sa.ru* is found in the *ki.ro* personnel list of HT 94; cf. the author, Kadmos 11, 1972. It is an occupational term derived from the toponym *sa.ro* (HT 9, 17, 19, 42, 62 + 73), cf. PY Un 718 *sa.ra.pe.da* ('Orchards'?) and Er 880 *sa.ra.pe.do.* E. Peruzzi (Word 15, 1959, 316 ff.), supported by F. Schachermeyr (Die minoische Kultur des alten Kreta, 1964, 254), has shown that *ku.ni.su* is an anthroponym as well, thus eliminating a priori the basis of the Semitic approach to the Minoan language. Vl. Georgiev (Les deux langues des inscriptions crétoises en linéaire A, 1963, 29, 277) related *mi.nu.te* to μινύθω and postulated a Minoan -ēs for Attic -eús. An appellative nomen agens in -tēr of μινύρομαι would make that postulation unnecessary.

not for some indications to the contrary. First there is the evidence of HT 86 which will be considered in the following section. Second, the wheat ideogram is found in an abnormal position; in- records of deliveries or payments this symbol invariably precedes the numerals, whereas it is here found in the heading[17]. This alone would suggest that HT 95 belongs to a special category[18]. In the third place — and this is the most important consideration — there is the heading itself *da.du.ma.ta*, which term may be associated with such Linear B terms as *me.ri.du.ma.te*, *me.ri.da.ma.te*, *po.ro.du.ma.te*[19], all compounded from the pre-Greek[20] *da.ma*, *du.ma* = dumart-, which may be translated as 'steward'. The Minoan term may then be understood provisionally to mean 'to the land stewards'[21].

If this interpretation be correct, the persons indicated[22] would have been given (the control of) land for which a total of 127 medimnoi (of 120 khoinikes) of seed-corn was needed or, in modern terms, of ca. 80 hectares[23] comprising plots ranging in size from 14 (*sa.ru*'s first allotment) to 5 (that of $k^w e.ra_2.u$) hectares. This total corresponds to 168 households of 48 ares each. The only text which specifically refers to the household unit, HT 133 (cf. Note 12), mentions an area of 55 such units, or ca. 26 hectares, under the heading *a.du*, which may be compared with the $93\frac{1}{3}$ DA or ca. $44\frac{1}{2}$ hectares of face b of HT 95 under the same heading. It may be that HT 133 gives the result of an enumeration of allotments (for *a.du* see further the next section).

---

[17] On face b, headed by the term *a.du* (for this term see further below), the ideogram had been lowered to bring it into line with the first item — but after, nor before, the numerals; the reason for this alternation of position might involve the different meanings of the two headings.

[18] Similarly HT 115, (also HT 108?).

[19] Cf. Docs.², 216, 573, 180.

[20] Cf. C. J. Ruijgh, Études du grec mycénien, 1967, 385, n. 166. It could be that the confusion in Linear B of *da.ma* and *du.ma* is due to the absorption into Mycenaean Greek of two Minoan loan-words, *damart-* = household and *dumart-* = steward (perhaps 'proxy': *du-mar-t-*, cf. Britomartis).

[21] For *da(h)-*, land, cf. Ruijgh, op. cit. 203, n. 517.

[22] The last term on both lists, $k^w e.ra_2.u$, refers to a collective of persons, as follows from the text of HT 1 where it precedes an enumeration of various types of personnel, including those of the *ki.ro* (or labour-supervising) class. For my interpretation of this text as a census of people dependent upon the administration of the 'royal villa', cf. Minos 16, 1977, 8–11.

[23] A Minoan medimnos had a capacity of ca. 108 litres, a hectare needed ca. 170 litres of wheat-seed: cf. the author, Kadmos 15, 1976, n. 44.

2*

III. The interpretation of HT 86

This text shows the same names as HT 95, only instead of $k^w e.ra_2.u$, we find $k^w a.ra_2.wa$, no doubt referring to the same notion[24]. The amusing aspect of the text is that the scribe, perhaps after a copious meal, started all over again, and only halfway, at the third item, discovered his mistake.

<div align="center">

HT 86
</div>

face a			face b		
a.ka.ru			a.ka.ru		
ku.ni.su	Lc11	20	ku.ni.su	Lc11	20
sa.ru	,,	20	sa.ru	,,	20
di.de.ru	,,	20	di.de		
$k^w a.ra_2.wa$	,,	10			

a.du		
da.me	Lc74	20
mi.nu.te	,,	20

The ligatured wheat ideograms Lc11 and Lc74 signify respectively one mina of wheat[25], and one-sixth (of a medimnos) of wheat[26] or twenty khoinikes with a weight of twenty-four mina. The horizontal line of division serves to segregate the two groups who are involved with two different orders of magnitude of land measure; which suggests that the text deals with two distinct types of land (as is the case in the Pylos texts) — types which may be referred to by the headings a.ka.ru and a.du. In this connection it may be of interest to compare the different

---

[24] Also R. Kamm, Orbis 15, 1966, 541—9. Of particular interest are the case endings in -au(s), nom. and -awa(n), acc. sing. The concurrent names, all in -ūs and -ēs (pre-Greek type of Arēs, cf. Ruijgh, op. cit. 88), with possible accusatives in -ūn and -ēn, would remain unchanged in the orthography. The vocal change in the root was considered by Kamm, op. cit. and Orbis 14, 1965, 410—32, as an Ablaut, characteristic of the Minoan language; but it might well be due to the different renderings by two scribes, (cf. J. Raison and M. Pope, Index du linéaire A, 1971, XX, n. 64) of a non-Minoan loanword. The nominative may be transcribed $k^w elliaus$, cf. βέλλιον· ἀτυχές (Cret) Hsch., i. e. 'withouth share', in this case implying the status of people with no claim to participate in the tilling of common land.

[25] Cf. the author, Kadmos 12, op. cit.

[26] Cf. the author, Kadmos 11, op. cit.

lots allocated to people both at Pylos and at Hagia Triada. The first three lots of twenty mina of wheat-seed each comprise one-third of an aroura[27]; that allocated to the $k^w a.ra_2.wa$ (or should we say 'to the $k^w e.ra_2.u$'?) measures one-sixth of an aroura. The larger allotments of *da.me* and *mi.nu.te* of twenty sixths (= 400 khoinikes) each correspond to a size of eight arouras. On HT 95 we have been confronted with far larger amounts, expressed in Minoan medimnoi of 120 khoinikes[28]. The seven medimnoi for the $k^w e.ra_2.u$ recorded on face a of HT 95 could also be expressed as twelve times seventy khoinikes, which may be significant for two reasons: first, because seventy khoinikes is the mean of the DA unit of ninety khoinikes and the aroura of fifty khoinikes; second, because that figure is used as a unit on HT 108, a text which deals with labourers on a *ki.re.ta.na*; and this term, through *ki.ro*, is connected with the $k^w e.ra_2.u$ (see further Section IV).

For the comparison of the Pylian[29] allotments with those of Hagia Triada see Table II. The correspondence between the two sets of figures is striking, particularly as the amounts expressed in medimnoi for the temenea of the high-placed individuals follow the reduction in size of that unit in Mycenaean society.

Table II
Land allotted in Pylos and in Hagia Triada

tenant	size	tenant	size
king	30 medimnoi[30]	*sa.ru*	20 + 10 medimnoi[31]
commander	10 medimnoi	*da.me* c.s.	10 + 10 medimnoi
peers each	10 medimnoi		
X[32]	6 medimnoi	$k^w e.ra_2.u$	7 + 10 medimnoi
fief holders from	2.2 − 8 arourai	2 stewards (each)	8 arourai
lease holders		*sa.ru* c.s.	$\frac{1}{3}$ aroura
(average[33])	ca. $\frac{1}{3}$ aroura	$k^w a.ra_2.wa$	$\frac{1}{6}$ aroura

---

[27] Cf. n. 14. The term is attested by PY Eq 213 and also, with typical Minoan -*u*-, by *a.ru.ra.X* on HT 11a, where it indicates one or more persons, as demonstrated by the labourer ideogram L99. At Pylos the leases of small plots were based on tenth parts of the aroura.

From this comparison some conclusions follow. The obscure X in the Pylos records corresponds to the Minoan $k^w e.ra_2.u$, a collective, but one without any cult association (cf. notes 22 and 32). The *a.ka.ru* of HT 86 corresponds to the Pylian *o.na.ta*, plural of ὀνατόν, 'gratification'. This identity suggests that the Minoan term reflects the Greek ἀγάλλω, 'paying honour (to a god)' and ἄγαλμα, 'pleasing gift', of obscure etymology[34]. Further, one may raise the question of whether the term *a.du* is the Minoan equivalent of the Pylian *ktoina ktimena*, which would explain the different sizes recorded after *a.ka.ru* and *a.du* on HT 86 (see Table II). If so, the latter term may be connected with Greek ἄλδη, 'growth', which would seem to be an appropriate term for land not administered by the *damos*, in other words land reclaimed by personal initiative. As to the extent of *a.du* land, next to the 55 DA or 99 arourai of HT 133 we have the text of HT 92: "*te, a.du*, wheat 680, barley 12", which can only refer to a harvest. Taking the harvest at five times the required amount of seed-corn[35], this would indicate an area of ca. 326 arourai sown with wheat (and some barley), perhaps a total of 185 DA or 333 arourai. (For further discussion of *a.du* land reference must be made to Part II of this paper).

IV. The interpretation of HT 120

HT 120

da.k^w e.ra			
da.me	Lc11	74	(mina)
	Lc9	$62\frac{1}{3}$	(wheat + PA)
da.u.120.no[36]	Lc9	20	(wheat + PA)
ki.re.ta.na	Lc74	60	(wheat $\frac{1}{6}$)
	Lc9	48	(wheat + PA)
pa.i.to[37]		$3\frac{1}{5}$	

---

[28] The Mycenaean medimnos had a capacity of 100 khoinikes only.

[29] Evidence: Er 312 (Docs.[2] 266, 453), 'first' and 'second' Pylos 'set' (Docs.[2] 240 ff., 446 ff.).

[30] Mycenaean units of 100 khoinikes.

[31] Minoan units of 120 khoinikes.

[32] X refers to line 7 of Er 312: *wo.ro.ki.jo.ne.jo e.re.mo*, sometimes held for a cult association, however see Chadwick, Docs.[2] 454.

[33] Ranging from $\frac{1}{30}$ of an aroura to one DA unit.

[34] Cf. Hj. Frisk, Gr. Etym. Wb. 1973, I, 6: *ἀγαλός.

[35] Cf. Docs.[2] 133.

In this text we meet again one of the stewards with the name *da.me*. The ideogram Lc9 is to be read as L42 + L2 = wheat + PA, not L42 + Lm20 = wheat $\frac{1}{12}$, as follows from enumeration on HT 102[38] (Raison and Pope, op. cit. 295, still retain both as possibilities).

The first clue in the text is found in the two amounts of wheat listed after the name *da.me*; first we have 74 mina, and thereafter $62\frac{1}{3}$ medimnos, which amount has a weight of $74\frac{2}{3}$ heavy talents (of 120 mina[39]). It follows that the first amount is $\frac{1}{120}$ part of the second (disregarding fractions of a mina[40]). This relation suggests that the second amount represents the harvest at a site called *da.k^{w}e.ra*[41] administered by the steward *da.me* who was allowed to effect a withholding tax of $\frac{1}{120}$ part of the harvest. Further, if we assess the harvest at five times the seed, the land involved would amount to 1496 khoinikes, a figure close to 1500 khoinikes or thirty arourai.

If this interpretation be sound, the other items too must make numerical sense. As a second pointer we may take it that all three amounts recorded as 'wheat + PA' represent harvests; and, as in two of these cases no name of a steward is mentioned, that *da.u.120.no* and *ki.re.ta.na* record the harvest of land not administered by such a steward[42]. The harvest listed after *ki.re.ta.na*, 48 medimnoi, is preceded by the mention of '60 wheat $\frac{1}{6}$', equal to ten medimnoi[43]. The ratio between these quantities, 4.8, is close enough to five to indicate that the first figure represents the area sown[44].

The amount recorded from *da.u.120.no* (probably a toponym) is twenty medimnoi of wheat + PA; here no size of land is indicated, but

---

[36] L120 cannot, as yet, be transcribed; it corresponds to Linear B *49. In Linear A it only occurs on HT 120.

[37] For the distinction between the signs representing *i* and *no*, now all classified wrongly as L100, cf. E. Peruzzi, Le iscrizioni minoiche, 1960, 40ff., and, more recently, M. Pope and J. Raison, Kadmos 16, 1977, 16–23. The morphological correspondence of L38 (now L100) with *28 = *i* is much greater than of L100 with *52 = *no*. The term *pa.i.to* is found on HT 97 as well.

[38] Cf. the author, Kadmos 11, op. cit. 5.

[39] The heavy talent = two talents measures 100 khoinikes of wheat, and one medimnos of wheat has a weight of 1.2 heavy talent.

[40] A symbol for a smaller unit than the mina of wheat has not been found.

[41] For *da.k^{w}e.ra* may be read *da-g^{w}erai*, cf. the distinction made in the Charente between Terres Chaudes and Terres Froides – arable as against pasture land.

[42] That must have been the normal situation.

[43] Apparently indicating sixty plots of land of one-sixth of a medimnos of wheat-seed each or $\frac{2}{5}$ of an aroura.

[44] This is only $4\frac{1}{2}$% less than the 'standard' of five.

such a harvest would correspond to an area of four medimnoi of wheat-seed[45].

Now the question arises of a possible correlation between the three amounts of wheat + PA and the numerals listed at the end of the text after *pa.i.to*. It should be observed that it would be perfectly simple to calculate in percentages: one per cent of a medimnos is 1.2 khoinikes, and one per cent of a heavy talent of wheat precisely one khoinix[46]. In calculating percentages, amounts less than $\frac{5}{6}$ of a medimnos would yield less than a khoinix and might have been disregarded; alternatively, any amount less than a khoinix resulting from taking percentages of parts of a medimnos as listed might have been left out of consideration. On this assumption, the following picture can be constructed (in brackets are the fractions left out of consideration).

$62(\frac{1}{3})$ med. at 3%; 1% = 74.(4); 3 × 74 = 222 khoin.
20   med. at 2%; 1% = 24;   2 × 24 = 48 khoin.
48   med. at 2%; 1% = 57.(6); 2 × 57 = 114 khoin.
                                                 ─────────
                                    total   384 khoin.

This total corresponds to the recorded figure of $3\frac{1}{5}$ medimnos[47]. Consequently, it may be supposed that land under the administration of the central authority[48] was taxed for the benefit of the palace at Phaistos at a rate of three per cent of the yield, while an additional $\frac{1}{120}$ part was set aside for the appointed steward. Other fields paid two per cent only[49].

---

[45] As it does not seem likely that, here, we are dealing with the large estates like those listed on HT 95, it is to be expected that the area comprised lots measured either in households or in arourai: the harvest, if accurately given (no steward was involved), would have been 9.6 such units, or 24 of the plots of the *ki.re.ta.na*.

[46] In the Mycenaean system a heavy talent of wheat measured one medimnos, thus further facilitating calculation. The reason for the reduction might have been inflation, cf. the author, Nestor, 1977, 1131–2.

[47] As 385 khoinikes could have been written as $3\frac{5}{24}$, this supports the correctness of the above interpretation.

[48] Peruzzi, op. cit. 69, guessed from the text of HT 97a that the 'royal villa' at Hagia Triada was called *ka.nu.ti*; for those knowing the site a derivative of γάνυμαι would seem to have been chosen rather appropriately.

[49] It seems likely that the notation 'wheat + PA' — also recorded on HT 43, 93, 102, 125 and 128 — indicated wheat taxed for Phaistos. However, in the notation '*no* wheat + PA' on HT 93, *no* may be the abbreviation of nōphelēs, 'not being under obligation'. — Cf. Linear B PY Sa 682 *no.pe.re.a₂* for nōpheleha. An analogy would be *o* for Linear B *o.pe.ro* on HT 15 (cf. the author, Kadmos 12, 1973, 142ff.).

As it may be taken that each steward controlled a number of sites, his revenue would have been considerably[50] in excess of that derived from the estates like those recorded on HT 95, of which the largest, that of *sa.ru,* corresponded to forty households with an average yield of 150 medimnoi or ca. 450 bushels of wheat.

Part II of this paper will be dedicated to the consideration of texts connected with those examined in this part.

---

[50] HT 10 may contain a full list of fields under the stewardship of *ku.ni.su* (see Part II of this paper).