




















Cretan Hieroglyphic Transaction Terms:

"Total Paid" and "Total Owed"*

Younger, John G. 2003. "Cretan Hieroglyphic Transaction Terms: 'Total Paid' and 'Total Owed'," *Cretan Studies [Briciaka. A Tribute to W.C. Brice*, edited by Y. Duhoux] 9: 301-16.

§1. This study investigates two Hieroglyphic transaction terms,   056-070 and   057-092, and their variants.¹ For "Texts Discussed", see the final section of this paper.



Signgroup   056-070



§2. Signgroup   056-070 appears in eight Hieroglyphic texts: #059, #061, #071, #118, #132, #**298**, #321, and #328 . Four of these texts carry the two signs as part of an isolated statement: a sherd #321 from Mallia Quartier Mu preserves  ]056-070; cone #071 from Mallia Quartier Mu carries X     X 022-056-070-061 (022 is hapax legomenon here); a jug handle from Mallia Quartier Mu carries the seal impression #**132**, X    X 008-056-070 ( 008 is probably always an initial);² and the four-sided cornelian prism #**298**.a carries X    X 056-070-040 on face a (we shall come back




* This study is dedicated to William Brice, to whom I am deeply indebted for having encouraged me to write the series of seven *Kadmos* articles, "Stylistic Groups of Aegean Seals in the Late Bronze Age," 1982-89. Yves Duhoux has given me constant good advice through many drafts of this paper; I am also grateful to Paul Rehak for his encouragement in my Hieromania.

















¹ For texts and syllabary, Louis Godart and Jean-Pierre Olivier, *Corpus Hieroglyphicarum Inscriptionum Cretae* (Paris 1996; hereafter, CHIC). Also see my "The Cretan Hieroglyphic Script: A Review Article," *Minos* 31-32 (1996-1997) 379-400 (hereafter, *Review*). Bold numbers are numbers actually written in the texts, and bold CHIC document numbers (e.g., #**298**) and thick signs refer to sealstones and their inscriptions; not-bold numbers are numbers assumed to be in the minds of the scribes, and not-bold document numbers and outline signs refer to clay and other documents and their texts.

² *Review* 393.

to this inscription at the end of this paper, §23). A fifth document, a stone libation table #328, carries a long, continuous inscription, of which -   - 056-070- is a part; I will not discuss this document here.

§3. The meaning of the signgroup,   056-070, can be deduced from its context on the three clay documents: #059 #061, and #118; I discuss the first two next, saving #118 for §19-20.

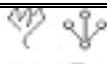
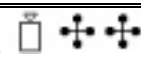



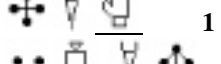
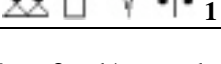
§4. I start with the four-sided bar from Knossos, CHIC #061 (Text 3); it is probably slightly more than half-preserved (pres. L 3.5 cm; intact bars are usually about 6 cm long); the text records a list of signgroups, each associated with the number **1**, as if receipts or allocations of an unspecified commodity from or to individual persons or places. The end of the bar, face e, carries    056-070-070 **12**. At present, seven units are preserved, and an eighth is certain; if the bar was at least half again as long, there would be room to supply the extra four signgroups, one on each face, with their units to make up the total **12**.









§5. If correct, then    056-070-070 means "total" or "total paid."³ I assume, however, that the two-sign signgroup   056-070 represents the "radical" or root of the word and carries the same meaning since unreduplicated   056-070 appears several times and once with the demonstrable meaning of "total paid" (§19-20). Although reduplicated    056-070-070 is a hapax here (see, however,    056-070-040 on sealstone #298.a, §23), such duplicated syllabograms are common in both Hieroglyphic and Linear A;⁴ cf., for instance,    049-070-070 (#167).


³ Y. Duhoux, "Pre-Hellenic Language(s) of Crete," *Journal of Indo-European Studies* 26 (1998) 1-39, esp. 23-24, first presented this important identification. This result also invalidates my earlier identification of ebb 506-070-070 as a "sign group with changing endings" (*Review Appendix I.5*).

⁴ Duhoux 1998: 5-6 (§2.1.2.2).












§6. Graphic summary of #061

items			total	
a. [••• 1]	|	1	e.  12	
b. [••• 1]	|	1		
c. [••• 1]	••• [1]	X 		1
d. [••• 1]	|	1		 1
			 1	

§7. The second document, CHIC #059 (Text 2a+b), another four-sided bar from Knossos, presents an account (faces a-c) of commodities that results in a balance surplus of 10 which is then queried on face d.⁵ It presents four transaction terms:  044-005,  044-049,  072-049, and   056-070-061. This last signgroup I understand to be another elaboration of the two-sign signgroup  056-070, and, like  056-070-070, it also demonstrably means "total paid." Sign  061 (the signgroup's last sign) functions apparently always as a terminal sign to signgroups;⁶ it does not appear to affect their primary meaning or function.

§8. I assume that cA.]2300[is some kind of target amount; I also assume that it is not coincidental that the total of the first set of numbers (a.  044-005 **40**[**400**]) is 10 more

⁵. Bar #059 is part of a set of accounting documents: it summarizes the totals of several commodities (including v *152 BOS and Î *156 VINUM) listed in bars #065, #066, and #067 and recorded on medallions #034 and #047.

⁶. CHIC's "Index of Signs" makes it clear that sign 061 (365-66) is almost always terminal. The exceptions are examined here (I omit examples of]061- and -061-•[and retrograde and circular readings):  Qc 061-062-042 (#095.b) is probably to be read retrograde since 042 is (almost) always an initial; s  v[â 054-061-013[(#034.a) and Fq  j **40** 063-047-061-031 **40** (#052.a) more probably use v and j as logograms *152 and *174; xb  h 057-070-061-005-019 (#112.a) is more probably to be separated as xb  h 057-070-061 005-019 (for the signgroup xb 057-070, see §13-20 below), and compare X hb  X  f X 019-070-061 X 072-039 (#040.a); and because not only does hatching separate 061 and 019 in Xb  hÚb 070-061-019-045-070 (#298.b) but no other signgroup has 070 for both its initial and terminal sign, it is better to read this as —>X b  <—[X] bÚh —>X 070-061 <—[X] 070-045-019 (cf. bjh 070-031-019 on #054.e, #056.aA). Finally, on #034 and #294.g1,  061 spans the entire height of the row like a divider (cf. #040.a1 and b1); similarly, I read  061 on #036.a as lines.

than the total of the second set (bB-cA. [transaction]130]300]). Side cB. [044-049] probably recorded this balance, 10.

§9. The two totals 440 and 430 should be payments and deficits, or vice versa, leaving 10 as a balance, either overpaid (a surplus) or owed, respectively. This implies that the two transaction terms [044-005 "payment/deficit" and [044-049 "balance" are not contradictory but can be complementary.⁷

§10. Side d concerns the balance. It introduces the amount [072-049 11 and concludes that this is a "total", [056-070-061 11, arrived at by the intervening statements, [044-049 6 "balance (surplus /owedpaid)" and]v̄v̄v̄v̄v̄[(transcribed as five \bar{v} s). The sign \bar{v} (\bar{v}) is a hapax here, but CHIC identifies it as a fraction; I find the fact that 6 plus five \bar{v} 's total 11 too coincidental, and I therefore think that \bar{v} is not a fraction but simply a tally mark.

§11. Both the term [056-070-061 "total" and the act of tallying (if that is what the five \bar{v} 's mean) imply that 11 is an actual number representing 11 units actually present; this should imply that it represents a surplus over the balance of one unit. The situation recorded on #059 could then be described in the following way: 440 units were assessed ([044-005), 330 units were paid at first, and 10 units were expected, but 11 showed up apparently in two batches, 6 already present as a balance ([044-049) and 5 newly arrived and being counted]v̄v̄v̄v̄v̄[as the bar was written.⁸

7. John G. Younger, "New Observations on Hieroglyphic Seals," *Studi Micenea ed Anatolici* 28 (1990) 85-93, esp. pp. 89 & 92: "the Arrow [[044-049] and Eye groups [[044-005] basically say similar things". While the two signgroups often appear on different faces of prism seals, CHIC #059 is the only clay document that presents both groups.

8. It is intriguing that a fragmentary lame #108 from the Hieroglyphic deposit in Mallia Palace also presents 6 and the hapax appearance of sign \bar{o} *169 followed by 5; is it possible that the two documents Knossos #059.d and Mallia #108 concern the same transaction, and that the 5 commodities being counted at Knossos were coming from Mallia?

§12. Graphic summary of #059:

target	assessed?	paid	balance expected	d. the problem
2300	aA: 40 aB: < > 400[total 440	bA-B.]130 cA.]300[total 430	cB. > cB. [10	dA. 11 actual amount 6 balance present]vvvvv[5 tallied amounts] 11[total

Signgroup 057-092

§13. The second transaction term under discussion is 057-092; it appears on two clay documents, #052 and #063, and a sealstone (#243.b).


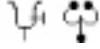





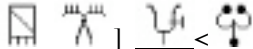

§14. Document #052 (Text 1a+b), another bar from Knossos, records quantities of at least one commodity *174.⁹ The preserved small numbers (60, 40, 50, 50, 70) total 270, 20 short of 290 recorded on side b (the 20 was probably recorded in the lost space on side a or c). I assume it is not coincidental that 290 and 710 total 1000, another unexpressed assessment. Against this target of 1000, the text records six items totaling 057-092 290, leaving a balance 029-070 710. Again, we do not know if the items listed were contributions paid or not paid (i.e., deficits).

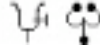

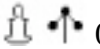

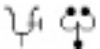
§15. Graphic summary of #052:

target amount	quantities paid/owed	total paid/owed	balance owed/paid
<1000>	a. 60, 40, c. 20,]50, 50, 70	b. 290	d.] 710



§16. The second bar, #063 (Text 4a+b), is very fragmentary, but it records two transaction terms: 057-092 and 044-049. Each line is broken at the left but all may have begun with a signgroup ending at least in - -006. Line a1, for instance, begins]]006 057-092 which is paralleled on sealstone #243.b:

⁹ Several documents present j, not as the syllabogram 031 (assumed to be the prototype for Linear AB RE, e.g., Duhoux 1998: 6), but as the logogram *174. If so, we can follow this transaction at Knossos: crescent #011 may record the arrival of j *174 into the administrative system; medallion #032 may indicate its dispersal or requisitioning; and bar #052 includes the commodity as part of a larger record of contributions or disbursements.

006-057-092; perhaps sign  006 could stand by itself or as a prefix to  057-092. Line a2, however, begins with a signgroup that consists of, or ends in,  041-006; and there are parallels for this signgroup as well: as an intact, two-sign signgroup on sealstone #246.b, or as a root with different terminal endings on two Chamaizi jugs from Mallia, #316 ( 049-041-006-025) and #327 ( 049-041-006-057). This last inscription, #327, suggests that  057 can terminate signgroup  041-006, perhaps implying (line b1)  > 041-006 057-<092>; if so, then on #063.b1 and d2 the following sign  053 may be separate.¹⁰ In the normalization of this fragmentary document (Text 4b) I follow this last option.



§17. In spite of the difficulties, the general layout of bar #063 seems clear: on the left side of the vertical separation lines are numbers headed by  057-092, and on the right side two sets of numbers, **105** and smaller numbers headed by  044-049, apparently a total **105** and the quantities paid. Since  044-049 in a previous document (#059.d; §10 & 11) functioned as one of two components in a totaling computation, we should expect it to function similarly here; thus, all the small numbers on both sides of the vertical separation line should total **105**. And since  044-049 in the previous document totaled actual amounts present,  057-092 may record amounts not present, i.e., amounts owed.

§18. Graphic summary of #063:

target amount	owed	paid
	 3, 20, 20	 2, 20, 40
total 105	total 43	total 62

¹⁰. Compare X Açgjb X 053-034-031-070 (#001), probably to be read, in spite of the initial X, retrograde, since bjg[070-031-034[appears on #091 and is a likely variant of bjh 070-031-019 on #054 and #056.


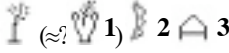











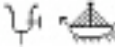

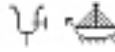

§19. Document #118 (Text 5) is the last document to be discussed here; it presents two lists of different commodities each preceded by a heading (I omit quantities here):

- a.  056-070 *159 *171 *172 *153
- b-d.  040-057 *177 *173 *155 *156 *179 *161 *162

Since commodities on Hieroglyphic documents tend to be listed in a conventional order, it will be interesting to see how the commodities on #118 follow this order.

First, the conventional order:¹¹

- 
 *161 *171 *172 *156 *180 *152 *153 *178 *158 *167 *155

§20. The first list on #118 begins with the heading "total paid" and then, apart from the first sign  *159, presents the remaining three commodities (the bold numbers refer to their position in Hieroglyphic conventional order of commodities) #118, list 1:  1)  2)  3)  7. The second list, however, puts most of its commodities in reverse order, and adds two others, #118, list 2):  11)  4)  (≈?  3 or  2)  1)  (=? a variety of  1). If the retrograde reading of list 2 applies to the heading as well, then it should read <—  057-040, not —>  040-057. If the two headings are in opposition, signgroup <—  057-040 may mean "total owed" and therefore be complementary to  057-092 (§14-15).

¹¹. *Review*, 390, Appendix F.

𐀀𐀃 056-070 = Linear A 𐀃𐀓 81-02 KU-RO and 𐀓𐀃 057-092 = 𐀓𐀓 67-02 KI-RO

§21. Two transaction terms in Linear A occur frequently: KU-RO 𐀃𐀓 81-02 demonstrably means "total",¹² and KI-RO 𐀓𐀓 67-02 means "owed".¹³

§22. Scholarly consensus assumes that Hieroglyphic signs 𐀃𐀓 070 and 𐀓𐀃 092 are the predecessors to Linear AB RO and RU, respectively.¹⁴ This would then make 𐀀𐀃 056-070 ("total paid") in AB values 𐀀𐀃 -RO (I suggest 𐀀𐀃 056 is *KU*, although palaeographically the sign does not seem related to AB 81 𐀃), and 𐀓𐀃 057-092 ("owed") in AB values 𐀓𐀃 -RU, (I suggest 𐀓𐀃 057 is *KI*; palaeographically AB 𐀓𐀓 67 KI could be a turned-around version of Hieroglyphic 𐀓𐀃 057).¹⁵

§23. If, as suggested above, 𐀓𐀓 𐀓𐀓 057-040 also means "owed" then 𐀓𐀓 040 may be phonetically similar to 𐀃𐀓 070; I suggest *RO*₂. If so, then the signgroup on sealstone

¹². Duhoux 1998: 19-20; R. Palmer, "Linear A Commodities: A Comparison of Resources," *Politeia, Aegaeum* 12 (Liège 1985), I: 133-155, esp. 136. Linear A KU-RO "total" can be demonstrated on HT 9.a & b, 11.b, 13, 25.b2-4, 85.a, 88.4-6, 89.4, 94.a3 & b1-4, 104, 116 (likely), 117.a1-6, 123.a, 127.b4-7; and ZA 15 and 17; and is likely on HT 118 (with 5 having been omitted) and 122, and on ZA 1. KU-RO can be restored on HT 27a.1-7, 100, and 102; the total seems to have been rounded off on HT 119; and the word is mentioned but its meaning cannot be deduced on HT 39.5, 40.3, and 46a.2. PO-TO-KU-RO seems to mean "grand total" on HT 122.b6 (off by one?), and can be restored on HT 131.4.

¹³. J. T. Hooker, "Problems and Methods in the Decipherment of Linear A," *Journal of the Royal Asiatic Society* 1975, 164-72; Duhoux 1998: 19, and "Le Linéaire A. Problèmes de déchiffrement," in Y. Duhoux, T. G. Palaima, and J. Bennet eds., *Problems in Decipherment* (Bibliothèque des cahiers de l'Institut de Linguistique de Louvain 49; Louvain-La-Neuve 1989) 59-119, esp. 79. KI-RO demonstrably means "owed" on HT 30.4, 123a, and 118; KI probably stands for KI<-RO> on HT 49a.8; on HT 1 KI-RO seems to mean "balance", perhaps of contributions owed; and KI-RO itemizes contributions paid or owed on HT 88.4, 93b.1, and 94b. KI-RO also appears on HT 88.4 and 124 where the meaning is unclear.

¹⁴. A. Evans, *Palace of Minos I*: 643, fig. 477; M. Ventris and J. Chadwick, *Documents in Mycenaean Greek*², 33, fig. 6; CHIC, p. 9; Duhoux 1998.

¹⁵. Hieroglyphic xb 057-070 *KI-RO* does occur (#056, #112; cf. #038.b2) but the context does not yet allow its meaning to be determined.

#298.a, 𐀀 𐀃 𐀆 056-070-040 would read **KU-RO-RO₂**, which would provide a parallel for 𐀀 𐀃 𐀆 056-070-070 *KU-RO-RO* on the first document discussed, #061 (§4-6).¹⁶

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






[correct present address]

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¹⁶. For reduplicated bb 070-070, see 𐀃 𐀆 bb 049-070-070 (**#167**) mentioned above (§6), and Jbf 040-070-038 (#097.g).

Summary of Transaction Terms Discussed Above




Signgroup	Discussion	Apparent meaning	suggested transcription	Linear A functional equivalent
 022-070 (#052)	§14-15	"total"	•-RO	KU-RO
 044-005 (#059)	§7-12	"total paid"/ "assessment"		
 044-049 (#059, #063)	§7-12; 16-18	"balance"		
 056-070 (#118)	§19-20	"total (paid)"	KU-RO	KU-RO
 056-070-061 (#059)	§7-12	"total (paid)"	KU-RO- >	KU-RO
 056-070-040 (#298.a)	§23	?	KU-RO-RO ₂	?
 056-070-070 (#061)	§4-6	"total (paid)"	KU-RO-RO	KU-RO
 057-040 (#118)	§19-20; 23	"owed"	KI-•RO ₂	KI-RO
 057-092 (#052, #063)	§14-15; 16-18	"owed"	KI-RU	KI-RO
 072-049 (#059)	§7-12	"actual amount"		

Texts Discussed

1a. CHIC #052 (HM 1296), four-sided bar from Knossos

a.]  60 X     40



]061. 60 X 063-047-061-031 40

b.]X    290

]X 057-092-061 290











c.]50 50 70

]50 50 70



































d.]   710

]022-070 710

1b. CHIC #052 normalized

a1.		60		]061	60
a2.	X    	40	X 063-047-061	*174	40
<c0.		20>			<20>
c1.		]50			]50
c2.		50			50
c3.		70			70
b.	]X  	290	]X 057-092-061		290
d.	]	710	]029-070		710

2a. CHIC #059, four-sided bar from Knossos.

aA.	X    X  	40[	X 028-049-049	X 044-005	40 [
aB.	X    	X 400[	X 038-071-066-070	X 400 [
bA.	X   X    X   .		X 060-013	X 028-029-002	X 013-•[
bB.	] 130 VESTIGIA [		] 130 VESTIGIA [
cA.	] 2300 [] 300[		] 2300 [] 300 [
cB.	] X [		]031-021-061	X 044-049[
dA.	  11 X   6 X   [] <u>v</u> <u>v</u> <u>v</u> <u>v</u> <u>v</u> <u>v</u>[		072-049 11 X 044-049 6 X 092-036[] <u>=====</u> [
dB.	X     []    11 [		X 028-049-007-042[]056-070-061 11 [

2b. CHIC #059 normalized

aA.	X		X		40[	X 028-049-049	X 044-005	40[
aB.	X		X <		> 400[	X 038-071-066-070	X <044-005>	400[
aB-bA.	X					X 060 *152			
bA-B.	X		X		·[130	X 028-029-002	X *152 ·[130
bB-cA.	VESTIGIA				2300[	VESTIGIA	[	2300[
cA.					300[			300[
cB.			X		[10]	031-021-061	X 044-049[	10]
dA.					11	072-049		11	
			X		6	X 044-049		6	
	X		[			]vvvyy[	X 092-036[	]zzzzzz[
dB.	X		[]		< 11 [	X 028-049-007	*175 []	056-070-061 11 [






















3. CHIC #061 (HM 1297), four-sided bar from Knossos.

a.	]mz 1 □ cej 1	]023-032 1 | 042-056-031 1
b.	]•ge 1 □ □ Xpu 1	]•-034-056 1 | X 037-011-029 1
c.	]• [1] □ bhDç 1	]• [1] | 070-019-009 1
d.	]wà 1 □ geh 1	]092-049 1 | 034-056-019-049 1
e.	12	056-070-070 12

4a. CHIC #063 (HM 1302), four-sided bar from Knossos.

a1.	] >> | 105[	]006-057-092 >> | 105[
a2.	] 3 |	]041-006 3 | 044-049[
b1.	] >> 20 [ ] | [ ] >> 20[	]057-053 >> 20 [ ] | [ ] 049-061 >> 20[
b2-d1.	DESUNT	DESUNT
d2.	] [ >>	]053-006[>>

5b. CHIC #118, normalized

a.			10		056-070	*159	10 L
			1			*171	1 G
			1[]			*172	1[]
			1			*153	1 G
b1+d2.			1			*162	1
d1.			1			*161	10
c3.			240			*179	240
c2.			20			*156	20 L
c1.			4			*155	4 LD
b2.			2			*173	2 D
b1.			1		040-057	*177	1 G