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**On Decipherment of the Inscriptions of Linear A in the Common
Kartvelian Language: *ku-ro* and *ki-ro***

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ABSTRACT

The paper presents the ancient Kartvelian scripts of Crete dated from the nineteenth to fifteenth century BC. On Linear A (LA) tablets mathematical data were written in the Common Kartvelian (CK) language. The vast bulk of LA signs are graphically and phonetically identical to those of Mycenaean Linear B (LB) and the Cypriot syllabic (CS) scripts. The problem of the language of LA inscriptions has long remained unsolved, because it was supposed that the language and its culture no longer existed. The meanings of the LA inscriptions remained unidentified, and the LA tablets were declared to be written in an unknown dead language. The LA words for addition *ku-ro* and subtraction *ki-ro* are especially interesting and important for the verification of my deciphering. J. Chadwick (1970:154 ff.) wrote: „The meaning of one LA word is certain: *ku-ro* is the word which introduces totals, and must mean something like ‘total’ or ‘so much’. If we could find such a word in a known language, the problem of LA might be solved“. The word *ku-ro* denoting arithmetic operation of addition, also the word *ki-ro*/**ki-lo* denoting subtraction/lessening are attested in all Kartvelian dialects: Georgian, Megrelian, Laz and Svan, which is shown in detail in the text of the paper. Phonemic sequences of root+suffixal morphemes **kur-oj* and **kir-oj*/**kil-oj* are the canonical forms of CK. It is shown that the sequence root+suffix is regulated by the principle of monovocalism in Kartvelian dialects (Gamkrelidze and Machavariani, 1965). The study of Kartvelian material justifies the reliability of interpreting the LA script sign-sequences *ku-ro* and *ki-ro*/**ki-lo* as the CK stems.

Keywords: Linear A script, Common Kartvelian dialects, the principle of monovocalism, comparative and inner reconstructions.

Introduction

Some of the results of my decipherment of the LA tablets are presented in the paper below.

The analysis of the data shows that LA inscriptions record the ancient CK language.

The following should be emphasized:

- a. The visual features of the LA syllabic signs are graphically simplified versions of the Cretan hieroglyphic script and the Phaistos Disk script signs (Kvashilava, 2011:239).
- b. The vast bulk of LA syllabic signs are graphically and phonetically identical to the graphic and phonetic properties of the syllabic signs of Mycenaean Greek LB (Chadwick, 1970:165, Figure 17; Ventris and Chadwick, 1973:23, Figure 4) and the CS scripts (Chadwick, 1970:24, Figure 7; Ventris and Chadwick, 1973:388, Figure 28). The problem of the language of LA inscriptions has long remained unsolved, and it was declared to be impossible to read because the language and its culture no longer existed.

The phonetic values of LA syllabic signs are presented in Table 1:

Table 1. Syllabograms of LA Script

001		da	017		za	039		pi	057		ja	077		ka
002		ro	020		zo	040		wi	058		su	078		qe
003		pa	021F		qi	041		si	059		ta	079		zu
004		te	023		mu				060		ra	080		ma
005		to	024		ne	045		de	061		o	081		ku
006		na	026		ru	046		je	065		ju	085		au
007		di	027		re	050		pu	066		ta ₂	087		twe
008		a	028		i	051		du	067		ki			
009		se	029		pu ₂				069		tu			
010		u	030		ni	053		ri	070		ko			
011		po	031		sa	054		wa	073		mi			
013		me	037		ti	055		nu	074		ze			
016		qa	038		e				076		ra ₂			

The meanings of LA inscriptions remained unidentified, and LA tablets were declared to be written in an unknown dead language.

- c. The method of comparative and inner reconstruction made it possible to identify the forms and meanings of LA syllabic sequences as belonging to the CK Language.

Linguistic material is one of the most important arguments for the verification of any decipherment. I am happy to say that in the case of the LA script the well-studied linguistic material of ancient CK dialects (such as Georgian, Megrelian, Laz and Svan), also of the dialects of the modern Georgian language, wholly supports my reading (see Kvashilava, 2008–2017).

It is interesting that the words denoting the items of these arithmetic operations like a *summand/addend*, *minuend*, *subtrahend* as well as the names of the operations (*addition* and *subtraction*) are derived from one and same root in all Kartvelian dialects mentioned above.

The sign-sequences (words) denoting arithmetic operations in LA inscriptions are: $\text{ჰ}+$ [ku-ro] (addition) – “to bind, gather, collect, add”, and $\text{ჱ}+$ [ki-ro] (subtraction) – “fault, defect; to subtract, lessen, diminish, cut off”.

Modern Georgian terms for mathematical operations are:

še-kr-eb-a – *addition*;
 še-sa-kr-eb-i – *summand/addend*;
 gamo-kl-eb-a – *subtraction*;
 sa-kl-eb-i – *minuend*;
 ma-kl-eb-i – *subtrahend*.

The following sequences that were reconstructed for the CK language by linguists (Gamkrelidze, 1966; Gamkrelidze and Machavariani, 1965; Klimov, 1998; Fähnrich, 2007, and others) are given in the texts of the LA. The comments on these words were presented by me earlier (Kvashilava, 2011:266-267; 2015a; 2017a:67; 2017b:858).

Below the analysis of the terms denoting arithmetic operations of *addition* and *subtraction* given in LA inscriptions is presented. The material is studied in detail.

Reading the Sign-sequence $\text{ჰ}+$ [ku-ro]

According to L. Godart and J.-P. Olivier (1976, I:18-19, 22-23, 26-27, 44-45, 48-51, 138-141, 150-153, 164-165, 168-171, 176-179, 192-203, 206-213, 218-219, 318-319; 1976, III:182-185) the sign-sequence $\text{ჰ}+$ has been attested on clay tablets HT 9 (HM 13), HT 11 (HM 29), HT 13 (HM 7), HT 25 (HM 34), HT 27 (HM 36+53), HT 88 (HM 1312), HT 89 (HM 1313), HT 94 (HM 1316), HT 100 (HM 1306), HT 102 (HM 1310), HT 104 (HM 1317), HT 109 (HM 1333), HT 110 (HM 1319), HT 116 (HM 1361), HT 117 (HM 1364), HT 118 (Pigorini 83734), HT 119 (HM 1362), HT 122 (HM 1366), HT 123 (HM 1367+1371), HT 127, PH(?) 31 (HM 1609), ZA 15 (HM 1627); these were

found at Hagia Triada, Phaistos (?) and Zakros in Crete, and dated back to LM IB period (Godart and Olivier, 1976, I:XXI, XXX; 1976, III:XIV, XVI, XXII; 1985, V:83-86, 113).

The following two inscriptions have been chosen for my study (see Figure 1, 2):

Figure 1. The inscription on side b of clay tablet HT 9 (HM 13). According to Godart and Olivier, 1976, I:18

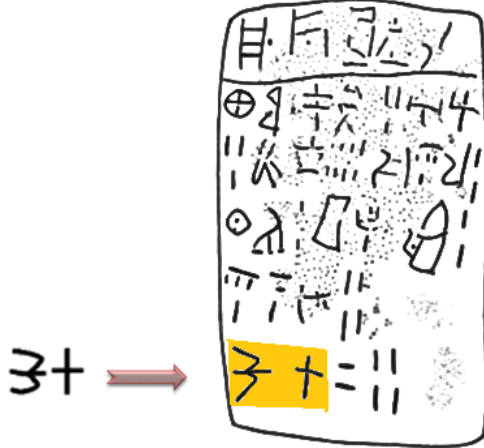
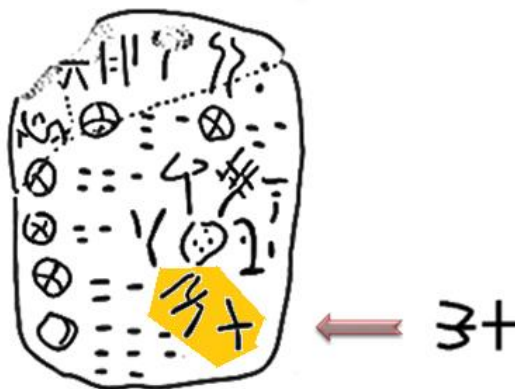


Figure 2. The inscription on side b of clay tablet HT 11 (HM 29). According to Godart and Olivier, 1976, I:22



The sign-sequence 3+ is attested at the end of the inscriptions on HT 9b (HM 13) and HT 11b (HM 29).

The LA script signs LA081 3 and LA002 + are considered to be identical (or similar) to the corresponding signs of LB and the CS script, as shown in Table 2:

Table 2. According to Godart and Olivier, 1985, V:xxxiv, xxviii; Raison and Pope, 1994:25

LA		ku	+	ro
LB		ku	+	ro
CS			+	lo

According to rule 5.2.2 of my algorithm for reading the signs of the Phaistos Disk and LA scripts (Kvashilava, 2008:253, 254), the LA081 sign 𐀓 and LA002 sign 𐀔 are read as [ku] and [ro/*lo] syllables. This coincides with the phonological values of the corresponding LB signs (Chadwick, 1970:165), and consequently the LA sequence of signs 𐀓𐀔 is read as [ku-ro/*ku-lo].

The meaning of 𐀓𐀔 [ku-ro/*ku-lo] is supposed to be “total” (Evans, 1952, II:16, 52; Ventris and Chadwick, 1973:36; Pope, 1958:21; Nagy, 1963:202, 203; Packard, 1974:26; Platon and Brice, 1975:73; Chadwick, 1975:144; Palmer, 1995:136, 137, 151; Duhoux, 2004:217; 2012:4, 5; Schoep, 1999:208; Younger, 2003:309₁₂; Owens, 2007:317); Indo-European *ger- “to collect, to gather”; Greek ἀγείρω¹ “to come together, to assemble; to gather, to collect” (SOS, 1976:91 / Pope, 1964); Kartvelian *ḡar-/*ḡr- – “bind, bind together, tie”; Kartvelian *ḡr-eb- – “to gather; sum up” (Gordeziani, 2000:117; 2007, II:211); Semitic *kull- “all”² (Gordon, 1958:249; 1975:153, 156; Packard, 1974:26 ff.).

The above material shows the connection of 𐀓𐀔 [ku-ro] with the CK archetype *ḡur-oj < *ḡur-w-ej/*ḡur-w-aj³.

¹Comp. Indo-European *h₂ger- “to gather, to collect; to come together, to assemble” (Bomhard, 2018, II:575, №490D); Mycenaean Greek 𐀓𐀔 [a-ke-re] (PY Cc 660.a tablet) – ἀγείρει (Jorro, 1999, I:38); 𐀓𐀔 [a-ko-ra] (PY Cn 453.1 tablet) – ἀγορά (Jorro, 1999, I:46); ἄγορος, “gathering” (Beekes, 2010, I:10; comp. Chadwick and Baumbach, 1963:166).

²Comp. Semitic *kull- “all, whole, entire” (Bomhard, 2018, III:609, №516A): Sumerian 𒀭𒀪 [kul] “to collect”.

³The following notations are used in this paper: C – any simple consonant or harmonic group of decessive order; /j/ stands for a frontal sonant phoneme; k=k'; S denotes any non-syllabic sonant; § denotes any syllabic sonant; V denotes any vowel phoneme; /w/ denotes a labial non-nasal sonant phoneme; †a¹=a or similar, †a_j=a or nothing; Ø – a null phoneme; * denotes the reconstructed phoneme; # denotes a pause; / denotes a parallel phoneme or form; a>b means that a changes to b; b∈C means: b belongs to C; syllabic /r/ is denoted as [r̥]; [r] is non-syllabic.

*Reconstruction of the CK Archetype *ḱur-oj*

The theory of morphological structure and typology of CK presented by Th. Gamkrelidze and G. Machavariani (1965:366-368), and the comparative study of Kartvelian languages allows the inner and comparative reconstruction of Later CK archetypes.

In comparative analysis of a special importance is the so-called principle of monovocalism.

The principle of monovocalism the effect of which is clearly seen in certain archaic formations of Indo-European, namely in Sanskrit and Greek, has been underlined by Th. Gamkrelidze and V. Ivanov. The principle implies that the morpheme sequences – root+suffix “undergo morphophonemic fusion of adjacent homogeneous vowels, or syncope of one of two vocalic elements of adjacent morphemes. ... This syncope can be seen as reflecting a principle of monovocalism whereby only one morpheme in a morpheme sequence can have a vocalic element” (Gamkrelidze and Ivanov, 1995, I:217).

According to the principle of monovocalism (Gamkrelidze and Machavariani, 1965:183, 243), if to one-morpheme verbal root – in our case { *ḱer-/*ḱar- } – a normal grade suffixal morpheme, such as { *-ew/*-aw } is added, then only one morpheme is presented at the normal vocalic grade in a bimorphemic stem, and the normal vocalic grade of the root changes to the zero or reduced grade (comp. Gamkrelidze and Machavariani, 1965:311, 238; Gamkrelidze, 2008:35):

Normal vocalic grade root

*ḱer-/*ḱar-, *ḱer-/*ḱar-b/-ib-, *ḱer-/*ḱar-n/-in⁴

Zero vocalic grade stem

*ḱr-/ḱr-ew/-aw-, *ḱr-/ḱr-eb/-āb-,⁵ *ḱr-/ḱr-ej/-aj-, *ḱr-/ḱr-en/-an-

These archetypes are of the phonemic structures of the CK morphemes (comp. Gamkrelidze and Machavariani, 1965:227, 239):

*ḱer-/*ḱar- ∈CVS-; *ḱr-ew/-aw- ∈CS-VS-; *ḱr-ew/-aw- ∈CṢ-VS-.

CK *ḱar- root morpheme is manifested in the 1st and 2nd subjective person forms of athematic (zero) aorist on the normal vocalic grade (comp. Gamkrelidze, 1966:74; Gamkrelidze and Machavariani, 1965:239):

A o r i s t

⁴*e/*a occurred after the *e and *a allophones of the CK vocalic /*ə/ phoneme acquired phonological values (Gamkrelidze and Machavariani, 1965:372).

⁵In Modern Georgian the suffix -eb substituted the earlier *-ew. Comp. Old Georgian a-ḱurt^hx-ev-s: Modern Georgian a-ḱurt^hx-eb-s (Gamkrelidze and Machavariani, 1965:263₁) – “the act of blessing” (DGL, 1950, I:259).

Singular

- I. *w-ḱar
- II. *h-ḱar

Plural

- I. *w-ḱar-t^h
- II. *h-ḱar-t^h

As for the CK zero-grade root morpheme *ḱr-, it is manifested in the 1st, 2nd and 3rd subjective person of thematic present forms, as well as in the 3rd person forms of the athematic aorist (comp. Gamkrelidze, 1966:74; Gamkrelidze and Machavariani, 1965:239):

P r e s e n t

Singular

- I. *w-ḱr-aw
- II. *h-ḱr-aw
- III. *ḱr-aw-s

Plural

- I. *w-ḱr-aw-t^h
- II. *h-ḱr-aw-t^h
- III. *ḱr- \emptyset w-en

A o r i s t

Singular

- III. *ḱr-a

Plural

- III. *ḱr-es

If the thematic zero-grade {*- \emptyset w} and normal grade {*-ej/*-aj} suffixal morphemes are added to the one-morpheme root {*ḱer-/ *ḱar-}, the normal vocalic grade of the root is changed to the reduced grade (comp. Gamkrelidze and Machavariani, 1965:226):

*ḱr-/ḱ_ḡ-w-ej/-aj-, *ḱr-/ḱ_ḡ-b-ej/-aj-, *ḱr-/ḱ_ḡ-en/-an-

CK archetypes *ḱr-w-ej/-aj- and *ḱ_ḡ-w-ej/-aj-] are of the CS-S-VS- and C_ḡS-S-VS- phonemic structures (comp. Gamkrelidze and Machavariani, 1965:203).

Consequently, the inner and comparative analysis allows the reconstruction of the CK archetypes:

*ker-/*kar-;
 *ker-b-/*kar-b-, *kr̥-eb/-āb-;
 *kr̥-b-ej/-aj-, *kr̥-ib-ej/-aj-;
 *kr-/*kr̥-ej/-aj-;
 *kr̥-/*kr̥-ew/-aw-;
 *kr̥-/*kr̥-en/-an-;
 *kr̥-/*kr̥-w-ej/-aj-.

Below the Kartvelian material connected to these archetypes is presented.

One-morpheme Root *kar-/*ker-/*kr-/*kr̥-

The CK root *kar-/*kr- (Gamkrelidze and Machavariani, 1965:311) is attested in the following Georgian words:

- Georgian še-v-kar(-i) (Shanidze, 1973, I:427, 428; Gamkrelidze and Machavariani, 1965:226, 235, 311, 354; comp. Mtskhetan Manuscript, 1985:343/Ezekiel 34.4) – “*ich verknüpfte*” (Fähnrich, 2007:222), “*I bound*”; Old Georgian h-kr̥-ev-d-it⁶ (Mtskhetan Manuscript, 1981:114 / Genesis 37.7; Abuladze, 1973:202) – “*ihr bandet*” (Fähnrich, 2007:222), “*you bound*”;
- Old Georgian [še-kr̥-v-aj]⁷ (Iakob Tsurtaveli, 1978:VI, VIII) – “*to bind*”;
- Georgian kr̥-w-aj, kr̥-w-a (Anton Pirveli, 1885:26), kr̥-v-a – “*verbinden, verknüpfen*” (Fähnrich, 2007:222), “*to knot together; connect*”;
- Georgian še-kr̥-v-a (Abuladze, 1973:476) > še-kr̥-v-a (Zhgenti, 1960, I:34-35, 34₂, 352) – “*1. to bind, tie, knot together with a strip, rope, cane; 2. bunch, collection, pack*” (DGL, 1962, VII:866-867);
- Georgian še-kr̥-a (Shota Rustaveli, 1937:255) – “*knot; bunch pack*”.

CK *kr̥-/*kr̥- [/*kar-/*kr-] is traced in Svan:

- Svan li-čär-n-e⁸ (Lentekhian dialect), li-čr-en-i (Upper Svan and Lashkhian dialects) – “*to bind, add*” (Topuria and Kaldani, 2000:1068; Klimov, 1998:86); “*to tie to*” (Chukhua, 2000-2001:375);

⁶CK unstressed syllabic *r̥ is non-syllabic in #C–V position Georgian r (comp. Gamkrelidze and Machavariani, 1965:108 ff., 111-112, 121; Gamkrelidze, 1966:73).

⁷CK unstressed syllabic *r̥ is non-syllabic in #C–S position Georgian r (comp. Gamkrelidze and Machavariani, 1965:104-105, 99; Gamkrelidze, 1966:72).

⁸According to the principle of monovocalism, when zero vocalic suffixal morpheme *-Øn is added to CK normal vocalic grade root morpheme *kar-, the archetype *kar-Øn- is received that represents the 1st state of the form. Earlier Svan normal grade stem is manifested in *kr̥-Øn- > Svan čär-n-. The Svan vowel *a is umlauted, when in the next syllable thematic *e is lost as a result of reduction (comp. Shanidze, 1981, II:323; Gamkrelidze and Machavariani,

Svan x-a-čär-n-e (Lentekhian dialect), x-a-čr-en-i (Upper Svan and Lashkhian dialects) – “*tie, sew to*” (Topuria and Kaldani, 2000:183);
 Svan a-čr-en-i (Upper Bal and Lashkhian dialects), a-čr-i (Lower Bal dialect), a-čar-e⁹ (Lashkhian dialect) – “*to make smth whole (that was torn)*” (Topuria and Kaldani, 2000:183);
 Svan čar-a (Upper Bal, Lower Bal and Lashkhian dialects) – “*to lengthen*” (Lashkhian dialect), “*adding*” (Topuria and Kaldani, 2000:1925);
 Svan an-čür-e (Upper Bal dialect), an-čur-e¹⁰ (Lower Bal dialect) – “*collects, gets together*” (Topuria and Kaldani, 2000:88);
 Svan i-n-čür-e (Upper Bal and Lashkhian dialects), i-n-čur-e (Lower Bal dialect) – “*gathers smth round himself, collects to himself*” (Topuria and Kaldani, 2000:635);
 Svan i-n-čür-i (Upper Bal and Lashkhian dialects), i-n-čur-i (Lower Bal dialect) – “*they gather together, get together*” (Topuria and Kaldani, 2000:635).

The following Laz and Megrelian words correspond to CK *k̄r-aw# > Zan *k̄r-ow# stem¹¹ (comp. Gamkrelidze and Machavariani, 1965:238, 245, 91, 92, 332, 333, 335):

- Laz k̄or-u (Atinian and Vits’e-Arkabian dialects) > *k̄ur-u] > k̄il r ɹ-u (Hopan dialect); do-k̄or-u (Vits’e dialect) > *do-k̄ur-u > do-k̄ir-u¹² (Hopan dialect) – “*tied, bound*” (comp. Chikobava, 2008, IV:290-291; Asatiani, 2012:135; Gamkrelidze and Machavariani, 1965:235, 311; Fähnrich, 2007:222);
- Laz o-k̄or-u (Atinian and Vits’e-Arkabian dialects) > *o-k̄ur-u > o-k̄ir-u (Hopan dialect) – “*to tie up; bind together*” (comp. Marr, 1910:157; Asatiani, 2012:135; Fähnrich, 2007:222);
- Laz me-k̄or-u (Atinian and Vits’e-Arkabian dialects) > *me-k̄ur-u > me-k̄ir-u (Hopan) – “*tie to; bind*” (comp. Asatiani, 2012:139);
- Megrelian *k̄or-u-a > *k̄ur-u-a > k̄ir-u-a/k̄or-u-a – “*to tie, bind*” (comp. Chikobava, 2008, IV:290-291; Fähnrich, 2007:222; Kipshidze, 1914:258-

1965:151, 153); Earlier Svan *k̄ pre-velar consonant changes to Svan č before the front phoneme ä.

⁹In Lentekhian dialects short e does not influence the vowel a of the preceding syllable if e is not syncopated (comp. Shanidze, 1981, II:323, 325).

¹⁰In Svan a full grade verbal stem may have the vowel u (comp. Gamkrelidze and Machavariani, 1965:231). In Svan dialects along with short-vowel type verbs, e.g., an-čur-e the long vowel form an-čür-e can be attested (comp. Gamkrelidze and Machavariani, 1965:248₁).

¹¹Influenced by *w labial elements, phonetically short Megrelian-Laz narrow *ō changes to narrow *u (comp. Gamkrelidze and Machavariani, 1965:91, 336). CK syllabic *r̄ is manifested in Laz as ōl r̄ ɹ/ä r̄ ɹ and Megrelian or/ir/or in position #C-V (comp. Gamkrelidze and Machavariani, 1965:111-112, 121-122; Gamkrelidze, 1966:73). The secondary o and i vowels developed in Zan after CK *a > Zan *o and CK *e > Zan *a processes (comp. Gamkrelidze and Machavariani, 1965:87).

¹²Labial u influenced Laz, Megrelian narrow ō that changed to i (Chikobava, 2008, IV:291).

259 (462-463); Zhgenti, 1960, I:61); “(n.) *bunch*” (comp. Kajaia, 2002, II:150-151);

Megrelian *do-ḳ̄or-u > *do-ḳ̄ur-u > do-ḳ̄ir-u – “*to bind, tie*” (comp. Chikobava, 2008, IV:290-291; Kajaia, 2002, II:150);

Megrelian *do-ḳ̄or-u-a > *do-ḳ̄ur-u-a > do-ḳ̄ir-u-a/do-ḳ̄or-u-a – “*to tie up*”; “(n.) *bunch; pack*”.

The following Megrelian words regularly correspond to CK *ḳ̄r-ej# > Zan *ḳ̄r-aj# root¹³:

- Megrelian ḳ̄il-i (ḳ̄il-s, ḳ̄ir-s), ḳ̄əl-i – “*bunch, sheaf; to pack*” (Kajaia, 2002, II:140); “*to wrap*” (Chukhua, 2000-2003:119).

Bimorphemic stem *ḳ̄er-b-/*ḳ̄ar-b-/*ḳ̄r-b-/*ḳ̄r-āb-

The CK archetype *ḳ̄er-b- of the 1st state of a bimorpheme stem (Gamkrelidze and Machavariani, 1965:182; Gamkrelidze 2008:35) is linguistically attested in the Old Georgian words:

- Old Georgian še-ḳ̄er-b-it^{h14} – “*you gathered together*” (Shanidze, 1973, I:460; comp. Mtskhetan Manuscript, 1981:139 / Genesis 49.1-2; Mtskhetan Manuscript, 1985:171 / Jeremiah 8.15; Zhgenti, 1960, I:62; Gamkrelidze and Machavariani, 1965:48, 51).

The CK *ḳ̄r-eb-¹⁵ of the 2nd state of a bimorphemic stem (Gamkrelidze and Machavariani, 1965:182; Gamkrelidze, 2008:35) is attested in the following Georgian words:

- Old Georgian ḳ̄r-eb-aj (Abuladze, 1973:202); Modern Georgian ḳ̄r-eb-a – “*gathering; assembly, collection*” (DGL, 1955, IV:1368).

The CK archetype *ḳ̄r-b- with a zero grade root and suffixal morphemes of the 1st state of a bimorphemic stem (Gamkrelidze and Machavariani, 1965:182; Gamkrelidze, 2008:35) is manifested in the Georgian word:

¹³According to Th. Gamkrelidze and G. Machavariani’s theory (1965:107), CK *ḳ̄r-ej changed to a Zan archetype *ḳ̄r-aj; in Megrelian the syllabic character of *ḳ̄r is lost, and *ḳ̄ir-e (see position CrV: Gamkrelidze, 1966:73) > ḳ̄il-i is received. The CK suffix *-ej regularly results in Zan *-aj > Megrelian-Chan (Laz) -e (Gamkrelidze and Machavariani, 1965:229, 230, 165); -e > -i occurs sporadically, especially in Megrelian.

¹⁴The suffix -b/-eb was isolated by V. Topuria and H. Vogt (Gamkrelidze and Machavariani, 1965:182₁).

¹⁵Comp. CK *ḳ̄r-eb-/*ḳ̄er-b-/*ḳ̄r-b- – “*session*”: CK *ḳ̄r-ep^h- – “*to pluck fruit, flowers*” (comp. DGL, 1955, IV:1367; 1962, VII:874; Chikobava, 2008, IV:292; Zhgenti, 1960, I:109); Proto-Indo-European *k^her-p^h- “*gather (harvest, fruit)*” (Gamkrelidze and Ivanov, 1995, I:775).

- Old Georgian *še-ḡr-b-a* (Mtskhetan Manuscript, 1981:48 / Genesis 1.9) – “*they gather together*” (DGL, 1962, VII:873).

The CK archetype **ḡr-ib-* with a zero grade root and reduced grade suffixal morpheme of the 2nd state of a bimorphemic stem (Gamkrelidze and Machavariani, 1965:182; Gamkrelidze, 2008:35) is manifested in the following Old Georgian word:

- Old Georgian *še-ḡr-ib-aj* (comp. Mtskhetan Manuscript, 1982 / I Samuel 10.17) – “*gathered together*”.

The following Megrelian and Laz words correspond to CK **ḡr-āb-* > Zan **ḡr-ōb-*¹⁶ root (Gamkrelidze and Machavariani, 1965:271, 356, 359):

- Megrelian *ḡor-ob-u* – “*to gather, collect*” (comp. Gamkrelidze and Machavariani, 1965:356₁, 341, 271, 245, 359);
Megrelian *ḡor-ob-u-a/ḡor-op^h-u-a* – “*to gather, collect*” (comp. Kipshidze, 1914: 261(465); Chikobava, 2008, IV:291-292; Zhgenti, 1960, I:62; Kajaia, 2002, II:159);
- Laz *ḡol r ḡ-ob-u; o-ḡol r ḡ-ob-u* – “*to gether, collect*” (comp. Marr, 1910:158); *oko-ḡor-ob-u* – “*gathered*” (Asatiani, 2012:142).

It is clear that to the CK root **ḡer-/ḡar-/ḡr-/ḡr-*¹⁷ Georgian *ḡer-/ḡar-/ḡr*, Svan *ḡar-/ḡr-/ḡur-*, Megrelian *ḡor-/ḡir-/ḡar-/ḡil-/ḡəl-* and Laz *ḡol r ḡ-/ḡil r ḡ-* are regularly connected (comp. Klimov, 1998:86; Gamkrelidze, 1966:73; Fähnrich, 2007:222).

The Kartvelian material presented above shows that the meaning of the CK archetype **ḡr-w-aj/*ḡr-w-ej* is: “*to tie up, gather, collect, bind; gather together; (n.) bunch, pack; sheaf*”.

According to the phonetic process, KC **we/*wa* > **o*¹⁸, CK **ḡr-w-ej/*ḡr-w-aj* changes to **ḡr-oj*.

¹⁶Zan **ō* is represented in Megrelian-Laz as *o* (Gamkrelidze and Machavariani, 1965:245).

¹⁷CK archetype **ḡer-/ḡar-/ḡr-/ḡr-* could be compared to Proto-Indo-European **k^her-/k^hor-/k^hr-* – “*to gather (together), to collect, to take a handful*” (Bomhard, 2018, II:574-575, №490C,D); Proto-Indo-European **k^her-/k^hor-/k^hr-* – “(vb.) *to twist, to turn, to bend, to wind; to tie (together), to bind; (adj.) curved, bent, crooked; tied, bound; (n.) that which is tied or bound together: bunch, bundle*” (Bomhard, 2018, II:563, №481C,D). A. Bomhard (2018, II:574, №490; 563, №481; III:625, №529) has also reconstructed Proto-Nostratic archetypes: **k^her-* – “(vb.) *to gather, to collect; to take a handful, to pick, to pluck*”; **k^her-a* – “(n.) *collection, gathering, handful*”; **k^har-* (~**k^har-*) – “(vb.) *to twist, to turn, to bend, to wind; to tie (together), to bind*”; **k^har-a* – “(n.) *that which is tied or bound together: bunch, bundle; (adj.) bent, curved, crooked; tied, bound*”; **k^{wh}ir-* (~**k^{wh}er-*) – (vb.) **k^{wh}ir-* – “*to twist or twine together, to tie together, to bind, to fasten*”; (n.) **k^{wh}ir-a* – “*twist, tie, bundle, rope; the act of twisting or twinning together: work, craft, act, action*”.

¹⁸According to Th. Gamkrelidze and G. Machavariani’s theory (1965:366 ff., 146, 307 ff.), in later CK the frequency of occurrence of **e* and **a* is higher than that of **o*, which is very rare in affixal and root morphemes of CK origin and plays an insignificant role in the ablaut system. Th.

CK root {**k_ṛ-*} and suffixal {**-oj*} morphemes are correspondingly of C_Ṣ- and –VS structural types (comp. Gamkrelidze and Machavariani, 1965:203).

Based on the principle of monovocalism (comp. Gamkrelidze and Machavariani, 1965:80₃ ff., 341, 370) I conclude that the syllabic quality of –**r* in CK **k_ṛ-oj* occurs at the expense of the non-phonemic value of the reduced vocalic element that shows up between **k* and sonorant **r* elements. Depending on phonetic context in some Kartvelian dialects (mainly in west Kartvelian area – in Megrelian and Laz, and partially in Svan) the mentioned reduced vocalic element only lately acquired the form of full narrow o/u/i (>ə) vowels (comp. Gamkrelidze and Machavariani, 1965:235, 237, 238, 231) which reflect the oldest CK archetypes from the point of view of the quantity of syllables (comp. Gamkrelidze and Machavariani, 1965:143).

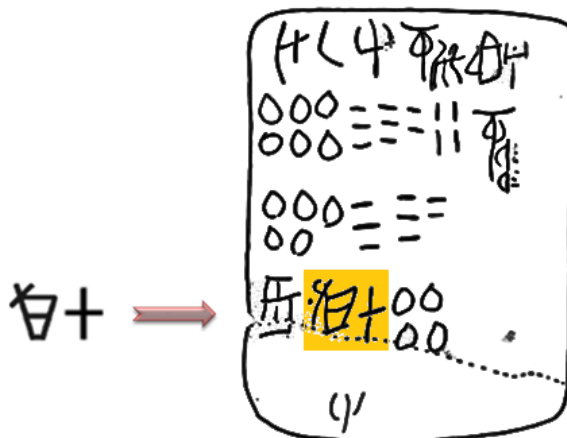
The reconstructed CK archetype **k_ṛ-oj* = **kur-oj* – “to tie, gather, pick up, collect” is presented as *ჰ+* [ku-ro] form in LA script. No o/i vocalic values are reflected here (comp. 2.1; Kvashilava, 2017a:70).

Reading the Sign-sequence *ჰ+* [ki-ro]

According to L. Godart and J.-P. Olivier (1976, I:2-3, 30-31, 56-57, 64-65, 70-71, 138-139, 150-153, 210-213) the sign-sequence *ჰ+* has been attested on the following clay tablets: HT 1 (HM 3), HT 15 (HM 16), HT 30 (HM 14), HT 34 (HM 22), HT 37 (HM 31), HT 88 (HM 1312), HT 94 (HM 1316), HT 123 (HM 1367+1371); these were found at Hagia Triada in Crete and were dated back to LM I B period (Godart and Olivier, 1976, I:xxi; 1985, V:83-86).

Two agricultural inscriptions have been chosen for my study (see Figure 3, 4):

Figure 3. *The Inscription on Clay Tablet HT 15 (HM 16). According to Godart and Olivier, 1976, I:30*



Gamkrelidze and G. Machavariani (1965:367, 43, 232) consider the phoneme */*o/* to be of later origin in the CK phonological system; it is mostly received from the complex **we/*wa*.

Figure 4. The Inscription on Side a of Clay Tablet HT 123 (HM 1367). According to Godart and Olivier, 1976, I:210



The LA script signs LA067 ∇ and LA002 \dagger are acknowledged to be identical to corresponding signs of LB and CS/LC, as shown in Table 3:

Table 3. According to Godart and Olivier, 1985, V:xxxix, xxviii; Raison and Pope, 1994:26

LA	∇ ∇ ∇ ki	\dagger ro
LB	∇ ∇ ∇ ki	\dagger ro
CS		\dagger lo

According to rule 5.2.2 of my algorithm the signs LA067 ∇ and LA002 \dagger are read as [ki] and [ro/*lo], which coincides with the phonological values of the corresponding LB signs (Chadwick, 1970:165), and the LA sequence of signs $\nabla\dagger$ is consequently read as [ki-ro/*ki-lo].

The meaning of $\nabla\dagger$ [ki-ro/*ki-lo]¹⁹ has been generally regarded to be “owed” (Younger, 2003:309₁₃); “owing”; “deficit” (SOS, 1976:91 / Pope, 1964; Duhoux,

¹⁹The meaning of the Mycenaean Greek LB $\nabla\dagger$ [o-pe-ro/*op^helos] (k/p, i/e) – “deficit” > Greek ὀφειλή – “owing”, “missing” (see also ὀφελος) is considered to be identical to LA $\nabla\dagger$ [ki-ro/*ki-lo] (comp. Ventris and Chadwick, 1973:36; Peruzzi, 1958:9; Chadwick and Baumbach, 1963:230-231; Facchetti, 2002:173, 173₂; Gordon, 1958:255; Nagy, 1963:202; Chadwick, 1970:121; Palmer, 1995:136₁₆; Jorro, 1999, II:34; Beekes, 2010, II:1132; I:xxvi, xxx).

2004:217; Schoep, 1999:208; comp. Facchetti, 2002:175); “*balance*” (Younger, 2003:309₁₃); *ki-re-(w)a = Old Greek χρέα, χρή, χρέος (Nagy, 1963: 204) < Indo-European (?) *g^hreh₁ – “*obligation; debt, fee, commitment, engagement*” (comp. Beekes, 2010, II:1648); CK *kel-/*kal-/*kl- – “*lack, shortage*” (Gordeziani, 2000:117); “*to decline, lessen*”; CK *kil- – “*defect*” (Gordeziani, 2007, II:188; Kvashilava, 2011:267; 2017a:67).

The sequence $\nabla+$ [ki-ro/*ki-lo] is connected by me to the CK archetype *kil-oj < *kil-w-ej/*kil-w-aj meaning “*to find fault, defect, deficit, subtract; to lessen*”.

*Reconstruction of the CK Archetype *kil-oj*

If to one-morpheme root – in this case {*kel-/*kal-} a normal grade suffixal morpheme, – such as {*-ew/*-aw} is added, then according to the principle of monovocalism, the normal vocalic grade of the root changes to the zero or reduced grade (comp. Gamkrelidze and Machavariani, 1965:107):

Normal grade root

*kel-/*kal-, *kel-/*kal-n-

Zero grade stem

*kl-/k_l-ew/-aw-, *kl-/k_l-ej/-aj-, *kl-/k_l-en/-an-, *kl-/k_l-eb/-ab-

These archetypes are of the phonemic structure of CK morphemes (comp. Gamkrelidze and Machavariani, 1965:227, 239):

*kel-/*kal-] ∈ CVS-; *kl-ew/-aw- ∈ CS-VS-; *k_l-ew/-aw- ∈ C_lS-VS-.

If the zero grade {*-Øw} (thematic) and normal grade {*-ej/*-aj} suffixal morphemes are added to one-morpheme root {*kel-}, then according to the principle of monovocalism, the normal vocalic grade of the root changes to the reduced vocalic grade²⁰ (comp. Gamkrelidze and Machavariani, 1965:226, 354):

*kil-w-ej/-aj-

The CK archetype *kil-w-ej/*kil-w-aj- is of CiS-S-VS- structural type.

Consequently, according to the principle of monovocalism, the inner and comparative analysis allows the reconstruction of CK archetypes:

²⁰The reduction grade that is characterized by *e > *i sonant on the normal grade, is formally equal to the zero variant of a morpheme (Gamkrelidze and Machavariani, 1965:308).

*kel-/*kal-;
 *kl-/k_l-eb/-ab-;
 *kl-/k_l-ew/-aw-;
 *kl-/k_l-ej/-aj-;
 *kl-/k_l-en/-an-;
 *kil-w-ej/-aj-.

Below the Kartvelian material connected to these archetypes is presented.

One-morpheme Root *kel-/*kal-/*kil-/*kl-/*k_l-

The CK root *kel-/*kal-/*kil-/*kl- (comp. Gordeziani, 2007, II:188) is attested in the following Georgian words:

- Georgian kil-v-a – “to find fault in smb or smth” (DGL, 1955, IV:1206); Georgian kil-i – “minor defect” (DGL, 1955, IV:1205); Georgian kl-eb-a – “lessen, make fewer” (DGL, 1955, IV:1244; comp. Abuladze, 1973:200; Klimov, 1998:89); Georgian da-kl-eb-a – “to decline, lessen” (DGL, 1953, III:464; Abuladze, 1973:111; Fähnrich, 2007:228); Georgian da-v-a-ke_l; da-v-a-ka_l (Khevsurian dialect) – “lessened” (Shanidze, 1984, I:309, 335; Gamkrelidze and Machavariani, 1965:106, 226, 265₁, 354); Georgian na-kl-i – (n.) “defect” (DGL, 1958, V:1311); Georgian na-kl-eb-i – “less, minor” (DGL, 1958, V:1312); Georgian m-kl-e (Pshavian dialect) – “less, not full”; (Khevsurian dialect) – “deformed”; (Tushetian dialect) – “disfigured (physically)” (Shanidze, 1984, I:363; comp. Klimov, 1998:85, 89); comp. Georgian m-kl-e (Pshavian dialect): Georgian mo-kl-e – “short, not long” (Gamkrelidze and Machavariani, 1965:106, 107, 166); Georgian mo-kl-eb-a – “to lessen” (DGL, 1958, V:766; comp. Abuladze, 1973:200).

CK *kel-/*kal-/*kil- root is reflected in Svan words:

- Svan at^h-ka_l-n-e (Lower Bal dialect), at^h-ka_l-in-e (Upper Bal dialect) – “(he) lessened smth” (comp. Topuria and Kaldani, 2000:222); Svan x-a-kl-i (Upper Bal, Lower Bal, Lentekhian and Lashkhian dialects) – “is less” (Topuria and Kaldani, 2000:44); Svan x-ä-kl-in-e (Upper Bal), x-ä-kl-in-e (Lower Bal dialect) – “makes less; lacks smth” (Topuria and Kaldani, 2000:222); Svan nä-kl-in-w (Lower Bal dialect) – “saved up; savings” (Topuria and Kaldani, 2000:1400); Svan kil (Lower Bal dialect) – “defect, fault” (Topuria and Kaldani, 2000:757; Fähnrich, 2007:228).

The following Laz and Megrelian words correspond to CK *kel-/*kil-/*k_l:

- Megrelian *ḳal-ip^h-u-a* – “empty” (Kajaia, 2002, II:103); “*lopping; to cut branches*” (Chukhua, 2000-2003:122); “*cut off*”;
- Megrelian *ḳil-i* (*ḳil-s/ḳir-s*)²¹, *ḳəl-i* (*ḳəl-s/ḳər-s*) – “*defect; fault*” (Kajaia, 2002, II:140; 2009, IV:277); “*minor defect*” (Kobalia, 2010:365);
- Megrelian *ḳil-eb-a* – “*to start being faulty*” (Kajaia, 2002, II:141);
- Megrelian *ḳil-ob-u-a* – “*defect, fault*” (Kajaia, 2002, II:142);
- Megrelian *ḳul-e* – “*short*” (Kobalia, 2010:375); *xe-ḳul-e* – “*mean*”; “*poor*” (comp. Kajaia, 2002, II:165); “*without a hand*” (Kobalia, 2010:721);
- Laz *m-ḳul-e* (Hopan dialect); *ḳul-e*²² (Atinian and Vits’e-Arkabian dialects) – “*short*” (Marr, 1910:159; comp. Gamkrelidze and Machavariani, 1965:106, 107).

The following Laz and Megrelian words correspond to CK **ḳl̥-d-aw#* > Zan **ḳl̥-d-ow#*²³ > **ḳr̥-d-ow#*:

- Megrelian *dā-ḳor-d-u* – “*got less*” (comp. Gamkrelidze and Machavariani, 1965:10, 106);
- Laz *gj-o-ḳor-d-u-n* – “*becomes less, diminishes*” (Asatiani, 2012:141).

Consequently, to the CK **ḳel-/ḳal-/ḳil-/ḳl̥-/ḳl̥*²⁴ (comp. Gamkrelidze and Machavariani, 1965:107, 226), Georgian *ḳel-/ḳal-/ḳil-/ḳl̥-*, Svan *ḳəl-/ḳil-/ḳl̥-*, Megrelian *ḳal-/ḳil-/ḳor-/ḳul-* and Laz *ḳor-/ḳul-* are connected (comp.

²¹Megrelian *-ir/-il* is the regular correspondence to CK **-il* (comp. Gamkrelidze and Machavariani, 1965:78, 79, 88, 91).

²²According to Th. Gamkrelidze and G. Machavariani (1965:107) CK **ḳl̥-ej* develops to Zan archetype **ḳl̥-aj*, the syllabic quality of **l̥* is lost in Laz and Megrelian, and *ḳul-e* (Laz) and *xe-ḳul-e* (Megrelian) forms occur (see position C₁V: Gamkrelidze, 1966:73). The CK suffix **-ej* is regularly corresponded by Zan **-aj* > Laz-Megrelian *-e* (Gamkrelidze and Machavariani, 1965:229, 230, 165).

²³Zan **l̥* changes to **r̥* between consonants (C–C) (Gamkrelidze and Machavariani, 1965:95).

²⁴To the CK **ḳel-/ḳal-/ḳil-/ḳl̥-/ḳl̥* archetype (“*to find fault; subtract lessen, cut off*”): Proto-Afro-Asiatic (Hamito-Semitic) **k’al-* – “*to take away, to remove, to deprive of; to decrease, to diminish, to reduce; to be or become reduced or diminished*” (Bomhard, 2018, II:540-541, №463A,B); Semitic **ḳal-/ḳil-* – “*be small*” (Orel and Stolbova, 1995:336). A. Bomhard (2018, II:540, №463; 492, №422; 612-614, №519, №520, №521) also reconstructed Proto-Nostratic archetypes: **k’al-* (~**k’əl-*) – (vb.) “*to take away, to remove, to deprive of; to decrease, to diminish, to reduce; to be or become reduced or diminished*”; **k’al-a* – (n.) “*littleness, small quantity, scarcity; few things; lack, want, poverty, deficiency, insufficiency*; (adj.) *little, scanty, sparse, meager, insufficient, lacking, short of, wanting, needy*”; **k^har-* (~**k^hər-*) – (vb.) **k^har-* “*to cut, to cut into, to cut off*”; (n.) **k^har-a* – “*cut, incision*”; Derivative: (n.) **k^har-a* – “*skin, hide; bark, rind*”; **k^{wh}ar-* (~**k^{wh}ər-*) – (vb.) **k^{wh}ar-* “*to cut*”; (n.) **k^{wh}ar-a* – “*piece cut off; knife*”; Derivatives: (vb.) **k^{wh}ar-* – “*to cut a groove, to hollow out, to dig*”; (n.) **k^{wh}ar-a* – “*cut, hole, hollow, digging, excavation, pit, groove, trench*”; (vb.) **k^{wh}ar-* – “*to cut short, to reduce, to decrease, to diminish, to lessen*”; (n.) **k^{wh}ar-a* – “*shortness*”; (adj.) “*short*”; **k^{wh}ar-* (~**k^{wh}ər-*) – (vb.) **k^{wh}ar-* “*to cut a groove, to hollow out, to dig*”; (n.) **k^{wh}ar-a* – “*cut, hole, hollow, digging, excavation, pit, groove, trench*”; Derivative of: (vb.) **k^{wh}ar-* – “*to cut*”; (n.) **k^{wh}ar-a* – “*piece cut off; knife*”; **k^{wh}ar-* (~**k^{wh}ər-*) – (vb.) **k^{wh}ar-* “*to cut short, to reduce, to decrease, to diminish, to lessen*”; (n.) **k^{wh}ar-a* – “*shortness*”; (adj.) “*short*”; Derivative of: (vb.) **k^{wh}ar-* – “*to cut*”; (n.) **k^{wh}ar-a* – “*piece cut off; knife*”.

Gamkrelidze, 1966:73; Shanidze, 1973, I:528; Klimov, 1998:85, 89; Fähnrich, 2007:228; Gamkrelidze and Machavariani, 1965:78, 80, 81).

The Kartvelian material presented above shows that the meaning of the CK archetype *k̄il-w-ej/*k̄il-w-aj is: “*fault, defect; shortage; to subtract; lessen, cut off*”.

According to the phonetic process the CK *-we/*-wa > *-o, CK *k̄il-w-ej/*k̄il-w-aj changes to *k̄il-oj. This archetype is CiS-VS.

The reconstructed CK *k̄il-oj/*k̄ir-oj,²⁵ meaning “(n.) *fault, defect; to subtract; lessen*” is presented in LA inscriptions as 𐌕𐌖𐌗 [ki-ro/*ki-lo].

Conclusions

1. Above the LA clay tablets with sign-sequences 𐌕𐌖𐌗 and 𐌕𐌖𐌗 are presented. The tablets were found at Hagia Triada, Phaistos (?) and Zakros in Crete; they are dated back to LM IB period.

2. Sign-sequences 𐌕𐌖𐌗 and 𐌕𐌖𐌗 are correspondently read as ku-ro and ki-ro/*ki-lo.

3. Semantic interpretation of ku-ro/*ku-roj and ki-ro/*k̄ir-oj/*ki-loj forms are presented as CK archetypes:

*kur-oj = *k̄r-oj – “*to bind pick up, gather, collect*”;

*k̄ir-oj/*k̄il-oj – “(n.) *fault, defect, subtract, lessen, diminish, cut off*”.

4. {*kur- = *k̄r-} and {*k̄ir-/*k̄il-} root morphemes are of CVS- structure; {*-oj} suffixal morpheme is of -VS structure. These phonemic structures are canonical forms of CK morphemes.

5. The principle of monovocalism created by Th. Gamkrelidze and G. Machavariani (1965) explains the following regular changes:

CK *kur-oj = *k̄r-oj < *k̄r-w-ej/*k̄r-w-aj;

CK *k̄ir-oj/*k̄il-oj < *k̄ir-w-ej/*k̄ir-w-aj/*k̄il-w-ej/*k̄il-w-aj.

These archetypes display regular phonological and semantic relations to Kartvelian materials.

6. The study of Kartvelian material confirms the reliability of interpreting the LA script sign-sequences 𐌕𐌖𐌗 [ku-ro] and 𐌕𐌖𐌗 [ki-ro/*ki-lo] the CK stems.

²⁵ CK nonsyllabic *l in V–V position (comp. Gamkrelidze and Machavariani, 1965:141) and syllabic *l in the position after a sonant could have been substituted by CK *r (comp. Gamkrelidze and Machavariani, 1965:85).

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