A TYPOLOGY OF COMMON KARTVELIAN

0.1. The Kartvelian (South Caucasian) languages form a group of closely related dialects consisting of Georgian (with an old literary tradition going back to the 5th century A.D.), Megrelian, Chan (or Laz), and Svan.[1]

0.2. The Kartvelian languages may be viewed as descendants of a common language that existed in the past, of which different transformations yielded historically attested cognate linguistic systems. The ancestral common language (Common Kartvelian) is not recorded in documents. We arrive at it by special methods of reconstruction.

Determining a set of correspondences on different structural levels between related languages makes it possible to reconstruct original linguistic patterns, which served as a basis to the historically attested language systems. Our reconstruction of a common system is theoretical and of necessity incomplete and partial, in that it lacks quite a number of structurally relevant features which are beyond the scope of the derived system. We arrive only at an overall picture of a linguistic system which shows us, in a first approximation, the functioning of the reconstructed structural elements and their interrelations.

A postulated form of the reconstructed system represents, then, a formula from which all the historically attested corresponding forms may be derived on the assumption of a set of typologically plausible and consistent transformations. Such transformations may be characterized as 'vertical transformations' or 'diachronic transformations' (in contradistinction to the 'horizontal transformations' which generate new constructions within the same system), as a result of which the common linguistic system yields different related languages in the course of time. A description of these transformations gives an approximate picture of the formation and prehistoric developments of the groups of cognate dialects, thus clarifying the diachronic relationships among them.

0.3. We seek to define the Common Kartvelian (CK) phonemic system in terms of structural principles. The reconstructed CK phonemic system, arrived at with the aid of functional criteria, distinguishes between different classes of phonemes, which form a determined set of paradigmatic oppositions. Different transformations of the original system yield the phonological systems of the historical Kartvelian languages.

0.4. Phonemic units may be classified in a linguistic system according to different structural criteria. Phonemic units ordered according to a given principle form one class, characterized by specific structural peculiarities and opposed to others in particular features. Using the criterion of syllabicity, we arrive at a division of the whole set of phonemic units of a language into three different subsets or classes: (1) a class of phonemes functioning syntagmatically as syl-

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[1] The theory of which this article presents the essential conclusions has been set forth in Th. V. Gamkrelidze and G. I. Machavariani, *The system of sonants and ablaut in Kartvelian languages*, Tbilisi, 1965 (in Georgian and Russian).

Consonants:

b	p		d	t		$\mathfrak{z}$	c		$\mathfrak{z}_1$	c_1		$\check{\mathfrak{z}}$	$\check{c}$		g	k		(g')		q	
	$\dot{p}$			$\dot{t}$			$\dot{c}$			$\dot{c}_1$			$\dot{\check{c}}$			$\dot{k}$				$\dot{q}$	
			z	s			z_1	s_1		($\check{z}$)	$\check{s}$		γ	x						h

Vowels: e ĕ a ā o ō

Sonants: j w r l m n

TABLE 1. The CK phonemic system

Each triplet of stops and affricates consists of a voiced ($b, d, \mathfrak{z} \ldots$), a voiceless aspirate ($p, t, c \ldots$), and a glottalized ($\dot{p}, \dot{t}, \dot{c} \ldots$) phoneme. Affricates and fricatives distinguish a front series /$\mathfrak{z}$ c ç z s/, a back series /$\check{\mathfrak{z}}$ č ç̌ ($\check{z}$) š/, and a mid series /$\mathfrak{z}_1$ c_1 $ç_1$ z_1 s_1/. The latter subsequently shifted to the back series (š-sibilants) in the Western dialectal area (Megrelo-Chan and Svan), but merged with the front series (s-sibilants) in the Eastern area (Georgian and its dialects).

labic elements only (i.e. as syllabics in all phonetic environments); (2) a class of phonemes functioning syntagmatically as nonsyllabics only (i.e. as nonsyllabics in all phonetic environments); and (3) a class of phonemes functioning both as syllabics and nonsyllabics according to their syntagmatic positions (i.e. as syllabics in some phonetic environments, as nonsyllabics in others).

Phonemic units of the first class are called VOWELS proper; those of the second class are called CONSONANTS proper; those of the third class are called SONANTS (or RESONANTS). In the phonological system sonants form a special class of phonemes, characterized by specific distributional peculiarities in contrast to vowels and consonants proper.

0.5. Such a threefold division of the phoneme inventory may be assumed or the CK phonemic system. The system presented in Table 1 is that of the stage of Common Kartvelian immediately before the division into dialects.

0.6. The postulation of a class of sonants in the CK phonemic system is based on structural analysis of the distributional behavior of the segments [i] and [j], [u] and [w], and [r l m n] in the historical Kartvelian dialects, and on internal and comparative reconstruction of their ancient distributional patterns.

The complementary distribution between the segments [i] and [j], [u] and [w] at a stage of CK immediately before the division into dialects gives a basis to assign them to unit phonemes /*j/ and /*w/, each with two positional allophones, syllabic and nonsyllabic.

The same applies to the ancient phonemic status of the sonorants [r l m n], which function in historical Kartvelian dialects as nonsyllabics only and must be assigned therefore to the class of consonants proper. A comparative analysis of the Kartvelian sonorants, however, makes it clear that the nonuniqueness of the correspondences is due to the distributional peculiarities of their CK prototypes. Allophonic variations in the prototypes of these phonemes at the CK chronological level resulted in a variety of reflexes in the historical Kartvelian dialects. By analysing these reflexes and reducing the complex scheme of correspondences attested in the historical dialects to an original system, with allophonic variations of the common phonemes, we arrive at the ancient distribu-

tional patterns of the CK prototypes of /r l m n/. These prototypes are char-
acterized by two positional allophones each, syllabic and nonsyllabic in mutually
exclusive environments.

Comparing the distributional patterns of /*r *l *m *n/ with those of /*w/
and /*j/, we find close structural similarity. The allophonic behavior of these
phonemes is determined syntagmatically by their phonetic environments, made
up of segmental or suprasegmental units and pause. Each of the allophones of a
sonant occurs only in definable phonetic environments and serves as its syllabic
or nonsyllabic manifestation. The distribution of a syllabic allophone is comple-
mentary to that of its nonsyllabic counterpart, while the distributions of differ-
ent syllabics or nonsyllabics overlap. Choice of the two positional variants is
determined by their syntagmatic characteristics.

0.7. The sonants are syllabic in four positions.

(1) After a consonant and before pause, $C\mathring{S}\#$:[2] *daq̇u 'elbow' (Chan duq̇u),
*ʒacxu 'lime-tree' (Chan ducxu), *woṗḷ 'sweat' (Megr. upu; Georg. opl-), *ċq̇inṭḷ
'immature, unripe' (Megr. ċq̇inṭu; Georg. ċq̇inṭl-).

(2) In stem-final position after a consonant: *ʒₗaɣḷ- 'dog' (Megr. ʒoɣor-;
Svan žeɣ⌐w⌐; Georg. ʒaɣl-), *wašḷ- 'apple' (Megr. uškur-; Chan oškur-; Svan
usgw; Georg. vašl-), *ʒₗecₗxḷ- 'fire' (Megr. dačxir-; Chan dačxur-; Georg. cecxl-),
*cₗlemṛ- 'tear' (Megr. -Chan čilamur-; Svan kim⌐r⌐; Georg. creml-).

(3) Between consonants, $C\mathring{S}C$: *ḳud- 'tail' (Georg. ḳud-; Megr. ḳud-el-),
*ḳḷde- 'rock' (Megr. ḳirde; Svan ḳoʒ; Georg. ḳlde), *gṛʒ- 'long' (Megr. girʒe;
Chan gunʒe, ginʒe; Georg. grʒel-), *me-cₗṛx-al- 'swallow' (Megr. ma-čirx-ol-;
Georg. me-rcx-al-), *q̇ṇd- 'beans' (Svan ɣed-er; Georg. qnd-ur-).

It is easy to see that the reflexes of /*r *l *n/ between consonants are similar
to their reflexes in root-final position after consonants.

Georgian forms with sonorants /r l n/ corresponding to Megrelo-Chan and
Svan forms with vocalic elements are accounted for on the assumption of de-
vocalized syllabic [*ḷ *ṛ *ṇ] in unstressed position. The same elements under
stress yield Georgian reflexes analogous to those assumed for Megrelo-Chan and
Svan: cf. *sₗaxḷ-d 'home' (Gk. 'oíkade') > Georg. saxid, saxed; ɣṛʒ- 'tusk' >
Georg. ɣoʒ- (as against Georg. ɣrʒ-ol- 'id.' from *ɣrʒ-ól-); *bṛḳ-il- 'fetters'
> Georg. borḳil- (as against Georg. brḳol- 'handicap' from *brḳ-ól-); :m-bṛʒₗ-ol-
'fighter', 'adversary' > Georg. m-borʒ-al- (as against Georg. m-brʒ-ol- from
*m̥-brʒₗ-ól- 'id.'), etc.

(4) After pause and before a consonant, $\#\mathring{S}C$: *ḷb-il- 'soft' (Megr. lib-u; Chan
lob- 'make soft'; Georg. lb-il-), *ḷš-n- 'kiss' (Georg. lošn-), *m̥zₗe- 'sun' (Svan
miž, məž; Georg. mze), *ṇq̇-iw-er- 'fertile' (Georg. noq̇ier-).

The sonants are nonsyllabic in five positions.

(1) After pause and before a vowel, $\#SV$: *wašl- 'apple' (Georg. vašl-; Svan
wisgw), *jor- 'two' (Svan jor-; Megr. žir-; Chan žur-; Georg. or-), *matl- 'worm'
(Georg. matl-; Megr.-Chan munṭur-; Svan məṭ).

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[2] In the following formulas the symbol C stands for any consonant, V for any vowel;
$\mathring{S}$ and S for syllabic and nonsyllabic sonants respectively; and $\#$ for pause.

Positions		C–#[1]			C–C		
CK	Megr.-Chan	Svan	Georg.		Megr.-Chan	Svan	Georg.
*ḷ	or, ur, ir, u[2]	w[3]	ḷ[4]		ir	o	ḷ[4]
*r̥	or, ur, ir	r[4]	r[4]		or, u˹r˺, i˹r˺	i	r, o˹r˺[5]
*m̥	–	–	–		–	–	–
*n̥	–	–	–		–	e	n[4]

TABLE 2. Reflexes of

[1] The formula C–# denotes absolute final position after a consonant, as well as stem-final position before inflectional endings.

[2] In absolute final position; cf. Megr. *upu* < *wopḷ# 'sweat'.

[3] From *u# > w# as a result of devocalization in unstressed position.

[4] As a result of devocalization in unstressed position.

(2) After a vowel and before pause, VS#: *qan- 'plough' (Georg. *qan-*; Svan *qan-*), *mc̣₁er- 'insect' (Georg. *mc̣er-*; Svan *mēr*).

(3) Between a vowel and a consonant, VSC: *ert- 'one' (Georg. *ert-*; Megr.-Chan *art-*), *(g')anc̣₁ḷ- 'elder' (Georg. *anc̣l-*; Megr.-Chan *inc̣ir-*; Svan *gänc̣w*).

(4) Between vowels, VSV: *nena- 'tongue' (Georg. *ena*; Megr. *nina*; Chan *nena*; Svan *nin*), *γame- 'night' (Georg. *γame*; Megr. *γuma*; Chan *γoma*).

(5) In the position between a consonant and a vowel (C–V) we must reconstruct for the Western dialectal area (Zan[3] and Svan) syllabic allophones of the sonants, while for the Eastern area (Georgian and its dialects) we assume nonsyllabics (or syllabics with subsequent conversion, due to devocalization, into the corresponding nonsyllabics; cf. the reflexes of syllabics in Georgian in other positions): *m̥šue- ‖ *mšwe- 'son' (Megr. *skua*, Georg. *-mšo*), *txḷe- ‖ *txle- 'lees' (Megr. *txolo*; Chan *txole*; Georg. *txle*), *c̣₁nex- ‖ *c̣nex- 'press' (Chan *c̣inax-*; Georg. *c̣nex-*), *pṛen- ‖ *pren- 'flight' (Megr. *purinua*; Georg. *prena*), *c₁xṛa- ‖ *c₁xra- 'nine' (Megr.-Chan *čxoro*; Svan *čxara*; Georg. *cxra*), *qṃel- ‖ *qmel- 'dry' (Megr.-Chan *xomula*; Georg. *qmel-*), *ʒ₁m̥a- ‖ *ʒ₁ma- 'brother' (Megr. *ʒima*; Chan *ʒuma*; Svan *ʒum-il*, *ʒim-il*, *ʒəm-il*; Georg. *ʒma*), *km̥ar- ‖ *kmar- 'husband' (Megr. *komonʒ-*; Chan *komoʒ-*; Georg. *kmar-*).

0.8. When two sonants are in juxtaposition, one of them is syllabic, the other nonsyllabic. The choice of the allophone is determined by the character of the sonant and its surrounding. Thus the sequence /#rwV/ is realized as [#r̥wV] and [#ruV] indiscriminately; cf. /*rwa/ 'eight' > *r̥wa (Chan *orvo*, *ovro*; Svan *ara*; Georg. *rva*) and *rua (Megr. *ruo*, *bruo*). /Cw/ before /*r *l *m *n/ is realized as [Cu], while the following /*r *l *m *n/ are nonsyllabic; cf. *q̇wer- 'testiculus' (Georg. *q̇wer-*; Megr.-Chan *q̇vaʒ-*) as against *q̇ur- 'id.' (Svan *q̇ur-nä-j*); *s₁w-a 'he drank' (Georg. *sw-a*) as against *s₁u-m-a 'drinking' (Megr. *šuma*).

The same sequence /Cw/ before /*j/ is realized with nonsyllabic [w], while the /*j/ is syllabic: *daq̇u 'elbow' (Chan *duq̇u*), but *daq̇w-i nom. sg. (Georg. *i-daq̇w-i* 'elbow'); *ʒacxu 'lime-tree' (Chan *ducxu*), but *ʒacxw-i nom. sg. (Georg. *cacxw-i*).

From the analysis of the distributional patterns of the CK sonants we infer

[3] By the term Zan I mean the ancestral language of which Megrelian and Chan are closely related descendants, i.e. Common Megrelo-Chan.

————C–V————			————#–C————		
Megr.-Chan	Svan	Georg.[6]	Megr.-Chan	Svan	Georg.
ol, ul	–	/	li, lo	–	l[4], lo[5]
or, ur, ir	ar	/	or	ar	r[4]
om, um, im	um, əm, im	/	ø, m	əm, mə, mi	m[4]
un, in	–	/	–	–	no[6]

the CK syllabic sonants

[5] In the position under stress.

[6] In that part of the CK dialect area continued by Georgian, we assume non-syllabic allophones of the sonants in the position *C–V*, in contradistinction to the Western dialectal area (Zan and Svan), where in the same position the corresponding syllabics are reconstructed.

that with respect to the positional relations of the sonants, a consonantal element *C* is structurally equivalent to pause #: #–*C*, *C*–# ≡ *C*–*C*.

0.9. The reflexes of the syllabic allophones of CK sonants in the historical dialects are presented in Table 2.

0.10. The allophonic variations of the CK sonants and their distribution at the stage of Common Kartvelian immediately before its division into dialects are reconstructed on the evidence of the behavior of sonorants in the historical Kartvelian languages. The distributional patterns were obscured by later developments and phonetic changes of the syllabic allophones of sonants, yielding in Western dialects, as a result of vocalization, sequences of vowel plus corresponding sonorant in consonant function (cf. similar developments of syllabic sonants in the Indo-European dialects).

The sonants /*w/ and /*j/, each with its two allophones, split in the historical dialects into two independent phonemic units: /w/ and /u/, /j/ and /i/, functioning as consonants and vowels respectively. The same is true of the syllabic allophones of /*r *l *m *n/, which split into a vocalic and a consonantal component. These processes led in the historical Kartvelian dialects to the elimination of the class of sonants and to an enrichment of the classes of consonants and vowels proper by new phonemic units.

1.1. The allophonic variations of the sonants were closely connected in the CK linguistic system with the mechanism of morphophonemic vowel alternation. The ablaut variations of vocalic phonemes determined CK structure as a whole and were used, along with affixation, to form different grammatical and lexical categories. Combinations of morphemes into complex sequences obeyed definite rules of vowel gradation.

For example, the base of the transitive verbal form *dr-ek̞- 'bend' is characterized by the zero-grade allomorph of the root morpheme compounded with the full grade of the suffix *-ek̞, while the corresponding intransitive base *der-k̞- 'bend, stoop' represents the full-grade allomorph of the root and zero grade of the suffix.

Such variations of zero and full grades of the root and suffix form structurally well-defined patterns of alternating verbal bases:

Transitive (present tense): *dr-eḳ- 'bend' (Georg. 1st sg. v-dreḳ, masdar drek̲-a 'bending'); Megr. dirak̲-a 'id.'); — *šr-eṭ- 'extinguish' (Georg. 1st sg. v-šreṭ, masd. šreṭ-a; Megr. masd. škiraṭ-a); — *ḳr-eb- 'collect' (Georg. 1st sg. v-ḳreb, masd. ḳreb-a).

Intransitive (aorist): *der-ḳ- 'bend, stoop' (Georg. 1st sg. v-derḳ, 2d sg. s-derḳ); —*šer-ṭ- 'go out' (Georg. 1st sg. v-šerṭ, 2d sg. h-šerṭ); — *ḳer-b- 'gather' (Georg. 1st sg. v-ḳerb, 2d sg. h-ḳerb).

Further addition of a full-grade suffix to the base causes replacement of a preceding full-grade morpheme by its zero or reduced grade. Thus, the transitive base *dr-eḳ- has the aorist *dr-iḳ-e (Georg. 1st sg. v-driḳ-e, 2d sg. s-driḳ-e, 3d sg. driḳ-a; Megr. 2d sg. do-diriḳ-u), with the first suffixal morpheme manifested in its reduced grade before the full-grade suffix *-e; the intransitive base *der-ḳ- has the 3d sg. aor. *dr̥-ḳ-a (Georg. drḳ-a, Megr. dirḳ-u, Chan druḳ-u) before the full-grade formant of the 3d sg., *-a.

The allomorphic interchange of ablaut grades in the root and suffixal morphemes within a paradigm, as illustrated above, may be viewed as realizing the syntagmatic principle of monovocality, which governs the combination of morphemes into words. A polymorphemic form allows of only one morpheme in the full grade; other morphemes in the syntagmatic sequence are represented by their zero- and/or reduced-grade variants. In conformity with this principle, the addition of a full-grade formant to the base causes replacement of one of the preceding allomorphs by the zero or reduced grade.

In a paradigmatic unit, changes of phonetic environment due to allomorphic alternations produce phonetic positions in which the sonants were actualized as syllabics or nonsyllabics. For example, in the form *der-ḳ- the sonant /*r/ was nonsyllabic (position V–C), while in the form with zero grade of the root and the derivational suffix (3d sg. aor. *dr̥-ḳ-a) the same phoneme was syllabic (position C–C).

1.2. The ablaut patterns adduced above characterize not only the limited class of bimorphemic verbal bases illustrated by the cited examples. The delimitation of the conjugation types of verbs is based mainly on structural differences in ablaut models which determine the whole morphophonemic system of Common Kartvelian and account for the behavior of the root and suffixal morphemes in a syntagmatic sequence. The principle of monovocality governs the machinery of derivation and inflection and underlies the rules of combining morphemes into words. Typical examples of these patterns are verb forms with thematic present and athematic aorist:

*ḳar- : *ḳr- 'bind'				*čer- : *čr- 'cut'		
Present:	1st sg.	*w-ḳr-aw		Present:	1st sg.	*w-čr-ej
	2d sg.	*h-ḳr-aw			2d sg.	*h-čr-ej
	3d sg.	*ḳr-aw-s			3d sg.	*čr-ej-s
Aorist:	1st sg.	*w-ḳar		Aorist:	1st sg.	*w-čer
	2d sg.	*h-ḳar			2d sg.	*h-čer
	3d sg.	*ḳr-a			3d sg.	*čr-a

		*$\underset{.}{t}ep$- : *$\underset{.}{t}p$- 'get warm'			*$\check{s}wer$- : *$\check{s}ur$- 'get dry'
Present:	1st sg.	*w-$\underset{.}{t}p$-eC-i	Present:	1st sg.	*w-$\check{s}ur$-eC-i
	2d sg.	*h-$\underset{.}{t}p$-eC-i		2d sg.	*h-$\check{s}ur$-eC-i
	3d sg.	*$\underset{.}{t}p$-eC-i-s		3d sg.	*$\check{s}ur$-eC-i-s
Aorist:	1st sg.	*w-$\underset{.}{t}ep$	Aorist:	1st sg.	*w-$\check{s}wer$
	2d sg.	*h-$\underset{.}{t}ep$		2d sg.	*h-$\check{s}wer$
	3d sg.	*$\underset{.}{t}p$-a		3d sg.	*$\check{s}ur$-a

1.3. These ablaut patterns are maintained, with slight modifications, in Old Georgian and partly (in the aorist forms) in Svan. In the historical Zan dialects the original system of ablaut variations broke down as the result of a complex series of analogic remodelings and extension of the zero grade of the 3d sg. to the whole paradigm. The verb paradigms in historical Zan dialects came to be formed exclusively on the root pattern of the 3d sg. aorist, eliminating the characteristic CK interchange of the full-grade and zero grade-variants of the verb root: cf. Chan *ḳor*-, Megr. *ḳir*- 'bind' (from *$ḳṛ$-) as against Georg. *ḳar*- : *ḳr*-; Chan *čḳor*-, Megr. *čḳir*- 'cut' (from *$čṛ$-) as against Georg. *čer*- : *čr*-; Chan *sḳur*-, Megr. *sḳir*- 'get dry' (from *$šur$-) as against Georg. *šwer*- : *šwr*- 'get tired'; Chan *ṭub*-, Megr. *ṭib*- 'get warm' (from *$ṭb$-, with a 'cluster-alleviating' vowel) as against Georg. *ṭep*- : *ṭp*-.

1.4. Along with full, zero, and reduced grades, the morphophonemic system of CK requires a lengthened grade (Dehnstufe) to account for a number of aberrant verb forms in the historical Kartvelian languages; these forms do not conform to the syntagmatic rules of monovocality, and consequently do not fit into the general morphophonemic pattern. Such a deviation is exemplified by a class of transitive verbs with thematic aorist; cf. Georg. 1st sg. present (first column) and aorist (second column):

$$v\text{-}çer \text{ 'I write'} \quad : v\text{-}çer\text{-}e$$
$$v\text{-}ḳwet \text{ 'I dissect'} \quad : v\text{-}ḳwet\text{-}e$$
$$v\text{-}ber\text{-}\ulcorner av\urcorner \text{ 'I blow'} \quad : v\text{-}ber\text{-}e$$
$$v\text{-}cl\text{-}i \text{ 'I empty'} \quad : v\text{-}cal\text{-}e$$

The antiquity of this pattern is evidenced by regular correspondences of these forms in the Zan dialects; cf. 3d sg. aor. Georg. $\ulcorner da\urcorner$-*çer*-*a* 'he wrote' : Megr.-Chan $\ulcorner do\urcorner$-*čar*-*u*, Georg. $\ulcorner gan\urcorner$-*ḳwet*-*a* 'he dissected' : Megr. $\ulcorner go\urcorner$-*ḳvat*-*u*, Georg. $\ulcorner ga\urcorner$-*cal*-*a* 'he emptied' : Megr. $\ulcorner go\urcorner$-*čol*-*u*.

This aberrant evidence is plausibly accounted for on the assumption of a lengthened ablaut grade in the aorist forms of this verb class. The Georgian aorist forms listed above (and the corresponding Zan verb forms) are easily derived from CK prototypes with lengthened root vowel:

Present	*w-$ç_1er$	Aorist	*w-$ç_1\bar{e}r$-e
	*w-$ḳwet$		*w-$ḳw\bar{e}t$-e
	*w-ber		*w-$b\bar{e}r$-e
	*w-c_1l-ej		*w-$c_1\bar{a}l$-e

The postulation of a CK lengthened grade explains aberrant verb forms. The syntagmatic principle of monovocality is now, in view of the lengthened grade, reformulated as follows: A polymorphemic form allows of only one morpheme in the normal grade (i.e. in the ablaut grade with a short vowel).

1.5. The lengthened grade set up in the CK morphophonemic system on the internal evidence of Georgian is supported by the comparative data of Svan, which actually preserves long vowels in verb forms corresponding to Georgian and Zan units with theoretically postulated vocalic length; cf. Georg. *v-ber-e* 'I blew' as against Svan *li-bēl-e* 'to blow'. Svan is the only Kartvelian language which has maintained, although in modified shape, the CK interchange of vocalic quantities.

The other historical dialects lost the vocalic quantity that served in CK ablaut patterns as a means of delimiting different structures.

1.6. The system of CK ablaut variations presented above was characteristic also of nominal bases. In the nominal system an especially widespread type of paradigmatic alternation was the interchange of normal- and zero-grade allomorphs conditioned by the inflexional endings: **mḳerd-* : **mḳr̥d-* 'breast'; **cwar-* : **cur-* 'dew'; **ǯwar-* : **ǯur-* 'shaft'. The alternating nominal bases were preserved in Old Georgian (cf. *mḳerd-* : gen. sg. *mḳrd-isa*; *cwar-* : gen. sg. *cwr-isa*; *ǯvar-* : gen. sg. *ǯvr-isa* 'cross'). In other dialects one of the ablauting forms spread to the whole paradigm, eliminating the original interchange of paradigmatic units; cf. Svan *muč̣od* 'breast', Megr. *ḳidir-* < **ḳird-* (both from the zero grade **mḳr̥d-*); Chan *mzguǯ-*, Megr. *ǯgunǯg-* 'shaft' (from the zero grade **ǯur-i*); Megr. *cunǯ-* 'dew' (from **cur-i*).

Extension of one of the allomorphs to the whole nominal paradigm is characteristic also, in certain cases, for Georgian; cf. the zero-grade forms Georg. *ḳud-* 'tail' (Megr.-Chan *ḳud-el-*) and *xorx-* 'throat' (Megr.-Chan *xurx-*) as against Svan normal grade *ha-ḳwäd* 'tail' and *qarq* 'throat', which must be traced back to CK ablauting forms **ḳwad-* : **ḳud-* and **qarq-* : **qr̥q-*.

Analogic extension of zero-grade variants was especially prominent in the Zan dialects. Here the nominal and verbal forms are based entirely on CK structures with zero vocalism.

The CK ablaut patterns were better maintained in Old Georgian. It is chiefly on Georgian evidence that we are in a position to reconstruct the CK linguistic model with its ablaut mechanism, and to obtain a general picture of the formation and development of verbal and nominal structures in the historically attested Kartvelian dialects.

2.1. An analysis of verbal and nominal bases in Kartvelian languages, as well as the internal and comparative reconstruction of ancient Kartvelian forms makes it possible to present the general features of the CK structural patterns which determined the shape of the radical and suffixal morphemes and the rules of their syntagmatic combinations into complex sequences.

Structural principles underlying the formation of verbal and nominal bases in the Kartvelian languages constitute the theory of the CK root.

2.2. The main (statistically prevalent) canonical form of the CK root morpheme is of the shape *CVC-*, where *C* may be replaced by *S* (sonant in its non-

syllabic function). We thus obtain the following phoneme combinations: CVC-, CVS-, SVC-, and SVS-, where V may take one of the three values *e, *a, or *o.

CVC-: *tes- 'seed' (Georg. *tes-l-*, Megr.-Chan *tas-*)
         *$ṭep$- 'warm' (Georg. 1st sg. aor. med. ⌐gan⌐-v-$ṭep$)
         *$ḳac_1$- 'man' (Georg. *ḳac-*, Megr. *ḳoč-*, Svan *čäš* 'husband')
CVS-: *ber- 'blow' (Georg. 3d sg. pres. *u-ber-*⌐av⌐-s)
         *ban- 'wash' (Georg. 3d sg. pres. *i-ban-s*)
         *c_1ol- 'wife' (Georg. *col-*, Megr.-Chan *čil-*, Svan *čoš-* 'coitus')
SVC-: *wed- 'go' (Georg. 2d sg. aor. ⌐$çar$⌐-x-wed)
         *wac_1- 'ram' (Georg. *vac-*, Megr. *oč-*, Svan *γwaš*)
SVS-: *wal- 'walk' (Georg. 3d sg. pres. *val-s*)
         *jor- 'two' (Georg. *or-*, Megr. *žir-*, Chan *žur-*, Svan *jor-*).

A special type of root structure is presented by CK forms with a so-called introvertive harmonic consonant cluster instead of a simple consonant or sonant. Such clusters are viewed in the root structure as homogeneous units functionally identical with a simple consonant.[4] In the root structure the symbol C covers such clusters too.

The root is subject, with respect to harmonic consonant clusters, to the limitation that only one cluster of this type appears in any one form:

*$c_1q̇al$- 'mercy' (Georg. *c̣q̇al-ob-a*, Megr. *č̣q̇ol-op-u-a*)
*rec_1x- 'wash' (Georg. 1st sg. pres. *v-recx-*⌐av⌐)

A functional unit of root structure is represented also by clusters of the type Cw—a single consonant or harmonic cluster plus w. Only one such cluster is allowed in the root:

*$šwer$- 'get tired' (Georg. 1st sg. aor. ⌐da⌐-v-$šwer$)
*$q̇wer$- 'testiculus' (Georg. *q̇wer-*, Chan *q̇waž-*)
*$leγw$- ‖ *$laγw$- 'fig' (Georg. *leγw-*, Megr.-Chan *luγ-*).

2.3. The suffixal morpheme is of the pattern -VC or -VS.

-VC: *-ed, *-et, *-$eṭ$, *-eb, *-$eš$, etc.
-VS: *-el, *-er, *-$ėm$, *-en, *-ew, *-ej.

The variable V may take the value *a, as well as the value *e. The vowel *o in suffixal morphemes is very rare, and may be interpreted as a result of contraction of *e or *a with preceding *w.

A small group of suffixal morphemes is characterized by the structure -V (univocalic suffixes). This pattern may be viewed as a variant of the structure -VC where the symbol C takes the value of zero.

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[4] Introvertive harmonic clusters are consonant sequences in which a nonvelar voiced, voiceless (aspirated), or glottalized stop or affricate is followed by a homogeneous velar consonant. The following are introvertive harmonic clusters:

$bγ$ $dγ$ $ʒγ$ $ʒ_1γ$ $ǯγ$
px tx cx c_1x $čx$
$ṗq̇$ $ṭq̇$ $c̣q̇$ $c̣_1q̇$ $č̣q̇$

2.4. Ablaut alternation of vowels represents one of the main morphophonemic characteristics of CK word forms. Each Kartvelian morpheme manifests itself in the shape of different allomorphs according to ablaut grades. Allomorphs of a Kartvelian morpheme constitute a group of morphemic variants that distinguish, in different morphologic categories, forms with and without a vowel. There are, that is, allomorphs in full or zero grade. Full grade implies both normal grade (i.e. a grade with a short vowel) and lengthened grade (i.e. a grade with a long vowel). Beside zero grade, there is a reduced grade characterized by the sonant [*i] (resulting from the apophony of the normal grade: $*e \rightarrow *i$) and identified formally with zero (absence of a vowel).

The ablaut variations of morphemes which motivate allomorphic alternation within one paradigm (in word inflection and word formation) are conditioned mainly by the syntagmatic rules of linear arrangement of morphemes. A root morpheme compounded with a derivational suffix yields extended forms (bases) characterized by two main ablauting states:

State I: root morpheme in normal grade, suffix zero;
State II: suffix in normal grade, root zero.

These alternating states of the complex (bimorphemic) verbal bases yield well-defined structural patterns, with the vocalisms of radical and suffixal morphemes strictly differentiated:

STATE I	STATE II
*der-ḳ-	*dr-eḳ-
*šer-ṭ-	*šr-eṭ-
*ḳer-b-	*ḳr-eb-

2.5. Similar structural patterns are evidenced by the bimorphemic nominal bases:

STATE I	STATE II
*s₁ax-ḷ- 'house'	*ḳm-ar- 'husband'
*ʒ₁aγ-ḷ- 'dog'	*cm-el- 'fat'
*ḳwen-ṭ- 'marten'	*ʒ₁m-ar- 'vinegar'

But any nominal base is sharply distinguished from a verbal base in that it is always fixed in the same ablauting state, whereas bimorphemic verbal bases have alternating states according to the paradigmatic pattern. This is one of the main formal differences setting apart bimorphemic verbal bases from nominal bases of the same morphemic composition.

2.6. Addition of a full-grade suffix to a base in State I or II results in the replacement of the preceding normal grade by a zero- or reduced-grade variant, in accordance with the rule allowing only one normal-grade morpheme in a polymorphemic sequence (the principle of monovocality):

State I: *der-ḳ- → *dr̥-ḳ-a
           *šer-ṭ- → *šr̥-ṭ-a
           *ḳer-b- → *ḳr̥-b-a
State II: *dr-eḳ- → *dr-iḳ-e
           *šr-eṭ- → *šr-iṭ-e
           *ḳr-eb- → *ḳr-ib-e

The principle of monovocality characterizes not only bimorphemic verbal bases. It determines the behavior of morphemic units in any sequence, and conditions paradigmatic alternation of allomorphs in mono-, bi-, and polymorphemic verbal and nominal bases. The principle of monovocality is in fact one of the main characteristics of the CK syntagmatic structure, here illustrated by the forms of simple (monomorphemic) bases.

NORMAL GRADE	ZERO GRADE
*dew- 'put' (Georg. 1st sg. aor. da-v-dev)	*dw- (Georg. 3d sg. aor. da-dv-a; Chan 1st sg. aor. do-b-dv-i)
*reγw- 'destroy' (Svan inf. li-reγw)	*rγw- (Georg. 3d sg. aor. da-i-rγw-a)
*ṭep- 'get warm' (Georg. 1st sg. aor. gan-v-ṭep)	*ṭp- (Georg. 3d sg. aor. gan-ṭp-a; adj. ṭp-il- 'warm')
*čer- ‖ *čar- 'cut' (Georg. 1st sg. aor. da-v-čer, da-v-čar)	*čr- (Georg. 3d sg. aor. da-čr-a; Megr. do-čkir-u, Chan do-čkor-u)

REDUCED GRADE

*qed- : *qid- 'bring' (Svan 3d sg. aor. an-qid)

*pen- : *pin- 'stretch', 'spread out' (Georg. 1st sg. pres. v-pen — aor. v-pin-e; Megr. go-pin-u)

*$з_1$en- : *$з_1$in- 'lie', 'sleep' (Chan 3d sg. pres. žan-s, Megr. žan-u-⌈n⌉: Georg. žin-av-s, Chan aor. di-žin-u)

LENGTHENED GRADE

The lengthened grade characterizes mainly the system of primary verbs and represents an essential morphologic feature of a group of verbal bases with thematic aorist. There are three alternations: *ĕ ~ *ē, *ŏ ~ *ō, and Ø ~ *ā.

ALTERNATION *ĕ ~ *ē

Pres. *-ber- 'blow' (Georg. 1st sg. v-ber-⌈av⌉) :
Aor. *bēr-e (Georg. 1st sg. v-ber-e, Svan ⌈čw⌉-ad-bēl-e)

ALTERNATION *ŏ ~ *ō

Pres. *-c_1oc_1- 'creep' (Georg. 1st sg. v-coc-⌈av⌉) :
Aor. *$c_1ōc_1$-e (Georg. 1st sg. v-i-coc-e; cf. Megr. čočua 'creeping')

ALTERNATION Ø ~ *ā

Pres. *-c_1l-ej 'empty' (Georg. 1st sg. v-cl-i) :
Aor. *-$c_1āl$-e (Georg. 1st sg. v-cal-e, Megr. go-v-čol-e)

2.7. The establishment of the principal canonical forms of the CK root and suffix morphemes makes it possible to reconstruct the original forms of a number of verbal and nominal bases that appear in the historical dialects as unsegmentable units, not subject synchronically to further morphological analysis.

2.8. Reconstruction of CK phonological and morphonological patterns, reflecting a stage of Common Kartvelian before its differentiation into dialects, gives us a basis to judge the functional role of ablaut relations and the character of vowel gradation in the paradigmatic structure of word formation and word inflection.

These patterns were obscured in the historical Kartvelian dialects by changes of the CK phonological system. The class of sonants was eliminated by the vocalization of the syllabic allophones, and these were redistributed as vowels or consonants; and the analogic leveling of forms brought about the unification of paradigms. The result was to reduce the CK morphophonemic complexity in the historical Kartvelian dialects.

2.9. The mechanism of CK ablaut as a system of morphophonemic alternations apparently originated as a result of phonological processes which had been operative at earlier stages of Common Kartvelian. We may assume that these processes gave rise to various types of vowel interchange, purely phonological in character, which were then morphologized by the loss of the conditioning phonetic factors. A genetically phonetic phenomenon became functional as it lost its phonological motivation.

3.1. I shall now try to find, by internal reconstruction, the earliest obtainable CK patterns, and to establish a relative chronology of the processes which must have led to the CK ablaut system as it appears immediately before the differentiation of Common Kartvelian into independent dialects.

3.2. As suggested above, the CK vowel phonemes were six: *e *ē *a *ā *o *ō. This inventory must be viewed as a result of relatively late developments; there is no balance in the distributions of these phonemes. The vowel /*o/ does not occur in affixes, and plays a minimal part in ablaut alternations. The low frequency of /*o/ as compared with /*e/ and /*a/ points to late appearance in the phonological system. For an earlier stage I assume only the vowels /*e/ and /*a/, functioning as active units in the CK ablaut system.

The vowels /*e/ and /*a/ are in some verbal and nominal patterns in free variation: *čer- ‖ *čar- 'cut', *cer- ‖ *car- 'sieve', *ḳel- ‖ *ḳal- 'lessen'. Such behavior provides a basis for defining the free variation *e : *a as a reflex of a linguistic state when vowels of different timbre were allophones of a single vocalic phoneme. We may envision an earlier stage of Common Kartvelian with no phonemic contrasts between vowels, assigning the two vowels *e and *a as allophones to one original vowel, which later split into different phonemic units according to the character of its allophones.

Vocalic length as a phonologically relevant feature seems to have arisen in a similar way. It is plausibly accounted for as a result of combinatory changes of the corresponding short vowels.

On such an assumption, the earliest stages of Common Kartvelian had a monovocalic system, with only one original vocalic phoneme manifesting itself in allophones of different timbre.

3.3. Of particular interest for the distributional behavior of consonants in a morpheme of normal grade are the introvertive harmonic consonant clusters, as well as the clusters *Cw with bilabial *w. Such combinations are clusters phonemically, as shown by commutation, but morphophonemically units. That is, with regard to the root structure, such a cluster is functionally equivalent to a simple consonant or a nonsyllabic sonant. In radical and suffixal morphemes the symbol C denotes, as pointed out above, either a single consonant or a cluster of the harmonic type.

This distributional peculiarity becomes understandable if we assume that these clusters originally represented unit consonant phonemes. Functional equivalence of the introvertive harmonic and labial consonant clusters to a single consonant is satisfactorily accounted for by a monophonematic interpretation of these clusters and their assignment to a common phonemic class. Thus, the clusters Cw may be viewed historically as labialized consonants that later suffered division into two phonemes. An analogous diachronic interpretation of introvertive harmonic clusters yields as their prototypes a set of consonant phonemes (apparently with a phonologically distinctive common feature of velarization) which resulted later in a sequence of consonants.

Such an interpretation of the CK labial and harmonic clusters sets up for an earlier stage of Common Kartvelian a complex consonant system with groups of labialized and velarized consonant phonemes, in contrast to a monovocalic system with its single phonemic unit realized, according to the phonetic environment, as vowels of several different timbres. This phonological model, representing a first approximation to the earliest obtainable stage of the CK system, is typologically close to the system of West Caucasian with its ample consonantism and simple vocalism.

3.4. In the CK ablaut system the most widespread pattern is represented by the interchange of a short vowel with zero: $*e, *a : \emptyset$. As suggested above, morphophonemic vowel alternation may be viewed diachronically as a result of morphologizing phonological processes operant at earlier stages. Such a phonological motivation may be sought also for the interchange $*e, *a : \emptyset$. This gradation seems to be in origin a vowel syncopation in certain phonetic environments. At a later stage it lost its phonetic-combinatory motivation and acquired functional relevancy, being used as a means of formally opposing different paradigmatic entities.

One of the plausible explanations of such phonetic syncopation is to postulate a movable stress accent, under whose impact vowels in unstressed syllables were lost. The stressed syllable appeared either in the root or in the suffix: $C\acute{\partial}C\text{-}\partial C$ or $C\partial C\text{-}\acute{\partial}C$. The former pattern yields the later structure $CVC\text{-}C\text{-}$ (State I: $*der\text{-}k\text{-}$, $*šer\text{-}ṭ\text{-}$, etc.), the second yields the structure $CC\text{-}VC\text{-}$ (State II: $*dr\text{-}ek\text{-}$, $*šr\text{-}eṭ\text{-}$, etc.). It is clear from the formulas that stress in such patterns was distinctive: the location of the accent in a bimorphemic (verbal) base determined its paradigmatic function. After the transformation of the structures $C\acute{\partial}C\text{-}\partial C$ and $C\partial C\text{-}\acute{\partial}C$ to $CVC\text{-}C$ and $CC\text{-}VC$ respectively, the stress accent lost its functional relevancy and became a nondistinctive phonetic feature accompanying every syllabic element; the contrast between stressed and unstressed vowels was eliminated as a result of syncopation.

3.5. In the CK protolanguage, before the development of ablaut patterns, each consonant stood in immediate contact with the single vocalic phoneme $*\partial$; hence the number of syllables was determined by the number of occurrences of $*\partial$. At that stage there was no class of sonants opposed to vowels and consonants proper. The CK phonological system consisted of two main phonemic classes: the class of consonants (with the sonorants /$*r$ $*l$ $*m$ $*n$ $*w$ $*j$/ among its elements) and the vocalic class with its single representative $*\partial$. This system was complemented by stress accent as a suprasegmental phonemic entity.

The formation of a special class of sonants in the CK phonemic system is closely connected with vowel syncopation in unstressed syllables and the rise of ablaut. After the loss of the unstressed vowel in the positions $C\text{--}C$, $\#\text{--}C$, and $C\text{--}\#$, the sonorants that came to be in contact with obstruents acquired syllabic function. Among the class of consonants a special group of phonemes evolved that was syllabic or nonsyllabic according to the phonetic environment, contrasting in this way with vowels (always syllabic) and consonants (never syllabic).

3.6. In the same direction lie the causes of vocalic length in Common Kartvelian. The rise of the CK ablaut with vocalic length is likewise to be associated with combinatory phonetic changes. The addition of a univocalic suffix to a root $C\partial C\text{-}$ must have resulted in a sequence of open syllables ($C\partial C + \partial \rightarrow C\partial|C\partial$) in which the vowel under stress developed a long variant: $C\acute\partial C\partial \rightarrow C\acute{\bar\partial} C\partial$.

This pattern is characteristic of the CK thematic aorist with lengthened grade: $*w\text{-}b\bar{e}r\text{-}e$ 'I blew', $*w\text{-}c_1\bar{e}r\text{-}e$ 'I wrote', in contrast to the aorist with zero grade: $*w\text{-}rc_1x\text{-}e$ 'I washed', $*w\text{-}rg\text{-}e$ 'I planted'. The two aorist patterns, with different ablaut grades, are reduced to uniform prototypes $C\acute\partial C\text{-}\partial$ and $C\partial C\text{-}\acute\partial$, differentiated only by the location of the accent. The pattern $C\acute\partial C\text{-}\partial$ yields the aorist type $C\bar\partial C\text{-}\partial \rightarrow C\bar VC\text{-}V$, while the pattern $C\partial C\text{-}\acute\partial$ yields the aorist type $CC\text{-}\partial \rightarrow CC\text{-}V$. The appearance of a long vowel was thus originally correlated with accent structure.

The disruption of the stress accent as a distinctive suprasegmental entity was due in the first place to the syncopation of unaccented vowels and to the operation of a universal phonological principle, first enunciated by Roman Jakobson: that when vocalic length and stress accent always coincide, one of them loses its phonological relevance. In the patterns of the thematic aorist the loss of accentual contrasts converted length into a paradigmatic feature characteristic of a verb class which had been marked earlier by the location of the accent. The patterns of alternation $V : \bar V$ and $V : \emptyset$ were thus originally linked with accentual structure.

The phonological irrelevance of stress accent in the later CK system is reflected in all the historical Kartvelian dialects, where accentuation appears as a purely phonetic, anthropophonic phenomenon without distinctive value.

3.7. The reduced grade, being a formal variant of zero, appears as a product of apophony when a full-grade suffix is added to the base. In that situation $*e$, $*a \rightarrow \emptyset$ and $*e \rightarrow *i$. It is, however, hard to determine diachronically the particular conditions under which the accent caused a reduction $*e \rightarrow *i$ rather than complete loss of the vowel in the unaccented syllable. Possibly the difference between zero and the reduced grade reflects differences in the development of various structural patterns at different stages of Common Kartvelian. In the last analysis, the structures that appear in late CK as synchronic ablaut patterns are the product of unification into a common morphonological system of phenomena that originated in different periods of CK development through a complex series of phonomorphological processes.

3.8. The oldest obtainable CK phonological system was transformed in the direction of simplifying the consonantism and creating a special class of sonants through the operation of ablaut. The latter came to determine the syntagmatic

relations between root and suffix. Prefixation, on the other hand, was only partly involved in this process; on the whole, prefixes maintained their ancient structural relations, which cannot be described consistently in terms of ablaut variations.

3.9. These modifications of the ancient CK system gave rise at a later stage to a morphonology that exhibits striking parallels to the patterns postulated for Proto-Indo-European.

The CK structures described above are on the whole identical with Indo-European patterns at the stage immediately before the division into dialects. The structure of roots and suffixes and the syntagmatic relations between them in Proto-Indo-European (as presented by Émile Benveniste) and in Common Kartvelian can be described in the same terms. The CK morphonological system is, in a sense, isomorphic to that of Proto-Indo-European.

With respect to the structure of morphemes and the syntagmatic relations between them, Kartvelian and Indo-European belong to a common typological class. The isomorphism between the Kartvelian and the Indo-European morphonological system raises new questions concerning the historical connections of Kartvelian languages with Indo-European. Assigning the two to the same typological class provides a basis for considering them members of the same Sprachbund (in Jakobson's sense) within the Eurasian group of languages.

Like any isomorphism between genetically unrelated languages, the structural characteristics shared by Kartvelian and Indo-European may prove to be important for studies in linguistic typology and universal tendencies of linguistic change.