Remarks on Mutæ cum Liquidā and Branching Onsets[1]

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āyókà, zònàtā !

0.   Introduction

Consider the proper name Boutros. The general consensus is that, segmental phonetic details aside, speakers of Arabic and English perform the different syllabic parsings shown in (1) of such a word. Assigning **t** and **r** to the rightmost syllable in English amounts to recognizing a *muta cum liquidā* (henceforth *mcl*) in the sense of XIXth century philologists and students of the versification of classical languages.
(1)

        Arabic: [but][rus]
        English: [bu][trus]

In this paper, I want to argue that the view represented in (1) does not correctly characterize the difference between Arabic and English, or a possible difference between any two languages. I submit that the correct view is that represented in (2).
(2)

        Arabic: [but][rus]
        English: [bu][t^{r}us]

That is, the syllabic analyses of (1) are correct, but the segmental analysis of the *mcl* is not. Rather, the difference between Arabic and English is that the segmental inventory of English, but not that of Arabic, includes segments with liquids as features of secondary articulation. Under this view, the consonantal system of a language such as say, Spanish includes plain voiced and voiceless velar stops (k, g) and complex voiced and voiceless velar stops (k^r, k^l, g^r, g^l); that of Sanskrit includes the former plus their aspirate counterparts (k_h, g_h, k_h^r, k_h^l, g_h^r, g_h^l), etc. Whether a language displays such complex consonants or not, is a fact about its consonant inventory, not about its syllable structure. Accordingly, English words such as **attrition** and **addition** will be viewed as forming a melodically minimal pair (one with consonant **t^r**, the other with consonant **d**), with no prosodic difference between them. This is not a new idea, as Fujimura & Lovins (1978), Hirst (1985), Rennison (1998), Steriade (1997), and others have already argued in the same direction. My contribution will essentially consist in reassessing influential arguments crucially assuming the existence of branching onsets.

As part of this lengthy introduction, I now turn to a brief discussion of the phonological analysis of segments involving secondary articulations in Chaha. It will illustrate the proposed range of necessary representational contrasts for such objects. The organization of the paper will be mapped out immediately thereafter.

Consider the following forms from the Perfectives of three Chaha verbs, from left to right "squash", "take a handful and close the hand", and "testify". Of interest here, is the analysis of the palatalized ejective coronal, **ċ**, present (underscored) in the first two verbs. Forms from the paradigm of the third verb are provided as representatives of regular quadriliteral behavior for the sake of control.
(3)

	a.	b.	c.
3msg.	fɪċ̲änäq-ä	qʷɪräċ̲-ä	mɪsäkär-ä

The first important observation is that **ɪ**, the high central vowel vocalizing C_1 in the Perfective paradigm is a sure indication of quadriradicality (Lowenstamm 1996a,b, 2001). Thus, a question immediately arises regarding the radical makeup of the verbs under discussion: **fɪċänäqä** displays four consonants, **f**, **ċ**, **n**, and **q**; but **qʷɪräċä** appears to display only three: **qʷ**, **r**, and **ċ**. The solution consists in recognizing two different phonological objects behind the unique phonetic notation **ċ** (adequate as such): /ṭʸ/ and /ṭy/. In other words, the roots of the two verbs are √fṭʸnq and √qʷrṭy/. This is the key to an explanation of the puzzling behavior, exemplified in (4) of the same stems before consonant initial agreement markers.
(4)

	a.	b.	c.
1sg.	fɪċänäq-xʷ	qʷɪräċä̲-xʷ	mɪsäkär-xʷ
2msg.	fɪċänäq-xä	qʷɪräċä̲-xä	mɪsäkär-xä

In the forms in (4a,c), the last root consonant directly abutts the initial consonant of the suffix. In (4b), on the other hand, a vowel (underscored) appears to the left of the agreement markers. This is the effect of a metathesis systematically reordering a root final glide and its preceding vowel, as indicated in (5).
(5)

	a.	b.	c.
1sg.	fɪċänäq-xʷ	/qʷɪräṭäy-xʷ/ > [qʷɪräṭyäxʷ]	mɪsäkär-xʷ
2msg.	fɪċänäq-xä	/qʷɪräṭäy-xä/ > [qʷɪräṭyäxä]	mɪsäkär-xä

Vowel initial agreement markers have a different effect on a glide final root: the glide is simply deleted, and the penultimate root consonant appears in its true form in (b), while the ensuing hiatus is broken up by insertion of w, a detail of no importance here:
(6)

	a.	b.	c.
3mpl.	fɪċänäq-o	/qʷɪräṭäy-o/ > [qʷɪräṭäwo]	mɪsäkär-o
3fpl.	fɪċänäq-äma	/qʷɪräṭäy-äma/ >[qʷɪräṭäma]	mɪsäkär-äma

More arguments could be adduced showing the bisegmentality of surface **ċ** in **qʷɪräċä**, but I now want to turn to the two suffix conjugations, the Imperfective and the Jussive for evidence for the monosegmentality of the same phonetic object in **fɪċänäqä**.

In the Imperfective paradigm, as can be seen from the control in (7c), the consonants of a quadriradical root are evenly distributed – two on one side,

two on the other – around the unique stem vowel.[2] The two types of
representations argued for here mesh perfectly with this pattern.
(7)

	a.	b.	c.
1sg.	ä-fċänq	ä-qʷräċ	ä-msäkɪr
	/ä-fṭ^{y}änq/	/ä-qʷräṭy/	

On the other hand, in the Jussive paradigm, the distribution of the consonants
of a quadriradical root around the stem vowel follows a different pattern: C_1
appears to the left of the stem vowel, while C_2, C_3 and C_4 appear to its right.
Here too, it will be seen that the proposed differential representations of **ċ**
fit the $C_1äC_2C_3C_4$ pattern.
(8)

	a.	b.	c.
2ms.	fänċɪq[3]	qʷänċ[4]	mäskɪr
	/fänṭ^{y}q/	/qʷänṭy/	

The argument made here for the ambiguous phonological status of phonetic **ċ**
extends to the entire range of phonetic palatalized segments of Chaha, **š**
{s^y,sy}, **ĵ** {d^y, dy}, **ž** {z^y, zy}, **č** {t^y, ty}, **k^y** {k^y, ky}, **g^y** {g^y, gy}, **q^y** {q^y,
qy}, **ç** {x^y, xy}. In fact, it carries over to rounded velars and labials as
well, **k^w** {k^w, kw}, **g^w** {g^w, gw}, **q^w** {q^w, qw}, **f^w** {f^w, fw}, **m^w** {m^w, mw}. Thus, it
can be shown by parallel arguments that say, ṭɪräqʷ-ä "he became deaf", is a
glide final quadriradical from root √ṭrqw whereas qʷɪmäqʷäm-ä "it was toasted",
is a quadriradical from a root involving monosegmental labiovelars, √qʷm+qʷm.

In this section, I argued based on evidence from the same language for the
need to recognize a dual phonological analysis, one monosegmental and one
bisegmental, of phonetic segments involving secondary articulation. This is
represented diagrammatically in (9) where x, when raised, stands for secondary
articulation, and as a separate segment otherwise.
(9)

$$[C^x]$$

$$/C^x/ \qquad /Cx/$$
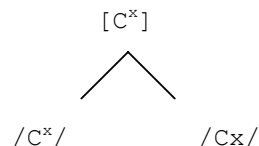
Syllabically, the two phonological segments in (9) will be classically
analyzed, as shown in (10) with 2nd masculine singular examples, where the
rightmost syllable is the agreement marker.
(10)

a.   b.

[$_σ$fɪ][$_σ$ṭ^{y}ä][$_σ$näq][$_σ$xä]   [$_σ$qʷɪ][$_σ$räṭ][$_σ$yä][$_σ$xä]

[fɪċänäqxä]   [qʷɪräċäxä]

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[2]   The high central vowel in **ä-msäkɪr**, is epenthetic.
[3] Note the metathesis, /fäċnɪq/ > [fänċɪq].
[4] **r** regularly turns to **n** when followed by a voiceless obstruent. Cf. Petros (2000) for
discussion.

I submit that a) the structural contrasts in (9) and (10) exhaust the range of necessary distinctions, b) *mcl*s pattern as complex segments, and c) there is no need for a third type, the popular branching onset.

The first two sections are devoted to discussions of one of the contrasting objects in (9) and (10), the monosegmental complex segment. In section 1, I take up the issue of the inertia of onsets in stress systems. I argue that *mcl*s make no difference in stress assignment because they are monosegmental. In section 2, I compare the differential treatment of *mcl*s in the reduplicative systems of Ilokano and Greek. I argue that the difference stems from a parameter of reduplication whose scope includes a larger range of monosegmental objects than just *mcl*s. In section 3, I return to a language, Czech, in which I claim obstruents and liquids pattern along the lines of the contrast in (9) with again, no need for branching onsets. A short conclusion sums it up.

1.   The inertia of *mcl*s in stress systems

One of the important results of a decade of work, roughly 1975-85, on the theory of phonological representations is the formulation of explicit theories of metrical structure (Halle & Vergnaud (1980), Liberman & Prince (1977), Hayes (1980)). Some of the most significant generalizations attained during that period involve a central representational device, tree geometry. Thus, in quantity-sensitive systems, stress will target "heavy" syllables, CVC and CVV in certain environments, while bypassing "light" CV syllables in the same environments. The distinction between light and heavy syllables can be elegantly captured as shown in (11), where it is apparent that the Rime of a heavy syllable - by contradistinction with that of light syllables (11a) - either branches (11b), or dominates a branching node (11c).
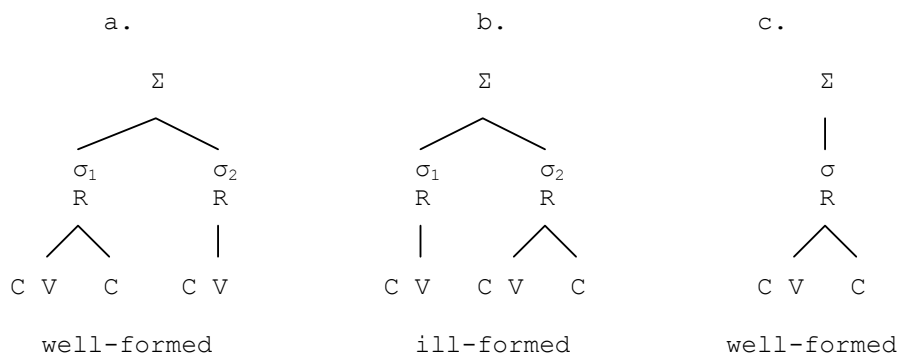(11)
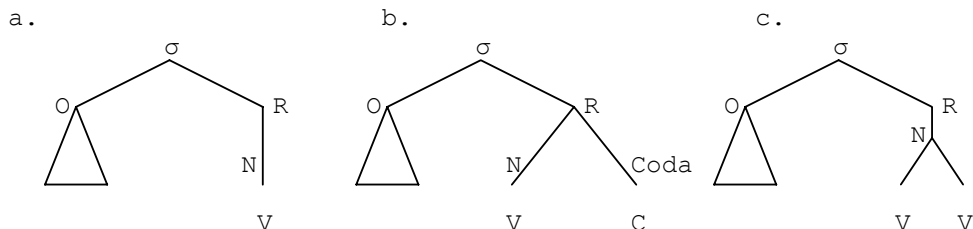
Quite strikingly, the very same distinction in onsets - branching vs. nonbranching - is of no consequence on stress assignment.[5] As Halle & Vergnaud (1980) put it, "stress assignment rules are sensitive to the structure of the syllable rime, but disregard completely the character of the onset". In fact, the difference between branching and nonbranching onsets appears to make little or no difference in any area of grammar.[6]

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[5] Arguments have been offered by Davis (1988), Everett & Everett (1984) and Nanni (1977) to the effect that certain classes of consonants, or the presence vs. absence of a consonant, in onset position affect stress placement. To the best of my knowledge, no cases involving the branching/nonbranching distinction have been reported to have a similar impact. This is puzzling as such a distinction might have been expected to be the source of even more dramatic differences.
[6] For reasons to doubt the genuiness of onsets as constituents, cf. Blevins (1995).

Consider, for instance, a standard account of foot well-formedness in a left-headed quantity sensitive language such as characterized by Hayes (1980)[7]. In such a language, (12a) is a well-formed trochaic foot: its head (σ_1) dominates a branching rime; the complement of its head (σ_2) doesn't. (12b), on the other hand, is an ill-formed trochee as σ_2, the complement of its head does dominate a branching rime. (12c), a non-branching (degenerate) foot dominating a branching rime, is legitimate. Clearly, the branching/non-branching distinction is all important in such a framework since the source of the ill-formedness of (12b) is the simultaneous branching of Σ and σ_2,: when Σ doesn't branch, a licit foot such as (12c) arises.

(12)

```
        a.                      b.                      c.

        Σ                       Σ                       Σ
       / \                     / \                      |
     σ₁   σ₂                  σ₁   σ₂                    σ
     R    R                   R    R                     R
    / \   |                   |   / \                   / \
   C V    C V             C V   C V   C             C V   C
   C V  C V               C V   C V   C             C V   C

   well-formed             ill-formed              well-formed
```

Implicit in this account is, of course, the assumption that rimal material only is taken into account, to the exclusion of segmental material parsed as an onset. This assumption is viewed as necessary for, at least, one reason put forth in various places in the literature.

(13)

> the syllable itself, a structure branching into an onset and rime,
> must be ignored, lest every syllable be counted as heavy

(13) seems to be missing the point. The important characteristic of quantity sensitive systems is that in such systems quantity (branching) is a contingent property of the objects under evaluation. Obviously, a hypothetical language which displayed heavy syllables exclusively, would not be detectably quantity sensitive. To put it differently, a condition for a stress system to be sensitive to syllable heaviness is that not every syllable in that language be heavy. Consequently, the fact that the syllable node - inasmuch as it necessarily branches - is ignored, goes without saying and follows, I suggest, from a proviso such as (14).
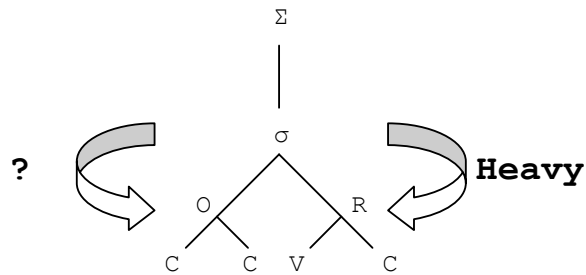
(14)

> The geometry of **optionally** branching constituents is
> taken into account for the evaluation of heaviness

(14) is a principled rationale for bypassing the definitional branching of the syllable node, and directly examining constituent geometry. At the same time, it begs in even more pressing fashion the question of the irrelevance of onset geometry, as represented in (15): does it follow from anything ?

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[7] This discussion is deliberately couched in an early version of the metrical framework because of its characteristic emphasis on geometry, and because of its contemporaneity with a brief period of productive work on syllable structure.
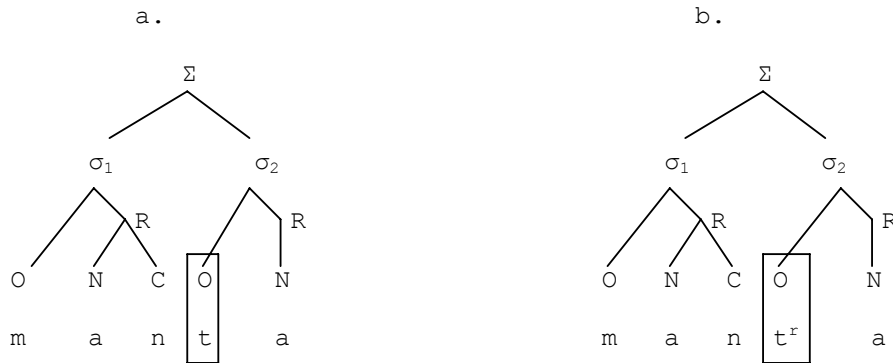
5

(15)

```
                        Σ
                        |
                        σ
    ?     ⟲         /     \          Heavy
                  O         R
                / |        / \
              C   C      V     C
```

In spite of various attempts at rationalizing the irrelevance of the branching/nonbranching distinction in onsets while at the same time emphasizing the crucial import of the same distinction in rimes, the problem hasn't vanished. In fact, it stands as an ongoing unacknowledged embarrassment for metrical theory that a remark such as Halle & Vergnaud's cannot be derived, rather has to remain a factually correct observation. Indeed, it is hard to see how metrical theory can countenance the fact that branching systematically fails to be of any consequence. On the other hand, it may well be that the problem lies not with metrical theory, but with the analysis of *mcls*.

If *mcls* are single segments, the fact that branching onsets have no more impact on stress assignment than non-branching onsets ceases to be puzzling: much as the underscored cluster in **attrition** [∂t̠ʳɪšn̩] is no more a branching onset than that in **addition** [∂d̠ɪšn̩], the difference between, say **manta** and **mantra** is strictly segmental. Whether single consonants **b** or **bˡ**, **k** or **kʳ**, **t** or **tʳ**, etc. appear in any given onset position amounts to no difference in onset geometry, as shown in the boxed portions of (16).

(16)

a.

```
              Σ
            /   \
          σ₁      σ₂
        / | \    / \
       /  | R  /    R
      O   N C  O    N
      m   a n  t    a
              (box around O/t)
```

b.

```
              Σ
            /   \
          σ₁      σ₂
        / | \    / \
       /  | R  /    R
      O   N C  O    N
      m   a n  tʳ   a
              (box around O/tʳ)
```

If the mode of representation advocated here is correct, it entails Halle & Vergnaud's observation. [8] In this section, I have suggested that the burden of reducing the problem of the inertia of *mcls* in stress systems rests with segmental analysis, not metrical theory. In the next section, I turn to reduplication.

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[8] I realize I am talking here of *mcls* and branching onsets as if they had identical extensions. In fact, in many languages *mcls* are the only uncontroversial source of evidence for branching onsets. While most analysts of English phonotactics would hesitate between analyzing a word such as *tweed* as /twīd/ or /tʷīd/, few would question that *plough* or *treat* have initial branching onsets. sC type initial clusters are not discussed in this paper, cf. Lowenstamm (2002)

2.   Ilokano and Greek Reduplication

There is a rich recent literature on reduplication (Clements (1985), Hyman,
Inkelas & Sibanda (1998), Kiparsky (1986), Marantz (1982), McCarthy & Prince
(1986, 1995), Steriade (1988), and references therein). No attempt will be
made here at chosing between the various proposals. The scope of this
discussion is much more limited as I merely want to offer an alternative way
of construing a portion of the crucial data, viz. the monosegmentality of
*mcl*s. From this perspective, I will compare and contrast selected aspects of
reduplication in Ilokano and Greek, two languages that have figured
prominently in the literature.

Ilokano is an Austronesian language spoken in the Luzon Island of the
Philippines. The lexicon of Ilokano overwhelmingly displays single consonants
in onset position (Lopez 1928, Constantino 1971). However, loans from Spanish
and some from English are numerous, and may involve initial and internal *mcls*
(**pr**esidente « president », **gr**ado "grade in school", po**bl**asyon "village",
etc.). Ilokano forms reduplicative plurals by prefixing a heavy (CVC)
reduplicative affix to the base of a verb (Hayes & Abad 1989).[9]
(17)

a.	kaldiŋ	"goat"	kal-kaldiŋ
b.	pusa	"cat"	pus- pusa
c.	klase	"class"	klas- klase
d.	jyanitor	"janitor"	jyan-jyanitor

A noun such as *klase* (17c) reduplicates the entire initial MCL. This fact and
others, forms the basis of an influential argument put forth by McCarthy &
Prince (1995) to the effect that the reduplicative affix of Ilokano must be
defined prosodically, a heavy CVC syllable in the cases at hand.

Such a definition guarantees Rime heaviness in the reduplicated portion of
the form, while at the same time allowing for the reduplication of the entire
range of prevocalic configurations licit in the language, e.g. #kV...,
#pV..., and crucially #klV... and #dy... Moreover, McCarthy & Prince
forcefully argue, the Ilokano data cannot be handled by what they call
"segmentalist theories of template form, such as those in McCarthy (1979,81),
Marantz (1982), Levin (1983,85), and Lowenstamm & Kaye (1986)". The
demonstration runs as follows.
If the reduplicative prefix was strictly defined in terms of segmental slots,
i.e. if reduplication essentially involved counting segments, ungrammatical
forms such as (18c) would result.
(18)


```
        a.                      b.                      c.

    x x x - x x x x x       x x x - x x x x       x x x - x x x x x
    │ │ │   │ │ │ │ │       │ │ │   │ │ │ │       │ │ │   │ │ │ │ │
    │ │ │   k a l d i ŋ     │ │ │   p u s a       │ │ │   k l a s e
    │ │ │                   │ │ │                 │ │ │
    k a l d i ŋ             p u s a               k l a s e

        kal-kaldiŋ              pus-pusa              *kla-klase
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[9] The data is presented as in Hayes & Abad 1989 and McCarthy & Prince (1995). An alternative will
be offered below.

If, on the other hand, they argue, the reduplicative affix were defined in
terms of Cs and Vs *alla* Marantz (1982), it would have to have the undesirable
form shown in (19).
(19)

```
    a.                          b.                          c.

    C C V C-C V C C V C V       C C V C-C V C V             C C V C-C C V C V
    │ ╱╱ │ │ │ │ │ │            │ ╱╱ │ │ │ │               │ │ │ │ │ │ │ │
    │╱╱╱  k a l d i ŋ           │╱╱╱  p u s a               │ │ │ │ k l a s e
    │╱╱╱                        │╱╱╱                        │ │ │ │
    │                           │                           │ │ │ │
    k a l d i ŋ                 p u s a                     k l a s e
```
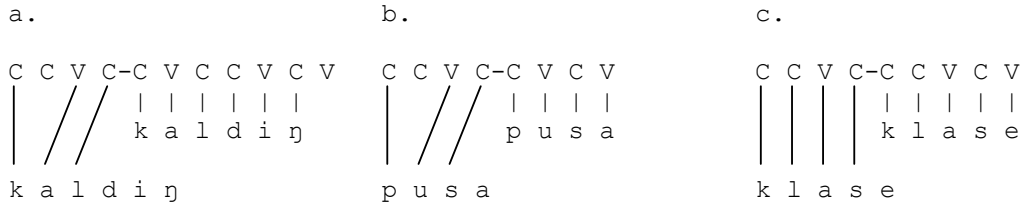
Defining the reduplicative affix as CCVC would derive the correct results in
the examples at hand, but at the expense of obscuring the exceptional
character of the realization of all its positions.

An interesting feature of this entire discussion is the unanimous, uncritical
acceptance of the idea that Ilokano *mcls* are bipositional as in (18c) or
(19c). The underlying tacit assumption is of course, that *mcls* are bisegmental
in Spanish and in English and that the massive injection of loans from those
languages eventually altered the syllable inventory of Ilokano. Suppose
instead they are monopositional, complex segments. Then, the facts of
reduplication are fully compatible with a "segmentalist" characterization of
the reduplicative affix, be it in terms of bare slots, or in terms or Cs or Vs
as shown in (20).
(20)

```
        a.                              b.

    [C V C]-C V C V                 [C V C]-C V C V
        │ │ │ │                     │ │ │  │ │ │ │
        kᶦa s e                     │ │ │  kᶦa s e
                                    │ │ │
                                    │ │ │
                                    kᶦa s e
```

Thus, the real issue, I submit, has less to do with the theory of
reduplicative morphology than with the proper representation of Ilokano *mcls*.
Is there evidence that they are bisegmental? None whatsoever. If anything, the
facts of the language appear to suggest the opposite: Ilokano, a language with
no branching onsets in its native lexicon, handles borrowed word-initial *mcls*
no differently from its native word-initial single consonants. Accordingly,
viewing them as monosegmental would be the null hypothesis with respect to the
problem at hand. In general, it appears that the large number of loans in
Ilokano had little impact on the syllable structure of the language. Thus, the
native vocabulary tolerates at most biconsonantal clusters intervocalically.
The only significant set of apparent exceptions involves postconsonantal *mcls*
as in the loans in (21a). However, to the extent that such clusters can be
analyzed as in (21b), the original restriction on the upper limit of
intervocalic cluster can be viewed as still being in full force.

(21)

    a.   b.

    3 segments   2 segments

| administ<u>ras</u>yon | "administration" | administ^{r}asyon |
| kom<u>pli</u>kasyon | "complication" | komp^{l}ikasyon |

In this respect, it is interesting to note that loans with clusters not amenable to the analysis in (21b) have undergone simplification of their consonantal overload, e.g. [konstabulario] "constabulary" is given along with a variant conforming to the phonotactics of the language, [kostabulario] in Constantino (1971).

Greek offers evidence of a different nature. [10] Reduplication is the vehicle of several derivational operations in Greek. In this subsection, I discuss the behavior of *mcls* in the context of one such operation, Perfect Formation. Perfect formation involves the phonetic interpretation of a light CV affix, a process partially exemplified in (22). [11] The reduplicative affix is uniformly vocalized **e**, and its onset is a copy of the root-initial consonant (22a). When the root begins in an *mcl*, as in (22b), the *muta*, but not the *liquida*, is copied onto the reduplicative affix, thus in the case of grap$_h$-o, ge-grap$_h$euka, not *gre-grap$_h$euka.

(22)

| a. | luo | le-luka |
| | paideuo | pe-paideuka |

| b. | grap$_h$o | ge-grap$_h$euka | *gre-grap$_h$euka |
| | pleo | pe-pleuka | *ple-pleuka |

This case can be handled in straightforward fashion by most theories and the correct output is successfully derived under left-to-right association as proposed by Marantz (1982), as shown in (23); parafixation (Clements ()), full copy (Steriade (1998); and, with minor adjustments, prosodic reduplication *alla* Mccarthy & Prince ().

(23)

               a.   b.

```
      [C V] - C V ...            [C V] - C C V C ...
      │ |   | |                  │ |   | | | |
      │ e   l e                  │ e   g r a pʰ
      │                          │
      │                          │
      l u                        g r a pʰ
```

In the frameworks just mentioned, the task is to devise the correct pruning mechanism whereby material contained in a root-initial branching onset will be made to fit the fixed space available in the reduplicative affix (there is room for one consonant only). By contrast, if **g^r** is a single segment, as advocated here, there is room enough for it in the CV affix. Thus, the view that *mcls* are single complex segments, forces a rather different construal of the data, one which will be spelled out directly.

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[10] I am grateful to Philippe Ségéral for help with the Greek data.

[11] For an encompassing discussion of major aspects of Greek phonology and morphology, including reduplication, cf. Steriade (1982). For an alternative view of Greek and Sanskrit reduplication, cf. Lowenstamm (in preparation).

It should a) account for Greek, b) draw the line between the Greek treatment
with pruning of the *liquida,* and the Ilokano treatment without pruning.

I submit that Greek *mcls* undergo decomplexification, as a consequence of
the negative setting of a parameter of reduplicative systems, (24). Ilokano,
on the other hand, evidences a positive setting of the same parameter.
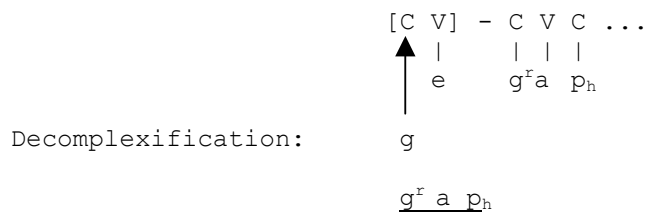(24)

<div align="center">Reduplicate complex segments YES/NO</div>

Under (24), all features of secondary articulation of Ilokano consonants
should be manifested in the reduplicative affix. This includes the
liquid part of *mcls*, hence [k^{l}as-k^{l}ase], [t^{r}ab-t^{r}abaho], etc. Another
likely candidate is palatalization. McCarthy & Prince, following Hayes &
Abad (1989), represent palatalized segments as bi- rather than
monoconsonantal, i.e. [jyanitor]. However, Hayes & Abad (1989) in their
discussion of the coronal consonants of the language and the
corresponding palatalized series explicitly contemplate an alternative:

"/č/ /ĵ/ and /š/ always occur with a short [y]-like offglide,
and may be phonemicizable as /ty/, /dy/, and /sy/; ...
We lack the evidence to decide this issue"

Suppose a variant of Hayes & Abad's view is adopted, though one involving a
more conservative representation of palatalization, namely /t^y/, /d^y/, /s^y/.
Then, the plural of janitor, [d^{y}an-d^{y}anitor], is just a further illustration
of the fact that Ilokano reduplication involves the secondary articulation
features of the reduplicated consonants. Along with the wholesale copy of
mcls exemplified in [t^{r}ab-t^{r}abaho], it fits into the general pattern. Neither
fact constitutes an argument in favor of Prosodic Morphology.

I suggested earlier that Greek consonants, by contrast, undergo
decomplexification in the course of reduplication.
(25)

```
                          [C V] - C V C ...
                          ↑|      | | |
                          |e      g^r a p_h
                          |
    Decomplexification:     g

                          g^r a p_h
                          ‾‾‾‾‾‾‾‾‾
```

Decomplexification is a loose term to refer to the deletion of a feature
of secondary articulation, here ^{r}. If clipping of secondary
articulations is really involved in Greek reduplication, its effects
should be felt beyond *mcls*.

Now, consider the facts of (26).
(26)

          pe-p$_h$eug-a   *p$_h$e-p$_h$eug-a

      « I have fled »

Reduplication does not copy aspiration. The economy of aspiration alternations

in Greek is reputed to be controlled by Grassmann's Law (Lejeune 1972).

However, Steriade (1982) convincingly argues that the reduplicative affix falls outside the scope of Grassmann's Law. If she is correct, as I assume she is, two independent mechanisms each geared at handling distinct configurations are now needed to derive the phonetics of reduplicated segments: one involves a proviso to the effect that copying does not involve features represented on the aspiration tier; the other will leave out the liquid of an obstruent cluster for lack of space in the reduplicative affix.
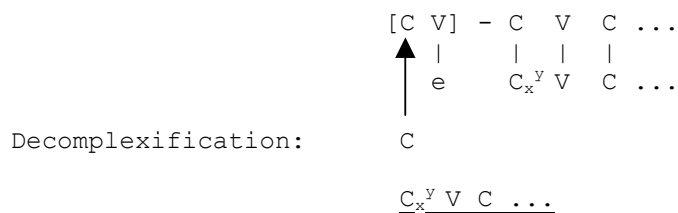
On the other hand, under the view I am advocating, whereby the *liquida* is, just like aspiration, a secondary articulation feature of the *muta,* a unified account of "cluster" simplification and unaspiration is available: secondary articulations when such are present are simply not reproduced on the affix. In (27), a number of examples are given where the reduplicative affix appears stripped of the multiple secondary articulation features of the initial root consonant.
(27)

Initial Consonants	Present	Gloss	Active	Medio/Passive Perfective
t_h^l	$t_h^l a\bar{o}$	"offend, hurt"	$te\text{-}t_h^l aka$	$te\text{-}t_h^l asmai$
t_h^r	$t_h^r a\bar{o}$	"break"		$te\text{-}t_h^r ausmai$
p_h^l	$p_h^l eg\bar{o}$	"set on fire"		$pe\text{-}p_h^l egmai$
p_h^r	$p_h^r ad^z\bar{o}$	"explain"	$pe\text{-}p_h^r aka$	$pe\text{-}p_h^r asmai$
k_h^l		« boil »	$ke\text{-}k_h^l aden$ (3s)	
k_h^r	$k_h^r onidz\bar{o}$	"last"	$ke\text{-}k_h^r onika$	

The general format of the operation is given in (28) where C_x^y is a consonant with secondary articulations.[12]
(28)

```
                         [C V] - C  V  C ...
                          |      |  |  |
                          e     Cₓʸ V  C ...

      Decomplexification:       C

                         Cₓʸ V C ...
```

In this section, I have tried to show that Ilokano and Greek *mcl*s pattern exactly like the other complex consonants of their respective systems. If this is correct, it cannot be maintained that they form branching onsets. In the next section, I turn to Czech for an illustration of the dual behavior – bisegmental/heterosyllabic vs. complex monosegmental/*mcl* – of obstruent-liquid sequences.

---

[12] This account is very close to a detailed proposal put forth in Steriade (1988). In the same paper, Steriade insightfully notes with reference to Sanskrit: "A more intuitive reason why *krand* does not reduplicate as **kar-krand* is that *kar* is not a (simplified) version of the original syllable: *kan-*, of the correct *kan-krand*, is." If *mcl*s are complex consonants, the account in (28) expresses Steriade's insight even more closely than her own solution.

3.   Czech
Of interest here is the behavior of a class of Czech prefixes discussed and
analyzed by Scheer (1996):[13] **bez** "without", **vz** "inchoative, upward", ***před***
"before", **roz** "inchoative, **nad** "on", **pod** "under", **od** "away".[14] These items,
when prefixed to stems with single initial consonants, behave unremarkably
e.g. roz-dat "distribute". On the other hand, they appear to react to stem-
internal alternations such as described in (29).
(29)
            a.   b.
od-b$\underline{\bar{\imath}}$rat   "take away, Inf. Imp."   ode-brat   "take away, Inf., Perf "
roz-deru   "I will scratch"   roz$\underline{e}$-drat   "scratch, Inf., Perf."
před-p$\underline{e}$ru "I will prewash"   př$\underline{e}$de-prat   "prewash, Inf.,Perf."

The presence of a vowel (underscored) in the Imperfective forms of (29a)
triggers no particular reaction from the part of the suffix and a short form
of it - as in roz-dat - surfaces.
By contrast, in the Perfective forms of (29b), the absence of a vowel after
the initial stem consonant triggers epenthesis (underscored) on the prefix,
viz. př$\underline{e}$de- C_1C_2..., roz$\underline{e}$- C_1C_2, pod$\underline{e}$- C_1C_2..., od$\underline{e}$- C_1C_2...., etc.

Scheer observes that such alternations conspiring to avoid overlong clusters
of consonants, are not unusual. He adduces an example from Standard German
involving syncope: inneren "internal" can be optionally pronounced [inr∂n] or
[in∂r∂n], but the superlative of the same adjective *innerste*, cannot be
pronounced with syncope on account of the heavy cluster created by suffixation
of *+st∂*.
Yet, familiar as the alternating pattern in (29) may seem, Scheer notes that
many Czech forms fail to conform to it. Several examples of departure are
given in (30a), along with unrelated forms in (30c) documenting for
comparison, the "expected", alternating pattern just discussed above in (29).
(30)
a.   b   c.

actual   expected   conforming

bez-grāvī "lawlessness,n."   *bez$\underline{e}$-grāvī   př$\underline{e}$de-prat
roz-breč   "cause s.o. to cry, Inf., Perf." *roz$\underline{e}$-breč   roz$\underline{e}$-bran
roz-drobit "crumble up, Inf., Perf."   *roz$\underline{e}$-drobit   roz$\underline{e}$-drat

The striking feature of the forms in (30) is, of course, the conspicuous
absence of epenthetic **e** before stem initial pr..., br..., and dr... in (30a)
and its presence, paradoxically, before the very same clusters in (30c).

Scheer's explanation consists in relating this puzzling behavior with other
systematic differences consistently opposing the two blocks. For instance, an
important generalization emerges when thematic vowels and suffixes are
separated from the roots to which they attach, as shown in the slanted forms
in (31).

---

[13] I rely mostly on the data and analyses of Scheer (1996). Readers familiar with Czech and/or
Slavic will easily think of seemingly problematic cases not covered in the highly cursory
discussion conducted here. They are urged to consult Scheer (1996) directly for an encompassing
discussion of the synchronic, diachronic, and philological facets of the phonological and
morphological issues only briefly dealt with here.
[14] Of course, the items under discussion here are only very loosely glossed.

(31)

        a.   b.

```
ode-brat   /br-a-t/         bez-bradī /brad-ī/   "chinless, adj."
přede-prat /pr-a-t/         vz-pruha  /pruh-a/   "boost, n."
roze-drat /dr-a-t/          bez-dřevī /dřev-ī/   "containing no wood, adj."
přede-hra  /hr-a/ "overture"  od-hrabat /hrab-a-t/ "rake, Inf., Perf."
```

Evidently, the shape of the roots, requiring the long form of the prefix in (31a) is √CC, whereas roots requiring the short form of the prefix in (31b) are of form √CCVC.

Moreover, roots of the first type, √CC, characteristically display the type of allomorphy already discussed and repeated for convenience in (32), where the first two consonants are sometimes separated by a vowel, sometimes not.
(32)

a.   b.

```
od-bīrat  "take away, Inf. Imp."  ode-brat "take away, Inf., Perf."
roz-deru  "I will scratch"        roze-drat "scratch, Inf., Perf."
před-peru "I will prewash"        přede-prat "prewash, Inf.,Perf."
```

By contrast, roots of the second type never display any such paradigmatic allomorphy disrupting the adjacency of their two consonants.[15]
Scheer proposes to represent the two types of roots as shown in (33) where the **v** of Type 1 stands for the site of alternation of vowels with zero, and the **V** of Type 2 for a stable vowel.
(33)

Type 1   Roots with alternately present and absent vowel: √CC

Type 2   Roots with unsplittable initial cluster and stable vowel: √CCVC

Scheer elegantly relates in direct fashion the operation of epenthesis on the prefix to root structure. I first demonstrate how Scheer deals with Type 1 roots. The two consonants flanking the v of Type 1 roots exemplified below are always separated by a templatic V slot (in bold italics in (34)), a consequence of the strict CV representational format adopted (Lowenstamm 1996). When a vowel is present in that position (34a), it properly governs - in the sense of Kaye et al. 1990 - the final prefixal vocalic position. As a consequence, no epenthesis is necessary. On the other hand, the absence of a vowel in (34b) leaves the final vocalic position of the prefix ungoverned, thus triggering epenthesis.

---

[15] For instance, whereas od-birat is the Imperfective corresponding to ode-brat, the Imperfective corresponding to od-hrabat is formed by suffixation: od-hrabāvat, not *od-hirabat

(34)

```
        a.                              b.
         ┌────────┐                      ┌───┬──┐
         │        │                      │  /   │
         ↓                               ↓      ↓
  C V C V + C V C + V            C V C V + C V C+V + C V
  | | | |   | | |   |            | | | ↑   | | ↑   | |   |
  r o z     d e r   u            r o z │   d ° r a   t
                                        │
                                        e
```

              [roz-deru]   [roze-drat]

In effect, under Scheers' view, the two consonants flanking the alternating
vowel site of Type 1 are the initial and the last root consonants, the *Anlaut*
and the *Auslaut* of the root, respectively. By contrast, in Type 2 roots, the
entire consonantal span to the left of the V, _VC, is the root's *Anlaut*.
A two-pronged prediction directly follows:
(35)

    i.   With respect to epenthesis-triggering Type 1 roots, no restriction
          is expected to constrain the class of segments lexically occuring
          in two such mutually independent radical positions as the first
          and the last. Thus, when v is absent, the entire gamut of
          imaginable sequences of two consonants is expected to arise: the
          range of sequences of consonants appearing to the right of the
          long form of the prefix will thus be unrestricted.
    ii.   With respect to Type 2 roots, their initial, unsplittable
          sequences, to the extent that they represent their lexical
          Anlauts, are expected to conform to phonotactic restrictions the
          range of sequences of consonants appearing to the right of the
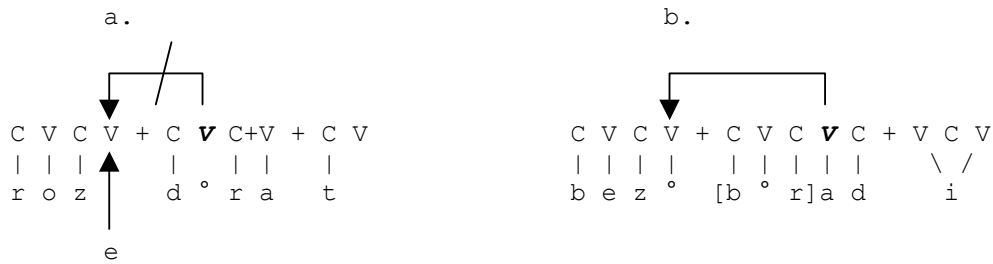   short form of the prefix **will** be restricted.

By and large, both aspects of the prediction are borne out.
(36)
    i.   Type 1 roots in their zero grades typically display mirror image
          effects. Thus obstruents and sonorants are allowed to occur in any
          order: *roze-**žr**at* vs. *roze-**rv**at*, *beze-**dn**ī* vs. *ode-**mk**nout*, etc.
    ii.   The unsplittable sequences of Type 2 roots are overwhelmingly
          of rising sonority, viz. kl, fr, etc. preceded or not by
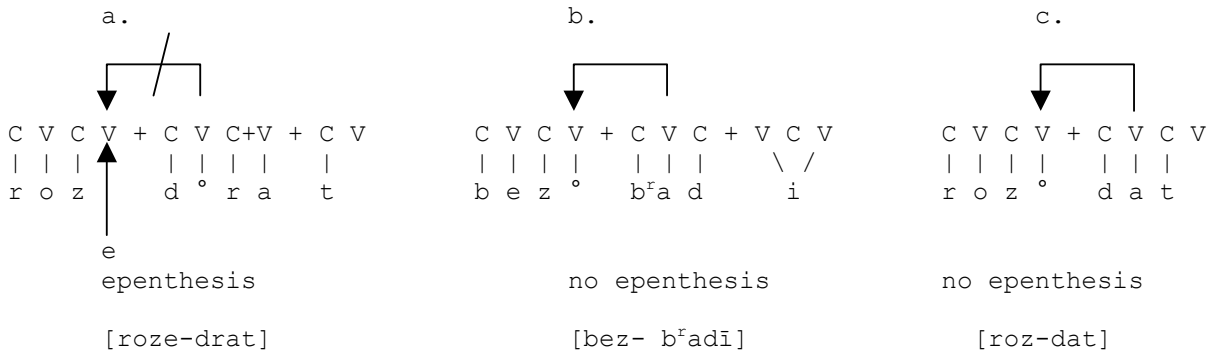   sibilants, *viz. šk*, *zp*, etc.

Of especial interest here is the differential treatment of *mcl*s: on the one
hand, in roots with alternating vowels, the rise of the zero grade will bring
about apparent "clustering" of the type analyzed and illustrated in (34), roz-
deru vs. roze-**dr**at which typically trigger epenthesis on the prefix; on the
other hand, we have unsplittable clusters such as bez-**br**adī, with no effect on
the prefix. Consistant with his representational assumptions with respect to
syllable structure, Scheer analyzes those as shown in (37b). In (37b), Scheer
proposes, the bracketed domain constitutes a closed, self-sufficient segmental
island. The empty nucleus trapped inside it requiring no government, the
position (bold italics) phonetically identified by vowel a directly governs
the final vocalic position of the prefix. Scheer then goes on to develop an
encompassing theory of such autonomous domains as can be jumped over by
government, cf. also Scheer (1998).

(37)

```
            a.                                    b.
               ___/|                                 _____
              |    |                                |      |
              ↓    |                                ↓      |
   C V C V + C V C+V + C V            C V C V + C V C V C + V C V
   | | | ↑   |   | |   |              | | | |   | | | | |   \ /
   r o z |   d ° r a   t              b e z ° [b ° r]a d     i
         |
         e
```

I would like to suggest an alternative account. To all intents and purposes,
the cluster construed as an autonomous domain in (37b) functions as a single
segment with respect to its lack of effect on the final prefixal vowel.
Suppose it **is** a single segment as represented in (38b). Then, its behavior is
no different from that of another root-initial single segment such as
illustrated in (38c). Both continue to contrast in the desired way with the
behavior of an alternating "root" such as (38a) repeated for convenience.
(38)

```
     a.                              b.                          c.
        ___/|                           _____                      _____
       |    |                          |      |                     |      |
       ↓    |                          ↓      |                     ↓      |
 C V C V + C V C+V + C V      C V C V + C V C + V C V      C V C V + C V C V
 | | | ↑   | | | |   |        | | | |   | | |   \ /        | | | |   | | |
 r o z |   d ° r a   t        b e z ° b ͬa d     i          r o z °   d a t
       |
       e
   epenthesis                     no epenthesis                no epenthesis

   [roze-drat]                    [bez- b ͬadī]                 [roz-dat]
```

An added benefit of viewing unsplittable clusters as single segments is the
rationalization it affords of the organization of the root system.
In Scheer's view of the root system, as I understand it, a major dichotomy
splits it down the middle, opposing "alternating" roots and "stable" roots.
(39)

Alternating roots: (od-)***bīr***-a-t/(ode-)***b°r***-a-t (√b_r)

Stable roots: ***mīx***-a-t "mix, stir" (√m_x), ***maz***-a-t "spread" (√m_z)
                          (od-)***hrab***-a-t "rake" (√hr_b), (vz-)***pruh***-a "boost, n."
                          (√pr_h)

A striking property emerges from (39): the *Anlaut* of alternating roots
consists of one consonant, whereas the *Anlaut* of stable roots includes one
(√C...) or more (√C..., √CC..., etc.). Such a distribution is exactly what one
expects under Scheer's analysis: roots with initial "closed domain" are not
expected to display the zero grade. On the other hand, the distribution in
(39) makes no sense if my claim is correct. Indeed, if *mcl*s are single
segments (40b) as opposed to being bisegmental complexes as in (40a), they
should be freely distributed in all root positions – only *Anlauts* will be
considered here - irrespective of whether a root is of the alternating type or
not. The two competing views are represented in (40) with their respective
analyses of (od-)***hrab***-a-t.

(40)

        Scheer's view   my view

        (od-)[***h°r***]***ab***-a-t   (od-)***hʳab***-a-t

In fact, roots with initial *mcl*s are NOT barred from membership in the
alternating class. Several exemples appear in (41), with the initial *mcl* and
the site of alternation indicated under "root". In the zero grade, the feature
of secondary articulation simply vocalizes.[16]
(41)

vocalized grade	zero grade	root
vˡažit "cool off", Inf., Imp."	vḷhnout "become wet, Inf., Perf."	√vˡ_h
od-kʳevnit "bloodlessness, n."	od-kṛvit "bloodlessness, n."	√kʳ_v
roz-mʳazit "unfreeze", Inf. Perf."	roz-mṛznout "melt, Inf., Perf"	√mʳ_z
pod-vʳātit "overthrow, Inf. "	pod-vṛtnout "twist (ankle), Inf."	√vʳ_t
pʳīskat "crack (paint)"	roz-pṛsknout "explode"	√pʳ_sk

The set of data in (41) is significant in two respects. First, it provides
additional evidence for Scheer's contention that the *Anlaut* of alternating
roots is followed by an empty vocalic position in the zero grade. When that
position is realized by the vocalization of a liquid, the short form of the
prefix surfaces (roz-mṛznout, not * roze-mṛznout), as he would predict based
on his discussion on p. 55 ff. of Scheer (1996). Second, it makes it possible
to simplify the characterization of a root *Anlaut* in Czech.
(42)
    a) Root *Anlaut*s in Czech consist in one single consonantal position
                (optionally preceded by a sibilant).
    b) The distributional privileges of consonants on that position are
                    unrestricted.

4.   Over the edge

In this section, I will tap antistrophy, known as *contrepet* (counterfart) in
French, a less traditional but potentially rich source of evidence for the
monosegmentality of *mcl*s. Antistrophy is a word game whereby segments, or
stretches of segments, of an input sentence exchange places in a kind of
metathesis over a syntactically unbounded domain (Antel, 1990). Instances of
contrepet are thus formally similar to spoonerisms. The difference is
contrepet is deliberately produced or teased out of an innocent input. The
greater the contrast between the inocuousness of the input and the obscenity
of the output, the more successful the *contrepet*. In his compilation of
spoonerisms, Birgolski (1962) quotes a headline of The Sri Lanka Clarion of
May 5, 1956 as a potential source of *contrepet* (43).[17]
(43)
               Rice Issue Likely to Delay Mayoral Election

The key lies of course in detecting which permutation will derive a felicitous
contrepet.

---

[16] Such a behavior is typical of secondary articulations, either optionally or obligatorily. Thus,
in Chaha, the Imperative Fem. Sg. of ċäqʷäsä "he begged" can be pronounced [ṭäqʷɪš] or [ṭäqŭš].
[17] Birgolski's later inquiries into the Clarion staff revealed that (43) had been intentionally
formulated in order to ridicule the mayor of Chattandhyana (Claire Birgolski, p.c.).

I submit that the derivation of a successful *contrepet* resulting from the permutation of an *mcl* and a *bona fide* simple obstruent counts as evidence for the monosegmentality of the former. It is my pleasure on this occasion to present Jonathan with a bisentential *contrepet* input exhibiting exactly those characteristics, (44). If I failed to convince him that my representational proposal for *mcl*s is sound, there is always the *contrepet* for him to work out...[18]

(44)

      Le barrage de la Garonne a été inondé.   Son flux est à la cote.
        The dam on the Garonne river was flooded. Her flow has reached the critical mark.

5.   Conclusion

In this paper I have argued that the behavior of *mcl*s constitutes no argument for branching onsets. Do onsets ever branch ?

References

Antel, J. (1990) *Le contrepet quotidien*, Editions Ramsay/Jean-Jacques Pauvert, Paris

Birgolski, B. (1962) S*poonerisms et contrepets* Editions La Rue du Quai, Paris

Blevins, J. (1995) The Syllable in Phonological Theory in Goldsmith (1995)

Broselow, E. (1995) Skeletal Positions and Moras in Goldsmith (1995)

Cairns, C. (1988) Phonotactics, Markedness and Lexical Representation, *Phonology* 5:2 209-236

Clements, G.N. (1985) The Problem of Transfer in Nonlinear Morphology, *Cornell Working* Papers *in Linguistics* 7: 38-73

Constantino, E. (1971) *Ilokano Dictionary*, University of Hawaii Press

Davis, S. (1988) Syllable Onsets as a Factor in Stress Rules, *Phonology* 5:1, 1-19

Everett, D. & K. Everett (1984) Syllable Onsets and Stress Placement in Pirahã, *Proceedings of the West Conference on Formal Linguistics* 3, 105-116

Fujimura, O. & J.B. Lovins (1978) Syllables as Concatenative Units in A. Bell & J.B. Hooper (eds.) *Syllables and Segments*, unabridged version distributed by IULC

Goldsmith, J. (1995) The *Handbook* of *Phonological* Theory (ed.),Basil Blackwell, Oxford

Halle, M. & J.R. Vergnaud (1980) Three Dimensional Phonology, *Journal of Linguistic Research* 1, 83-105

Hayes, B. (1981) *A Metrical Theory of Stress Rules*, Doctoral Dissertation, MIT

Hayes, B. & M. Abad (1989) Reduplication and Syllabification in Ilokano, *Lingua* 77, 331-374

Hirst, D. (1985) Linearisation and the Single-segment Hypothesis *Grammatical Representation, J.* Guéron, H. Obenauer & J.Y. Pollock (eds.) pp. 87-100, Foris, Dordrecht

Hyman, L. (1985) A Theory of *Phonological Weight,* Foris, Dordrecht

Hyman, L., S. Inkelas & G. Sibanda (1998) Morphosyntactic Correspondence in Bantu, ms. University of California at Berkeley

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[18] In order to protect the editor's reputation and Mouton's good name, I guarantee that the output corresponding to (44) ranks in the bottom 10% on a scale of increasing social unacceptability.

Kaegi, A. (1903) *Griechische Schulgrammatik*, Weidmannsche Buchhandlung, Berlin

Kaye, J.D., J. Lowenstamm & J.R. Vergnaud (1990) Constituent Structure and Government in Phonology, *Phonology* 7, 193-231

Kiparsky, P. (1986) *The Phonology of Reduplication*, ms. Stanford University

Lejeune, M. (1972) *Phonétique du grec ancien et du mycénien,* Klincksieck, Paris

Levin, J. (1983) *Reduplication and Prosodic Structure*, ms. MIT

Levin, J. (1985) *A Metrical Theory of Syllabicity*, Doctoral Dissertation, MIT

Liberman, M. & A. Prince (1977) On Stress and Linguistic Rhythm, *Linguistic Inquiry* 8

Lopez, C. (1928) *Comparison of Tagalog and Iloko*, Doctoral Dissertation, University of Hamburg

Lowenstamm, J. (1996) Five Puzzling Chaha Verbs *Essays on Gurage Language andnCulture Dedicated to Wolf Leslau on the Occasion of his 90th Birthday*, G. Hudson (ed.), Harrassowitz Verlag, Wiesbaden pp. 123-133

Lowenstamm, J. (1996) CV as the Only Syllable Type, *Current Trends in Phonology, Models and Methods,* J. Durand & B. Laks (eds.), European Studies Research Institute, Salford. pp.419-443

Lowenstamm, J. (2001) The Image of a Segment, *Naturally ! Linguistic Studies in Honour of Wolfgang Ulrich Dressler presented on the Occasion of his 60th Birthday*, C. Schaner-Wolles, J. Rennison & F. Neubarth (eds.), pp. 281-290, Rosenberg & Sellier, Torino

Lowenstamm, J. (2002) *A Note on the Segmental Identification of Templatic Sites*, ms. Université Paris 7

Lowenstamm, J. (in preparation) *An Essay on the Grammatical Significance of Phonological Quantity*

Lowenstamm, J. & J. Kaye (1986) Compensatory Lengthening in Tiberian Hebrew *Studies in Compensatory Lengthening* 97-146, L. Wetzels & E. Sezer, (eds.), Foris, Dordrecht

Marantz, A. (1982) Re reduplication *Linguistic Inquiry* 13: 435-482

McCarthy, J. (1979) *Formal Problems in Semitic Phonology and Morphology*, Doctoral Dissertation, MIT

McCarthy, J. (1981) A Prosodic Theory of Nonconcatenative Morphology, *Linguistic Inquiry* 12: 373-418

McCarthy, J. & A. Prince (1995) Prosodic Morphology in Goldsmith (1995)

Nanni, D. (1977) Stressing Words in –ative, *Linguistic Inquiry* 8, 752-763

Petros, D. (2000) *Sound Mutations – The Morphophonology of Chaha*, John Benjamins, Amsterdam

Pike, K. & E. Pike (1947) Immediate Constituents of Mazateco Syllables, *International Journal of American Linguistics* 13: 78-91

Rennison, J. (1998) Contour Segments without Subsegmental Structure, in *Structure and Interpretation – Studies in Phonology*, E. Cyran (ed.) Wydawnictwo Folium, Lublin

Scheer, T. (1996) *Une théorie de l'interaction directe entre consonnes*, Doctoral Dissertation, Université Paris 7

Scheer, T. (1998) A Theory of Consonantal Interaction, *Folia Linguistica* XXXII/3-4: 201-237

Steriade, D. (1982) *Greek Prosodies and the Nature of Syllabification*, Doctoral Dissertation, MIT

Steriade, D. (1988) Reduplication and Syllable Transfer in Sanskrit and Elsewhere, *Phonology* 5:73-155

Steriade, D. (1997) Complex Onsets as Single Segments in *Perspectives in Phonology*, J. Cole & C.Kisseberth (eds.), Center for the Study of Language and Information, Stanford