Remarks on mutæ cum liquidā and branching onsets*

Jean Lowenstamm

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 recognising a muta cum liquidā in the sense of 19th 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 characterise 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’us]

That is, the syllabic analyses of (1) are correct, but the segmental analysis of the muta cum liquidā 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’, k’
that of Sanskrit includes the former plus their aspirate counterparts ($k_h, g_h, k'_h, k''_h, g'_h, g''_h$), 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 $t'$, the other with consonant $d$), with no prosodic difference between them. This is not a new idea, as Fujimura and 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 organisation 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 palatalised ejective coronal, $\ddot{c}$, present (underscored) in the first two verbs. Forms from the paradigm of the third verb are provided as representatives of regular quadriliteral behaviour for the sake of control.

\[
\begin{align*}
(3) & \quad a. \quad b. \quad c. \\
& \quad 3\text{sg.m.} \quad \text{fièänäq-ä} \quad \text{qwäräł-ä} \quad \text{msäkär-ä}
\end{align*}
\]

The first important observation is that $i$, the high central vowel vocalising $C_1$ 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: *fièänäqi* displays four consonants, $f$, $\ddot{c}$, $n$, and $q$; but *qwäräł* appears to display only three: $q^w$, $r$, and $\ddot{c}$. The solution consists in recognising two different phonological objects behind the unique phonetic notation $\ddot{c}$ (adequate as such): $h^2/\ddot{c}$ and $h7\ddot{c}$. In other words, the roots of the two verbs are $\sqrt{f}nq$ and $\sqrt{q^wrt}$. This is the key to an explanation
of the puzzling behaviour, exemplified in (4) of the same stems before consonant initial agreement markers.

(4) 

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<tr>
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<th>a.</th>
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<th>c.</th>
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<tbody>
<tr>
<td>1sg.</td>
<td>fićänäq-xʷ</td>
<td>qʷträqä-xʷ</td>
<td>msäkär-xʷ</td>
</tr>
<tr>
<td>2sg.m.</td>
<td>fićänäq-xä</td>
<td>qʷträqä-xä</td>
<td>msäkär-xä</td>
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In the forms in (4a, c), the last root consonant directly abuts 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) 

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<tr>
<td>1sg.</td>
<td>fićänäq-xʷ</td>
<td>/qʷträqäy-xʷ/ &gt; [qʷträqäyxʷ]</td>
<td>msäkär-xʷ</td>
</tr>
<tr>
<td>2sg.m.</td>
<td>fićänäq-xä</td>
<td>/qʷträqäy-xä/ &gt; [qʷträqäyäxä]</td>
<td>msäkär-xä</td>
</tr>
</tbody>
</table>

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 (6b), while the ensuing hiatus is broken up by insertion of w, a detail of no importance here:

(6) 

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<th>c.</th>
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<tbody>
<tr>
<td>3pl.m.</td>
<td>fićänäq-o</td>
<td>/qʷträqä-o/</td>
<td>msäkär-o</td>
</tr>
<tr>
<td>2pl.f.</td>
<td>fićänäq-äma</td>
<td>/qʷträqäy-äma/ &gt; msäkär-äma</td>
<td></td>
</tr>
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</table>

More arguments could be adduced showing the bisegmentality of surface č in qʷträqä, 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 fićänäqä.

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.¹
The two types of representations argued for here mesh perfectly with this pattern.

(7)  
\[ \text{1sg.} \quad \ddot{a}-\dddot{f}c^\dddot{q} \quad \ddot{a}-q^w\dddot{r} \dddot{c} \quad \ddot{a}-ms\ddot{a}k\ddot{r} \]  
\[ /\ddot{a}-f^2t^\ddot{a}nq/ \quad /\ddot{a}-q^w\dddot{r}t^\ddot{a}y/ \quad /\ddot{a}-ms\ddot{a}k^r/ \]  

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\textsubscript{1} appears to the left of the stem vowel, while C\textsubscript{2}, C\textsubscript{3} and C\textsubscript{4} appear to its right. Here too, it will be seen that the proposed differential representations of ċ fit the C\textsubscript{1} ċ C\textsubscript{2} C\textsubscript{3} C\textsubscript{4} pattern.

(8)  
\[ \text{2sg.m.} \quad f\ddot{a}n^\ddot{c}^2q^2 \quad q^w\dddot{a}n^\ddot{c}^3 \quad m\ddot{a}k\ddot{r} \]  
\[ /f\ddot{a}n^\ddot{a}nt^\ddot{a}q/ \quad /q^w\dddot{a}n^\ddot{a}t^\ddot{y}/ \]  

The argument made here for the ambiguous phonological status of phonetic ċ extends to the entire range of phonetic palatalised segments of Chaha, ʃ \{s\textsuperscript{y}, sy\}, f \{d\textsuperscript{y}, dy\}, ͡ž \{z\textsuperscript{y}, zy\}, ċ \{t\textsuperscript{y}, ty\}, k\textsuperscript{y} \{k\textsuperscript{3}, ky\}, g\textsuperscript{y} \{g\textsuperscript{y}, gy\}, q\textsuperscript{y} \{q\textsuperscript{y}, qy\}, ė \{x\textsuperscript{y}, xy\}. In fact, it carries over to rounded velars and labials as well, k\textsuperscript{w} \{k\textsuperscript{w}, kw\}, g\textsuperscript{w} \{g\textsuperscript{w}, gw\}, q\textsuperscript{w} \{q\textsuperscript{w}, qw\}, ċ\textsuperscript{w} \{f\textsuperscript{w}, fw\}, m\textsuperscript{w} \{m\textsuperscript{w}, mw\}. Thus, it can be shown by parallel arguments that say, ḥr\textsuperscript{a}q\textsuperscript{w}-\ddot{a} ‘he became deaf’, is a glide final quadriradical from root √hrqw, whereas q\textsuperscript{w}imāq\textsuperscript{w}ām-\ddot{a} ‘it was toasted’, is a quadriradical from a root involving monosegmental labiovelars, √q\textsuperscript{w}m+q\textsuperscript{w}m.

In this section, I argued based on evidence from the same language for the need to recognise 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)  
\[ [C^x] \]  
\[ /C^x/ \quad /Cx/ \]
Syllabically, the two phonological segments in (9) will be classically analysed as shown in (10) with second masculine singular examples, where the rightmost syllable is the agreement marker.

\[(10)\]

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<tbody>
<tr>
<td></td>
<td>2sg.m.</td>
<td>2sg.m.</td>
</tr>
<tr>
<td></td>
<td>[fı][tӾä][nāq] [xä]</td>
<td>[qı][rāt] [yā] [xä]</td>
</tr>
<tr>
<td></td>
<td>[ćänäqxä]</td>
<td>[ćāxä]</td>
</tr>
</tbody>
</table>

I submit that 1. the structural contrasts in (9) and (10) exhaust the range of necessary distinctions, 2. *mutæ cum liquidā* pattern as complex segments, and 3. 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 *mutæ cum liquidā* make no difference in stress assignment because they are monosegmental. In section 2, I compare the differential treatment of *mutæ cum liquidā* 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 *mutæ cum liquidā*. 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 *mutæ cum liquidā* in stress systems**

One of the important results of a decade of work, roughly 1975–1985, on the theory of phonological representations is the formulation of explicit theories of metrical structure (Halle and Vergnaud 1980; Liberman and Prince 1977; Hayes 1981). Some of the most significant generalisations 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 Rhyme of a heavy syllable — by contradistinction with that of light syllables (11a) — either branches (11b), or dominates a branching node (11c).

(11) a. b. c.

Quite strikingly, the very same distinction in onsets — branching versus non-branching — is of no consequence on stress assignment. As Halle and Vergnaud (1980) put it, “stress assignment rules are sensitive to the structure of the syllable rhyme, but disregard completely the character of the onset”. In fact, the difference between branching and non-branching onsets appears to make little or no difference in any area of grammar.

Consider, for instance, a standard account of foot well-formedness in a left-headed quantity-sensitive language such as characterised by Hayes (1980).

In such a language, (12a) is a well-formed trochaic foot: its head \( \sigma_1 \) dominates a branching rhyme; the complement of its head \( \sigma_2 \) does not. (12b), on the other hand, is an ill-formed trochee as \( \sigma_2 \), the complement of its head, does dominate a branching rhyme. (12c), a non-branching (degenerate) foot dominating a branching rhyme, 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 \( \Sigma \) and \( \sigma_2 \): when \( \Sigma \) does not branch, a licit foot such as (12c) arises.
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(12) a. Well-formed  b. Ill-formed  c. Well-formed

```
Σ
  \sigma_1 \sigma_2
|
R     R
C V   C C V
```

Implicit in this account is, of course, the assumption that rhymal 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, e.g., Goldsmith (1990).

(13) The syllable itself, a structure branching into an onset and rhyme, 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?

(15)

\[
\begin{array}{c}
\Sigma \\
\sigma \\
? \\
O \quad R \\
C \quad C \quad V \quad C
\end{array}
\]

Heavy

In spite of various attempts at rationalising the irrelevance of the branching/non-branching distinction in onsets while at the same time emphasising the crucial import of the same distinction in rhymes, the problem has not vanished. In fact, it stands as an ongoing unacknowledged embarrassment for metrical theory that a remark such as Halle and 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 *mutæ cum liquidā*.

If *mutæ cum liquidā* 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* \([\underline{a}t\underline{\text{i}}\underline{s}\underline{n}]\) is no more a branching onset than that in *addition* \([\underline{a}d\underline{\text{i}}\underline{s}\underline{n}]\), the difference between, say *manta* and *mantra* is strictly segmental. Whether single consonants *b* or *b’,* *k* or *k’,* *t* or *t’,* etc., appear in any given onset position amounts to no difference in onset geometry, as shown in the boxed portions of (16).
If the mode of representation advocated here is correct, it entails Halle and Vergnaud’s observation. In this section, I have suggested that the burden of reducing the problem of the inertia of mute cum liquidā in stress systems rests with segmental analysis, not metrical theory. In the next section, I turn to reduplication.

2. Ilokano and Greek Reduplication

There is a rich recent literature on reduplication (Clements 1985; L. Hyman, Inkelas, and Sibanda 1998; Kiparsky 1986; Marantz 1982; McCarthy and Prince 1986, 1995b; Steriade 1988; and references therein). No attempt will be made here at choosing 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 mute cum liquidā. 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 more recently from English are numerous, and may involve initial and internal mute cum liquidā (presidente ‘president’, grado ‘grade in school’, poblasyon ‘village’,
etc.). Ilokano forms reduplicative plurals by prefixing a heavy (CVC) reduplicative affix to the base of a verb (Hayes and Abad 1989).8

(17) a. kal-diŋ ‘goat’ kal-kal-diŋ
   b. pus-a ‘cat’ pus-pus-a
   c. klase ‘class’ klas-klase
   d. jyanitor ‘janitor’ jyan-jyanitor

A noun such as klase (17c) reduplicates the entire initial muta cum liquidā. This fact and others, forms the basis of an influential argument put forth by McCarthy and Prince (1995b) 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 Rhyme 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 #kV… and #dy… Moreover, McCarthy and 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. kal-kal-diŋ b. pus-pus-a c. *kla-klase

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).
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(19) a. kal-kaldiŋ b. pus- pusa c. *kla- klase

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 its full realisation.

An interesting feature of this entire discussion is the unanimous, uncritical acceptance of the idea that Ilokano mutæ cum liquidā are bipositional as in (18c) or (19c). The underlying tacit assumption is of course that mutæ cum liquidā 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” characterisation 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.

Thus, the real issue, I submit, has less to do with the theory of reduplicative morphology than with the proper representation of Ilokano mutæ cum liquidā. 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 mutæ cum liquidā 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
count of loans in Ilokano had little impact on the syllable structure
of the language. Thus, the native vocabulary tolerates at most bicon-
sonantal clusters intervocally. The only significant set of apparent
exceptions involves postconsonantal *mutae cum liquidā* as in the
loans in (21a). However, to the extent that such clusters can be ana-
ysed as in (21b), the original restriction on the upper limit of inter-
vocalic cluster can be viewed as still being in full force.

\begin{center}
(21) a. Three segments
\begin{tabular}{ll}
\textit{administrasyon} & ‘administration’ \\
\textit{komplikasyon} & ‘complication’
\end{tabular}
\begin{tabular}{l}
\textit{administrasyon} \\
\textit{komplikasyon}
\end{tabular}

\begin{tabular}{ll}
\textit{administrasyon} & ‘administration’ \\
\textit{komplikasyon} & ‘complication’
\end{tabular}
\begin{tabular}{l}
\textit{administrasyon} \\
\textit{komplikasyon}
\end{tabular}
\end{center}

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 lan-

Greek offers evidence of a different nature. 9 Reduplication is the
vehicle of several derivational operations in Greek. In this subsec-
tion, I discuss the behaviour of *mutae cum liquidā* in the context of
one such operation, Perfect formation. Perfect formation involves the
phonetic interpretation of a light CV affix, a process partially exem-
plified in (22).10 The reduplicative affix is uniformly vocalised e,
and its onset is a copy of the root-initial consonant (22a). When the
root begins in a *muta cum liquidā*, as in (22b), the *muta*, but not the
*liquida*, is copied onto the reduplicative affix, thus in the case of
\textit{grafh-o}, \textit{ge-graphh-eu-ka}, not *\textit{gre-graphh-euka}.

\begin{center}
(22) a. \textit{luo} \hspace{1cm} \textit{le-luka} \\
\textit{paideuo} \hspace{1cm} \textit{pe-paideuka}
\end{center}

\begin{center}
(22) b. \textit{grafh-o} \hspace{1cm} \textit{ge-graphh-eu-ka} \hspace{1cm} *\textit{gre-graphh-euka} \\
\textit{pleo} \hspace{1cm} \textit{pe-pleuka} \hspace{1cm} *\textit{ple-pleuka}
\end{center}

This case can be handled in straightforward fashion by most theories
and the correct output is successfully derived under left-to-right asso-
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ciation as proposed by Marantz (1982), as shown in (23); parafixation (Clements 1985); full copy (Steriade 1998); and, with minor adjustments, prosodic reduplication alla McCarthy and Prince (1986, 1995b).

(23) a. b.

\[
\begin{array}{c|c|c|c|c|c|c}
\text{[CV]} & \text{.} & \text{CV} & \ldots & \text{[CV]} & \text{.} & \text{CC VC} & \ldots \\
\hline
\text{e} & \text{l u} & \\
\text{l u} & \\
\end{array}
\]

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 \( g' \) is a single segment, as advocated here, there is room enough for it in the CV affix. Thus, the view that mutæ cum liquidā are single complex segments, forces a rather different construal of the data, one which will be spelled out directly.

It should 1. account for Greek, 2. draw the line between the Greek treatment with pruning of the liquida, and the Ilokano treatment without pruning.

I submit that Greek mutæ cum liquidā 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) Reduplicate complex segments: YES/NO.

Under (24), all features of secondary articulation of Ilokano consonants should be manifested in the reduplicative affix. This includes the liquid part of mutæ cum liquidā, hence \([k'\text{l}as-k'\text{l}a\text{se}], [t'\text{ab}-t'\text{abah}o], \) etc. Another likely candidate is palatalisation. McCarthy and Prince (1986, 1995b), following Hayes and Abad (1989), represent palatalised segments as bi- rather than monoconsonantal, i.e. \([j\text{yanitor}]\).
However, Hayes and Abad (1989: 333) in their discussion of the coronal consonants of the language and the corresponding palatalised series explicitly contemplate an alternative:

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

Suppose a variant of Hayes and Abad’s view is adopted, though one involving a more conservative representation of palatalisation, namely /č/, /dč/, /š/. Then, the plural of janitor, [d'an-d'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 mutæ cum liquidā exemplified in [t'a-b-t'a-baho], 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 simplification in the course of reduplication.

(25)

\[
[C\cdot V] - C\cdot V\cdot C…
\]

\[
e\text{ g'achp}_{ph}
\]

Decomplexification: \[
g\text{ g'achp}_{ph}
\]

Simplification is a loose term to refer to the deletion of a feature of secondary articulation, here \textquoteleft. If clipping of secondary articulations is really involved in Greek reduplication, its effects should be felt beyond mutæ cum liquidā.

Now, consider the facts of (26).

(26) \textit{pe-pheug-a} ‘I have fled’ *\textit{pe-pheug-a}
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.

\[
\begin{array}{lllll}
(27) & \text{Initial Cs} & \text{Present} & \text{Gloss} & \text{Active} & \text{Medio/passive perfective} \\
& t_h & t_h'ao & \text{‘offend’} & te-t_h'aka & te-t_h'asmai \\
& t_h' & t_h'ao & \text{‘break’} & te-t_h'^asa & te-t_h'^asmai \\
& p_h & p_h'ego & \text{‘set on fire’} & pe-p_h'egma & pe-p_h'^asmai \\
& p_h' & p_h'ad'io & \text{‘explain’} & pe-p_h'^a & pe-p_h'^asmai \\
& k_h & k_h'ontidzo & \text{‘boil’} & ke-k_h'aden \text{ (3sg.)} & ke-k_h'^onika \\
& k_h' & k_h'ontidzo & \text{‘last’} & ke-k_h'^onika & \\
\end{array}
\]

The general format of the operation is given in (28) where $C_x^y$ is a consonant with secondary articulations.
In this section, I have tried to show that Ilokano and Greek *mute cum liquid* 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 behaviour — bisegmental/heterosyllabic versus complex monosegmental/*muta cum liquid* — of obstruent–liquid sequences.

3. Czech

Of interest here is the behaviour 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).

$$\begin{align*}
\text{(29)} \quad (a) & \quad \text{od-}břat & \text{‘take away (inf. imp.)’} & \text{ode-}brat & \text{‘take away (inf. perf.)’} \n(b) & \quad \text{roz-}deru & \text{‘I will scratch’} & \text{roze-}drat & \text{‘scratch (inf. perf.)’} \\
& \quad \text{před-}puru & \text{‘I will prewash’} & \text{pře-}de-prat & \text{‘prewash (inf. perf.)’}
\end{align*}$$

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 Perfec-
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tive forms of (29b), the absence of a vowel after the initial stem consonant triggers epenthesis (underscored) on the prefix, viz., \( \text{přede-}C_1C_2\ldots \), \( \text{roze-}C_1C_2\), \( \text{pode-}C_1C_2\ldots \), \( \text{ode-}C_1C_2\ldots \), 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 [\( \text{inr}^\text{Ă} \text{r\text{Ă}} \) or [\( \text{inr}^\text{Ă} \text{a\text{Ă}} \), 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 alternating pattern just discussed above in (29).

(30) a. Actual

\( \text{bez-grāvī} \) ‘lawlessness’
\( \text{roz-breč} \) ‘cause s.o. to cry (inf. perf.)’
\( \text{roz-drobit} \) ‘crumble up (inf. perf.)’

b. Expected

\( *\text{beze-}\text{grāvī} \) \( \text{přede-}\text{prat} \)
\( *\text{roze-}\text{breč} \) \( \text{roze-}\text{bran} \)
\( *\text{roze-}\text{drobit} \) \( \text{roze-}\text{drat} \)

c. Conforming

The striking feature of the forms in (30) is, of course, the conspicuous absence of epenthetic *e* before the stem-initial clusters of (30a) and its presence before similar clusters in (30c).

Scheer’s explanation consists in relating this puzzling behaviour with other systematic differences consistently opposing the two blocks. For instance, an important generalisation emerges when thematic vowels and suffixes are separated from the roots to which they attach, as shown in the slanted forms in (31).
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. od-bīrat /br-a-t/ 'take away (inf. imp.)'
    bez-bradī /brad-ī/ 'chinless'
    přeďe-prat /pr-a-t/ vz-pruha /pruh-a/ 'boost (n.)'
    roze-drat /dr-a-t/ bez-dřevī /dřev-ī/ 'containing no wood'
    přeďe-hra /hr-a/ od-hrabat /hrab-a-t/ 'rake (inf., perf.)'

b. odev-brat /br-a-t/ 'take away (inf. perf.)'
    odev-brat /br-a-t/ 'take away (inf. perf.)'
    roze-drat /dr-a-t/ 'scratch (inf. perf.)'
    před-pěru /před-pěru/ 'I will prewash'
    před-prat /před-prat/ 'prewash (inf. perf.)'

By contrast, roots of the second type never display any such paradigmatic allomorphy disrupting the adjacency of their two consonants. 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: √C[v]C.
    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
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italics in (34)), a consequence of the strict CV representational format adopted (Lowenstamm 1996a). When a vowel is present in that position (34a), it properly governs — in the sense of Kaye, Lowenstamm, and Vergnaud (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.

(34)  a. roz-deru  b. roze-drat

\[
\begin{array}{c}
\text{C V C V} & + & \text{C V C V} & \text{C V C V} & + & \text{C V C V} & + & \text{C V} \\
roz & d & er & u & \multicolumn{2}{c}{roz} & d & \text{r a t}
\end{array}
\]

[e]

In effect, under Scheer’s 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 is the root’s *Anlaut*.

A two-pronged prediction directly follows:

(35)  1. With respect to epenthesis-triggering Type 1 roots, no restriction is expected to constrain the class of segments lexically occurring 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.

2. With respect to Type 2 roots, their initial, unsplittable sequences, to the extent that they represent their lexical *Anlaute*, 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) 1. Type 1 roots in their zero grades typically display mirror image effects. Thus obstruents and sonorants are allowed to occur in any order: *roze-žrat* vs. *roze-rvat*, *beze-dnī* vs. *ode-mknout*, etc.

2. 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 *mutæ cum liquidā*: on the one hand, in roots with alternating vowels, the rise of the zero grade will bring about apparent “clustering” of the type analysed and illustrated in (34), *roz-deru* versus *roze-drat* which typically trigger epentheses on the prefix; on the other hand, we have unsplittable clusters such as *bez-bradī*, with no effect on the prefix. Consistent with his representational assumptions with respect to syllable structure, Scheer analyses those as shown in (37a). In (37a), 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 (1999b).

(37) a. *bez-bradī*

   \[\text{C V C V} + \text{C V C V} + \text{C V C V}]\]
   \[\text{bez} [\text{br}] \text{ad i} \]

b. *roze-drat*

   \[\text{C V C V} + \text{C V C V} + \text{C V} \]
   \[\text{roz} d \text{r a t} \]

I would like to suggest an alternative account. To all intents and purposes, the cluster construed as an autonomous domain in (37a) 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 (38a). Then, its behaviour 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 behaviour of an alternating “root” such as (38b) repeated for convenience.

\[
(38) \begin{align*}
\text{a. } & \text{bez-}b’\text{adī} & \text{b. } & \text{roze-drat} \\
& \text{CVC V + CVC V + VCV} & \text{CVC V + CVC V + CVC V} \\
& \text{bez} & \text{b’ad} & \text{roz} & \text{drat} \\
& \text{no epenthesis} & \text{epenthesis} \\
\end{align*}
\]

\[
\begin{align*}
\text{c. } & \text{roz-dat} \\
& \text{CVC V + CVC V} \\
& \text{roz} & \text{dat} \\
& \text{no epenthesis} \\
\end{align*}
\]

An added benefit of viewing unsplittable clusters as single segments is the rationalisation it affords of the organisation 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.

\[
(39) \begin{align*}
\text{Alternating roots: } & \text{(od-)}b\text{̄r-a-t/(ode-)}b\text{̄r-a-t (}\sqrt{b_r}). \\
\text{Stable roots: } & \text{mix-a-t ‘mix, stir’ (}\sqrt{m_x}), \text{ maz-a-t ‘spread’ (}\sqrt{m_z}), \text{ (od-)}hrab-a-t ‘rake’ (}\sqrt{hr_b}), \text{ (vz-)}pruh-a ‘boost (n.)’ (}\sqrt{pr_h}). \\
\end{align*}
\]

A striking property emerges from (39): the Anlaut of alternating roots consists of one consonant, whereas the Anlaut of stable roots includes one or more (\sqrt{C\ldots}, \sqrt{CC\ldots}, 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 mute cum liquidā 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-)[h’ab]-a-t

In fact, roots with initial mute cum liquidā are not barred from membership in the alternating class. Several exemples appear in (41), with the initial muta cum liquidā and the site of alternation indicated under “root”. In the zero grade, the feature of secondary articulation simply vocalises. 

(41) Vocalised grade  Zero grade  Root
v’žit ‘cool off (inf. imp.)’  ylhnout "become wet (inf. perf.)’  √v’_h
od-k’évnit ‘bloodlessness’  od-k’vit ‘bloodlessness’  √k’_v
roz-m’azit ‘unfreeze (inf. perf.)’  roz-mţznout ‘melt (inf. perf.)’  √m’_z
pod-v’ātit ‘overthrow (inf.)’  pod-vţtnout ‘twist (ankle)’  √v’_t
p’škat ‘crack (paint)’  roz-p’šknout ‘explode’  √p’_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 realised by the vocalisation of a liquid, the short form of the prefix surfaces (roz-mţznout, not *roz-e-mţznout), as he would predict based on his discussion (Scheer 1996:...
55ff.). Second, it makes it possible to simplify the characterisation of a root *Anlaut* in Czech.

(42) 1. Root *Anlauts* in Czech consist in one single consonantal position (optionally preceded by a sibilant).
2. The distributional privileges of consonants on that position are unrestricted.

4. **Over the edge**

In this section, I will tap antistrophy, known as *contrepét* (counter-fart) in French, a less traditional but potentially rich source of evidence for the monosegmentality of *mutæ cum liquidā*. 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 *contrepét* are thus formally similar to spoonerisms. The difference is *contrepét* is deliberately produced or teased out of an innocent input. The greater the contrast between the innocuousness of the input and the obscenity of the output, the more successful the *contrepét*. In his compilation of spoonerisms, Birgolski (1962) quotes a headline of *The Sri Lanka Clarion* of May 5, 1956 as a potential source of *contrepét* (43).17

(43) Rice Issue Likely to Delay Mayoral Election

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

I submit that the derivation of a successful *contrepét* resulting from the permutation of a *muta cum liquidā* 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 *contrepét* input exhibiting exactly those characteristics, (44). If I failed to convince him that my representational proposal for *mutæ cum liquidā* is sound, there is always the *contrepét* for him to work out…18
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.]

Conclusion

In this paper I have argued that the behaviour of *mutæ cum liquidā* constitutes no argument for branching onsets. Do onsets ever branch?

Notes

* I am grateful to Claire Birgolski, Mamadou Keita, Philippe Ségéral, Marta Ungermanova for help with specific aspects of this paper, to Sabrina Bendjabbalah, Alain Kihm, Brenda Laca for a thorough reading of a first draft and important comments and suggestions, and to Stefan Ploch for his insights on the issues discussed here, his patience and efficiency.
1. The high central vowel in *ä-msäkhr* is epenthetic.
2. Note the metathesis, /fäₙₙₙₙₙₙₙq/ > [fänₙₙₙₙₙₙₙq].
4. Arguments have been offered by Davis (1988), Everett and 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/non-branching 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. 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.
7. I realise I am talking here of *mutæ cum liquidā* and branching onsets as if they had identical extensions. In fact, in many languages *mutæ cum liquidā* 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 /twiₙₙₙₙₙₙd/ or /t wiₙₙₙₙₙₙd/, few would question that *plough* or *treat* have initial branching onsets. sC-type initial clusters are not discussed in this paper, cf.
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Kaye [1991/1992] (1996a); Lowenstamm (2002); Nikiëma (this volume) for various analyses of sC-clusters.

8. The data is presented as in Hayes and Abad (1989), and McCarthy and Prince (1995). An alternative will be offered below.

9. I am grateful to Philippe Ségéral for help with the Greek data.


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 kränd does not reduplicate as *kar-krænd is that kæ is not a (simplified) version of the original syllable: kan-, of the correct kan-krænd, is.” If mutæ cum liquidā are complex consonants, the account in (28) expresses Steriade’s insight even more closely than her own solution.

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.

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

16. Such a behaviour is typical of secondary articulations, either optionally or obligatorily. Thus, in Čaha, the Imperative feminine singular of čäq’äši ‘he begged’ can be pronounced [täq’äš] or [täq’uš].

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.).

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.