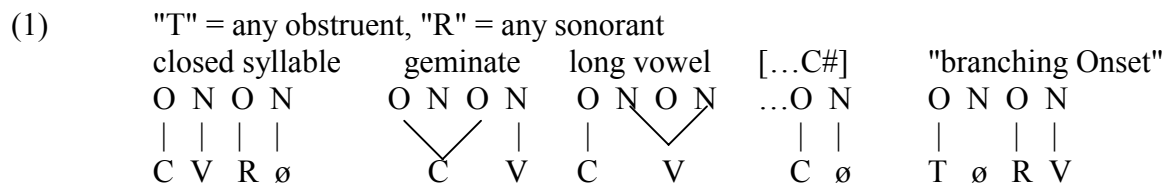Tobias Scheer
Université de Nice
CNRS 6039

How yers made Lightner, Gussmann, Rubach, Spencer & Co invent CVCV

1. Introduction[1]

Since some time, work has been done in phonology assuming that syllable structure boils down to a strict sequence of non-branching Onsets and non-branching Nuclei (Lowenstamm 1996)[2]. The diagram below depicts the representation for basic phonlogical objects in this perspective, which has been called "CVCV".

(1)   "T" = any obstruent, "R" = any sonorant
             closed syllable   geminate   long vowel   […C#]   "branching Onset"
             O N O N   O N O N   O N O N   …O N   O N O N
             | | | | \   / | | \ / | | | |
             C V R ø   C   V   C   V   C   ø   T   ø   R V

In traditional approaches, the syllabic tree-structure assures the function of binding together the different constituents and thereby identifying their grouping into higher units. In the option shown under (1), this function is shifted onto lateral relations that are assumed to hold between constituents: Government and Licensing. Effects that are usually attributed to the fact that a given segment belongs to this or that syllable are claimed to stem from the configuration regarding Government and Licensing this segment is involved in. The reasons to consider an approach where constituents are organized according to syntagmatic rather than paradigmatic relations are exposed in, among others, Ségéral & Scheer (2001), Scheer (1998a,b,1999,2000), Szigetvári (1999,2000).

An important step towards CVCV was made by the massive introduction of empty Nuclei into phonological analysis by Kaye et al. (1990). Even though empty Nuclei were used in the literature before this programmatic paper of Government Phonology, the frame laid out in Kaye et al. (1990) was pioneering in that it gave a theoretical existence to empty Nuclei that was supposed to hold true cross-linguistically, and not just for the purpose of a particular language. In the ensuing paradigm that may be called Standard Government Phonology (Kaye 1990, Charette 1991, Harris 1994, Gussmann 2001), empty Nuclei exist in the following locations: 1) there are no final Codas: word-final consonants pertain to Onsets whose Nucleus is empty (Kaye 1990); 2) vowel-zero alternations do not imply resyllabification (nor does any other process): in case the zero-alternant appears on the surface, the two consonants that are adjacent on the surface belong to two independent Onsets that enclose an empty Nucleus (Kaye et al. 1990).[3]

---

[2] For example Bendjaballah (1999a,b), Heo (1994), Larsen (1998), Lowenstamm (1988,1996,1999), Nikiema (1989), Scheer (1996,1998a,1999,2000), Ségéral (1995,1996), Ségéral & Scheer (2001), Szigetvári (1999,2000), Rowicka (1999).
[3] A third situation where empty Nuclei are warranted are so-called bogus clusters: unsyllabifiable sequences such as [tl] in English *butler, atlas* etc. do not violate any sonority-principle but pertain to two different Onsets that flank an empty Nucleus (Harris 1994:67,224).

In this paper, I would like to show that the resulting syllable structure roots much deeper in the history of generative phonology than its inventors thought it did. Namely, the idea that the clusters mentioned are separated by "abstract vowels" goes back to the thesis of Theodore Lightner (1965) on Russian (see also Lightner 1972), and was practised in both linear SPE- and autosegmental generative frameworks in the late seventies until the end of the eighties. However, the actors of this tradition did not make any stand as to the theoretical and possibly universal value of the structures they were proposing. Lightner's insight was the synchronic expression of a diachronic generalization made by Antonín Havlík in 1889, which is known as the Havlíkovo Pravidlo (Havlík 1889). I wish to bridge the gap between both groups of scholars: the ones that were manipulating "abstract vowels" without giving them a theoretical and cross-linguistic status, and those who have derived empty Nuclei theoretically in order to run its predictions against a variety of languages. Of course, a good question to be asked is why both groups did not see each other. I submit that the answer is simple: Slavic. This language-family is very present in SPE, and the reason why "abstract vowels" were practised through the 70s and 80s was a typical Slavic phenomenon, probably the most important issue in Slavic phonology: the yers. Gussmann (1980), Rubach (1984, 1986), Kenstowicz & Rubach (1987), Spencer (1986) and others have developed analyses that are de facto identical to the claims of Standard Government Phonology, which really looks far fetched for languages that are reputed for their excessive consonantal clustering. Since yers are an idiosyncratic property of Slavic that is not found in other families, the yer-analysis was not exported. No claim was made to the effect that English or French should follow the same pattern. Another factor is that the formal approach to empty Nuclei supposes the tools developed in Government Phonology (Kaye et al. 1990, Charette 1991, Harris 1994): Government and Licensing, which did not exist or were in an embryotic state by the time the Slavic data were discussed.

On the following pages, I trace down the motivations that led to the existence of empty Nuclei on one hand, and to "abstract vowels" on the other. They did not coincide: the existence of empty Nuclei in Government Phonology is largely due to a reaction against resyllabification, while "abstract vowels" were assumed in order to reduce the disjunction "in closed syllables or in open syllables if the following vowel alternates with zero" to a non-disjunctive statement. Hence, the empirical record that feeds the conception of empty Nuclei practised in Standard Government Phonology turns out to be much larger than Kaye et al. (1990) thought it was. Viewed from the other side, the spine of Slavic phonology that was developed by Lighter, Gussmann, Rubach, Spencer & Co is in fact a natural and prenatal expression of Standard Government Phonology. Hence, it may be assumed that the former are encline to accept the analyses of the latter, while the latter find a natural theoretical harbour for what they were doing over the years.

In a second step, I show that Slavic vowel-zero alternations are not the only phonological processes that are conditioned by the aforementioned yer-context "in closed syllables or in open syllables if the following vowel alternates with zero". Several other alternations inside Slavic engaging the two Polish nasal vowels, Polish and Czech [ɔ]-[u], as well as Czech vowel length are governed by this structural description. Moreover, the crucial yer-context is also active in French where it drives the ATRness of mid vowels and the alternation between schwa and [ɛ]. If the recurrence of this highly specific structural description is not to be regarded as accidental, a unified analysis of all alternations mentioned is called for. I show that a unified analysis supposes the move from Standard Government Phonology to CVCV. Namely, not only the subset of word-internal clusters that enclose a vowel-zero alternation are to be regarded as two distinct Onsets. Rather, all clusters that are traditionally viewed as Coda-Onset clusters are distinct Onsets that enclose an empty Nucleus. As a result, there are no Codas, and hence no closed syllables at all. If it is true that a unified analysis of all

alternations controlled by the yer-context requests a CVCV syllable structure, the only area that could be non-CVCV are branching Onsets. This issue will not be addressed in this paper.

Before sketching the structure of the paper, the reader must be warned: section two reviews the basic distributional facts of Slavic synchrony (Lower) and diachrony (Havlík). Slavicists will be bored to death since this evidence has been rehearsed over and over again in countless publications over the past 40 years. The same holds true for the reader who is familiar with the French data that are exposed in section four. Since ever French has been carried into the spotlight of generative interest by Schane (1968), the data regarding the ATR-value of mid vowels and schwa [ɛ]-alternations have been discussed. I suggest that either public skips the relevant section, which makes the paper somewhat shorter.

Section three exposes Slavic facts that are governed by the same context as vowel-zero alternations but are less well known. In section five, the overall puzzle including both Slavic and French evidence is assembled. The different approaches are discussed, some of which will not resist the cross-linguistic test. Finally, a synthesis of the two empirical records in the light of Government Phonology is undertaken in section six.

2. Slavic yers and their analysis
2.1. Distributional facts and the challenge they raise

The basic pattern of vowel-zero alternations that is recurrent throughout all Slavic languages appears under (2) hereafter.[4]

(2)   basic pattern of Slavic vowel-zero alternations

	C__C-V	C__C-ø	C__C-CV	gloss
Czech	lokøt-e	loket-ø	loket-ní	"elbow" GENsg, NOMsg, adj.
Polish	wojøn-a	wojen-ø	wojen-ny	"war" NOMsg, GENpl, adj.
etc.				

In view of these data, the alternation is correctly captured in terms of open vs. closed syllables: a vowel appears in closed syllables (*loket-ø, loket-ní*), while zero occurs in open syllables (*lokøt-e*). Hence, it can be claimed that the vocalization of alternation-sites is a direct consequence of syllable structure: if a Coda needs to be accommodated within a syllable, this syllable must not remain unvocalized. The presence or absence of a vowel following the alternation site stands in no causal relation with the effect observed: word-final consonants that are not followed by a vowel do trigger vocalization of their syllable just as much as word-internal consonants that are followed by another heterosyllabic consonant and a vowel.

Hence, the vowel-zero alternations observed seem to be entirely predictable from syllable structure. The existence of a following vowel and its quality plays no role at all.

However, this naive view on the matter must be revised when facing the data that are reported under (3).

---

[4] Examples are chosen from Czech and Polish. See Scheer (1996,1997,1999) on Czech alternations. For Polish, Rowicka (1999) offers an informed discussion of literature and facts. Lightner (1965,1972), Melvold (1989), Farina (1991), Yearly (1995) (Russian), Rubach (1993) (Slovak), Hristova (1994) (Bulgarian), discuss other particular languages. The general Slavic picture is exposed e.g. in Bethin (1998:205ss), Panzer (1991:303ss), Vaillant (1950:124ss).

(3) vocalization in open syllables

| | open syllable | | closed syllable | | |
| | zero | | vowel | | |
	C__C-V	C__C-yer CV	C__C-ø	C__C-CV	gloss
Czech	dom-**ø**k-u	dom-**eč**-ek-ø	domek-ø	dom-**eč**-øk-u	house dim.GENsg, double dim. NOMsg, dim. NOMsg, double dim. GENsg
Slovak	kríd-**ø**l-o	kríd-**el**-iec-ø	kríd-**el**-ø	kríd-**el**-øc-e	wing dim.NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Polish[5]	buł-**ø**k-a	buł-**ecz**-ek-ø	buł-**ek**-ø	buł-**ecz**-øk-a	bread roll dim. NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Serbo-Croatian[6]	vrab-**ø**c-a	vrab-**ac**-a	vrab-**ac**-ø		sparrow GENsg, GENpl, NOMsg

As may be seen, another recurrent pattern in Slavic languages is the existence of forms where the alternation site is vocalized in spite of the fact that it occurs in an open syllable. The offending items appear in column two of the above table (the paradigms shown are fully regular in the languages at hand).

The distributional solution to this problem is also provided by the data shown:

(4) alternation-sites are vocalized in open syllables iff the following vowel alternates with zero itself.[7]

Indeed, in all cases where an alternation site is vocalized in an open syllable (pol *buł-ecz-ek-ø*), the vowel of the next syllable alternates itself with zero (pol *buł-ecz-øk-a*). In other words, the fact that we observe a vowel in pol. *buł-ecz-ek-ø* is a direct consequence of the idiosyncratic properties of the diminutive suffix *-ek* whose vowel alternates with zero. Alternation sites are never vocalized in open syllables if the following vowel is stable.

For historical reasons that will be discussed in section 2.3, vowels that alternate with zero in Slavic languages are called "yers". Yers were regular vowels in Common Slavic. They come along in two flavours, one front "ь" and one back "ъ". Accordingly, the relevant distributional generalization must state that zero occurs in closed syllables and before yers. This disjunctive context is identified in SPE-fashion under (5).

---

[5] The symbols "cz" and "č" are Polish/ Czech spelling for [t͡ʃ] and represent the palatalized version of [k] in the words discussed.

[6] The alternating identity of the final vowel in GENpl vrab-ac-a may not be established synchronically since morphology does not allow to add another suffix. However, GENpl vrab-ac-a contrasts with GENsg vrab-øc-a, and more generally with all other nominal forms: 11 out of 12 vowel-initial case-markers (for a total of 14, seven sg, seven pl; only NOMsg and ACCsg are zero) provoke the allomorph containing zero -øc-, only GENpl induces its vocalized version. It is a fact that the GENpl marker, and only this marker, goes back to a yer diachronically. This can hardly be taken as an accident.

[7] The usual formulation says "…in open syllables iff the following vowel is a yer", see fro example Gussmann (1980), Rubach (1984). It is one of the important goals of this paper to show that the crucial property of the triggering vowel in the following syllable is NOT to be a yer or a schwa, but to alternate with zero (Scheer 1997:71). Gussmann explicitly identifies this property of triggering vowels: "the deleting vowel disappears if followed directly by a nondeleting vowel" (Gussmann 1980:30).

(5) alternation sites bear

$$V \, / \, \underline{\quad} \quad \left\{ \begin{matrix} \text{CCV} \\ \text{C\#} \\ \text{C ь,ъ} \end{matrix} \right\} \quad \begin{matrix} \text{in Closed Syllables} \\ \\ \text{before yers} \end{matrix} \qquad \begin{matrix} \text{buł-ecz-k-a} \\ \text{buł-ek-ø} \\ \text{buł-ecz-ek-ø} \end{matrix}$$

$$\text{ø} \, / \, \underline{\quad} \quad \text{CV} \qquad\qquad \text{iff V} \neq \text{ь,ъ} \qquad \text{buł-øk-a}$$

The challenge raised by this distribution is its disjunctivity. In early Generative Phonology, the disjunctive context "before a (heterosyllabic) consonant or word-finally" __{C,#}, which is recurrent in the description of a wide range of phonological processes from genetically unrelated languages, has led to major revisions of the frame established by SPE. It was argued that phonological theory must be able to refer to both sites as a phonologically unique object if no generalization is to be missed[8]. This view led to the (re)introduction of Codas and hence syllable structure into the hitherto linear theory. More recently, Ségéral & Scheer (2001) have made a case along the same lines for the disjunctive context that is the exact mirror of the Coda-context: "after a (heterosyllabic) consonant or word-initially" {C,#}__. In any event, it is consensual practice that theory is called to be able to attribute identical effects to one single reason, rather than to different and unrelated causes. In our case, the question thus arises in which way closed syllables and yers constitute a natural class. Put in another way, this question may also sound "why do yers behave like a consonant, rather than like a vowel?", since __CCV = __Cь,ъ vs. __CV. Expressed yet in a different fashion, one could ask why yers behave as if they were not there: if __Cь,ъCV reduced to __CCV, the Closed Syllable generalization would be correct in all instances.

In the next section, we will see how this challenge was dealt with since the 60s.

2.2. Lower

If there is any chance to state the distribution of vocalized and unvocalized alternation sites in terms of a non-disjunctive context, the formulation must not include any reference to closed vs. open syllables: the closed-syllable analysis is contrary to fact. Hence, the only alternative is to explore the opportunities of generalizing the yer-context: no vowel appears in an alternation site if and only if a yer is present in the following syllable. This is the essence of Lightner's (1965) proposal, which is known as "Lower". The rule appears under (6), where yers are transcribed according to traditional diachronic and generative practice ь=ĭ, ъ=ĭ̵.[9]

(6) Lower
    ĭ,ĭ̵ —> e,o / __C_0 {ĭ,ĭ̵}

In Lightner's view and in all following analyses that use a version of Lower, yers are vowels that are present in underlying representations and appear as various vowels in different Slavic languages. In some idioms, the front-back opposition is carried onto the surface, while in others both yers merge into one single phonetic object. For instance, Western Slavic merges both yers into [ɛ], Eastern Slavic transforms /ь,ъ/ into [ɛ,ɔ], respectively, while both yers

---

[8] See orthodox textbook-evidence given in, among others, Carr (1993:198ff), Roca (1994:134f), Goldsmith (1990:103ff), Lass (1984:250ff), Blevins (1995:209). This issue was first carried into generative discussion by Kahn (1976:20ff).

[9] The historical object "yer = vowel in Common Slavic" had appeared in synchronic analysis since Halle (1959).

appear as [a] in South Slavic[10]: compare /dьn/ "day" and /sъn/ "dream" in Polish (*dzień, sen*), Russian (*den', son*) and Serbo-Croatian (*dan, san*).

For theory-internal reasons that do not appeal to the present demonstration[11], as well as for the sake of their diachronic value (ь,ъ < IE i,u), the yers were located in the central upper part of the vocalic triangle, enjoying descriptions such as "high front centralized lax vowel" for /ь/ and "high back centralized lax vowel" for /ъ/. In the course of the derivation, yers could have two fates: either they were lowered to some mid or low vowel (according to the language concerned), or they were deleted.[12] The latter event was said to take place after the former. Thus, a yer could never be surprised in its underlying identity on the surface: the only phonetic trace of yers were said to be non-high vowels. This is where the name of Lightner's rule comes from.

Another important property of yers is their unpredictable distribution among words: yers occur in roots and affixes just as other vowels do, their occurrence may be predicted by reference to no other parameter. For instance, the surface-representatives of yers may be phonetically identical with regular vowels whose quality has not been acquired through Lower, and which do not alternate: compare e.g. Czech pes [pɛs], psa [psa] "dog NOMsg, GENsg" with les [lɛs], lesa [lɛsa] "forest NOMsg, GENsg". Hence, yers must be present in the lexicon, and insertion-strategies that would fill in a vowel in the appropriate syllabic environment do not qualify.[13] Furthermore, yers must possess an underlying identity that is different from the one of phonetically identical vowels that do not alternate, that is /pьs/ for "dog" vs. /lɛs/ for "forest" in the above example.

Let us now return to the issue raised at the end of the previous section. We have seen the reasons that led to the proposal of Lower. However, if vocalization takes place in case a yer is present in the following syllable, there must be yers in word-final position. In other words, Lower enforces the existence of underlying yers that never appear on the surface. Consider the four relevant contexts that bear yers and their ensuing derivation under (7).[14]

(7)		underlying	Lower	yer-deletion	surface
	a.	buł-ĭcz-ĭk-a	buł-**ecz**-ĭk-a	buł-**ecz**-k-a	bułeczk-a
	b.	buł-ĭk-ɨ̆	buł-**ek**-ɨ̆	buł-**ek**	bułek
	c.	buł-ĭcz-ĭk-ɨ̆	buł-**ecz**-**ek**-ɨ̆	buł-**ecz**-**ek**	bułecz-ek
	d.	buł-ĭk-a	buł-ĭk-a	buł-k-a	bułk-a

Note that under (7)c, Lower must apply two times and from left to right (or from the root towards the periphery) in order to transform //buł-ĭcz-ĭk-ɨ̆// into /buł-**ecz**-**ek**-ɨ̆/. This effect is

---

[10] These are only general indications. The detail language by language is much more complicated. In Slovak for example, various vocalizations can be found, cf. Rubach (1993:134ss).

[11] See e.g. Gussmann (1980:39ss,63ss), Rubach (1984:28s) on that issue.

[12] The debate on the kind of deletion that occurs (stray erasure vs. erasure by rule) is not relevant here; see Rubach (1984:184ss, 1993:140s) for discussion. Note that even in case both yers are merged into the same phonetic result, it may be necessary to posit two distinct underlying identities. In Polish for example, the front yer leaves a trace on the preceding consonant /dьn/ --> [d͡ʑɛɲ], whereas the back yer does not /sъn/ --> [sɛn] (but see Gussmann 1992 for a solution capitalizing on underlying palatalized consonants).

[13] Treatments relying on insertion have been proposed by, among others, Laskowski (1975), Czaykowska-Higgins (1988), Piotrowski (1992a). They are convincingly refuted in Gussmann (1980:26ss), Rubach (1984:28s, 1993:134ss), Szpyra (1992:280ss, 1995:94ss). See Bethin (1992) for a compromise that relies on both epenthesis (in borrowings) and underlying specification.

[14] Parts of the derivations that are not relevant for the demonstration are left unmentioned, cf. for example Gussmann (1980:41ss), Rubach (1984:184ss).

commonly viewed as a consequence of the cyclic application of Lower (Rubach 1984:184ss, 1993:139s).[15]

Word-final yers have to be present because yers are the only objects that may trigger vocalization according to Lower. As a matter of fact, all words whose last phonetically expressed segment is a consonant were assumed to end in yers underlyingly: the yers in question was attributed the morphological value of a case-marker (i.e. marking NOMsg in (7)b and GENpl in (7)c).[16] The same holds true for yers that occur within two consonants which form a cluster on the surface: [bułeczk-a] must possess an underlying yer between /cz/ and /k/ since the only reason for the vocalization of the alternation site located between /ł/ and /cz/ is the presence of a yer in the following syllable. And indeed, the existence of a yer in the middle of the cluster [czk] is confirmed by its phonetic existence under (7)b.

According to Lower, there are thus two ways of identifying the underlying presence of yers: 1) if a vowel alternates with zero, it is the surface-realization of a yer; 2) the object that occurs to the righthand side of the consonant following an alternation site must be a yer, even if there is no vocalic trace on the surface.

In the next section, we will examine the diachronic reality of yers.

2.3. The difference between Lightner and Havlík

In 1889, Antonín Havlík discovered the following diachronic regularity when comparing Common Slavic (CS) to Old Czech (OCz).[17]

(8) Havlík's Law
   a. given a sequence of consecutive yers in CS, every second yer survives in Old Czech, counting from the right edge of the sequence.
   b. illustration thereof

   $$\begin{array}{llll}
   & 4\ 3\ 2\ 1 & 4\ 3\ 2\ 1 & \\
   \text{CS} & \text{sъ рьs-ъmь} > \text{OCz} & \text{se pøs-emø} & \text{se psem} \quad \text{"with the dog"} \\
   & 5\ 4\ 3\ 2\ 1 & 5\ 4\ 3\ 2\ 1 & \\
   \text{CS} & \text{sъ šьv-ьc-ьmь} > \text{OCz} & \text{sø šev-øc-emø} & \text{s ševcem} \quad \text{"with the shoemaker"}
   \end{array}$$

This historical evolution is best reflected in Czech, which is more regular in this respect than other Slavic languages. But very soon, it was understood that Havlík's Law in fact applies to all Slavic languages. It covers the third line of the synchronic generalization (5) which states that a yer is vocalized if it occurs before another yer. While both Havlík's Law and (5) define the vocalization of yers according to the presence or absence of a following yer, they do not operate this condition in the same way. The former qualifies a yer followed by another yer for vocalization if and only if this yer is even-numbered in a yer-chain, while the latter does not inform of any condition relying on even- or odd-numberedness. This is the first remarkable difference between Havlík and Lightner's synchronic genralization embodied in (6). The second one concerns directionality: Havlík attributes odd and even numbers of a yer-chain from right to left, whereas Lower (6) must apply cyclically, which means in terms of directionality from left to right in case it faces several yers in a row (//buł-ĭcz-ĭk-ĭ// comes out

---

[15] See, however, the non-cyclic interpretation advocated by Gussmann (1980:30) and Anderson (1974): "the string is first scanned for the [alternating] segments; once these are identified, the change is implemented simultaneously" (Gussmann 1980:30).

[16] See Gussmann (1980:36ss), Rubach (1984:41ss) for discussion. The choice between the front and back versions of the yer is usually determined by its palatalizing effects.

[17] See general descriptions of the evolution of yers for example in Trávníček (1935:46ss), Lamprecht et al. (1986:46ss), Liewehr (1933:91ss).

as /buł-**ecz-ek-ɨ**/ only after recursive application of Lower first to the leftmost, then to the intermediate yer, cf. 2.2).

In sum, the phililogical point of view holds that even-numbered yers are "strong", while odd-numbered yers are "weak". The former are vocalized, the latter fall out.[18]

The other two lines of the synchronic generalization (5) are irrelevant for Common Slavic and Havlík since Common Slavic lacked closed syllables altogether: all CS words end in a vowel, and the only sequence of consonants are of rising sonority, hence Onset-clusters.[19]

The move that was taken by Lightner's Lower thus makes the underlying structure of modern Slavic languages look like Common Slavic: all words end in a vowel (words that are consonant-final on the surface possess an underlying word-final yer with morphological value), and Codas do not exist in alternation-environments (Coda-clusters that host a vowel-zero alternation are separated by a yer in underlying representations).

Consequently, Lightner assimilates the grammar of modern Slavic languages to Havlík in yet another respect: Lower does away with any reference to closed syllables. The only parameter driving yer-vocalization is the presence or absence of a yer in the following syllable.

So why are Lower and Havlík's Law different with respect to directionality (cyclicity) and the mention of odd and even numbers? The answer is given in table (3), of which relevant parts are repeated under (9) for convenience.

(9)   vocalization in open syllables: diachronic situation

	open syllable zero		closed syllable vowel		gloss
	C__C-V	C__C-yer CV	C__C-ø	C__C-CV	
Czech	dom-**ø**k-u	OCz dom-**ø**č-ek-**ø** ModCz dom-**eč**-ek-**ø**	domek-**ø**	dom-**eč**-**ø**k-u	house dim.GENsg, double dim. NOMsg, dim. NOMsg, double dim. GENsg

All historical grammars report that Havlík's Law correctly describes the state of affairs in the old languages (Old Czech etc.) that have continued Common Slavic, but that "secondary vocalizations" have disturbed the picture. The forms at stake are precisely those of the offending second column where a CS yer-chain has been reduced according to Havlík's Law: CS dom-**ьč-ьk-ъ** > OCz dom-**ø**č-ek-**ø** > ModCz dom-**eč**-ek-**ø**. The third yer is odd and thus weak. It should fall out, which it does in Old Czech, but is "restored" in Modern Czech. Philologists always invoke analogy in order to explain this "secondary vocalization" of weak yers, see e.g. Trávníček (1935:47), Komárek (1962:48), Liewehr (1933:98), Vondrák (1924:180). However, the statement (4) "alternation-sites are vocalized in open syllables iff the following vowel alternates with zero itself" is absolutely regular. This fact points to a phonological, rather than an analogical activity. The analogization of the entire language according to a perfectly defined phonological parameter can hardly be granted any credit.[20] Supposing analogical activity in this case is even more bewildering when considering the fact that several modern languages have operated exactly the same "secondary vocalization" of

---

[18] The philological approach is exposed in, among others, Koschmieder (1958), Panzer (1991:277ss), Vaillant (1950:124ss), Trávníček (1935:46ss), Lamprecht (1987:137ss), Lamprecht et al. (1986:46ss), Nahtigal (1961:96s), Liewehr (1933:91ss), Carlton (1991:165ss).

[19] See e.g. Carlton (1991:100ss), Vaillant (1950:284ss).

[20] To the best of my knowledge, there is only one root in Czech that disregards the generalization expressed under (4), i.e. where yers still alternate according to Havlík in the modern language: *šev* "seam", which derives *šv-ec* and not **šev-ec* "shoemaker", the genitive of which is *šev-øc-e*. This hapax is always used in diachronic textbooks in order to show the modern reality of Havlík's Law, cf. for instance Lamprecht et al. (1986:47), Trávníček (1935:46), Liewehr (1933:95).

yers in identical conditions, cf. (3). One of the challenges of this paper is to seek an explanation for this fact which is not lexical, analogical and accidental, but phonological.

The "secondary vocalization" discussed is the real difference between Lightner and Havlík: two consecutive yers are never both vocalized in the regularity described by the latter, but do both appear on the surface in the generalization formulated by the former. Both statements describe realities which are slightly different but share the feature of solely depending on the presence vs. absence of a yer in the following syllable. No other parameter of any kind influences either Havlík's Law nor Lower (directionality (cyclicity) and odd-/ even-numberedness also define the relation with the following yer).

It appears that Lightner has simply made Common Slavic the underlying structure of modern Slavic languages, and adjusted Havlík's Law according to the "secondary vocalizations" discussed. This move was current practice in early generative work: the representations that were assumed to be synchronically underlying coincinde with earlier stages of the language.[21] Before we can concentrate on the crucial importance of Lightner's proposal for the purpose of this paper, some more diachronic information needs to be introduced in the next section.

2.4. The difference between triggering and alternating yers

We have seen in section 2.2 that yers may have two destinies: either they become vocalized, or they are deleted. In both cases, they are an instance of what has been called an absolute neutralization (e.g. Kiparsky 1968,1982, Kenstowicz & Kissseberth 1977:1-62, Tranel 1981), that is the existence of an underlying object that never appears on the surface. Indeed, if yers are affected by vocalization, Lower transforms their initial yer-identity into a vowel that is part of the surface-inventory of the particular language. If on the other hand they are subject to deletion, they exist only in order to perform an action in the course of the derivation (triggering the vocalization of a preceding yer), but have no phonetic representative.

On these grounds alone, it is obvious that "the yers" do not constitute a homogeneous group of vowels, but fall into two categories: the ones that appear on the surface, and the ones that may never be observed as a phonetic object. In fact, this division has already been made at the end of section 2.2 when the question of how yers may be detected was addressed: recall that a yer exists underlyingly 1) in the location where a vowel alternates with zero, and 2) to the righthand side of the consonant following an alternation site.

The former category may be called alternating, the latter triggering yers. We will see in the present section that this fundamental distinction also enjoys a diachronic reality. More synchronic evidence in support of it will be adduced in section 3 below.

A certain part of the philological literature as well as courses in historical Slavic phonology hold that alternating vowels in modern languages go always back to yers: if a vowel alternates with zero, it was a yer in Common Slavic. This is a legend.[22] An alternating vowel in a

---

[21] Theodore Lightner was a specialist in this kind of analysis, which he drove to absurd extremes for other Indo-European languages. In his view, English for example is derived synchronically by the application of Grimm's Law, Verner's Law and subsequent modifications setting it apart from continental Germanic (e.g. *tooth* and *dental*, *foot* and *pedal*, *detonation* and *thunder*, *torrid* and *thirst*, respectively, derive from the same synchronically underlying representation), see for example Lightner (1981).

[22] Which is provoked by the antipathy of philologists against non-etymological objects. See Scheer (1996:92ss) for discussion. Even though diachronic grammars such as Gebauer (1894-98 I:154ss), Trávníček (1935:230), Trávníček (1948-49 I:41ss), Havránek & Jedlička (1963:31) clearly expose the fact that alternating vowles may originate either in a yer or in epenthesis, the same authors sometimes properly invent yers or recur to analogical explanations in order to be able not to refer to an object that is bare of any etymological existence. For GENpl forms, instead of acknowledging epenthesis, Gebauer (1894-98 I:160), Gebauer (1894-98 II,139ss), Trávníček (1935:230), Lamprecht (1987:138) and Komárek (1962:150) for example invoke analogy with yer-bearing items.

modern Slavic language may have two CS sources: 1) a yer or 2) nothing. In other words, some modern alternating vowels were born through epenthesis. The yer-origin does not need specific illustration; relevant evidence from Czech regarding the epenthetic origin is shown under (10), where the group of words concerned is identified according to the traditional classification of stems that relies on the thematic vowel in Indo-European.

(10) epenthesis of "yers"
    a.   feminine -i stems in NOMsg[23]
        CS case-suffix -ь   cause: loss of a yer in the following syllable
        Modern Czech   Common Slavic
        píseň - písøn-ě   "song NOMsg, GENsg"   NOMsg *pě-sn-ь
        báseň - básøn-ě   "poem NOMsg, GENsg"   NOMsg *ba-sn-ь
    b.   neuter o-stems and feminine a-stems, both in GENpl[24]
        CS case-suffix -ъ   cause: loss of a yer in the following syllable
        Modern Czech   Common Slavic
        čísøl-o - čísel   n. "number NOMsg, GENpl" GENpl *čit-sl-ъ
        sestør-a - sester   f. "sister NOMsg, GENsg"   GENpl *sestr-ъ
    c.   some masculine o-stems in NOMsg[25]
        CS case-suffix -ъ   cause: loss of a yer in the following syllable
        Modern Czech   Common Slavic
        mozek - mozøk-u   "brain NOMsg, GENsg"   NOMsg *mozg-ъ
    d.   prepositions and prefixes[26]
        vze-pnout se - vzø-pínat se   "straighten up pf, ipf"   *vъz-
        roze-psat - rozø-pisovat   "begin to write pf, ipf" *orz-
        beze-dný - bezø-bradý   "without bottom,   *bez-
                               without beard"
        ode-mknout - odø-mykat   "open (key) pf, ipf"   *od-

It is not difficult to see that epenthesis occurred when a yer fell out in the following syllable. All cases quoted under (10) follow this pattern.[27] This behaviour of course hints at Havlík's Law: in the period of its activity (CS > particular Slavic languages), vowels appear out of nothing iff a yer in the following syllable was lost. Both in case of yer-chains and in those where an epenthetic vowel emerges, the vocalization is identical, e.g. [ɛ] in Czech and Polish. In other words, the loss of a yer causes the vocalization of either a yer, or of nothing in the preceding syllable. If the same causes produce identical effects, the "nothing" mentioned and the (vocalized=alternating) yer must share some property. What could that be? Can

---

[23] For more material on feminine i-stems, see for example Vážný (1963:73ff), Vondrák (1906:478ss), Trávníček (1948-49 I:43), Trávníček (1935:230), Gebauer (1894-98 I:160ss), Gebauer (1894-98 II:343ss), Arumaa (1985:49ss,120ss), Havránek & Jedlička (1963:149ss), Vaillant (1958:142ss).

[24] On epenthetic vowels in genitive plural forms, see e.g. Gebauer (1894-98 I:160,165), Gebauer (1894-98 II:139ss), Panzer (1991:324), Vážný (1963:45,61ss), Trávníček (1948-49 I:44), Trávníček (1935:230), Arumaa (1985:68ss,141s), Lamprecht (1987:138), Komárek (1962:128s,150), Vaillant (1958:35s).

[25] On these stems, see for example Vondrák (1906:344), Trávníček (1948-49 I:43), Gebauer (1894-98 I:160).

[26] The effects of the antipathy against non-etymological objects appear most strinkingly in the treatment of prefixes and prepositions. In answer to the question "which prepositions/ prefixes were terminated by a yer?", almost everything and its contrary can be found in the literature. The item *roz(e)* is identified as *orzъ in etymological dictionaries (Machek 1957:424, Holub & Lyer 1966:391), although no yer can be established on the basis either of comparatism or Old Church Slavonic texts. The sme holds true for *otъ (Lamprecht et al. 1986:332ss). Machek (1957:579) invents yers when a vowel-zero alternation without etymological yer-source has to be brought back to yer-regularity: he derives stč vzezvati from CS *vъz-ъ-zъvati, identifying the yer between prefix and stem as "added" ("přidáváno ъ, dávající e").

[27] Including the prepositions and prefixes mentioned, see Scheer (1996).

nothhing be a yer? No, this is what some philologists have done: inventing yers (see notes 22 and 26). Can a yer be nothing? Yes, of course. We know that yers were "fading away", that is they were centralized first, and then fell out. Hence, the object that is vocalized are not yers, as is commonly believed. Rather, the objects that undergo vocalization are "nothing", or zeros. Zeros of vocalic nature, to be precise. In autosegmental representations, a "vocalic zero" of course is an empty Nucleus. Thus, it appears that the CVCV-approach makes a correct prediction: the existence of empty Nuclei is predicted exactly where epenthesis occurs. No special provision has to be made in order to insert vowels: they simply fill in empty Nuclei that have always existed. These empty Nuclei were either empty since ever (cases of "epenthesis"), or they contained a yer and were emptied as the yers faded away (cases of "yer-vocalization"). Empty Nuclei of both origins then were vocalized iff the vowel in the following syllable dropped (because it was a yer). Hence, Havlík's Law does not concern only yer-chains, its scope is wider: objects that are vocalized are former yers **and** former nothings. In other words, a reformulation of Havlík's Law is in order, at least for the Czech situation. This adjustment, as well as a summary of the preceding discussion, is provided under (11).

(11) a. in late CS, yers were centralized and fell out.
     b. they were **not** vocalized but dropped, leaving behind an empty Nucleus.
     c. empty Nuclei were vocalized iff the following Nucleus was empty (because it hosted a yer that fell out)
     d. hence,
       ь,ъ > ø > vowel   (and not: ь,ъ > vowel)
     e. Havlík's Law
       regular formulation
       "given a sequence of consecutive yers in CS, every second yer survives in Old Czech, counting from the right edge of the sequence."
       reformulation
       "given a sequence of consecutive empty Nuclei in CS, every second empty Nucleus survives in Old Czech, counting from the right edge of the sequence."

The reformulation of Havlík's Law describes the Czech state of affairs, the language on which the Law was originally built. In other Slavic languages, epenthesis has been less regular, and hence (11)e is unapplicable.[28] I will come back to the phonological interpretation of the version of Havlík's Law that suits Czech in section 6.4.

This being clarified, let us return to the main purpose of this section: alternating vs. triggering yers. We have observed that alternating yers are not always etymologically real; they may go back to an etymologically present vowel, or to nothing. By contrast, triggering yers have only one single source: yers. In all instances that have been reviewed above, the case-marker that triggers the vocalization of the preceding empty Nucleus is a yer (NOMsg of fem i-stems and masc o-stems, GENpl of fem a-stems and neuter o-stems). The synchronic assumption that word-final yers are actual case-markers (Gussmann 1980:36ss, Rubach 1984:41ss) is a diachronic reality.

It is therefore correct to say that the contrast between alternating and triggereing yers that has been established on purely synchronic grounds is paralelled in diachrony. Furthermore, viewing the modern alternations as a simple reflex of the diachronic situation is necessarily erroneous: the object called "yer" that we deal with in the formulation of Lightner's Lower is different from the historical vowels ь,ъ that occurred in Common Slavic. Lower includes etymological "nothings", whereas historical yers do not. The yers that are supposed to have a

---

[28] For example in Polish: pol NOMsg siostra - GENpl sióstr = cz sestra - sester; pol baśń = cz báseň etc.

modern existence in underlying representations are abstract theoretical vowels (Gussmann 1980, Rubach 1984:28) rather than the modern version of a diachronic reality.[29]

2.5. Slavic vowel-zero alternations are caused by a syntagmatic relation

There is a cruicial difference between Lightner's analysis that recurs to "invisible" yers and the distribution (5) that is read off the surface. In the latter view, the reason why vowels alternate with zero is of paradigmatic nature: syllable structure determines whether an alternation site is vocalized or not; in a closed syllable, vowels occur, while nothing is visible in open syllables (provided the following vowel does not alternate with zero itself). By contrast, Lower denies any causal relation between syllable structure and the vocalization of alternation sites: the **only** information that is needed in order to calculate the phonetic value of alternation sites is of syntagmatic nature. Either the vowel on the righthand side is a yer, or it is not. If it is, the alternation site is vocalized, if it is not, the site remains phonetically vacuous. This situation is summarized under (12) below.

(12) Lower is entirely independent from syllable-structure
      a.   vowel-zero alternations are not triggered by the presence or absence of a consonant in a given syllable (Coda-analysis), but by an **intervocalic communication**.
      b.   this intervocalic communication involves two yers.

We will see in sections five and six in which way this statement is important for phonological theory. Before moving on to other relevant phenomena that do not involve vowel-zero alternations, it remains to be seen how autosegmental representations have affected Lower.

2.6. Autosegmentalized Lower

Lower and its presuppositions have been subject to substantial modifications in the mid-80s when autosegmental representations became a settled part of phonological theory. The autosegmentalization of Lower has been operated in Spencer (1986), Rubach (1986) and Kenstowicz & Rubach (1987)[30]. For the sake of argument, the first paper mentioned is not discussed in the present section. It will be introduced below (section 5.4).

Recall from section 2.2 that the distribution of alternating yers is unpredictable. Their occurrence in a root or a morpheme is a lexical property of every single item. In non-autosegmental terms, the only way to express that two vowels are different in underlying representations is to make them different in quality. Hence, in a six-vowel system such as the one encountered in Polish ([i,u,ɨ,ɛ,ɔ,a]), two yers need to be implemented, and their melodic properties must not coincide with any of the six vowels shown. The traditional solution was to make yers high vowels for historical reasons, but which were attributed a [-tense] feature that

---

[29] A note on the use of the word "yer" is in order here. Yers are two vowels present in Common Slavic that possess a certain phonetic indentity. They have always been called "yers", and so are they in this paper. For obvious reasons, the same word is widely used in the synchronic analysis of Slavic languages in order to refer to the vowels that alternate with zero and those that are assumed in word-final position. Using the word "yer" in synchronic analysis is handy and does not mean that the synchronic and the historical object are confused. It does, however, entertain the terminological confusion. It should therefore be born in mind that "yer" means only "abstract vowel" in a synchronic context.

[30] Further exploration of the line defined in the two latter articles may be found in Rubach & Booij (1990a,b).

made them stand apart from the other three high vowels. Polish was thus believed to possess no less than five high vowels: /i,u,ɨ,ĭ,ɨ̆,ɛ,ɔ,a/.[31]

In autosegmental representations, a vowel that enjoys phonetic expression is defined as the association of a melodic identity (feature-bundle) with an x-slot dominated by a syllabic constituent. If there is an x-slot but no melody, nothing is heard (empty Onset or Nucleus); if there is a melody available but no x-slot, no phonetic trace of this melody will appear (e.g. latent consonants in French); and finally, if both melody and x-slot are present but remain unassociated, nothing is heard either. These basic principles of autosegmentalism do not need special motivation, any textbook provides ample illustration.

As a consequence, there is another way of making yers different from other vowels: their peculiar properties may be encoded structurally rather than melodically. It was not a very lucky move anyway to attribute the specific phonotactic behaviour of yers (the fact that they alternate with zero due to a communication with a following vowel) to a melodic property (the fact of being [-tense]). The alternative explored by Rubach (1986) and Kenstowicz & Rubach (1987) grants a melodic, but no skeletal identity to yers: yers are floating melodies that do not possess any skeletal anchor. The ensuing underlying representations are given under (13) below for the three distributional situations, exemplified on the familiar Czech data.

(13)   Czech "elbow"
    a. lokt-e GENsg   b. loket NOMsg   c. loket-ní adjective
    x x x   x x   x x x   x   x x x   x   x x
    | | | | | | | | | | | | | | |
    l o k **e** t e   l o k **e** t **e** l o k **e** t **e** n í

This option offers several advantages. First, there is no need anymore to locate the melodic identity of yers in the high zone. Yers and non-alternating [ɛ,ɔ] are identical as far as melody is concerned. The only difference comes from the fact that the latter are associated to a skeletal slot, while no skeletal slot dominates the former (observe the difference between the two "e"s under (13)a). Hence, the acrobacy related to the feature [tense] can be dispensed with, and the Polish system of underlying melodies is driven back to normal: there are only six distinct underlying melodies. Another advantage is that the rule of yer-deletion that was needed before is superfluous: the phonetic absence of unassociated melodic material is in-built in the autosegmental frame (stray erasure). And finally, vowels that alternate with zero are predicted not to be subject to any melodic restriction anymore: in the earlier system working with two yers, at most two distinct vowels on the surface could alternate with zero (as is the case in Eastern Slavic). But what about languages like Slovak where more than two vowels behave in this way? Relevant alternations are reported by Rubach (1993:139ss): o-zero *bahor - bahra* "belly NOMsg, GENsg", e-zero *šev - švu* "seam NOMsg, GENsg", a-zero *jedlo - jedál* "food NOMsg, GENpl". In autosegmental terms, the associated representations are straightforward: whatever vowel alternates with zero, its underlying representation is simply its floating melodic identity without a skeletal slot. Any alternating vowel will thereby be different from its melodically identical peer that does not alternate because it is associated to a skeletal slot.

The autosegmental expression of Lower, then, takes the following shape (Rubach 1986, Kenstowicz & Rubach 1987).

---

[31] The exact situation is even slightly more complicated, see Gussmann (1980:63ss), Rubach (1984:27ss,139ss).

(14) Lower autosegmentalized

$$\textcircled{V} \longrightarrow \overset{\overset{\text{x}}{|}}{V} \ / \ \_\_C \ \textcircled{V}$$
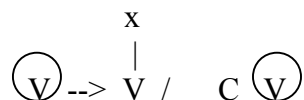
Yers are cercled. A skeletal slot is associated to a yer iff this yer is followed by a consonant and another yer. The cyclic application of the autosegmentalized version of Lower transforms the underlying floating melodies of (13) into the attested surface forms, and promotes to a phonetic existence all members of a chain of yers except the final one. A word like pol *pieseczek* "dog double diminutive" hosts four yers in a row in its underlying structure: /p<u>ie</u>s-<u>o</u>cz-<u>e</u>k-<u>o</u>/ (yers are underscored, the difference between e- and o-yers follows from their palatalizing effects).

This is as far as the analysis of vowel-zero alternations in Slavic languages has been developed until the beginning of the 90s. With minor revisions, the core of the reasoning still stands up to present-day analysis.

We have now reached the first goal of this paper: in the core analysis of Slavic vowel-zero alternations, yers have exactly the same distribution as empty Nuclei in Standard Government Phonology. They occur 1) word-finally in words that end in a consonant on the surface and 2) within consonant clusters that enclose a vowel-zero alternation.

In the next section, I propose to generalize the results of the analysis shown first to other phenomena known from Slavic, then to other languages. This step, I submit, requires the move towards CVCV.

3. Yers all over the place in Slavic?

The evidence that has led Lightner, Gussmann, Rubach and others to seek a non-disjunctive analysis of Slavic vowel-zero alternations is compelling: there is only one single cause for the appearance of a yer, that is the existence of a yer in the following syllable. The cornerstone of the entire venture that allows for the excellent insight and the elegant demonstrations mentioned has been pinpointed in section 2.5: Slavic vowel-zero alternations have got nothing to do with syllable structure; they are the consequence of an intervocalic relation between two yers.

In the following discussion, I show that the disjunctive context (5) "in closed syllables and in open syllables if the following vowel is a yer", which is at the origin of Lower, also controls other alternations in Slavic. As a matter of fact, it even occurs massively in non-Slavic languages. The empirical record thereby established will then be confronted with phonological interpretation in section 4.

Let us begin with four well-known segmental events from Czech and Polish where different melodic effects are conditioned by a unique context, namely the one stated under (5) above. Relevant data appear below.[32]

---

[32] Spelling: an acute accent or a little round on the u ("ů") notes vowel length in Czech. Czech ž,y = [ʒ,i]. Polish "ó" is [u], and a hook under a vowel notes its nasal character, whereby ą = nasal [ɔ] and ę = nasal [ɛ]. The phonetic value of nasal vowels in Polish depends on the following segment. Roughly, [ɛN], [ɔN] appear before a stop ("N" is a homorganic nasal consonant that shares place with the stop), while [ɛ̃w̃], [ɔ̃w̃] surface elsewhere. See e.g. Ostaszewska & Tambor (2000:53ss), Nagórko (1998:35ss) for a more detailed description. The allophony at hand is of no relevance for the discussion engaged.

(15) the distributional pattern "in closed syllables and in open syllables if the following vowel
      is a yer" (5) extends beyond vowel-zero alternations

	open syllable		closed syllable		gloss
	C__C-V	C__C-yer	C__C-ø	C__C-CV	
a. Czech VV-V	žáb-a	žabek-ø	žab-ø	žab-øk-a	frog NOMsg, dim. GENpl, GENpl, dim. NOMsg
	jmén-o	jmen-ný	jmen-ø		name NOMsg, adj., GENpl
b. Czech ů-o	nož-e	nůž-ek-ø	nůž-ø	nůž-øk-y	knife GENsg, scissors (=dim.) GENpl, knife NOMsg, scissors NOMpl
c. Polish ó-o	krov-a	króv-ek-ø	króv-ø	króv-øk-a	cow NOMsg, dim. GENpl, GENpl, dim. NOMsg
d. Polish ą-ę	zęb-a	ząb-ek	ząb-ø	ząb-øk-a	tooth GENpl, dim. NOMsg, NOMsg, dim. GENsg

3.1. Czech alternations in vowel length

The alternation in vowel length shown under (15)a is typical for Czech.[33] The distribution of long and short vowels is constant in the paradigm mentioned, i.e. feminine a-stems and neuter o-stems to which yer-initial suffixes such as the diminutive *-ek* and the adjectival *-ný* are attached. The presence of a yer is guaranteed by the vowel-zero alternation observed in *žab-øk-a - žab-ek* "frog diminutive NOMsg, GENpl". We also know from so-called short adjectives that occur in predicative function where the case-marker *-ý* is absent that the adjectival *-ný* in fact is yer-initial: *nemoc-øný - nemoc-en* "ill long, short form". On the other hand, it was established earlier that all words that are phonetically consonant-final end in a yer. Hence, abstracting away from vowel length, the underlying representations of *žába, žabek, žab, žabka, jméno, jmen-ný, jmen* are /žab-a, žab-ĭk-ĭ, žab-ĭ, žab-ĭk-a, jmen-o, jmen-ĭn-ý, jmen-ĭ/, respectively.

If the distribution of long and short vowels that occur in the root were to be characterized without recurring to yers, the correct statement would be "long vowels occur in open syllables if the following vowel does not alternate with zero, whereas short vowels occur in closed syllables and in open syllables if the following vowel alternates with zero". That is, the distribution of vowel length is exactly identical with the pattern of vowel-zero alternations extracted under (5): long vowels appear in the same environment as zeros, short vowels exist in the same context as vowels.

Could this identical behaviour be accidental? We have good reason to think that it is not. Consequently, the usual Closed Syllable Shortening-analysis that phonologists are tempted to apply in these circumstances[34] cannot cope with the Czech alternation shown. This follows

---

[33] Vowel length is a century-old problem in Czech, see e.g. Černý (1897), Trávníček (1921,1948-49 I:201ss). There is no general distributional pattern for the entire language, regularities only hold within certain morphologically defined paradigms. It is shown in Scheer (2001a,b) that the lion part of the length alternations is templatic in the Semitic sense. The alternations discussed must be kept apart from those produced by another category of diminutives, which produces opposite results (*vlak - vláč-ek* "train, dim").
More examples of the paradigm illustrated by *žába* are (NOMsg - GENpl - suffix -CV): bába-bab-babka "old woman", blána-blan-blanka "membrane", brána-bran-branka "gate", pára-par-parní (adj) "steam", skála-skal-skalka "rock", kráva-krav-kravka "cow", lípa-lip-lipka "lime tree", síla-sil-silný (adj) "strength", víla-vil-vilnice, vilnost "nymph, lascive woman, voluptuousness", víra-věr-věrnost "faith", léto-let-letní (adj) "summer", houba-hub-hubka "mushroom", louka-luk-luční "meadow", smlouva-smluv-smluvní "contract". See Scheer (2001a,b) for more material.

[34] Closed Syllable Shortening is a process whereby underlyingly long vowels are forced to shorten because a Rhyme must not dominate more than two skeletal slots (either a simplex Nucleus and a Coda, or a branching

from the same reason that made the Closed Syllable-analysis unapplicable to vowel-zero alternations: saying that short vowels occur in closed syllables is contrary to fact because they appear in open syllables if the following vowel alternates with zero.

By contrast, the analysis becomes simple and non-disjunctive if yers are invoked: short vowels occur before yers, while their long versions appear before other vowels. In spite of this striking identity in the triggering environment, we cannot apply Lower to these data, be it in its linear or autosegmental flavour. Indeed, the triggering conditions are identical, but the effects are very different: vocalization in one case, shortening in the other.

Let us leave this issue open for the time being. Before we can push the discussion further, the other alternations mentioned under (15) call for examination.

3.2. Czech and Polish [ɔ] - [u(u)], Polish ą-ę

In both Czech and Polish, [ɔ] alternates with [u(u)]. This phenomenon is sometimes referred to as "raising". In Czech, the alternation in quality is accompanied by length: [ɔ] is short, while [uu] is long; the former is spelt "o", the latter "ů". In Polish where length is not contrastive, [ɔ] (spelt "o") alternates with [u] (spelt "ó"). This way, Polish spelling differentiates [u] that alternates with [ɔ] from [u] that does not: the former is written "ó", the latter "u". Relevant data are given under (15)b and (15)c.

Both Czech and Polish alternations are governed by the same contextual conditions (5) that do not need to be commented anymore: [u(u)] occurs in closed syllables, and in open syllables if the following vowel alternates with zero. On the other hand, [ɔ] appears in in open syllables if the following vowel does not alternate with zero.[35] This statement can be recast in non-disjunctive fashion as before if yers are assumed. Their motivation can be read off the data in the way that is familiar by now.[36]

We do certainly not deal with two separate phenomena here. Rather, there is one single event that has a Polish and a Czech manifestation (and is also present in neighbouring areas). Spelling in both languages hints to the common origin: the [u(u)] is fake, its real identity is [ɔ]. The Polish symbol "ó" betrays this source overtly, and so does the Czech "ů": the little circle on the "u" (*kroužek*) reminds that the "u" in question comes from an [ɔ] (long [uu] that has never been [ɔɔ] is written "ú").

Another important factor is that this alternation occurs only if the following consonant is voiced. In Czech, this is true for the entire set of alternating roots (20 items). Polish possesses many more alternating roots, and some of them have a voiceless consonant following the ó, e.g. *powrót - powrotu* "return NOMsg, GENsg".

Nucleus), thereby ruling out rhymal sequences of a long vowel and a Coda. See orthodox texbook-evidence such as in Spencer (1996:85ss), Harris (1994:78ss), Kenstowicz (1994:436ss,646ss).

[35] The majority of Czech roots that show the o-ů alternation does in fact react on yers: dům - domek "house, id. diminutive", stůl - stolek "table, id. diminutive" etc. The cases where yers are treated as regular vowels seem to be those where the form that contains the vocalized version of the yer is the Nominative singular. Feminine nouns that show the vocalized yer in GENpl forms bear the unaltered ů: nůž-øk-y - nůž-ek "scissors NOMpl, GENpl", hůl-øk-a - hůl-ek "little stick NOMsg, GENpl", půl-øk-a - půl-ek "half NOMsg, GENpl". There is no hope to tell both sets from each other on phonological grounds. Whatever the solution, it does not bear on the demonstration.

[36] The Czech side is discussed in, among others, Lamprecht et al. (1986:113), Trávníček (1935:82ss), Komárek (1962:169s). For the Polish part, see Gussmann (1980:53s,113ss) who is explicit on the triggering yer-context (5), Szpyra (1989:160ss,1992:288ss), Rubach & Booij (1987:10s) who are mistaken in denying its relevance. See also Grzegorczykowa et al. (1999:114ss) for a discriptive survey. Exhaustive data for Czech are available in Scheer (2001a), where the diachronic character of the alternation is established.

Place restrictions preclude further discussion of this alternation. In its original form, short [ɔ] was lengthened iff it occurred 1) word-finally and 2) before a voiced consonant. This statement is true for Old Polish (where vowel length was contrastive) and Old Czech.[37] Later on, long [ɔɔ] was raised to ů/ó = [uu] in both languages, and Polish lost distinctive length. In any event, the diachronic scenario shown does not explain why lengthening has not taken place before regular vowels, but did occur before yers. Whatever the status of this alternation, synchronic or diachronic, involving vowel-quality or vowel-quantity (or both), it exists and is (or has been) triggered by the context that is of interest here.

The alternation shown under (15)d that concerns the two nasal vowels in Polish (sometimes called "Nasal Backing") belongs to the same family: it may be traced back to a diachronic reality (that is Old Polish) where short nasal o was lengthened iff it occurred 1) word-finally and 2) before a voiced consonant. Later on, an independent diachronic event turned short nasal o into nasal e = ę, and then contrastive length was abandoned.[38] The same remarks apply as before: this diachronic scenario does not explain why yers do not behave like regular vowels. Moreover, the status of this alternation in the synchronic grammar of the speakers is not clear either. However, these remarks do not harm the relevance of the familiar conditioning context (5) that is recurrent once more.

3.3. Summary

The table under (16) gives a summary of the four phenomena examined. It supposes that Polish/ Czech [ɔ] - [u(u)] and Polish ą-ę are traced back correctly to their historical identity: the three variations at hand are alternations in vowel length that have been colored by secondary processes such as raising ([ɔɔ] > [uu]), ą>ę and the loss of contrastive length in Polish. I wish to insist on the fact that this diachronic interpretation does make no statement concerning the cognitive reality of the processes at hand in the synchronic grammar of speakers.

---

[37] Pedersen (1905:305) for example discusses the diachronic identity of both alternations involving [ɔ] (nasal or not) in both languages: [ɔ] > [ɔɔ] / __C_{+voice}#. The existence of many non-alternating stems that do meet the contextual conditions in both languages and for both alternations [ɔ] - [u(u)] and ę-ą also shows that the phonological process at stake is not synchronically active, but occurred in a former (common) stage of Polish and Czech.

[38] See for example Stieber (1973), Carlton (1991:128s) for a summary of the diachronic situation of Polish nasal vowels. Gussmann (1980:54,84ss), Rubach (1984:130ss,229s), Szpyra (1989:163ss, 1995:104) and Bethin (1992) provide exhaustive synchronic data. It is curious to observe that most authors hint at the close relationship between the alternations involving ę-ą and o-ó because of the identical triggering context (5), but do not link them to vowel-zero alternations even though these are governed by the same contextual conditions. Since Rubach (1986) and Kenstowicz & Rubach (1987), the fact that yers "are invisible" for syllable-based processes (such as comparative and imperative allomorphy and Iotation) has been a standard argument for their representation as a floating matrix (lacking any X-slot, rather than as an empty Nucleus). Szpyra (1992:288ss,1995:105ss) argues that both alternations concerning ę-ą and o-ó fall into this category, but rejects a causal relation between their distribution and the existence of a yer in the following syllable. However, she convincingly moderates the orthodox statement to the effect that while yers fail to be syllabified, they block the tautosyllabicity of flanking consonants that qualify as branching Onsets.

(16)

alternation	object occurring in __CV	__Cyer	example __CV	__Cyer
vowel-zero	zero	vowel	dom-øk-u	dom-ek, dom-eč-ek, dom-eč-øk-u
Czech vowel length	VV	V	žáb-a	žab, žak-ek, žab-øk-a
	V	VV		
Polish o-ó	o	[ɔɔ] / __C$_{+\text{voice}}$# (> [uu] > [u]=ó)	kr**o**w-a	kr**ó**w, kr**ó**w-ek, kr**ó**w-øk-a
Czech o-ů	o	[ɔɔ] / __C$_{+\text{voice}}$# (> [uu]=ů)	nož-e	n**ů**ž, n**ů**ž-øk-y, n**ů**ž-ek
Polish ą-ę	ą (> ę)	ąą / __C$_{+\text{voice}}$# (> ą)	z**ę**b-a	z**ą**b, z**ą**b-ek, z**ą**b-øk-a

Looking at this table immediately raises a question: how can long vowels be provoked by the fact that there is no yer in the following syllable in one case (Czech vowel length), and by its opposite context in the others (Polish/ Czech [ɔ]-[u(u)], Polish ą-ę)? In order to understand this distribution, we must know what kind of causality is expressed by the statement "before a word-final voiced consonant" in the first place. The three latter alternations are indeed controlled by three parameters: 1) presence vs. absence of a yer in the following syllable; 2) presence of a voiced consonant to their righthand side; 3) the fact that this voiced consonant is word-final. Unless the interplay of these three conditioning factors is properly understood, the initial question cannot be solved. This issue is too ambitious for the present paper, and I will not discuss it any further.

In absence of better evidence, the Czech alternations in vowel length (*žába - žab*) that are free from any additional conditioning factor have to be taken as the unmarked case. I will come back to this issue in section 5.1.

For the time being, we can close this section on the following observation, which is its actual goal: yers condition a variety of segmental alternations in the preceding syllable, among which vowel-zero alternations and vowel length. However, Lower in its initial or autosegmental formulation aims only at describing the influence of yers on preceding vowel-zero alternations, i.e. a relation involving two yers. The fact that vowel length obeys exactly the same pattern (5) as vowel-zero alternations suggests that this ambition is too narrow: a more general formulation of what yers can do to vowels in the preceding syllable is called for.

Moreover, the theory-internal and diachronic motivation for the fundamental difference of triggering and alternating yers is now enriched by an overt distinction. It is incorrect to say that yers bear influence on other yers only. Rather, vocalic alternations in Slavic languages are triggered by yers. Yers condition vowels that occur in the preceding syllable. Target-vowels may be yers themselves (vowel-zero alternations), but also regular vowels (length alternations). If the identity of the context governing vowel-zero alternations and those involving vowel length is not accidental, the generalization in order may not be achieved through the yer-vocalization rule Lower. Rather, it is of more general intervocalic nature. This intervocalic relation does not necessarily target a yer, but it necessarily originates in a yer. Tiggering and alternating yers are different.

In the next section, we will see in which way the familiar yer-context extends beyond Slavic.

4. Yers all over the world ?

In this section, two more occurrences of the yer-context (5) are reviewed: the ATR-value of French mid vowels and alternations involving schwa [ə] and [ɛ] in the same language.

French possesses six mid vowels that subdivide into two sets: +ATR [e,o,ø] and -ATR [ɛ,ɔ,œ].[39] ATRness is distributed according to the familiar yer-context: +ATR versions occur in open syllables if the following vowel does not alternate with zero, while mid vowels are -ATR in closed syllables and in open syllables if the following vowel alternates with zero. Since Dell (1973), this pattern is usually referred to as "Closed Syllable Adjustment" or "Loi de Position" in the relevant literature.[40]

In French, the only vowel that alternates with zero is schwa [ə]. Unlike in Slavic, this alternation is not obligatory but optional, thus *la semaine* "the week" may be pronounced as either [la səmɛn] or as [la sømɛn], depending on dialectal, sociological, and idiolectal parameters.[41]

Table (17) illustrates this description.

(17)   French ATR-alternations of mid vowels

	closed syllable		open syllable			
	__C#	__C.CV	__Cə	__CV		
e	fɛt	alɛχte	sɛləʁi	fete	je fête, alerter, céleri, fêter	I party, alert, celery, to party
	mɛtχ	pɛʁdy	bɛtəʁav	metχik	mètre, perdu, betterave, métrique	meter, lost, turnip, metrical
	səʁɛn		səʁɛnəmã	seʁenite	sereine, sereinement, sérénité	serene, serenely, serenity
o	kɔd	pɔrte	mɔkəʁi	kode	code, porter, moquerie, coder	code, carry, mockery, to code
	rɔz	nɔrmal	rɔzəʁɛ	rozje	rose, normal, roseraie, rosier	rose, normal, rose garden, rose tree
	sɔbʁ		sɔbʁəmã	sobrijete	sobre, sobrement, sobriété	sober, soberly, sobriety
ø	øʁœz	œχte	ørœzəmã	apøʁe	heureuse, heurter, heureusement, apeuré	happy, happily, frightened
	œvʁ	sœχfe	bœvəʁi	øvre	œuvre, surfer, beuverie, œuvrer	work (opus), surf, boozing, to work
	ʒœn		vœləʁi	ʒønɛs	jeune, veulerie, jeunesse	young, weakness, youth

Is it reasonable to suppose that the distribution of French ATRness, Slavic vowel-zero alternations and Czech alternations in vowel length is exactly identical by accident? If it is not, we should recast the statement "-ATR-vowels occur in closed syllables or in open syllables if the following vowel is a schwa" as "mid vowels are -ATR iff a yer occurs in the following syllable". Hence, should we conclude that there are yers in French? The answer to that question probably depends on the definition of the word "yer": if a "yer" is a high

---

[39] In Northern French (Paris), realizations in open syllables are floating und inconsistent (both [fete] and [fɛte] may be produced for *fêter* "to party" by the same speaker in free variation). In the South on the other hand, ATRness is constant und subject to no kind of free variation (only [fete] is possible for *fêter*). In closed syllables such as [fɛt] *je fête* "I party", mid vowels are always -ATR in both northern and southern varieties. The following discussion addresses the southern pronunciation.

[40] See for example Dell (1973:209ss), Selkirk (1972:367ss), Schane (1968:30ss), Valdman (1972), Morin (1986,1988), Tranel (1987,1988).

[41] Dell (1973:219ss) and many others expose the general facts about schwa-zero alternations in French.

centralized lax vowel with either a palatal or a velar flavour that underlies vowel-zero alternations and corresponds to Indo-European *i* and *u*, respectively, there is no doubt that we conclude on the absence of yers from French. No such objects are known in either French diachronics or synchronic analysis. If on the other hand yers are abstract theoretical vowels as is suggested by Gussmann (1980), Rubach (1984:28) and at the end of section 2.4, the answer may be positive. If a Slavic word that is consonant-final on the surface can end in an abstract vowel underlyingly, there is no reason why a French word could not be analyzed this way, and for identical reasons.[42] Also, if an abstract vowel may occur after Codas in Slavic, it can do so in French as well. However, there is a notable difference between Slavic vowel-zero alternations and French ATR: in the former case, yers after Codas always enjoy additional motivation because they appear on the surface in the appropriate context (pol /buł-ĭcz-ĭk-a/ [bułet͡ʃøka] NOMsg vs. /buł-ĭcz-ĭk-ĭ/ [bułet͡ʃek] GENpl). This is not the case in French: the inferred yer separating [r] and [d] in [pɛrdy] *perdu* "lost" has a phonetic existence under no circumstances. This issue, which calls for additional empty Nuclei that are not motivated by vowel-zero alternations, is further discussed in section 6.3.2.

The price to pay if this perspective should be rejected is high: 1) the analysis of French ATRness must cope with an unwarranted disjunction; 2) a generalization regarding this disjunction and its identical occurrence in Slavic would be missed; 3) the same effects would be ascribed to different causes.

Before evaluating the theoretical consequences of the presence of "yers" in French, another piece of evidence in support of the reality of French "yers" needs to be introduced. It concerns the well-known French alternation between schwa [ə] and [ɛ] that is referred to as "Schwa-Adjustment (ə-AJ)".[43] This alternation and the aforementioned ATR-variation are commonly assumed to be two effects of a single phonological mechanism called Closed Syllable Adjustment.[44]

Their distribution obeys the familiar pattern: schwa appears in open syllables if the following vowel is not a schwa itself, while [ɛ] is observed in closed syllables and in open syllables if the following vowel is a schwa. Table (18) embodies this statement.

---

[42] Interestingly, Dell (1995:18ss) makes a parallel suggestion for the sake of entirely independent evidence.

[43] See for example Dell (1973:198ss), Schane (1968:30ss), Tranel (1987,1988), Charette (1991:172ss).

[44] See Tranel (1987,1988), Morin (1988) for a more detailed comparison of both alternations and a survey of the relevant literature.

(18)   French schwa – [ɛ] alternation

closed syllable	open syllable			
ɛC#	ɛCə	əCV		
mɔχsɛl	mɔχsɛləmã	mɔχsəlõ, mɔχsəle	1) je, tu, il, ils morcèle(s)(nt), 2) morcèlement, 3) nous morcelons, 4) inf./ part./ vous morceler/ -é/ -ez	1) cut into pieces 1sg; 2) id., noun; 3) cut into pieces 1pl; 4) id., infinitive
apɛl	apɛləra	apəle	j'appelle, appellera, appellation	call 1sg; id., future 3sg; id., infinitive
ãsɔχsɛl	ãsɔχsɛləmã	ãsɔχsəle	j'ensorcèle etc., ensorcèlement, ensorceler etc.	bewitch 1sg; id., noun; id., infinitive
aχsɛl	aχsɛləmã	aχsəle	je harcèle etc., harcèlement, harceler etc.	harass 1sg; id., noun; id., infinitive
aʃɛv	aʃɛvəmã	aʃəve	j'achève etc., achèvement, achever etc.	achieve 1sg; id., noun; id., infinitive
sɛvʁ	sɛvʁəʁa	səvʁe, səvʁaʒ	elle sèvre, sèvrera, sevrer, sevrage	1) wean 1sg; 2) id., future 3sg; 3) id., infinitive; 4) id., noun

Internal closed syllables (__C.CV) are not represented because French morphology does not allow to produce __C.CV-clusters where both consonants are heteromorphemic. On the other hand, schwa does not exist in closed syllables at all, and hence will never occur in roots that end in two consonants of falling sonority √__RT such as *alert-er, perd-re* "alert, lose" etc. Relevant examples actually appear in table (17).

The two French alternations shown require yers in order to be understood as a non-disjunctive reality. In the next section, I inquire on the real phonological identity of what has been referred to as "yers" up to this point.

5. What an "abstract vowel" really is
5.1. The puzzle

Let us first assemble the pieces of the puzzle that have been collected in the previous sections. The environment (5) that I have been referring to as the "yer-context" conditions the following alternations ("schwa" is shorthand for "vowel that alternates with zero").

(19)

alter-nation	statement	object occurring in		example	
	surface	__CV if V≠schwa	closed syllable and __CV if V=schwa	__CV	__Cyer
	using yers	__CV	__Cyer		
Slavic vowel-zero	zero	vowel		dom-øk-u	dom-ek, dom-eč-ek, dom-eč-øk-u
French schwa - [ɛ]	schwa	[ɛ]		[apɛl] *appelle*	[apəle] *appeler*
Czech vowel length	VV	V		žáb-a	žab, žak-ek, žab-øk-a
French ATR	+ATR	-ATR		[fɛt] *fête*	[fete] *fêter*

residual: multiple parameters, to be understood				
	V	VV		
Polish o-ó	[ɔ]	[u]	krow-a	krów, krów-ek, krów-øk-a
Czech o-ů	[ɔ]	[uu]	nůž-e	nůž, nůž-øk-y, nůž-ek
Polish ą-ę	ę (> ę)	ąą (> ą)	zęb-a	ząb, ząb-ek, ząb-øk-a

As stated earlier, the alternations that I call "residual" exceed the scope of this paper. They appear for the sake of completeness.

The main part of the table is explicitly grouped: Slavic vowel-zero alternations go along with French schwa - [ɛ], while Czech alternations in vowel length are paired with French ATRness. This classification is made on purpose. It reflects the relative strength and weakness of the particular alternating items: in the former group, the objects that are relatively weaker with respect to their alternating partners (i.e. zero and schwa) appear before real vowels, while the stronger alternants (i.e. vowels and [ɛ]) occur before yers. By contrast, strong and weak alternants are flipped in the second group: the strong long and +ATR-vowels occur before real vowels, whereas their weak alternants (i.e. short and -ATR vowels) are observed before yers.

This situation seems contradictory: why should an identical context sometimes create the conditions for the appearance of strong allophones, but prohibit their existence in other instances?

I will come back to this issue in section 6.5 once the theoretical tools for its understanding are laid out.

5.2. Empty Nuclei prior to Government Phonology I: Stephen Anderson on French

A unified solution to the puzzle sketched was proposed by Anderson (1982) and Spencer (1986): "yers", whose identity was supposed to be "abstract vowels" are in fact empty Nuclei. Both papers came to this conclusion in the same intellectual drive that was created by the advent of autosegmental structures, and they were motivated by the two sets of data that have been discussed above: French alternations involving schwa and Slavic vowel-zero alternations.

Let us first look at Anderson's problem. He observes that the two French alternations exposed under (17) and (18) are conditioned by the same context and therefore wishes to conflate the corresponding rules into one. As for the alternation introduced under (18), what could be the underlying identity of the object whose surface-manifestations are [ɛ], [ə] and zero? As was mentioned before, schwa may be optionally realized as zero[45], including instances where it alternates with [ɛ] as in *appelle* [apɛl] (only possible realization) vs.

---

[45] Subject to certain contextual conditions, see e.g. Dell (1973:219ss).

appeler [apəle] or [aple]. However, the phonetic realization of schwa is most frequently not [ə], but [œ]. Since both [ɛ] and [œ] are also surface-realizations of underlying objects that do not participate in the alternation schwa - [ɛ] - zero (e.g. *allaite* [alɛt] "give milk 1sg" - *allaiter* [alɛte], *[aləte] "id., infinitive"; *abreuver* [abʁøve] "give water (animal) inf." vs. *abreuve* [abʁœv], *[abʁɛv] "id., 1sg"), neither /ɛ/ nor /schwa/ (realized as [ə] or [œ]) qualify for underlying representations (Anderson 1982:544ss,550). The third candidate, zero, does in principle.

But this option was excluded by Dell (1973:187s) for a reason that is identical to the one that disqualified epenthesis-strategies in Slavic (cf. section 2.2): in both Slavic and French, the occurrence of vowels that alternate with zero is a lexical property of each word and morpheme. It cannot be predicted from any environmental parameter. If zero were underlying in French, the two words *secouer* [səkwe] "to shake" and *skier* [skje] "to ski" would possess an identical underlying structure at their left margin: /#sk…/. Accordingly, either both forms are expected to surface with schwas, or none is.

This is where the title of Anderson's (1982) article stems from: **How to get something for nothing**. In linear terms, the two insights that Anderson had made could not be married: melodically (or paradigmatically), the only possible underlying identity for the object at stake was zero: "nothing"; but structurally (or syntagmatically), the location of the same object had to be different from zero: "something". However, autosegmental theory provided a natural solution to this equation: since the structural level is separated from the definition of melody, nothing prohibits the structural presence of the vocalic object sought, i.e. a Nucleus, which is melodically zero. On this account, schwas are different from any other vowel since they are the simple spell-out of an empty Nucleus (whereas stable [œ] is an underlying /œ/ which is already associated with its Nucleus in the lexicon), and their occurrence in the linear string is anchored in the lexicon.

Once this important step away from the unwarranted syllabic philosophy "What you get is what you see" is made, the question arises how these empty Nuclei come into segmental being in case they appear on the surface. Anderson evolves in a rule-ordering type of grammar that may be described as a version of SPE augmented with autosegmental representations. In this spirit, he operates with various linking- and delinking rules. Namely, the segmental material attached to the Onset of an empty Nucleus is resyllabified as the Coda of the preceding syllable if and only if its original syllable containing the empty Nucleus does not bear a Coda (Anderson 1982:553ss). This is Anderson's way to encode the Closed Syllable condition: the Onset of a syllable whose Nucleus is vacuous and that lacks a Coda is captured by the preceding syllable. Note that this move makes vowels come to stand in closed syllables that either have always been in that situation since the lexicon (such as /tet/ --> [tɛt] *tête* "head" and /per.dy/ --> [pɛʁ.dy] *perdu* "lost" for ATR, /a.p_l/[46] --> [a.pɛl] *j'appelle* "I call" for schwa-[ɛ]), or whose Rhyme was adjoined a consonant through the capture of the Onset of the following syllable that bore an empty Nucleus (cases of /be.t_.ʁav/ --> [bɛt.ə.ʁav] *betterave* for ATR, /a.p_.l_.ra/ --> [a.pɛl.ə.ʁa] *appellera* for schwa-[ɛ]). By these means, Anderson gets rid of the disjunction (5) "in closed syllables and in open syllables if the following syllable hosts a schwa": something that behaves like a Coda (= the Onset of a schwa-syllable) must be a Coda, and if it is not, we will make it a Coda.

Once this resyllabification has taken place, subsequent rules fill in the remaining empty Nuclei by [ɛ] if their Rhyme possesses a Coda, and mid +ATR-vowels are turned into their

---

[46] I use the symbol "_" in order to refer to empty Nuclei while maintaining the difference with "ø" which stands for the mid front rounded +ATR vowel.

-ATR partners under the same conditions. The remaining empty Nuclei that have not been filled by the [ɛ]-insertion rule (i.e. the ones whose Coda has been captured) are optionally deleted (according to the optional character of schwa in e.g. [apɛl(ə)ʁa] *il appellera* "he will call"). To be precise, Anderson proposes that the entire syllable, which does possess neither Onset-material nor a Coda, is deleted. In case schwa is realized, the empty Nucleus of these remaining syllables is filled in by [ə]/ [œ].[47]

5.3. Coda-capture vs. yers

The solution favoured by Anderson is typical for the early period of generative endeavour: anything could be a rule and change any object into any other object, the only goal being to produce the attested result on the surface.[48] "Coda-capture", as practised here, is one case in point of this strategy whose ambition is to derive the attested forms rather than to understand which phonological (and hence biological) processes are involved. A substantial critique of this SPE-type of behaviour was available as early as in Foley (1977:3ss). Since the concept of Coda-capture has survived up to present-day phonology in different disguise, Harris (1999) has made clear one more time what it really is: an attempt to make fit into a theory a reality that is unpleasant. Some open syllables behave as if they were closed, so let us write a rule that makes them closed.

Acting along these lines makes sure to miss the basic insight of Lower: the presence or absence of a Coda in a given Rhyme is completely irrelevant for the alternations governed by the yer-context (5). Rather than in the paradigmatic relation of a Nucleus and a Coda, the solution is to be sought in the syntagmatic communication between two vowels.

Apart from the formal properties mentioned and those that are to be exposed below, there is good reason to be surprised that the "French" reaction on the same object (5) that led to Lower on the "Slavic" side went the paradigmatic, rather than the syntagmatic way. Indeed, since ever French was carried into the spotlight of modern and generative investigation by Schane (1968), all analyses recurred to a kind of word-final yers which occurred at the end of words that were consonant-final on the surface. These vowels were called "protective schwas". They are almost exactly parallel to the word-final triggering yers in function and behaviour: 1) they never reach the surface, 2) they exist in order to prevent (Slavic: in order to trigger) the application of rules, 3) they are assigned morphological value. For instance, first, second and third person signular of verbs belonging to the first group (infinitives in *-er* like *porter* "to carry") were said to be marked by /-ə/, the feminine marker of adjectives was /-ə/, and the thematic vowel of the first group of verbs was /-ə-/ as well. On the account of alternations between consonants and zero, consonant-deletion rules were proposed. For instance, adjectives typically lose their final consonant in masculine forms, but maintain it in feminine occurrences: *fort* [fɔχ] "strong masc." vs. *forte* [fɔχt] "strong fem." and the like are characteristic examples. Both were said to derive from the common and unique underlying

---

[47] The optional character of the rule deleting syllables with empty Nuclei as well as the exact ordering of rules is inferred by me, Anderson (1982:555s) is evasive on this topic.

[48] For the sake of fairness, this has not been Anderson's exclusive motivation. He has also sought to connect his analysis based on Coda-capture with other facts from French such as the ordering of other rules and h-aspiré. Another attempt at reducing the disjunction (5) was made by Selkirk (1978). She proposes that the relevant domain of application of the rule governing the alternations at hand is not the syllable, but the foot (see also Basbøll 1981 along these lines). Tranel (1987:312s) has shown that this approach does not resist the French evidence. Moreover, it is transparent that the definition of a French foot as "containing one syllable, except if the following vowel is a schwa, in which case it contains two syllables", serves no other purpose than making the yer-context (5) non-disjunctive. Schwa being drowned in the foot by force, the yer-context can be recast as "everywhere but at the end of a foot". This procedure is overtly circular.

root /fɔrt/. The masculine morpheme was zero, while the identity of the feminine suffix was schwa /-ə/. If the rule of consonant-deletion applies before the one that evacuates final schwas, the correct surface-forms are derived. The same kind of argumentation was made for the other morphemes mentioned that involve protective schwas. Their discussion exceeds the scope of this paper, relevant information is available in, among many others, Dell (1973:177ss), Tranel (1981:277ss).

Hence, half of the technology that is needed in order to run a syntagmatic implementation of (5) in the spirit of Lower was already solidly assessed in the analysis of French: word-final "protective yers" and the rules deleting them were needed anyway (though not in all instances of words that end in a consonant on the surface, that is true). Perhaps was the ongoing debate on abstractness (e.g. Kiparsky 1968,1982, Kenstowicz & Kisseberth 1977:1-62, Hooper 1976) with firm advocates of "concreteness" (i.e. anti-abstractness) on the French side (Tranel 1981) a brake on generalizing "abstract schwas" to all triggering contexts including the location after Codas. Or perhaps did the label "protective" intuitively preclude from considering this object as a trigger of phonological processes (+ATR --> -ATR, schwa --> [ɛ])?

Be that as it may, let us return to the discussion of Anderson's Coda-capture. Edicting that the disturbing open syllables are closed misses another important insight that Lower expresses: it is not just any arbitrary kind of open syllable that behaves as if it were closed, but precisely the one whose righthand neighbour hosts a very peculiar vowel. What is so special about this vowel? Of course, Anderson and the other authors that have identified the relevance of the yer-context (5) in French were aware of the list of special properties displayed by French schwa, among which the fact that it alternates with zero. But they did not establish any kind of causal relation between this property and the fact that only this vowel has a special influence on the preceding syllable. If any other vowel, say non-alternating [u], had displayed this behaviour, the Coda-capture rule would simply have stated that Onsets of syllables whose Nucleus is /u/ are resyllabified as the Coda of the preceding syllable if their Rhyme does not bear a Coda. In yet another scenario, the Coda-capture rule would have sounded exactly as was proposed by Anderson if French schwa did not alternate with zero.[49]

This is in fact another typical property of early generative analysis, consubstantial with the one that was depicted above: rules transform X into Y in the vicinity of the context A. We are not interested in the causal relation involved: why does A turn X into Y rather than into Z? Why is X turned into Y by A rather than by B? These questions had no answers, and they would not even be taken as relevant questions (Foley 1977:4).[50]

---

[49] Coda-capture is not the only possible attitude towards the problem, as is demonstrated by the wise position taken in Dell (1973:211s,214). The triple disjunction [1) before a word-final consonant, 2) before two consonants of falling sonority, 3) before a single consonant or two consonants of rising sonority if the following vowel is schwa] is listed without ambiguity. Dell does not doubt a moment that a sound phonological theory must allow for the reduction of this reality to a non-disjunctive statement. Since 3) cannot be expressed in terms of a closed syllable, Dell pinpoints this fact, expresses the desire to do away with it and leaves the question open for further investigation: "Nous renonçons pour l'instant à expliquer pourquoi E-AJ traite ə et e comme s'ils se trouvaient en syllabe fermée lorsqu'ils sont en syllabe ouverte et que la syllabe suivante contient un schwa" (214). He clearly chooses between deriving the correct surface forms via Coda capture ex machina and an explanatory analysis: as the latter was not available at the time he wrote, he preferred not to submit any solution, which I believe was the best solution.

[50] However, it must be said in defence of the "French" branch that the identification of the crucial property of schwa in regard of its relation to the preceding syllable, i.e. its alternating status, was not self-evident since the Slavic data and analyses were obviously set in no relation with the French data at all. This is probably due to the fact that there were no slavicists on the "French" side, and the literature dealing with Slavic data was not reviewed (at least is it completely absent from the texts dealing with the French alternations). One purpose of the present paper is to bridge this gap.

By contrast, the very essence of Lower precisely states this causality: a yer is vocalized iff followed by another yer. There would be no way to replace the triggering yer by another vowel since only the fact that yers alternate with zero opened the opportunity to posit underlying triggering yers that never reach the surface.[51]

It is only when both the Slavic and the French pieces of the puzzle (19) are identified that the crucial question can be raised: what is the common feature of the triggering yers (appearing as [ɛ], [ɔ], [a] etc. in particular Slavic languages) and the French schwa? The answer is beyond any doubt: the fact that both alternate with zero. Hence, any analysis that does not encode this causality between the alternating character of the triggering vowel and its bearing on the preceding syllable must be erroneous. Anderson was wrong, Lightner and his followers were right.

But yet in one respect, the reverse is true: autosegmentalized versions of Lightner's Lower that were proposed by Rubach (1986), Kenstowicz & Rubach (1987) do not recognize empty Nuclei. One goal of the present paper is to achieve a synthesis of both insights: the Slavic syntagmatic solution (=yers) and the French way to get something for nothing (=empty Nuclei).

Given the yer-analysis, what made refrain the Slavic side from acknowledging empty Nuclei in the French fashion, and for the same reasons? In order to understand the motivation for autosegmentalizing Lower in the way that was shown in section 2.6, we need to discuss the missing link in the evolution of the study of Slavic vowel-zero alternations: the paper that Spencer (1986) wrote on Polish.

5.4. Empty Nuclei prior to Government Phonology II: Andrew Spencer on Polish

Unlike Anderson (1982), Spencer (1986) did not have to struggle with the data and their analysis in terms of yers since he could build on Gussmann (1980) and Rubach (1984). He fully accepts the fundamental insights of Lower that have been discussed earlier: yers exist, and Polish does not possess Codas in alternating environments nor word-final consonants at the underlying level.

Spencer's purpose is not to construct a new analysis, but to make Lower and the formal apparatus used by Gussmann and Rubach less abstract. His motivation stems from the long lasting debate on abstractness that was initiated by Kiparsky (1968)[52], and Spencer is firmly engaged against abstract analyses if a more concrete alternative is available. Thus, he does not intend to attack Lower in its essence, but merely aims at proposing a version of it that does not need to appeal to underlyingly present yers that are subject to absolute neutralization, the extensive use of extrinsic rule-ordering and the cyclic application of rules. In short, Spencer's goal is to achieve the same descriptive adequacy as Gussmann and Rubach while cutting down their formal machinery to a minumum and expanding the role of both the lexicon and allomorphy. He considers autosegmental representations as the adequate tool that allows to successfully implement this program.

One direct result of his approach is the equation "yer = empty Nucleus" (Spencer 1986:255). Hence, the alternating pairs of the word for "day" [d͡ʑɛɲ] *dzień* NOMsg - [dɲ-a] *dønia* GENsg and "dream" [sɛn] *sen* NOMsg - [sn-u] *søn-u* GENsg enjoy the following lexical representation.

---

[51] Gussmann explicitly identifies the crucial property of triggering vowels: "the deleting vowel disappears if followed directly by a nondeleting vowel" (Gussmann 1980:30).

[52] This debate was led over the years by, among others, Stampe (1973), Schane (1974), Hooper (1976), Koutsoudas (1980), Dinnsen (1980), Tranel (1981), Kiparsky (1982).

(20) dzień NOMsg	dønia GENsg	sen NOMsg	søn-u GENsg
C V C V	C V C V	C V C V	C V C V
| | |	| | | |	| | |	| | | |
d j n *	d j * n a	s n *	s * n u

The difference between both words is that the former, in addition to the vowel-zero alternation, shows a [d͡ʑ]-[d] alternation, while the initial consonant of the latter is not affected. This contrast classically motivates the existence of two distinct yers, even though the phonetic value of alternating vowels is always the same: the front yer ĭ which has palatalizing effect and the back yer ɨ̆ which does not induce palatalization. In the account of Gussmann (1980) and Rubach (1984), the underlying identity of the alternating vowel in *dzień* is a front yer, while the [ε] in *sen* originates in a back yer. Since Spencer wishes to do away with abstract vowels that are part of the phonemic inventory of the language, he equates the vowel yer with an empty Nucleus. He also conflates both yers into one single object: there is just one variety of empty Nuclei. As shown under (20), the palatality-effects are achieved by the lexical presence of a /j/ in the root of *dzień* vs. its absence in the root of *sen* (on the fate of this /j/ see below).

On this account, the vocalization of the lexically present empty Nuclei proceeds as follows. Spencer (1986:252) correctly translates the action of Lower into prose: "its effect is to lower all but the rightmost of a consecutive string of yers. The remaining yer is then deleted". His computation of empty Nuclei is a simple recast of this formulation: first, he gives a special status to the last member of a yer-chain, calling it "extrametrical" (even though it may occur word-internally). In the representations under (20), these empty Nuclei are identified by an asterisk. Spencer further stipulates that extrametrical empty Nuclei may not receive melodic identification. All other empty Nuclei are then subject to epenthesis: [ε] is inserted. Finally, a late postcyclic rule deletes unassociated empty Nuclei. This rule feeds another rule that deletes the /j/ mentioned in case it occurs between two C-slots (like in GENsg *dnia*). If /j/ is not deleted, it causes palatalization of the preceding consonant (like in NOMsg *dzień*).

Further implications of Spencer's account regarding the organization of the lexicon and the exact nature of allomorphy are not relevant here. In the next section, his contribution to the analysis of vowel-zero alternations is evaluated in the light of the previous discussion.

5.5. Fill-in without cuasality vs. intervocalic relation

As was mentioned earlier, at no point of his endeavour, Spencer is concerned with the reduction of the nasty disjunctive yer-context (5) to a non-disjunctive statement. He takes for granted that there are vocalic items present in the underlying representations in exactly the locations specified by Lower: word-finally (triggering yers) and in alternation sites (alternating yers). Only does he "desegmentalize" the objects in question, giving them a purely syllabic, non-melodic identity.

As far as I can see, a much simpler account is available under these provisions (and Spencer was in quest of concreteness ≈ simplicity). Recall that the effect of Lower "is to lower all but the rightmost of a consecutive string of yers. The remaining yer is then deleted". A good question to be asked is why the "remaining yer", i.e. the last yer of a yer-chain, should exist in the first place if it is deleted anyway and needs the very suspicious stipulation of (word-internal) "extrametricality". This leads us to the crucial shortcoming of Spencer's analysis: there is no reason for the existence of the extrametrical empty Nuclei in his account. The insertion-strategy he advocates would produce identical results if the last yer of a yer-

chain were not embodied by an empty Nucleus. This follows from the fact that there is no causal relation between the existence of an empty Nucleus (= a yer) and the vocalization of its preceding peer. Spencer's rule that inserts melodic content to empty Nuclei makes no refernce to the melodic status of the following syllable at all. It simply says "insert [ɛ] into empty Nuclei".[53]

In this respect, Spencer and Anderson behave alike: both posit empty Nuclei, but neither incorporates the fundamental insight from Lower according to which the effects of (5) do not originate in the paradigmatic organization of syllable structure, but are caused by a syntagmatic relation between two vowels.

While Rubach (1986) and Kenstowicz & Rubach (1987) welcome the idea of eliminating the yers from the underlying inventory of vowels in giving them an autosegmental representation, they disagree on the consequences induced by Spencer's empty Nuclei. Namely, palatalization is triggered by the adjective marker [-n-] in words such as *głos* [gwɔs] "voice" vs. *głoś-n-y* [gwɔɕ-n-ɨ] "loud".[54] We also know that the adjective marker in question is yer-initial since a vowel occurs in predicative forms where the final *-y* is absent: pol *win-ien* [viɲ-ɛn] - *win-øn-y* [vin-n-ɨ] "guilty", cz *nemoc-en* - *nemoc-øn-ý* "ill". Hence, if the underlying identity of the adjectival [-n-] were an empty Nucleus followed by an [n] /-Vn-/, how should palatalization be achieved? Since the empty Nucleus is not subject to epenthesis, it will be deleted on Spencer's account. Consequently, no palatal agent is available that could trigger palatalization.[55] On the faith of this argument and on a few others, Rubach (1986:257s) concludes that 1) the autosegmental idea is good, 2) the elimination of the yers from the underlying inventory of vowels is called for, 3) yers must enjoy a melodic identity, and 4) representations must allow for the existence of two different yers, one palatalizing, the other not.

The consequences of this scenario have been exposed in section 2.6. There is no more melodic difference between stable /ɛ/ and the yers. The alternating properties of the latter are achived by the fact that they are lexically unassociated to either a skeletal slot or a syllabic constituent.[56]

In the light of the evidence regarding the other Slavic alternations discussed under (15) (Czech VV-V, Polish ą-ę, Polish and Czech [ɔ]-[u(u)]), Spencer's analysis runs into even more serious trouble. Since there is no causal relation between the site where the segmental effect is observed and the following vowel, what could be the trigger of these alternations? The underlying identity of the target-vowels in question is certainly not an empty Nucleus. The same holds true for French ATR-alternations. In sum, the discussion of (15) concluded that not only must there be an intervocalic relation, but that theory must also be able to distinguish triggering from alternating yers. Since on Spencer's account, vocalization is not triggered by any object but occurs by default, no such difference can be made, and the associated processes where vowels alternate with something different from zero remain unexplained.

---

[53] The absence of an intervocalic causal relation in his analysis exists even though Spencer (1986:255) explicitly mentions that one of his motivations was an insight from the analysis of Finnish: "The C slot, though empty, can condition syllable-sensitive rules, but if left unassociated at the end of a derivation is deleted".

[54] But see the absence of palatalization in *-ny* formations such as *mięso* [mjɛ̃wsɔ] - *mięsny* [mjɛ̃wsnɨ] "meat, adj.", *żelazo* [ʒɛlazɔ] - *żelazny* [ʒɛlaznɨ] "iron, adj.".

[55] But see the solution proposed by Gussmann (1992) and Bethin (1992) in defence of Spencer that records palatalized consonants in the lexicon.

[56] See Piotrowski (1992a,b) and Piotrowski et al. (1992) for more discussion of Spencer's (1996) analysis and autsegmental solutions for the yer-problem.

Yet another fact constitutes a serious hurdle for Spencer's analysis: there are languages where more than one vowel alternates with zero. Among these are Eastern Slavic (typically [ɛ]-zero from Common Slavic soft yers vs. [ɔ]-zero from Common Slavic hard yers) and Slovak. Rubach (1993:134ss) has collected a truly convincing set af arguments that extincts any kind of hope in insertion-perspectives.

Before we can proceed to a summary of the approaches studied, a brief discussion of Szpyra's (1992) analysis is in order. Participating in the drive against abstract underlying structures (see the discussion in section 5.3), she aims at doing away with yers that never appear on the surface (i.e. those with morphological value). This is achieved in denying the intervocalic causality of Polish vowel-zero alternations altogether: yers are present in underlying representations, but are not vocalized because of the presence of a yer in the following syllable. Rather, they come into phonetic being in order to salvage unsyllabifiable consonants that could not otherwise be accommodated. Her argumentation crucially hinges on the analysis of the alternations mentioned under (15)c,d: Polish ę-ą and o-ó. For the sake of her demonstration, the yer-context (5) controlling them must not be deprived of its disjunctivity (see also note 38). She thus explicitly welcomes the disjunctive statement "in closed syllables and before a yer". Besides the fact that disjunctions are suspect per se, she ultimately draws a red line in the middle of three processes that are governed by identical contextual conditions: ę-ą and o-ó on one hand obey a disjunction, whereas vowel-zero alternations on the other are due to a single cause, that is the unsyllabifiable character of certain consonants. Moreover, if the non-Slavic data discussed should be accounted for along the lines of her analysis, the cross-linguistic generalizations they imply could not be formulated.

5.6. We are looking for a theory of intervocalic relations

Before examining the avent and use of empty Nuclei in Government Phonology, let us summarize the different views that were expressed in the preceding sections. Table (21) provides a synopsis (the term "abstract vowel" subsumes both yers in the traditional generative sense and empty Nuclei in Spencer's 1986 analysis).[57]

---

[57] Szpyra (1995:107ss) provides a more elaborate discussion of the various representations of yers that have been put forth.

(21)

	Slavic				French
	linear	non-linear			
	Gussmann (1980), Rubach (1984)	Spencer (1986)	Szpyra (1992)	Rubach (1986), Kenstowicz & Rubach (1987)	Anderson (1982)
presence of yers in the underlying vocalic inventory	yes	no	no	no	no
underlying melodic identity of vowels that alternate with zero	yes	no	no	yes	no
"abstract vowels" in word-final position and after Codas	yes	yes	no	yes	no
causal intervocalic relation	yes	no	no	yes	no
coda capture	no	no	no	no	yes
deletion of unassociated "abstract vowels"	yes	yes	--	yes	yes
"abstract vowels"/ vowels that alternate with zero = empty Nuclei	no	yes	no	no	yes
"abstract vowels" = floating matrices	no	no	no	yes	no
"abstract vowels" = floating root-nodes unspecified for any feature	no	no	yes	no	no

This comparison allows for two interesting observations. First, under no analysis do the empty Nuclei (Anderson, Spencer), floating matrices (Kenstowicz & Rubach) or yers (linear accounts) "survive" on the surface. This is understandable in the latter case where the presence of a feature-matrix in the linear string is the only condition on its phonetic expression. But it does not follow from any principle in non-linear accounts: one cornerstone of autosegmental representations is the fact that a phonetic expression is the result of the association of a feature-bundle with a skeletal slot (which is itself linked to a syllabic constituent). A feature-matrix alone may be present, it will not appear on the surface if it is not associated to a syllabified skeletal slot. Conversely, a syllabic constituent (provided with a skeletal slot or not) will not be phonetically interpreted if it lacks melodic content. At least is this the situation of empty Onsets in vowel-initial words. Hence, there is no reason, a priori, to assume that empty Nuclei or floating feature-matrices are deleted if they do not reach the surface. They may as well subsist.

Second, it is noteworthy that, among the authors who assume a causal relation between the triggering yer and the alternating vowel, this intervocalic relation remains nameless. The formulation never goes beyond "a yer is vocalized if there is a yer in the following syllable". However, it was shown earlier that the existence of this intervocalic relation is the backbone of Lower and sets accounts using this concept apart from others. It may thus come as a surprise that the central device of the crucial instrument has attracted so little attention. What is the exact nature of this force that relates two vowels, is disbalanced (one is under the spell of the other) and strictly directional (always right-to-left)? Put in another way, why is it that the existence of yers always conditions the preceding vowel, but never the following syllable?

We have now completed the following steps: data whose distribution is governed by the yer-context (5) have been collected in section two (Slavic vowel-zero), three (other Slavic alternations) and four (French alternations). The analyses they have given way to have been

exposed and evaluated in section 5. On the remaining pages, I will try to weave all these strings into one solid rope that can support the entire weight of the puzzle (19).

6. Government Phonology and yers
6.1. Abstract vowels are Empty Nuclei, Structure Preservation and Government

As was shown above, empty Nuclei existed before Government Phonology was constituted in print: the two major references are Kaye et al. (1985,1990), and empty Nuclei appear only in the latter text. However, the empty Nucleus is a typical and genuine GP-concept. For one thing, neither Anderson (1982) in the French nor Spencer (1986) in the Slavic tradition have found any followers who would have maintained and developed the theoretical potential of empty Nuclei. On the other hand, empty Nuclei are central in the conception of grammar that underlies GP. They have been introduced into the theory for reasons that are of purely theoretical, rather than empirical nature. From the beginning on, the research-project of Government Phonology was to build a "syntax of phonology", using central concepts form syntactic theory. By this token, phonological versions of the Minimality Condition (Kaye et al. 1990:224s) and the Projection Principle were proposed. It was the latter device that had most widereaching consequences: "governing relations are defined at the level of lexical representation and remain constant throughout a phonological derivation" (Kaye et al. 1990:221). According to Kaye et al. (1990), syllable structure is a consequence of the governing relations that hold among consonants. Therefore, resyllabification is prohibited: a melodic object that is "born" in a Coda cannot surface in an Onset.[58]

Another consequence of the Projection Principle is Structure Preservation (also known from syntax, see Harris 1994:189s on this parallel): a syllabic constituent is not deleted in case the associated melody, for one reason or another, should be phonetically absent. Facing a typicl Slavic alternation such as cz *loket* vs. *lokt-e* "elbow NOMsg, GENsg" for example, [k] and [t] belong to two independent Onsets in both forms. Did they not, i.e. were the [k] resyllabified into the Coda of the preceding vowel, the governing relations holding among both consonants would be changed in the course of the derivation. Therefore, all alternations of a segment with zero concern exclusively the melodic part of the autosegmental representation, while constituent structure remains untouched.

Given these premises, the question arose how many empty Nuclei a structure can support and what their phonological status is in case they lack any phoneitc representation. Again parallel to syntax, a phonological Empty Category Principle (ECP) was proposed for that sake. In its primitive version, it simply stated that an empty Nucleus may remain phonetically unexpressed if it is properly governed (Kaye et al. 1990:219)[59]. Sound governors are contentful Nuclei that possess a phonetic existence.

As a consequence of this restriction on the existence of empty Nuclei, a disbalanced syntagmatic relation between two Nuclei has been introduced: one Nucleus acts as the governor, the other is the governee. This typical dependency-relation has given its name to the theory: Government Phonology. And we have now found, I submit, the lateral relation we were looking for.

Before going into further detail, let us summarize to which extent GP reproduces concepts that preexisted for different reasons, and to which respect it has developed tools that may turn out to cover empirical situations that were orphan before. Empty Nuclei are not an invention of GP, but GP is the only framework that has given them a theoretical status. In GP, there is no

---

[58] Typical instances of word-final resyllabifications when a vowel is suffixed to a /CVC/-root do not arise since the final C of the root is the Onset of an empty Nucleus (see below section 5.XXX(6.3.1)).

[59] Or if they are domain-final. See Kaye (1990a). Later on, proposals were made to the effect that the ECP may be satisfied in other configurations as well, see Kaye (1992), Gussmann & Kaye (1993), Scheer (1996, 1999).

other way than considering vowel-zero alternations as the presence vs. absence of melodic material in a Nucleus. Hence, the identity of Slavic yers, French schwas and any other vowel that alternates with zero in any other language must be an empty Nucleus in case the zero-alternant appears. Abstract vowels = empty Nuclei. However, Structure Preservation forces GP to be significantly different from all approaches summarized under (21): only melody may or may not be absent from surface structure, the corresponding Nucleus is always present. Recall that both on Anderson's (1982) and Spencer's (1986) account, empty Nuclei that do not vocalize are deleted. Another point is that the relation between vowels that we have good reason to look for is not intervocalic but internuclear: GP offers a name and a theory for the causal relation between yers that constitutes the spine of Lower. And of course, government is a genuine device of GP.

But what about the objections made by Rubach (1986) and Kenstowicz & Rubach (1987) against the empty Nucleus-analysis? This problem will be addressed in the next section.

6.2. Again: deletion or insertion?

Originally, the government-analysis of vowel-zero alternations relied on insertion: alternation-sites are underlying empty Nuclei which are filled in by default in case they escape Proper Government (Kaye et al. 1990:219ss, Kaye 1990a, Charette 1990,1991). This surely is the zero-hypothesis that one is entitled to make in absence of conflicting evidence (cf. Spencer 1986). The theoretical devices related to vowel-zero alternations were developed at that time mainly on the faith of Moroccan Arabic (Kaye 1990b), French (Charette 1990,1991) and Tigrinya (Kaye et al. 1990:222ss). In all of these languages, there is only one vowel that alternates with zero, a situation that the insertion-analysis is able to cope with. None of the arguments put forth by Rubach (1986) and Kenstowicz & Rubach (1987) (cf. section 5.5) could be made on the evidence from these languages: not only did they not possess more than one alternating vowel, but the vowel that does alternate had no triggering or blocking effect on rules that apply to neighbouring segments.

Later on, it was proposed that alternating vowels must be underlyingly present. This move was taken in Scheer (1997:80s, 1998b:264s, 1999:229s)[60]. It was motivated by one of the arguments mentioned, that is the existence of languages like Eastern Slavic or Slovak where more than one vowel alternates with zero (cf. Dubina 2001). Another reason was of purely theory-internal nature. If syllable structure boils down to CVCV, there must be two different kinds of "empty Nuclei": the ones that sometimes appear on the surface, i.e. alternation-sites, and the ones that never enjoy a phonetic manifestation, i.e. those located in the middle of branching Onsets and Coda-Onset sequences, as well as word-final empty Nuclei.[61] If it were true that all empty Nuclei are alternation sites and filled in by default, there should be no empty Nuclei that never appear on the surface. I thus proposed to recover the empirical contrast between both kinds of "empty Nuclei" by identifying alternation sites with a melody

---

[60] Yoshida (1993:138) had already proposed that the melodic material of vowels that alternate with zero is lexically present. However, this was assumed only for languages where mid (= complex) vowels alternate, and their lexical representation (whether attached or not) was not discussed. Yoshida holds that schwas, high and low vowels that alternate with zero are instantiations of empty Nuclei that do not possess any melody in the lexicon.

[61] I use the familiar terminology "branching Onset" and "Coda-Onset" sequence informally. The syllabic structures that are referred to contain only Onsets and no branching constituents: VTøRV (intervocalic "branching Onset"), VRøTV (intervocalic "Coda-Onset" sequence), …Cø (word ending in a consonant on the surface).

that is underlyingly present, while empty Nuclei that never appear on the surface lack any melodic content (Scheer 1997:80s,1998:264s).[62]

Note that this option is a logical possibility of representing "empty Nuclei" that in fact combines the two views on the matter that have been expressed by Spencer (1986)/ Kaye et al. (1990) on one hand, and Rubach (1986)/ Kenstowicz & Rubach (1987) on the other. The former authors grant a syllabic, but no melodic identity to alternating vowels, while the latter represent them as floating matrices that are bare of syllabic material (x-slots and constituency). In a CVCV-environment, both melodic and syllabic structure is underlyingly present. The difference between alternating and non-alternating vowels is expressed in terms of association: the latter are underlyingly associated, while the former are not. Proper Government (PG) acts as an association-inhibitor: a properly governed Nucleus may not receive melody, whereas alternating melodies attach to Nuclei that escape Proper Government. The diagram under (22) summarizes the three logical possibilities mentioned.

(22)   underlying representation of vowels that alternate with zero
       example: cz *pes - psa* "dog NOMsg, GENsg"
       a. Spencer (1986),   b. Rubach (1986),   c. Scheer (1997,1998)
          Kaye et al. (1990)   Kenstowicz & Rubach (1987)

```
O N O N            x   x              O N  O N
|   |              |   |              |      |
p   s              p e s e            p  e   s
```

The objections raised by Rubach (1986) and Kenstowicz & Rubach (1987) against solutions that recur to empty Nuclei do not apply to (22)c since there is an underlying melody that can trigger or block the application of rules.[63] Also, nothing precludes more than one vowel to alternate with zero because all alternating vowels remain distinct at the underlying level. It is not clear a priori whether the structure under (22)c should be viewed as part of an insertion- or a deletion-strategy. It does not instantiate either perspective: nothing is inserted since the alternating vowel is present in the lexicon, but nothing is deleted either because the appearance of the zero-alternant does simply mean that the melody has not been linked to the Nucleus. Neither the Nucleus nor the melody need to be deleted.

The proposal depicted under (22)c, which is a direct consequence of the multiplication of empty Nuclei in a CVCV-environment, bears another interesting property. It reproduces the contrast between triggering and alternating yers that was discussed at length in sections 2.2, 2.4 and 3.3. Recall that triggering yers are those that never appear on the surface, while alternating yers are vocalized in case they are followed by another yer. It was shown that yer-internal (section 2.2) and diachronic (section 2.4) reasons, as well as alternations involving other alternants (section 3.3) require that this difference be made. It now appears that precisely this constrast is not only derived from, but in fact enforced by CVCV. I take this to

---

[62] Identical reasons have led to yet two different proposals: Inter-Onset Government (Gussmann & Kaye 1993) and Recursive Government (Gussmann 1997).

[63] This is true for Rubach's (1986) and Kenstowicz & Rubach's (1987) reasons that have been discussed in section 5.5. In addition to these, the latter paper appeals to the fact that the Slovak Rhythmic Law "jumps" over yers as if they were not there (e.g. *písm-ach* "letter LOCpl" for lexical *-ách* over a yer located between [s] and [m]: *písem*). In case the Rhythmic Law operates over X-slots, the invisibility of yers follows if they are floating matrices unassociated to any X-slot. In other locations, Rubach & Booij (1990a:129ss, 1990b:435ss) argue for the representation of yers as floating matrices upon the observation that unvocalized yers are invisible to syllable structure and syllabification. The latter evidence is reminiscent of the particular theory of syllabification (by algorithm) developed. Whether the former observation concerning the Rhythmic Law can be accommodated by (22)c remains to be seen.

be significant support for CVCV.

In the next section, the status of the last vowel/ Nucleus that appears in the representations under (22) is examined.

6.3. Extra empty Nuclei
6.3.1. Final empty Nuclei

Lower supposes the existence of word-final abstract vowels for all words that end phonetically in a consonant. This is a genuine Government Phonology-claim. As in the case of empty Nuclei, the original idea was developed for the purpose of Slavic data regarding vowel-zero alternations. The final yers were given morphological value (just as the "protective" schwas in French), and nobody sought to extend their existence beyond Slavic (or French). The step taken by Government Phonology was to make this language-specific analysis a universal claim. And as before, this was done on the grounds of entirely independent empirical evidence, with no reference to the Slavic situation.

Kaye (1990a) has examined so-called Closed Syllable Shortening: a long vowel shortens if a Coda-consonant is present in its Rhyme. In Yawelmani, CVVCvC-CV [ʔaamil-ka] sequences alternate with CVCøC-VC [ʔaml-al]. If it is true that vowel-zero alternations imply the existence of a non-deleted empty Nucleus even in case zero surfaces, the vowel-shortening may not be ascribed to the presence of a Coda in the Rhyme of the shortened vowel since the following consonant is the Onset of an empty Nucleus. Moreover, Kaye (1990a) observes that the two consonants that flank the empty Nucleus, which allegedly constitute a Coda-Onset sequence, obey no distributional restrictions. This is unexpected since Coda-Onset interludes usually exhibit a falling sonority-profile. He concludes that "Closed Syllable Shortening" has got nothing to do with closed syllables. Rather, long vowels are shortened iff the following Nucleus is empty. Or, translated into Slavic terms, in case the following syllable bears a yer: recall the Czech alternations from section 3.1 *žáb-a* vs. *žab-øk-a, žab-ek, žab-ø* "frog NOMsg, dim NOMsg, dim GENpl, GENpl". When Kaye developed his analysis, he probably ignored that his result "long vowels shorten before a vowel that alternates with zero" was correct also for Slavic data. The only difference of the phenomenon analyzed by Kaye and the Czech alternations in vowel length is the phonetic status of the triggering Nuclei. These host vowel-zero alternations in both instances, but in the former case, they preclude a long vowel in the preceding syllable only if they are phonetically unexpressed. In the Czech examples on the other hand, they prohibit vowel length in the preceding syllable in any event, whether phonetically present (*žab-ek*) or not (*žab-øk-a*). This is precisely the reason why the Yawelmani (and Turkish, cf. below) facts are not illustrative of the yer-context (5).

Kaye (1990a) had to conclude on the existence of word-final empty Nuclei in vowel-shortening languages since shortening also occurs before a word-final consonant: [pana-t] vs. [panaa-hin] in Yawelmani, [merak] vs. [meraak-ɨ] "curiosity NOM, possessive" in Turkish. If shortening is triggered by the existence of a following empty Nucleus, the final consonant of a word where shortening obtains must sit in the Onset of an empty Nucleus as well. On the other hand, in languages where "Closed Syllable Shortening" is observed only word-internally, but not word-finally such as English (*keep, leave* vs. *kept, left*), Kaye (1990a) maintains a true Closed Syllable analysis: the vowel in *kept* is short because the [p] is the Coda of its Rhyme.[64] Hence, if long vowels are banned from closed syllables in English, the final consonant of *keep, leave* cannot close the syllable that contains the long vowel. The only

---

[64] Hence, supposing Structure Preservation, *keep* and *kept* must be two separate lexical entries. For implications thereof, see Kaye (1990a:323ss).

solution is to make it the Onset of an empty Nucleus: /kii.pø, lii.vø/. As a consequence, word-final consonants in all languages (whether of the Yawelmani or the English type) are the Onset of an empty Nucleus.

This way, a cross-linguistic claim was made that parallels the language-specific analysis of Slavic. The latter was made earlier than the former, but did not inspire it. Two very different traditions reached the same result, but did not really recognize this fact.

6.3.2. Empty Nuclei after internal Codas

Government Phonology as it stood in the early 90s had the following means to identify empty Nuclei: 1) consonant-final words end in an empty Nucleus, 2) vowels that alternate with zero are hosted by an underlyingly empty Nucleus, 3) so-called bogus clusters enclose an empty Nucleus: English [tl]-clusters such as in *atlas, antler* cannot be branching Onsets (they do not occur word-initially), and do not qualify as Coda-Onset sequences either because their sonority (GP-terminology: Charm) profile is opposite to what it should be. Both consonants are Onsets that enclose an empty Nucleus.[65]

In all other configurations, consonants were reputed not to be separated by empty Nuclei. How does this prediction relate to the Slavic facts? Does it embrace them as it did on the issue of final empty Nuclei? The answer is twofold: yes as far as vowel-zero alternations and the French schwa-[ɛ] are concerned; no with respect to alternations in vowel length, Polish ą-ę, Czech-Polish [ɔ]-[u(u)] and French ATR-values.

In the former situation, closed syllables are always produced by vowel-zero alternations. In any instance of $[C_1vC_2-CV]$ pol *pies-ka* "dog dim GENsg" where "v" alternates with zero, its phonetic manifestation is due to a closed syllable which is closed on the surface. However, it is guaranteed that in fact C_2 is the Onset of an empty Nucleus (or of a yer). If the final vowel is removed, this empty Nucleus surfaces: $[C_1vC_2-vC]$ pol *piesek* "dog dim NOMsg". In other words, all instances where the alternating object (in this case a vowel alternating with zero) is conditioned by a phonetically closed syllable, it can be shown that the consonant that allegedly closes the syllable in fact is the Onset of an empty Nucleus, which acquires phonetic expression in the appropriate context.

The case of French schwa-[ɛ] is similar: schwa does not occur in closed syllables at all, neither internal, nor final. The only way to tell a stable [ɛ] such as in *j'enchaîne* [ãnʃɛn] "I chain" that does not alternate with schwa (compare with *enchaîner* [ãnʃɛne] "to chain") from an alternating one (*j'ensorcèle* [ãsɔχsɛl] "I bewitch" vs. *ensorceler* [ãsɔχsəle] "to bewitch") is to observe its behaviour in a __CV-context. If morphology does not allow to carry out this test as for example in all CC-final roots such as √alert (*j'alerte* [alɛχt] "I alert" = *alerter* [alɛχte] "to alert"), there is no reason to assume that we are facing an [ɛ] that alternates with schwa. Hence, no empty Nucleus needs to be assumed between the [χ] and the [t] of the verb *alerter*, while there must be an empty Nucleus between the [l] and the [m] of *ensorcèlement* [ãsɔχsɛlment] "the fact of bewitching". This prediction is indeed borne out since schwa-zero alternations are optional in French, and a schwa surfaces in the alternative pronounciation *ensorcèlement* [ãsɔχsɛləment]. As a consequence, no empty Nucleus must be supposed that is not independently motivated by a vowel-zero alternation.

This does not hold true when we turn to the Czech alternations in vowel length. In a word like *žab-ka* "frog dim NOMsg", the short vowel is due to a following empty Nucleus/

---

[65] See Harris (1994:67s,182ss) for the a more elaborate characterization of the notion of bogus-clusters.

yer, and this fact is demonstrated by the appearance of an [ɛ] in the genitive plural of the same word: *žab-ek*. But there are also cases where no vowel appears between two word-final consonants. A sample of this paradigm appears under (23) below.[66]

(23) Czech CVCC-a/o - CVCC-ø

	NOMsg	GENpl		NOMsg	GENpl	
fem -a	pravd-a	pravd	truth	valch-a	valch	washboard
	korb-a	korb	tipper lorry	jirch-a	jirch	white leather
	kajd-a	kajd	jacket	sekt-a	sekt	sect
	křivd-a	křivd	pain	blept-a	blept	gossip
	harf-a	harf	harp	revolt-a	revolt	revolt
	miliard-a	miliard	multimillionaire			
neut -o	hejn-o	hejn	swarm	lejn-o	lejn	excrement
	salt-o	salt	salto			

The shortness of the vowel preceding the stem-final consonant cluster in nominative forms where a suffixal vowel is present cannot be attributed to any empty Nucleus that would betray its existence through a vowel-zero alternation in this case. But still, the vowel is short, and there are no words with a long vowel in this paradigm.[67]

On the other hand, there are words that do liberate a yer in the same morphological situation. Illustration of this paradigm is given under (24) below.

(24) Czech CVCC-a/o - CVCeC-ø

	NOMsg	GENpl		NOMsg	GENpl	
fem -a	farm-a	farem	farm	zebr-a	zeber	zebra
	Vilm-a	Vilem	Wilma (female first name)	algebr-a	algeber	algebra
	palm-a	palem	palm	kobr-a	kober	cobra
	norm-a	norem	norm	sestr-a	sester	sister
	reform-a	reforem	reform	kmotr-a	kmoter	godmother
	kaps-a	kapes	pocket	bucht-a	buchet	kind of dumpling
	jacht-a	jachet	yacht	kart-a	karet	card
	placht-a	plachet	sail	barv-a	barev	colour
neut -o	žebr-o	žeber	rib	jitr-o	jiter	morning
	patr-o	pater	floor	metr-o	meter	metro
	vnitr-o	vniter	inside			

Under the Standard Government Phonology analysis, the stable stem-final cluster under (23) must be interpreted as a Coda-Onset sequence since it does not liberate any [e] in GENpl, i.e. /kor.ba/. By contrast, there must be an empty Nucleus eclosed by the two last consonants of the stems in their NOMsg forms under (24). This empty Nucleus appears overtly in the GENpl, i.e. /fa.rø.ma/. Hence, the second but last consonant of the stems under (23) are

---

[66] Note that these words belong to the same paradigm as the words that do show length-alternations žáb-a vs. žab, i.e. feminines in -a and neuters in -o. The examples concern both native (e.g. *pravda*) and loan (e.g. *miliarda*)-vocabulary. The examples are chosen among words with identical morphological pattern, the last two consonants being monomorphemic.

[67] In the entire language, there are three words of the fem. -a/ neuter -o class that do possess a long vowel followed by two consonants CVVCC-a/-o: *brázda, jízda, hnízdo* "furrow, journey, nest", GENpl *brázd, jízd, hnízd*. However, the cluster at stake is always the very suspect -zd-, i.e. a variant of s+C. In Czech and in other languages, s+C clusters often behave as if they were one.

Codas, while those of (24) are Onsets. We know from the *žaba*-alternations that empty Nuclei (yers) are responsible of the shortness of the root-vowel. The short root-vowels of (24) are covered by this generalization. However, root-vowels should be able to be long if there is no empty Nucleus following the root-vowel as under (23). As a matter of fact, they may not. Their obligatory shortness must be the consequence of the presence of an emtpy Nucleus to their righthand side, and hence we conclude that their underlying structure is not /kor.ba/, but /ko.rø.ba/.

In this environment, Czech has no Coda-Onset sequences, no Codas and no closed syllables at all: surface Coda-Onset sequences that are broken up by an alternating vowel are separated by an alternating yer (*farm-a - farem*); those which never flank a vowel on the surface are separated by a triggering yer (*korb-a -korb*).[68] In other words, both consonants of both kinds of clusters sit in Onsets. The former is separated by a Nucleus that is lexically provided with melodic content as under (22)c, while the latter also flanks a Nucleus, but which lacks any lexical melodic identity, cf. (22)a.

The same argument holds true for French ATR-alternations. These are observed over the entire language. There is no such thing as two different kinds of mid vowels, one alternating in ATR, the other not: ALL French mid vowels are subject to ATR-variation. Hence, the non-ATRness of a the mid vowel in a word like *il appellera* [apɛlʁa] "he will call" can be motivated by the appearance of a schwa in the alternative pronounciation [apɛləʁa] (recall that schwa-zero alternations are optional in French). But no overt schwa will ever motivate the non-ATRness of *alerter* [alɛχte] "to alert": *[alɛrəte]. Hence, in case it is true that mid vowels are non-ATR iff they are followed by a yer, there must be a yer between [χ] and [t] as well. Accordingly, there are no closed syllables at all, there are only two kinds of "empty Nuclei": those provided with a lexical melody as in *il appellera* [apɛlʁa] = /apɛləʁa/ "he will call", and those that lack this melody such as in *alerter* [alɛχte] = /alɛχ_te/ "to alert".
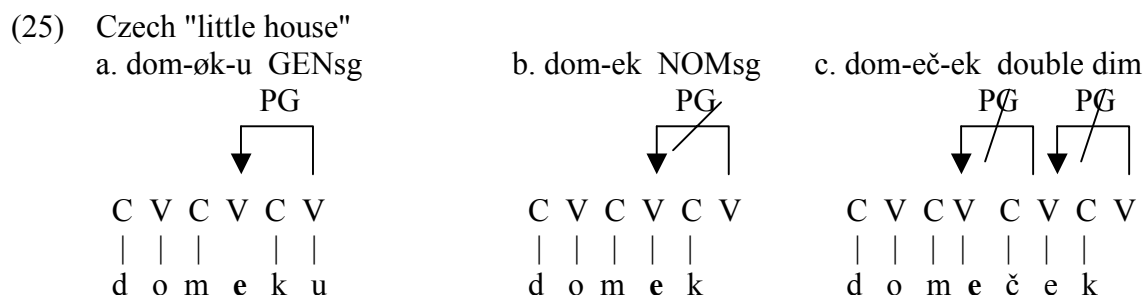
We have now reached the important conclusion that the yer-context hints at an underlying CVCV-interpretation not only for Slavic, but also for French. The only area that remains non-CVCV regards branching Onsets. This issue will not be taken up in this paper.[69]

6.4. Proper Government derives Havlík, not Lower

The relevant tools for the analysis of vowel-zero alternations in a CVCV-frame have been introduced in the previous sections: 1) vowel-zero alternations are not due to an intervocalic, but to an internuclear relation; 2) the relation in question is of Dependency-type, that is disbalanced: one member is the head, the other the dependent. The former has precedence over the latter; 3) this Dependency-relation is called Proper Government (PG); 4) governors must be contentful (= phonetically expressed); 5) governees remain phonetically unexpressed; 6) a Nucelus cannot be governor and governee at the same time: a governed Nucleus is unable to dispense PG; 7) PG is right-headed; 8) PG targets Nuclei that are lexically unassociated to melody; 9) there are two kinds of such Nuclei: those that lack any melody (=triggering yers) and those that possess floating underlying melody (=alternating yers). The diagram under (25) shows how the basic Slavic pattern is analyzed under these provisions.
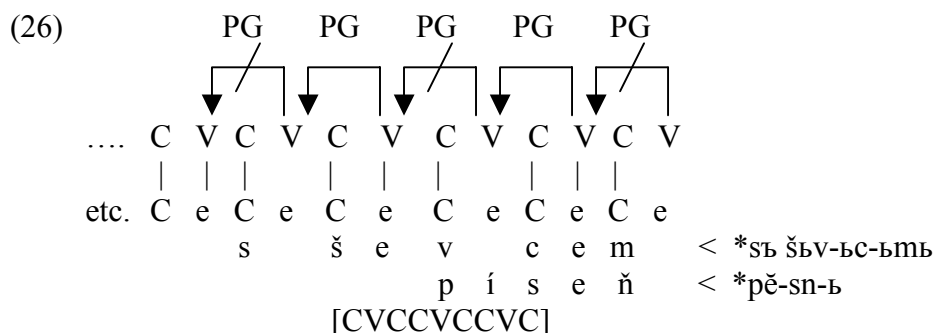
---

[68] Of course, as was demonstrated earlier, both alternating and triggereing yers trigger the effects observed in the preceding syllable, while the reverse is not true: only alternating, but not triggering yers alternate with zero.

[69] The representation of branching Onsets in CVCV is discussed at length in Scheer (1996, 1997, 1998b, 1999, 2000).

(25) Czech "little house"

a. dom-øk-u GENsg   b. dom-ek NOMsg   c. dom-eč-ek double dim

```
          PG                           PG                      PG      PG
        ┌──┐                         ┌──┐                    ┌──┐    ┌──┐
        ↓  │                         ↓  │                    ↓  │    ↓  │

    C V C V C V                  C V C V C V            C V C V C V C V
    | | |   | |                  | | | | |              | | | | | | |
    d o m   e k u                d o m e k              d o m e č e k
```

Under (25)a, the stem-final Nucleus which hosts the suffixal vowel properly governs the preceding Nucleus. Under (25)b however, it cannot dispense PG since it lacks melody. Under (25)c, the second but last Nucleus is therefore expressed. Consequently, the Nucleus flanked by [m] and [č] should be under PG, i.e. phonetically absent. However, this is not the case.

It appears that Proper Government does not derive the modern Slavic state of affairs described by Lower. Instead, it produces the alternating system discovered by Havlík: in a chain of several Nuclei with floating melody, every second item, counted from the right edge of the chain, receives phonetic expression.[70] This situation is depicted under (26).

(26)

```
                  PG      PG      PG      PG      PG
                ┌──┐    ┌──┐    ┌──┐    ┌──┐    ┌──┐
                ↓  │    ↓  │    ↓  │    ↓  │    ↓  │
     ....  C V C V C V C V C V C V C V
           | | |   | | |   |   | | |
     etc.  C e C e C e C e C e C e
                 s       š e   v     c e m     < *sъ šьv-ьc-ьть
                         p í   s     e ň       < *pě-sn-ь
           [CVCCVCCVC]
```

Note that all vowel-zero alternations found in modern languages do not follow the pattern found in modern Slavic languages: Moroccan Arabic (Kaye 1990b), German (e.g. Noske 1993, Wiese 1996) and French for exemple are faithful instantiations of Havlík. In a French schwa-chain such as *je ne te le redemanderai pas* "I will not ask you that again" for example where all spelt "e"s are schwas, any number and combination of schwas may be dropped provided that two adjacent schwas do not drown. In a formulation that has become famous, this regularity is stated in terms of consonants: "any schwa may be dropped provided the result thereof is not a sequence of three consonants", known as Grammont's (1914) "loi des trois consonnes".[71]

Of course, the goal of any theory must be to cover both occurring patterns: Havlík and Lower. A proposal that views both empirical situations as non-related phenomena can hardly be granted any credit. Therefore, a parameter must allow to describe both varieties of vowel-zero alternations with one single theoretical device.[72] We know from section 2.3 what makes

---

[70] Recall the special status of final empty Nuclei in regard of the ECP: Nuclei remain phonetically unexpressed if they are subject to PG or if they are domain-final.

[71] See Dell (1973:248ss) for discussion and precise formulation.

[72] I cannot see how this could be achieved without diacritic expense in the approaches of Anderson (1982), Spencer (1986), Rubach (1986)/ Kenstowicz & Rubach (1987) and Szpyra (1992,1995).
On the analysis of Gussmann & Kaye (1993:435), whether vowel-zero alternations in a particular language are regulated by Havlík or Lower is decided by the kind of vowel that alternates with zero: if the vowel concerned is [ɨ] (which is supposed to be the blank phonetic expression of empty Nuclei without any epenthetic activity, "cold vowel" in the terminology of Government Phonology), Havlík's pattern is observed, while Lower is in place in languages where any vowel different from [ɨ] alternates with zero. This generalization was established

the difference between Havlík and Lower: on top of the vocalizations operated by the former, the latter gives phonetic content to those yers that are followed by another yer. The reader may verify that this difference is correctly recast into Government-terminology in the way shown under (27).

(27) Havlík vs. Lower
    a.   Havlík: Proper Government applies without condition
    b.   Lower: Proper Government applies
           alternating vowels do not act as governors

    The restriction on governing abilities that produces more vowels when Lower applies instead of Havlík may be formulated in another way as well: even when associated to Nuclei, lexically floating melodies may not govern; only Nuclei that are lexically associated to a melody are sound governors. Or, yet more general: schwas may not govern. This statement requires a proper definition of "schwa". The sense given to schwa here is phonological: all and only the vowels that alternate with zero are called schwa. But there is also a phonetic reality to the label "schwa": in many languages where vowel-zero alternations are observed (French, German, modern Arabic varieties), the alternating vowel is phonetically central and thus overtly deserves the name "schwa". In other languaes where alternating vowels are not central but peripheral, their central identity is a diachronic fact. Slavic is a case in point. Furthermore, a causal relation between the central properties of vowels and their alternating characater must exist anyway: diachronically, vowels start to alternate precisely when they are "weakened", that is centralized. This is true for all languages I am aware of where diachronic information is available: German, Slavic, French, Arabic. Hence, the statement "schwa may

---

on the faith of Moroccan Arabic (Havlík, [ɨ] alternates) and Polish (Lower, [ɛ] alternates). It does not stand up to a broader empirical record: in languages such as French and German, [ə] alternates with zero, but the phonotactic pattern observed is Havlík. The same holds true for Havlík-governed Old Czech, where [ɛ] alternated with zero.

Gussmann & Kaye (1993) observe that Proper Government derives the Moroccan Arabic pattern (Havlík), but makes wrong predictions when applied to modern Slavic where Lower reigns. In order to salvage PG in an environment controlled by Lower, they recur to 1) cyclicity and 2) Kaye's (1995) theory of analytic vs. non-analytic domains (comparable to level 1- vs. level 2-morphemes known from Lexical Phonology).

Under this analysis, the crucial difference between the modern Slavic pattern and Havlík is the cyclic application of Proper Government in the former, but not in the latter system. This way of implementing the modern Slavic pattern thus joins the classical analysis of Slavic vowel-zero alternations discussed in section 2.2: in Rubach's (1984) system for example, the effect that all yers of a yer-chain but the last one are vocalized is achieved through the cyclic application of Lower.

However, the appeal to domain-structure induces an important consequence that sets Gussmann & Kaye's account apart from the classical cyclic mechanism: the diminutive suffix -ek must be analytic (=creating two domains and two cycles), while case-markers have to be non-analytic (creating one single domain and one single cycle). More generally speaking, Gussmann & Kaye's analysis works out only if all yer-initial suffixes are analytic, whereas those that begin with a stable vowel are non-analytic. In other words, the distributional fact that vocalization does not occur before any vowel, but only before yers, is purely accidental in their view. Gussmann & Kaye (1993) recast the phonological opposition "yer vs. non-yer" in morphological terms: "analytic vs. non-analytic". Apart from selling a phonological opposition as morphological, this distinction is also suspect on the morphological side: while we control independently which vowel is a yer and which vowel is not (through alternation), there is no independent evidence that would help us decide which suffix is analytic and which one is non-analytic. At least do Gussmann & Kaye (1993) not present any such evidence. The analytic or non-analytic status of each suffix considered remains pure stipulation. In absence of an independent indicator for domain-structure in Polish, the analysis must thus be regarded as circular. In any event, it needs the analytic vs. non-analytic contrast where the classical analysis fares well without any additional provision regarding domains.

not govern" has a phonetic, phonological, synchronic and diachronic motivation. Alternating vowels that are not phonetically central are simply schwas in a different dress.

6.5. Arbitrary effects of the yer-context ?

Let us now come back to a problem that was raised in section 5.1 but could not be addressed then. The yer-context (5) that controls the Slavic and French alternations summarized under (19) seems to provoke opposite and conflicting effects: a yer prohibits the existence of long (Czech) and tensed mid vowels (French) in the preceding syllable (a real vowel is required for long and tensed mid vowels to surface), while it enables vowels (Slavic) and [ɛ] (French) to appear (against zero and schwa). This is a highly puzzling behaviour indeed: why should the same context sometimes provoke the strong alternant to appear, while favouring the weak one at other times?

There is only one solution to this puzzle: since all pieces are identical (syllabic situation, trigger), the difference must be found in the nature of the internuclear relation at stake. In section 5.6, we concluded on the need for a theory of intervocalic relations. We now see that the plural was in order: we are not dealing with one single internuclear relation known as Proper Government, but with yet another one, to be identified. The effect of Proper Government is obvious: its targets are silenced. Hence, it is certainly correct to say that Proper Government inhibits the segmental expression of its target.

The other lateral force we are looking for is phonological Licensing, which qualifies since it yields the opposite effect. Licensing is a process whereby a constituent or a segment (possibly via its constituent) receives support from another segment. The phonetic interpretation of segments or constituents that fail to be licensed is narrowed or null. This notion is part of common phonological background. It is exploited in, among others, McCarthy (1979), Goldsmith (1990), Itô & Mester (1993). In Government Phonology, Charette (1991) and Harris (1997) have put forth proposals that crucially relie on Licensing. The precise effects that both lateral forces Government and Licensing produce on consonants and vowels have been established in Ségéral & Scheer (2001): Government is destructive, Licensing helps. Government inhibits the segmental expression of its target, while Licensing backs up its melodic health.[73]
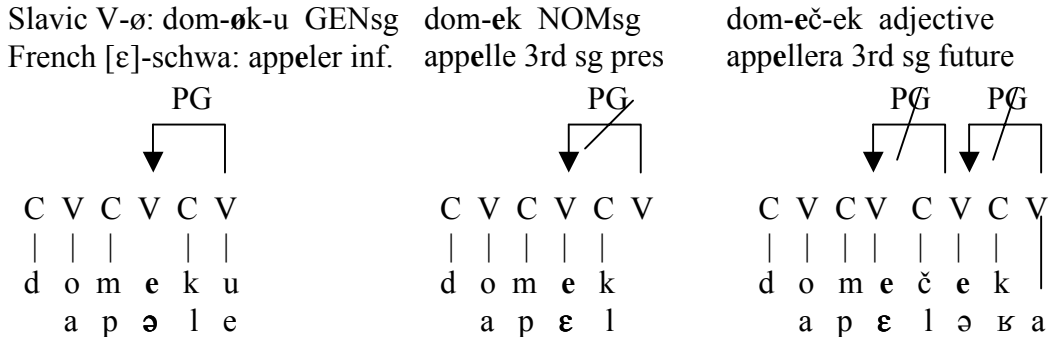
Again, it appears that the theoretical tools that have been developed for entirely independent reasons match the empirical situation: the puzzle (19) has no solution if a single internuclear relation is assumed. The identity of the arrow that stands for the internuclear relation may now be calculated according to the effects observed. Recall that Lower supposes that yers (schwas) are unable to dispense Government. Accordingly, Slavic vowel-zero alternations and French schwa-[ɛ] are consequences of Government. More specifically, zero (Slavic) and schwa (French) occur under Government, while a vowel (Slavic) and [ɛ] surface when Government fails to apply.

---

[73] In Kaye (1990a), the distributional generalization "long vowels shorten before empty Nuclei" is simply formulated without questioning the kind of relation contracted by both Nuclei. The existence of such a relation is supposed by Larsen (1998) in his analysis of Italian Tonic Lengthening and Lowenstamm (1996). Since the theory did not recognize internuclear Licensing at the time they wrote, both authors had to conclude that Government relates the long vowel and its righthand neighbour, although this lateral force was supposed to render its targets improper for melodic identification. However, vowel length is not precluded under Government on this analysis, but on the contrary Government would be a condition on its existence. This mismatch between a single cause (Government) and two opposite effects (inhibition vs. support of melodic expression) could not be resolved unless two different lateral agents were assumed. The correct move was taken by Yoshida (1993) who had extended Charette's (1990) notion of Government-Licensing to internuclear instances in the analysis of similar data from Palestinian Arabic. See Rowicka (1999:59ss) on that issue.
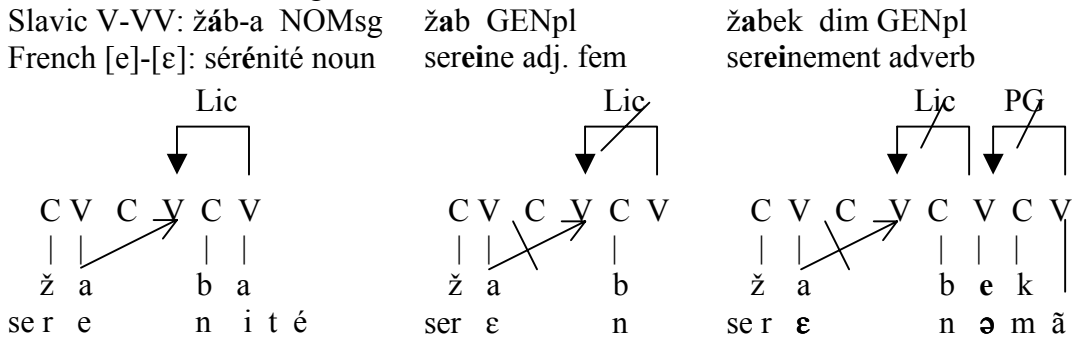
On the other hand, long vowels (Czech) and tensed mid vowels occur if their Nuclei are targeted by Licensing. In case Licensing is unable to reach its target, short (Czech) and lax mid vowels (French) are encountered.[74]

Both situations are sketched under (28) below.

(28)   a. instances of Government
        Slavic V-ø: dom-øk-u GENsg   dom-ek NOMsg   dom-eč-ek adjective
        French [ɛ]-schwa: appeler inf.   appelle 3rd sg pres   appellera 3rd sg future

                    PG   PG   PG   PG

                    ↓   ↓   ↓   ↓

        C V C V C V   C V C V C V   C V C V C V C V
        | | | | | | | | | | | | | | | | |
        d o m e k u   d o m e k   d o m e č e k
           a p ə l e   a p ɛ l   a p ɛ l ə ʁ a

        b. instances of Licensing
        Slavic V-VV: žáb-a NOMsg   žab GENpl   žabek dim GENpl
        French [e]-[ɛ]: sérénité noun   sereine adj. fem   sereinement adverb

                    Lic   Lic   Lic   PG

                    ↓   ↓   ↓   ↓

        C V C V C V   C V C V C V   C V C V C V C V
        | | | | | | | | | | | |
        ž a   b a   ž a   b   ž a   b e k
        se r e   n i t é   se r ɛ   n   se r ɛ   n ə m ã

In representations using CVCV, long vowels are two independent Nuclei that enclose an empty Onset, to which a single chunk of melody is attached. As any other branching structure, long vowels are headed. In the case shown under (28), long vowels are lexically left-headed and spread onto their complement if and only if this complement is licensed. In the two latter instances of (28), Licensing does not apply to the potential complement since the licensor either lacks phonetic content or is filled with a yer (schwa).[75]

It comes as no surprise that Licensing is subject to the same existential parameters as its cognate Government: only Nuclei that enjoy a phonetic expression are sound licensors. Hence, Nuclei that are not lexically provided with melody may not dispense Licensing, and neither may Nuclei that are phonetically unexpressed because they are subject to Proper Government. In addition, in the Czech and French cases at hand, yers (schwas) do not act as licensors, just as they cannot govern in Slavic.

An interesting complication arises when Slavic and French are compared: in the former case, yers can neither govern nor license. In French on the other hand (and in the Havlík-stage

---

[74] Rizzolo (forth) shows that the French ATR-alternation of mid vowels is in fact an alternation in vowel length. The table below follows this analysis.

[75] Right-headed long vowels also exist. These are the ones that are entirely unsensitive to their righthand environment. Long vowels in German, Czech and Somali for examples are of that kind. Head-final long vowels may be long regardless to what happens in their environment because the complement they spread on is always licensed by the head: Licensing (as Government) is right-to-left. Accordingly, the head will always act as the licesor of its own complement. See Scheer (1998b,2000) for discussion. The distinction head-initial vs. head-final long vowels is the principled recast of what is usually referred to as "languages admitting vs. prohibiting super-heavy Rhymes".

of Slavic), schwa is habilitated to govern, but cannot act as a licensor. The following table summarizes this situation.

(29)   lateral actorship of yers (schwa)

	yers (schwa) may	
	govern	license
modern Slavic	no	no
French and Havlík	yes	no

It remains to be seen whether the habilitation for lateral actorship of yers may be distributed in other ways.[76]

6.6. Nuclear typology

The conclusions that have been drawn in the previous section suppose that there are different categories of Nuclei in phonology, each of which possesses specific lateral abilities. That is, 1) full Nuclei, 2) schwa and 3) empty Nuclei. The latter subdivide in final empty Nuclei and internal empty Nuclei. Even though the opposition of final and internal empty Nuclei is not discussed in this article, there is no way to elude its relevance: Coda-effects are visible on the Codas themselves (e.g. l-vocalization) or an the vowels preceding them (e.g. closed syllable shortening). All processes of this kind may affect either both the internal and the final site alike, or they occur word-internally, but are not observed word-finally. The reverse pattern where final Codas or their preceding vowels would be affected while their internal peers remain stable do not seem to exist. The extraordinary behaviour of word-final consonants and vowels in word-final closed syllables is commonly analyzed as an effect of extrasyllabicity: in languages where word-final consonants do not trigger the closed-syllable effects that are observed word-internally, they are held to stand outside of syllable structure. In Government Phonology, there can be no extrasyllabicity because all strings are fully syllabified in the lexicon, and no serialism is tolerated. Hence, no syllabification algorithm may disregard final consonants and reattach them to some prosodic constituent at a later derivational stage. Instead, the peculiar properties of word-final consonants in some languages may be seen to derive from the specific licensing-abilities of final empty Nuclei: in case they behave like their internal peers, final empty Nuclei are unable to license, while they are endowed with some lateral actorship in those languages where final consonants are "extrasyllabic" (further discussion is available in Scheer 2000, forth).

In sum, two kinds of Nuclei out of four have cross-linguistically stable and predictable lateral actorship: full Nuclei (laterally fully enabled) and internal empty Nuclei (laterally fully disabled). The governing- and licensing abilities of the two other categories of Nuclei are subject to parametric variation in different languages: schwa and final empty Nuclei may or may not be able to govern and license. The following table gives illustration of this summary.

(30)

	can govern	can license
full Nuclei	yes	yes
schwa	parametrized	parametrized
final empty Nuclei	parametrized	parametrized
internal empty Nuclei	no	no

---

[76] See Scheer (1998b:281s,2000:192ss) for discussion of the combinatory of both lateral forces.

On the grounds of typological variation regarding the existence of different types of consonants clusters, Cyran (2001) is concerned with the same endeavour, that is the identification of different kinds of Nuclei according to their lateral actorship across languages.

7. Conclusion

In this paper, I have pursued a diachronic and a synchronic goal. The former concerns the history of the analysis of vowel-zero alternations in the past 40 years. Three traditions are examined: one which is anchored on Slavic grounds (Gussmann 1980, Rubach 1984,1986, Kenstowicz & Rubach 1987, Spencer 1986, Szpyra 1992), another that builds on the empirical record of French (Dell 1973, Anderson 1982), and a third one which does not root in the analysis of a particular set of data but stems from theoretical endeavour (Government Phonology, Kaye et al. 1990, Charette 1991, Harris 1994 etc.). These traditions have worked on the same phonological object, that is vowel-zero alternations in general and the puzzling yer-context (5) in particular, but did not really reflect each other's analyses and proposals.

My goal was to show the precise content and motivation of each analysis, to confront them and do something that was not undertaken so far. That is, bringing together all alternations that obey the yer-context (5) and run the different analyses against this cross-linguistic record: if the highly specific character of the conditioning context excludes multiple and accidentally converging causalities, certain elements of the competing analyses must be abandoned, and others promoted to the status of candidates for a more general theory of vowel-zero alternations. For instance, only the confrontation of Slavic and French data allows for the correct formulation of the relevant context: the crucial property of the vowel in the following syllable that behaves as if it were not there is not to be a yer, a schwa or the manifestation of an empty Nucleus, but to alternate with zero.

More specifically, there are two logically possible moves when faced with the disjunction "in closed syllables and in open syllables if the following vowel alternates with zero": either the latter part "in open syllables if the following vowel alternates with zero" is an optical illusion and must be reduced to the former, or the closed syllable is a mirage and must be expressed in terms of open syllables. The former way was taken by Anderson (1982) who captures the underlying Onset of the following schwa into the preceding syllable. The Coda being captured, he can apply the necessary rules to closed syllables only. By contrast, the Slavic tradition produced Lower, which proposes the elimination of underlying closed syllables: the open-syllable context is generalized.

I have tried to show that the West was wrong, one more time.[77] Coda-capture is an artefact that is unwarranted for independent reasons (Harris 1999) and does not encode the crucial syntagmatic causality that is expressed by Lower, cf. section 5.3. On the other hand, the West was on the right track when proposing that the triggering yers/ schwas sit in empty Nuclei. This analysis is paralelled by part of the East, i.e. Spencer (1986), but could not be successfully implemented at that time for the reasons exposed in Rubach (1986), Kenstowicz & Rubach (1987). I argue that this obstacle can be overcome when the theoretical tools developed in Government Phonology are taken advantage of. The (revised) theory of syntagmatic relations among Nuclei embodied as Government and Licensing offers a natural harbour for the expression of the intervocalic relation that constitutes the backbone of Lower, but whose precise characterization has been neglected on the Eastern side.

The classical generative analysis of Slavic vowel-zero alternations recurs to "abstract vowels", the yers, whose distribution is shown to be identical with the one of empty Nuclei in Standard Government Phonology. If a unified account of Slavic vowel-zero alternations and

---

[77] See the paper by Gussmann & Harris (1998) intitled "Why the West was wrong", which traces down the history of the syllabic analysis of word-final consonants.

the other phenomena that are controlled by the yer-context (5) is not to be missed, it must be concluded on the existence of empty Nuclei (or yers) even within those Coda-Onset clusters that do not host vowel-zero alternations. This means that there are no Codas nor closed syllables in either Slavic or French. A uniform analysis of all relevant alternations may not be achieved unless this most simple of all constituencies is assumed. Under these provisions, only one area of the grammar remains non-CVCV, that is branching Onsets. These are discussed in other places, cf. note 69.

The story of vowel-zero alternations also provides exemplary testimony of the research program underlying CVCV: phonological phenomena whose explanation is commonly sought in the existence of contrasting paradigmatic structures (syllabification) may turn out to be controlled by syntagmatic relationships among constituents whose structure does not vary. Outside Government Phonology as well, the evolution of syllabic theory since its (re)introduction by Kahn (1976) has led to significant empoverishing of syllabic arborescence: for many phonologists (but not all), Onsets do not branch five times anymore, Codas do not branch anymore at all, and restrictions relie on the maximal size of Rhymes. With respect to this issue, Government Phonology has always been avantgarde: a landmark on this track was the Binary Theorem (all constituents are maximally binary, Kaye 1990a:306). CVCV is but the ultimate stage of this evolution.

Hence, the review of the history of vowel-zero alternations, the confrontation of two well-known empirical records and Government Phonology produces a synchronically relevant result, i.e. an argument in favour of CVCV. The present paper may thus be seen as a contribution to what Encrevé (1997) and Durand & Laks (1996) call the cumulative character of scientific investigation: bringing together different traditions and argue on the grounds of the entire pool of ideas and facts. In this sense, it appears that Lightner, Gussmann, Rubach, Anderson, Spencer and their followers have practised Government Phonology in heavily clustering languages such as Slavic and French before a theory of this kind of constituency was available. CVCV, Government and Licensing offer a natural superstructure for these analyses.

References

Anderson, Stephen R. 1974. The Organization of Phonology. New York: Academic Press.

Anderson, Stephen R. 1982. The analysis of French shwa: or, how to get something for nothing. Language **58**, 534-573.

Arumaa, Peeter 1985. Urslavische Grammatik. Band III: Formenlehre. Heidelberg: Carl Winter.

Basbøll, Hans 1981. Metrical Theory and the French Foot. Phonologica 1980, edited by Wolfgang Dressler, Oskar Pfeiffer & John Rennison, 35-43. Innsbruck: Institut für Sprachwissenschaft Innsbruck.

Bendjaballah, Sabrina 1999a. La palatalisation en somali. Linguistique Africaine **21**, 5-52.

Bendjaballah, Sabrina 1999b. Trois figures de la structure interne des gabarits. Thèse de doctorat Université Paris 7.

Bethin, Christina 1992. Polish Syllables: the Role of Prosody in Phonology and Morphology. Columbus OH: Slavica.

Bethin, Christina 1998. Slavic Prosody. Language change and phonological theory. Cambridge: Cambridge University Press.

Blevins, Juliette 1995. The Syllable in Phonological Theory. The Handbook of Phonological Theory, edited by Goldsmith John, 206-244. Oxford, Cambridge, Mass: Blackwell.

Carlton, Terence R. 1991. Introduction to the phonological history of the Slavic languages. Columbus, Ohio: Slavica.

Carr, Philip 1993. Phonology. London: Macmillan.

Černý, Fr. 1897. Studie o české kvantitě. Listy Filologické **24**, 343-354.

Charette, Monik 1990. Licence to govern. Phonology Yearbook **7.2**, 233-253.

Charette, Monik 1991. Conditions on Phonological Government. Cambridge: Cambridge University Press.

Cyran, Eugeniusz 2001. Parameters and scales in syllabic markedness: the right edge of the word in Malayalam. Constraints and Preferences, edited by Katarzyna Dziubalska-Kołaczyk, 1-42. Berlin & New York: Mouton de Gruyter.

Czaykowska-Higgins, Ewa 1988. Investigations into Polish morphology and phonology. Cambridge MA: MIT Press.

Dell, François 1973. Les règles et les sons. 2e édition 1985 Paris: Hermann.

Dell, François 1995. Consonant clusters and phonological syllables in French. Lingua **95**, 5-26.

Dinnsen, Daniel 1980. Phonological rules and phonetic explanation. Journal of Linguistics **16**, 171-191.

Dubina, Andrzej 2001. Lukashenka's native tongue defies Proper Government. Paper presented at Generative Linguistics in Poland 3, Warsaw 7-8 April 2001.

Durand, Jacques & Bernard Laks 1996. Why Phonology is one. Current trends in Phonology: Models and Methods, edited by Jacques Durand & Bernard Laks, 3-13. Manchester, Salford: ESRI.

Encrevé, Pierre 1997. L'ancien et le nouveau. Quelques remarques sur la phonologie et son histoire. Langages **125**, 100-123.

Farina, Donna 1991. Palatalization and jers in modern Russian phonology: an underspecification approach. Ph.D. dissertation, University of Illinois.

Foley, James 1977. Foundations of theoretical phonology. Cambridge: CUP.

Gebauer, Jan 1894-1898. Historická mluvnice jazyka českého. 3 vol. Praha.

Goldsmith, John 1990. Autsegmental & Metrical Phonology. Oxford: Blackwell.

Grammont, Maurice 1914. Traité Pratique de Prononciation Française. Paris: Delgrave.

Grzegorczykowa, Renata, Roman Laskowski & Henryk Wróbel (ed) 1999. Morfologia. 3rd edition Warszawa: PWN.

Gussmann, Edmund 1980. Studies in Abstract Phonology. Cambridge Mass.: MIT Press.

Gussmann, Edmund 1992. Back to front: non-linear palatalization and vowels in Polish. Phonnological Investigations, edited by Jacek Fisiak & Stanisław Puppel, 5-66. Amsterdam: Benjamins.

Gussmann, Edmund 1997. Govern or perish: sequences of empty nuclei in Polish. A Festschrift for Jacek Fisiak on his 60th birthday, edited by Raymond Hickey & Stanisław Puppel, 1291-1300. Berlin: de Gruyter.

Gussmann, Edmund 2001. Phonology: Analysis and Theory. Cambridge: CUP.

Gussmann, Edmund & John Harris 1998. Final Codas: why the west was wrong. Structure and Interpretation. Studies in Phonology, edited by Eugeniusz Cyran, 139-162. Lublin: Folium.

Gussmann, Edmund & Jonathan Kaye 1993. Polish notes from a Dubrovnik Café: I. The yers. SOAS Working Papers in Linguistics and Phonetics **3**, 427-462.

Halle, Morris 1959. The Sound Pattern of Russian. The Hague: Mouton.

Harris, John 1994. English sound structure. Oxford: Blackwell.

Harris, John 1997. Licensing Inheritance: an integrated theory of neutralisation. Phonology Yearbook **14**, 315-370.

Harris, John 1999. Release the captive coda: the foot as a domain of phonetic interpretation. UCL Working Papers in Linguistics **11**, 165-194.

Havlík, Antonín 1889. K otázce jerové v staré ceštine. Listy Filologické **16**, 45-51, 106-116, 248-258, 342-353, 436-445.

Havránek, Bohuslav & Alois Jedlička 1988. Ceská mluvnice. 6th edition Praha: SPN.

Holub, Josef & Stanislav Lyer 1978. Stručný etymologický slovník jazyka českého. Praha: Státní Pedagogické Nakladatalství.

Hooper, Joan 1976. An Introduction to Natural Generative Phonology. New York: Academic Press.

Hristova, V. 1994. Nominal vowel/ zero alternations in Bulgarian and Russian. Ph.D. dissertation, University of Delaware.

Itô, Junko & Armin Mester 1993. Licensed segments and safe paths. Revue Canadienne de Linguistique **38**, 198-213.

Kahn, Daniel 1976. Syllable-based generalizations in English phonology. Thèse de doctorat MIT.

Kaye, Jonathan 1990a. 'Coda' licensing. Phonology Yearbook **7.2**, 301-330.

Kaye, Jonathan 1990b. Government in Phonology: the case of Moroccan Arabic. The Linguistic Review **6**, 131-159.

Kaye, Jonathan 1992. Do you believe in magic? The story of s+C sequences. SOAS Working Papers in Linguistics and Phonetics **2**, 293-313.

Kaye, Jonathan 1995. Derivations and Interfaces. Frontiers of Phonology, edited by Jacques Durand & Francis Katamba, 289-332. Londres & New York: Longman.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud 1985. The internal structure of phonological representations: a theory of Charm and Government. Phonology Yearbook **2**, 305-328.

Kaye, Jonathan, Jean Lowenstamm & Jean-Roger Vergnaud 1990. Constituent structure and government in phonology. Phonology Yearbook **7.2**, 193-231.

Kenstowicz, Michael 1994. Phonology in Generative Grammar. Cambridge MA, Oxford: Blackwell.

Kenstowicz, Michael & Charles Kissseberth 1977. Topics in Phonological Theory. New York: Academic Press.

Kenstowicz, Michael & Jerzy Rubach 1987. The Phonology of Syllabic Nuclei in Slovak. Language **63**, 463-497.

Kiparsky, Paul 1968. How abstract is phonology? Bloomington: Indiana University Linguistics Club.

Kiparsky, Paul 1982. Explanation in Phonology. Dordrecht: Foris.

Komárek, Miroslav 1962. Historická mluvnice Česká. Volume I: Hláskosloví. 3e édition 1969, Praha: SPN.

Koschmieder, Erwin 1958. Schwund und Vokalisation der Halbvokale im Ostslavischen. Die Welt der Slaven **A.F.3**, 124-137.

Koutsoudas, Andreas 1980. The question of rule ordering: some common fallacies. Journal of Linguistics **16**, 19-35.

Lamprecht, Arnošt 1987. Praslovanština. Brno: Univerzita Purkyně.

Lamprecht, Arnošt, Dušan Šlosar & Jaroslav Bauer 1986. Historická mluvnice Češtiny. Praha: SPN.

Larsen, Bergeton Uffe 1998. Vowel length, Raddoppiamento Sintattico and the selection of the definite article in Italian. Langues et Grammaire II-III, Phonologie, edited by Patrick Sauzet, 87-102. Paris: Université Paris 8.

Laskowski, Roman 1975. Studia nad morfonologią współczesnego języka polskiego. Wrocław: Ossolineum.

Lass, Roger 1984. Phonology. An introduction to basic concepts. Cambridge: Cambridge University Press.

Liewehr, Ferdinand 1933. Einführung in die historische Grammatik der tschechischen Sprache. 1. Teil: Lautlehre, Erste Lieferung. Brünn.

Lightner, Theodore 1965. Segmental Phonology of Contemporary Standard Russian. Ph.D. dissertation, MIT.

Lightner, Theodore 1972. Problems in the Theory of Phonology, vol.I. Edmonton, Alberta: Linguistic Research.

Lightner, Theodore 1981. New explorations into Derivational Morphology. Phonology in the 80's, edited by Didier Goyvaerts, 93-99. Ghent: Story-Scientia.

Lowenstamm, Jean 1988. Another look at Ngizim syllable structure. Paper presented at 19th Conference on African Linguistics, Boston University, avril 1988.

Lowenstamm, Jean 1996. CV as the only syllable type. Current trends in Phonology. Models and Methods, edited by Jacques Durand & Bernard Laks, 419-441. Salford, Manchester: ESRI.

Lowenstamm, Jean 1999. The beginning of the word. Phonologica 1996, edited by John Rennison & Klaus Kühnhammer, 153-166. La Hague: Holland Academic Graphics.

Machek, Václav 1957. Etymologický slovník jazyka českého a slovenského. Praha: Nakladatelství Československé Akademie Věd.

McCarthy, John 1979. Formal problems in Semitic phonology and morphology. Doctoral Dissertation MIT.

Melvold, Janis 1989. Structure and stress in the phonology of Russian. Ph.D. dissertation, MIT.

Morin, Yves-Charles 1986. La loi de position ou de l'explication en phonologie historique. Revue Québecoise de Linguistique **15**, 199-232.

Morin, Yves-Charles 1988. De l'ajustement du schwa en syllabe fermée dans la phonologie du français. La phonologie du schwa français, edited by Paul Verluyten, 133-202. Amsterdam & Philadelphia: Benjamins.

Nagórko, Alicja 1998. Zarys gramatyki polskiej. Warszawa: PWN.

Nahtigal, Rajko 1961. Die Slavischen Sprachen. Abriß der vergleichenden Grammatik. Wiesbaden: Harroassowitz.

Nikiema, Emmanuel 1989. Gouvernement Propre et licenciement en phonologie: le cas du Tangale. Langues Orientales Anciennes, Philologie et Linguistique **2**, 225-251.

Noske, Roland 1993. A theory of syllabification and segmental alternations. With studies on the phonology of French, German, Tonkawa and Yawelmani. Tübingen: Niemeyer.

Ostaszewska, Danuta & Jolanta Tambor 2000. Fonetyka i fonologia współczesnego języka polskiego. Warszawa: PWN.

Panzer, Baldur 1991. Die Slavischen Sprachen in Gegenwart und Geschichte. Sprachstrukturen und Verwandtschaft. Frankfurt/ Main: Peter Lang.

Pedersen, Holger 1905. Die nasalpräsentia und der slavische akzent. Zeitschrift für vergleichende Sprachforschung **38**, 297-425.

Piotrowski, Marek 1992a. Polish Yers in Non-Linear Phonology. Phonologica 1988, edited by Uli Dressler, Hans Luschützky, Oskar Pfeiffer & John Rennison, 215-227. Cambridge: Cambridge University Press.

Piotrowski, Marek 1992b. Polish Yers and extrasyllabicity: An autosegmental account. Phonological Investigations, edited by Jacek Fisiak & Stanislaw Puppel, 67-108. Amsterdam & Philadelphia: Benjamins.

Piotrowski, Marek, Iggy Roca & Andrew Spencer 1992. Polish yers and lexical syllabicity. The Linguistic Review **9**, 27-67.

Rizzolo, Olivier forth. French tensed mid vowels are long. Doctoral Disseration Université de Nice.

Roca, Iggy 1994. Generative Phonology. London: Routledge.

Rowicka, Grażyna 1999. On Ghost vowels. A Strict CV Approach. Ph.D. dissertation, Leiden University.

Rubach, Jerzy 1984. Cyclic and Lexical Phonology: The Structure of Polish. Dordrecht: Foris.

Rubach, Jerzy 1986. Abstract vowels in three dimensional phonology: the yers. The Linguistic Review **5**, 247-280.

Rubach, Jerzy 1993. The Lexical Phonology of Slovak. Oxford: Clarendon Press.

Rubach, Jerzy & Geert Booij 1987. Postcyclic versus Postlexical Rules in Lexical Phonology. Linguistic Inquiry **18**, 1-44.

Rubach, Jerzy & Geert Booij 1990a. Syllable structure assignment in Polish. Phonology **7**, 121-158.

Rubach, Jerzy & Geert Booij 1990b. Edge of constituent effects in Polish. Natural Language and Linguistic Theory **8**, 427-463.

Schane, Sanford 1968. French Phonology and Morphology. Cambridge, Mass.: MIT Press.

Schane, Sanford 1974. How abstract is abstract? Papers from the parasession on Natural Phonology, edited by A.Bruck, R.Fox & M.La Galy, 297-317. Chicago: Chicago Linguistic Society.

Scheer, Tobias 1996. Une théorie de l'interaction directe entre consonnes. Doctoral Dissertation Université Paris 7.

Scheer, Tobias 1997. Vowel-zero alternations and their support for a theory of consonantal interaction. Certamen Phonologicum III, edited by P.M.Bertinetto, L. Gaeta, G. Jetchev & D. Michaels, 67-88. Torino: Rosenberg & Sellier.

Scheer, Tobias 1998a. A unified model of Proper Government. The Linguistic Review **15**, 41-67.

Scheer, Tobias 1998b. Governing domains are head-final. Structure and Interpretation. Studies in Phonology, edited by Eugeniusz Cyran, 261-285. Lublin: Folium.

Scheer, Tobias 1999. A theory of consonantal interaction. Folia Linguistica **32**, 201-237.

Scheer, Tobias 2000. De la Localité, de la Morphologie et de la Phonologie en Phonologie. Habilitation thesis, Université de Nice.

Scheer, Tobias 2001a. Čeština ve Waršawě. Course handout University of Warsaw. Downloadable at http://www.unice.fr/dsl/wa/Warszawa.htm.

Scheer, Tobias 2001b. The key to Czech vowel length. Paper presented at Formal Description of Slavic Languages 4, Potsdam 27-30 November 2001.

Scheer, Tobias forth. On locality, morphology and phonology in phonology. Ms University of Nice.

Ségéral, Philippe & Tobias Scheer 2001. La Coda-Miroir. Bulletin de la Société Linguistique de Paris **96**, 107-152.

Selkirk, Elisabeth 1972. The phrase phonology of English and French. Ph.D. Dissertation MIT, published 1980 by Garland Press.

Selkirk, Elisabeth 1978. The French foot: on the status of "mute" e. Studies in French Linguistics **1**, 141-150.

Spencer, Andrew 1986. A non-linear analysis of vowel-zero alternations in Polish. Journal of Linguistics **22**, 249-280.

Spencer, Andrew 1996. Phonology. Oxford: Blackwell.

Stampe, David 1973. A dissertation on Natural Phonology. Ph.D University of Chicago.

Stieber, Zdzisław 1973. A Historical Phonology of the Polish Language. Heidelberg: Winter.

Szigetvári, Péter 1999. Why CVCV? The Even Yearbook **4**, 117-152.

Szigetvári, Péter 2000. VC Phonology: a theory of consonant lenition and phonotactics. Thèse de doctorat Université de Budapest.

Szpyra, Jolanta 1989. The Phonology - Morphology Interface. London & New York: Routledge.

Szpyra, Jolanta 1992. Ghost segments in nonlinear phonology: Polish yers. Language **68**, 277-312.

Szpyra, Jolanta 1995. Thee Tiers in Polish and English Phonology. Lublin: Wydawnictwo Universytetu Marii Curie-Skłodowskiej.

Tranel, Bernard 1981. Concreteness in Generative Phonology. Evidence from French. Berkeley: University of California Press.

Tranel, Bernard 1987. Floating Schwas and Closed Syllable Adjustment in French. Phonologica 1984, edited by Wolfgang Dressler, Hans Luschützky, Oskar Pfeiffer & John Rennison, 311-317. London: Cambridge University Press.

Tranel, Bernard 1988. A propos de l'ajustement de e en français. La phonologie du schwa français, edited by Paul Verluyten, 89-131. Amsterdam & Philadelphia: Benjamins.

Trávníček, František 1921. De la quantité en tchèque. Revue des Etudes Slaves **1**, 204-227.

Trávníček, František 1935. Historická mluvnice Československá. Praha: Melantrich.

Trávníček, František 1948-49. Mluvnice spisovné Češtiny. 2 vol. Praha: Melantrich.

Vaillant, André 1950. Grammaire comparée des langues slaves. Tome 1: Phonétique. Paris & Lyon: Institut d'Etudes Slaves.

Vaillant, André 1958. Grammaire comparée des langues slaves. Tome 2: Morphologie. Paris, Lyon: Institut d'Etudes Slaves.

Valdman, Albert 1972. The Loi de Position as a pedagogical norm. Papers in Linguistics and Phonetics to the memory of Pierre Delattre, edited by Albert Valdman, 473-485. The Hague, Paris: Mouton.

Vážný, Václav 1963. Historická mluvnice česká. Vol. II,2: Tvarosloví, Skloňování. Praha: SPN.

Vondrák, Wenzel 1906. Vergleichende Slavische Grammatik. Band I: Lautlehre und Stammbildungslehre. Göttingen: Vandenhoek & Ruprecht.

Vondrák, Wenzel 1924. Vergleichende Slavische Grammatik. Band I: Lautlehre und Stammbildungslehre. 2. Auflage Göttingen: Vandenhoeck & Ruprecht.

Wiese, Richard 1996. The Phonology of German. Oxford: Oxford University Press.

Yearly, Jennifer 1995. Jer vowels in Russian. Papers in Optimality Theory, edited by J. Beckman, S. Urbanczyk & L. Walsh, 533-571. Amherst, MA: GSLA.

Yoshida, Shohei 1993. Licensing of empty Nuclei: The case of Palestinian vowel harmony. The Linguistic Review **10**, 127-159.