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REVIEW ARTICLE

ON THE FAILURE OF HASTY PHONOLOGY

A review of Michael Kenstowicz and Charles Kisseberth, *Topics in phonological theory**

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'On the failure of hasty phonology' is a review of M. Kenstowicz and C. Kisseberth: *Topics in phonological theory*. Part 1 presents seven recent phonological analyses by K and K which have been refuted in the recent literature for sometimes futile reasons: technical failure, incoherent reasoning, incorrect renderings of primary sources, and so on. Six of these seven analyses are repeated in *Topics*, although at least for some of them the reanalyses were available to the authors. In part 2 are presented three new phonological analyses included by K and K in *Topics* which again fail for futile reasons. The line of research represented by *Topics* is called here *hasty phonology*, and in part 3 it is concluded that *Topics*, taken as a report on this type of phonology, is a disappointing book.

1. Recent phonology

Consider the following *seven* recent phonological analyses (1.1–1.7).

1.1. Piro

According to Kisseberth (1970a), Piro, an Arawakan language spoken in Peru, has a rule which drops a stem-final vowel when preceded by VC and followed by suffixal CV, i.e. rule (1) (op. cit.: 47, 51):

(1) $V \rightarrow \varnothing \; / \; V\,C\_\_ + C\,V$

This rule accounts, for instance, for the forms in the righthand column of (2).

* Academic Press, New York, 1977.

(2)	yimaka	+ lu	'nominal'	: yimaklu	'teaching'
	heta	+ lu	'3 obj.'	: hetlu	'see it'
	heta	+ ya	'there'	: hetya	'see there'
	hata	+ nu	'abstract'	: hatnu	'light'
	čokoruha	+ kaka	'cause'	: čokoruhkaka	'cause to harpoon'
	salwa	+ kaka + lu		: salwakaklu	'cause him to visit'

While these examples are straightforward, VOWEL DROP happens to have an interesting range of exceptions. In particular, there is a class of suffixes which never occasion deletion of the preceding stem-final vowel. This class includes the verbal theme suffix *-ta*, the anticipatory suffix *-nu*, intransitive *-wa*, and *-wa* 'still, yet', in, for instance, the following examples.

(3)	meyi + ta	: meyita	'to please'
	hata + ta	: hatata	'to illuminate'
	meyi + wa + ta	: meyiwata	'to celebrate'
	poko + wa + ta	: pokowata	'to establish a town'
	heta + wa	: hetawa	'still see'
	heta + nu	: hetanu	'going to see'

Curiously enough, this class of exceptional suffixes falls again into two subclasses: one includes *-ta*, *-nu*, and intransitive *-wa*, and allows deletion of the suffixal vowel itself when followed by a suffix triggering deletion; the other includes *-wa* 'still, yet', which neither triggers deletion, nor allows deletion of its own vowel. Examples are given in (4a) and (4b), respectively.

(4a)	meyi - w - lu	'celebration'
	yona - t - nawa	'to paint oneself'
	heta - n - ru	'going to see him'[1]
(4b)	hišinka - wa - lu	'to be still thinking about it'
	heta - wa - lu	'to see him yet'

According to Kisseberth, the standard theory of generative phonology by Chomsky and Halle (1968) (henceforth *SPE*) provides two potential ways of handling these patterns but, he claims, both are wrong. Firstly, consider the following brief description of the subtheory of exceptionality as contained in *SPE* (172–176; 373–380):

[1] *-lu* becomes *-ru* after *n* by an independent rule of Piro phonology.

(5a) by convention, the 'focus', or 'target' (i.e. the *A* of the schematic phonological rule A → B / X __ Y) of each phonological rule contains the positively signed *rule feature* [+rule n], where *n* is the 'name' of the rule;

(5b) by convention, in the lexicon, each morpheme (and indeed the whole morpheme rather than one or more of its individual segments) contains the feature [+rule n] for each phonological rule;

(5c) by convention, (5b) is undone for each exceptional morpheme in that [+rule n] is replaced with [−rule n] for each phonological rule the morpheme is an exception to.

In this subtheory, notice in particular that according to (5a) the application of a rule is blocked by rule features if and *only* if the exceptional morpheme contains the focus of the rule, not if the morpheme is represented by the environment of the rule. This constraint is motivated by Chomsky and Halle as follows (375):

(6) the issue is whether the context in which a segment appears should be permitted to block the application of a rule to this segment, even if the segment itself is not specified as an exception to this rule. It is easy to invent examples that militate against this assumption, but we have no clear cases in a real language.

It is precisely the Piro VOWEL DROP data above, however, which look like examples of the required format: apparently, some suffixes do block the application of a phonological rule from a distance, i.e. when the victim vowel is contained in the stem. Thus, one could propose to relax the *SPE* theory in (5), in allowing convention (5a) to assign [+rule n] to each unit of a phonological rule, rather than only the focus. Furthermore, the exceptional suffixes will receive [−rule VOWEL DROP] in their lexical representations. However, as Kisseberth notes immediately and correctly, while superficially plausible, there is a very serious disadvantage to this procedure. On the one hand, it accounts nicely for the behaviour of *-wa* 'still yet', which fails to undergo *and* trigger deletion. On the other hand, we lose the opportunity to differentiate this suffix from the remaining three, since for these the lexical specification [−rule n] will incorrectly prevent them from dropping their own vowel, too. Apparently, rule feature markings on environments of rules are incapable of describing both types of exceptionality cooccurring vis-à-vis one phonological rule.

Secondly, for some types of exceptionality *SPE* uses so-called *alphabet*

features.[2] These features are used, for instance, when the class of potential input forms to a rule falls into two subgroups, with no apparent phonological difference, one of which triggers a rule, while the other blocks it. Thus, in Russian (*SPE*: 379–380), which has a rule of *i*-DROP before C_1V, the behaviour of the vowel of the suffix *-isk* is unpredictable when followed by V, and preceded by a non-anterior stem-final consonant: one finds, for instance, *mušskóy* 'manly' (as expected) next to *grečiskəy* 'Greek' (where one expects **grečskəy*). In order to account for this, *SPE* proposes to add to the grammar of Russian the rule in (7),

$$(7)\quad i \rightarrow [-\text{rule i-DROP}] / \begin{bmatrix} C \\ -\text{ant} \\ -D \end{bmatrix} + \_\_ \text{ sk } +$$

where the stem *greč* will be [−D] (and hence will fail to trigger *i*-DROP), and *muš* will be [+D] (and hence will trigger *i*-DROP). Given such an account, one could propose that in Piro there is a subdivision of suffixes into trigger-happy [+D] ones, and reluctant [−D] ones, where a readjustment rule specifies final stem-vowels as exceptions to VOWEL DROP before [−D] suffixes. To this type of approach, Kisseberth has the following objection (op. cit.: 75):

> (8) [...] this approach would permit certain kinds of 'exceptional contexts' which is not at all clear should be permitted. For example, a given morpheme could block the application of a phonological rule even though that morpheme is not part of the context of the rule. For example, consider a language which has a rule shortening vowels before two consonants. This language could have a readjustment rule of the form,
>
> V → [−SHORTENING] / pa + ——
>
> (where *pa* is some arbitrary morpheme). Indeed it would not have to be the case that the exceptional morpheme be adjacent to the segment being assigned the rule feature. Thus the above rule might be formulated slightly differently:
>
> V → [−SHORTENING] / pa + C V C_0 + ——
>
> It remains to be demonstrated that exceptions of this sort exist (where a particular morpheme limits the application of a rule but is itself not part of the context of the rule) and thus less powerful apparatus should be preferred until proven insufficient.

Given these objections to both ways of handling the exceptional Piro suffixes, the correct account of the Piro facts, according to Kisseberth, consists

[2] This terminology is taken from Coats (1970), the twin article to Kisseberth (1970a).

in the addition to the subtheory of exceptions in generative phonology of the set of conventions in (9).

(9a) as (5a), but here all units of the 'environment' of the rule will contain [+context n];
(9b) as (5b), but 'context' replaces 'rule';
(9c) as (5c), but 'context' replaces 'rule' and 'fails to trigger' replaces 'is an exception to'.

This approach, with a new type of exception feature, the *context feature*, added to the theory, results in the following tripartite division of Piro suffixes, as regards the rule of VOWEL DROP:

(10) *kaka* et al.	*ta* et al.	*wa* 'still, yet'
+rule VD	+rule VD	−rule VD
+context VD	−context VD	−context VD

Kisseberth adds that (57):

(11) Not only is this analysis adequate to the Piro facts, it is significantly less powerful than the readjustment analysis. To cite one key difference, under the latter analysis a morpheme may block application of a phonological rule only by virtue of having one or more of its segments in the context governing application of the rule. The readjustment approach is not similarly constrained.

According to Zonneveld (1978), the above arguments in favour of the context-feature approach to environmental exceptions in generative phonology fail for the following four reasons. Firstly, Kiparsky (1973a) (the published version of a 1968 paper) proposes that readjustment rules of the type objected to by Kisseberth should be banned from phonology anyway. His well-known Alternation Condition "should exclude the assignment of rule features to particular morphemes or segments by means of readjustment rules" (Kiparsky 1973a: 18). Given, then, the fact that one can add directly the alphabet feature [+D] to the right-hand environment of the Piro VOWEL DROP rule (as pointed out by Iverson and Ringen (1977); a similar reanalysis is possible for *SPE*'s case from Russian, cf. Coats (1970)), the objection to the use of alphabet features in the characterization of environmental exceptions falls. While this in itself does not argue in favour of these features, it does leave us with two devices for environmental exceptions in phonology: Kisseberth's context features, *and SPE*'s alphabet features.

As an introduction to the following two reasons of the failure of Kisseberth's approach, consider (12).

(12)

	V	C *V* + C V
(a)	m e	y i + *t a*
(b)	y o n a + *t a* + n a w a	
(c)	b o + *t a* + c e + d i	

(12) contains three Piro forms, the upper two of which are actually occurring forms, while the lower is, for the time being, hypothetical. Each form is matched with the structural description of VOWEL DROP, where the focus is emphasized. With each form, the suffix *-ta*, a blocking suffix, proceeds one step to the left in a string of suffixes. Moreover, as displayed in (10), within Kisseberth's theory *-ta* will be [+rule VOWEL DROP], but [−context VOWEL DROP]. In fact, these markings present the following difficulty. Since exception features are properties of whole morphemes rather than individual segments (cf. (5b)) (Kisseberth (1970a: 50, 56–57) subscribes to this constraint), both segments of *-ta* will be separately marked [+rule, −context VOWEL DROP]. But the presence of the latter marking on *t* will block, unfortunately, the deletion of *a* in (12). In other words, the approach fails when a [+rule n, −context n] form is simultaneously partly focus, partly environment of the same structural description, i.e. it fails in precisely those cases in Piro where the 'extended' rule feature approach fails, for precisely the same reason! Those who should wish to claim that this example shows that individual segments (in this case only the vowel of *-ta*) rather than whole morphemes should be marked for context features, will run into difficulties when we turn to the next observation.

From Kisseberth's theory it follows that *-ta* ([−context VOWEL DROP]) will block the rule also when it is part of the left-hand environment as, hypothetically, in (12c), rather than the right-hand environment. In other words, the theory makes no difference as regards the *direction* of the blocking. This is a highly implausible consequence, since one does not expect *-ta* to block VOWEL DROP from the position of (12c). That this prediction is empirically false as well can be shown with the aid of a form from Kisseberth's source for the Piro data, Matteson (1965), which runs as follows. The stem *čokoruha* 'to harpoon' (cf. (2)) may be prefixed with *w-* meaning, oddly enough, 'we'. Furthermore, the following string of suffixes may be added: *-ha*, the 'sinister hortatory', a blocking suffix; *-nu*,

the anticipatory suffix, a blocking suffix which may itself undergo deletion (cf. (4a)); and finally *-lu* 'it', a non-blocking suffix (cf. (2)). The resulting string is that of (13), where again the structural description of VOWEL DROP is matched (I ignore other possible leftward matchings, which are irrelevant since both *-ha* and *-nu* are blocking suffixes).

(13) V C *V* + C V
w + č o k o r u h a + h a + n u + l u 'let's harpoon it'

Notice that, crucially, *-lu* is a non-blocking, and *-nu* is a self-deleting suffix. Thus, we have created precisely those circumstances which will tell us whether or not *-ha* will allow deletion of the vowel of *-nu*. Preservation is predicted by Kisseberth's theory of context features, one's expectation, *pace* this theory, is that the vowel will drop. In actual fact, the vowel drops, the correct form being *wčokoruhahanru* (cf. fn. 1). Again, therefore, Kisseberth's theory fails. Those who should wish to claim that this argument, together with the one immediately above, shows that environment features should be separated into left-hand and right-hand environment features, will have to find an answer to the following observation.

One of the standard examples of 'focal' exceptions in generative phonology is the English noun *obesity* (related adjective *obese*), where long *e* contradicts the rule of TRISYLLABIC SHORTENING (cf. *serene/serenity*, *appeal/appellative*, and so on). This rule has a structural description very similar to that of Piro VOWEL DROP, as shown in (14).

(14) *V* C + V C V
s e r e n + i t y
ap p e ll + a t i ve
o b e s + i t y (blocked)

The present relevance of this case resides in the fact that, given context features as an addition to the theory of exceptions from *SPE* in (5), there is no principled way to characterize *obesity* either as a 'focal' (rule feature) or 'environmental' (context feature) exception: either [–rule TRISHORT], or [–context TRISHORT] (or both, although this will be excessively costly) will result in the rule being blocked, since *obese* contains both the focus and part of the environment of the rule. Of course, this is a dilemma for Kisseberth's theory not only for this English case, but for the type of situation in general (for the source of this argument, see Tranel 1974: 116).

It does not strike one as an exaggeration to require that no adequate theory of exceptionality in generative phonology allow for this kind of arbitrariness.

These arguments clearly cast doubts on the validity of Kisseberth's context features as part of the exception theory of generative phonology. And although this is not the main point of this section, notice that *SPE*'s original alphabet features, if constrained by Kiparsky's Alternation Condition, are superior to context features in that they overcome all objections to the latter. Being part, e.g., of the right-hand environment of Piro VOWEL DROP, a feature [+D] would not make claims on either the focus or the left-hand environment of the rule. And finally, while there is an apparent stand-off again between rule features and alphabet features for *obese*, any adequate evaluation measure will prefer the rule-feature solution for this case, since it allows one to characterize *obese* as [– rule TRISHORT], i.e., as an exception, while the alphabet-feature solution would force one to characterize all *regular* cases, such as *serene*, as the exceptions, since the alphabet feature would have to appear both in the rule *and* in the lexical representations of these forms. The correct choice is ensured, therefore, also for these cases.

1.2. Lithuanian

According to Kenstowicz (1970), Lithuanian has a rule which changes acute accent to circumflex in third person future, for non-high long vowels, i.e. rule (15) (op. cit.: 101):

$$(15)\quad \begin{bmatrix} \acute{V} \\ -\text{high} \\ 3\ \text{FUT.} \end{bmatrix} \rightarrow \tilde{V} \,/\, \_\ V$$

This rule accounts, for instance, for the circumflex accent of the third person future forms in (16).

(16)	*infinitive*	*2 fut.*	*3 fut.*	*gloss*
	déeti	déesi	dẽes	'do'
	klóoti	klóosi	klõos	'unfold'
	véesti	véesi	vẽes	'grow cold'
	žinóoti	žinóosi	žinõos	'know'

While this is the regular situation, there are five forms which are exceptional in that they contain long *high* vowels which change accent in third person future, while the majority by far of forms with high vowels fail to do so. The five irregular forms are those of (17).

(17)	*infinitive*	*3 fut.*	*gloss*
	líisti	líis	'grow lean'
	líišti	líiš	'loosen'
	matíiti	matíis	'see'
	s'úuti	s'ûus	'sew'
	víiti	víis	'chase'

According to Kenstowicz, within the *SPE*-framework this situation would be handled as follows: "what would be done would be to abstract out the [−high] condition and formulate it as a readjustment rule [...] on the now modified accent change rule [...]" (101–102):

(18a) readjustment: $\begin{bmatrix} \dot{V} \\ +\text{high} \end{bmatrix} \rightarrow [-\text{rule ACCENT CHANGE}] \,/\, \_\, V$

(18b) accent change: $\begin{bmatrix} \dot{V} \\ 3\ \text{FUT.} \end{bmatrix} \rightarrow \tilde{V} \,/\, \_\, V$

Under this assumption, 'regular' derivations will proceed as in (19a), and 'irregular' ones as in (19b):

(19a)	dées	púus	(19b)	líiš
readj.:	–	[−ACC.CH.]		[−READJ.]
accent:	ẽ	ˊ		ĩ

Kenstowicz has several objections to such an approach, however, the main one of which runs as follows. Within the *SPE*-theory (see section 1.1 above) readjustment rules of type (18a) apply at the level of the lexicon, and it is predicted, therefore, that all regular lexical long high vowels will fail to change accent. However, accent change has a subrule which regularly applies to vowel-sonorant combinations, as in *gérti/geřs* 'drink', and *ginti/gins* 'defend'. If such a sequence derives from an underlying long high vowel, accent change still applies, as in (*mínti* >) *mínti/miñs* 'trample'. These data show that the readjustment approach fails, and that the

restriction against high vowels "is to be stated as part of the structural description of accent change itself" (104). Given such an observation, Kenstowicz continues as follows (104–107):

> (20) If these observations are correct then it would seem that the theory of exceptions may have to be expanded to allow for the marking of morphemes as exceptional in undergoing rules they aren't supposed to. If this could be accomplished then the accent change rule could be stated as [15] and the [*páus*] and *mìns* class of forms could now be characterized as perfectly regular and effectively distinguished from the *vìs* class, which would be idiosyncratically marked lexically [...].
>
> Such an innovation means allowing rules to apply to strings of segments which strictly speaking do not meet the structural description of the rule if these strings are specifically marked as such. Whether or not this is the correct move to make depends upon at least two things. First, whether it is characteristic of language to have exceptionally behaving elements which are exceptional in that they undergo or condition rules they aren't supposed to. In a more abstract sense, it would involve the question of whether it is typical to find a rule referring to a class A to the exclusion of a class B, and also find that there are a small minority of elements belonging to B which do condition or undergo the rule.
>
> Secondly, such an innovation of allowing rules to apply to forms not meeting the structural description would obviously have to be severely restricted, since otherwise it would in effect claim that any segment could potentially condition or undergo any rule.

In fact, Kenstowicz then goes on to suggest that

> (21) (some?) phonological rules have a basic skeletal structure and that a given language can embellish it by placing further conditions on the application of the rule. It might be conjectured that the variability of language lies in these ancillary conditions and that they should be formally distinguished from the basic process.
>
> If this is correct one might imagine that the structural description of the skeletal part of the rule establishes a constraint which all items must meet in undergoing or conditioning the rule, but that they may exceptionally undergo or condition the rule if they violate one of these ancillary conditions. Thus, in the Lithuanian accent change rule the basic condition (one might say the point of the rule in the first place) is the specification for acute accent on the final syllable of the third person future, while the vowel quality of the syllable is a condition which would be subject to modification and variation.

According to Zonneveld (1978), Kenstowicz' suggestions are at least imprecise and probably superfluous in that the device he suggests is already contained in *SPE* (Chomsky and Halle 1968). In particular, consider the following example. In order to account for the change in height in the stem vowels of alternations such as *serene/serenity*, *sane/sanity*, and *divine/divinity*, *SPE* proposes that the phonology of English contain the VOWEL SHIFT rule of (22) (*SPE*: 190):

effects, e.g.:

(22) $\begin{bmatrix} V \\ +\text{stress} \\ +\text{tense} \end{bmatrix} \rightarrow \begin{Bmatrix} [-\alpha\text{high}] \;/\; \begin{bmatrix} \overline{\alpha\text{high}} \\ -\text{low} \end{bmatrix} \\ [-\alpha\text{low}] \;/\; \begin{bmatrix} \overline{\alpha\text{low}} \\ -\text{high} \end{bmatrix} \end{Bmatrix}$ $\begin{matrix} \bar{\imath} > \bar{e}: \text{divīyn} > \text{divēyn} \\ \bar{e} > \bar{\imath}: \text{serēyn} > \text{serīyn} \\ \bar{e} > \bar{æ}: \text{divēyn} > \text{divǣyn} \\ \bar{æ} > \bar{e}: \text{sǣyn} > \text{sēyn} \end{matrix}$

As appears from the formulation of (22), the application of VOWEL SHIFT is constrained to (stressed) *tense* vowels (in (22) the bar over the respective vowels represents tenseness). Yet, there is a small class of *lax* vowels to which VOWEL SHIFT apparently applies, too. These are, for instance, the stem vowels of some irregular verbs in past tense. Thus, *i* in *sit* and *sing* shows a change paralleling the change in *divinity/divine* in their past tenses *sat* and *sang*. Chomsky and Halle account for these alternations among the lax vowels by adding the environment [__, +F] to the focus of the VOWEL SHIFT rule, which now reads as in (23)[3]

(23) $\begin{bmatrix} V \\ +\text{stress} \\ \{[+\text{tense}]\ [+F]\} \end{bmatrix} \rightarrow \ldots\ldots\ldots$

and by marking lexically the irregular verbs *sit* and *sing* as [+F] in past tense. Notice that this English case is one of 'overapplication', too, since the original VOWEL SHIFT rule itself refers to *tense* vowels to the exclusion of lax ones, whereas the irregular vowels are lax. Yet, *SPE* brings these cases into line by extending VOWEL SHIFT with a subbranch containing an alphabet feature (see previous section) which is itself part of the lexical representations of the irregular verbs. Therefore, completely in line with this analysis of some irregular English verbs, an analysis of the irregular Lithuanian verbs will postulate the ACCENT CHANGE rule of (24) (cf. (15)),

(24) $\begin{bmatrix} \acute{V} \\ 3\ \text{FUT.} \\ \{[-\text{high}]\ [+L]\} \end{bmatrix} \rightarrow \tilde{V} \;/\; \_\_\; V$

where the alphabet feature [+L] will be contained in the lexical

[3] Slightly revised for expository purposes, cf. *SPE*: 243. For a recent treatment of these phenomena, cf. Halle (1977).

representations of irregular verbs such as *liiš*. No theoretical innovation will be required at all, and no rule applies when its structural description is not met. Over and above this, one gets for free with this approach at least the initial opportunity to heavily constrain the notion 'overapplication' in generative phonology *per se*, by constraining the use of alphabet features when braced into phonological rules. For instance, (22), (23) and (24), together with several more examples given in Zonneveld (1978), suggest that alphabet features cannot be collapsed in phonological rules with more than one feature at the time. Notice that this is one of the heaviest constraints thinkable in that a single feature is, in a sense, the *minimal* element of a phonological rule.

1.3. Tonkawa

At one stage of Kisseberth (1970b)[4], the author argues that Tonkawa, a language formerly spoken in Texas, had a rule of VOWEL ELISION, as in (25) (op. cit.: 118):

$$(25)\quad \begin{bmatrix} V \\ +\text{STEM} \end{bmatrix} \rightarrow \varnothing \;/\; \left\{ \begin{matrix} \left\{ \begin{matrix} \# \\ C + \end{matrix} \right\} C\ V\ C \\ V + C \end{matrix} \right\} - C \begin{bmatrix} V \\ +\text{STEM} \end{bmatrix} \quad \begin{matrix} (a) \\ (b) \\ (c) \end{matrix}$$

The various parts of this rule are motivated as follows. The (a)-branch deletes (i) the second vowel of unprefixed trisyllabic stems; and (ii) the first vowel of stems prefixed with CV-, cf. (26).

(26a) notoxo + o? 'he hoes it' > notxo?[5]
picena + o? 'he cuts it' > picno?
(26b) we + notoxo + o? 'he hoes them' > wentoxo?
we + picena + o? 'he cuts them' > wepceno?

The correctness of the requirement that the rightmost vowel be part of the stem is shown by data such as that in (27), where stems are bisyllabic.

(27) ELISION: we + pile + no + o? 'he is rolling them' > wepleno?
we + cane + no + o? 'he is leaving them' > wecneno?

[4] Part of the analysis below is repeated in Kisseberth (1973c); the rule in (25) is slightly revised for expository purposes, cf. Kisseberth (1970b: 118).
[5] An independent rule of Tonkawa phonology deletes the first in a sequence of two vowels.

failure:	pile + no + o?	'he is rolling it'	> pileno?
	cane + no + o?	'he is leaving it'	> caneno?

The (b)-branch of VOWEL ELISION is motivated by a form such as /nes + yam*a*xa + o? + s/ 'I cause him to paint his face' > [nesyamxo?s], where the rightmost *a* disappears by TRUNCATION (cf. fn. 5), and emphasized *a* by ELISION. Finally, the data in (28) motivate the (c)-branch, plus the requirement that the focal vowel be part of the stem.

(28) ke + ya + xamac + o? 'he breaks my bones'
* ∅ > keyaxmaco?
ke + ya + saxaw + o? 'he scares me'
* ∅ > keyasxawo?

Given the rule as in (25), it is interesting to note that not only do *short* vowels elide in its context, but also *long* vowels shorten, at least so when a CV-prefix precedes, cf. (29) (notice, parenthetically, that for this environment the (a)- and (c)-branches overlap).

(29) xa + ka:na + o? 'he throws it far away' > xakano?
we + na:te + o? 'he steps on them' > wenato?

Kisseberth does not formally elaborate upon this point, although he suggests that (25) will have to be interpreted "to mean that a vowel will lose one mora of length [...] in the environment indicated" (121). Given this interpretation, the point of these preliminaries is the following. Firstly, consider the fact that VOWEL ELISION, as formulated in (25), requires that the focal vowel be flanked by single Cs. The cruciality of this requirement is shown by the failure of short stem-vowels to drop in, for instance, the forms in (30).

(30) nep*a*xke + no + o? 'he is smoking' > nepaxkeno?
we + s*a*lke + o? 'he pulls sinews from meat' > wesalko?
yasy*a*ke + no + o? 'he is tearing it' > yasyakeno?
notx*o*ko + no + o? 'he is expectorating' > notxokono?

With this data in mind, the behaviour of *long* vowels in the same context is peculiar. In fact, long vowels do shorten even when followed by a cluster, as shown by the following forms.

(31) ke + so:pka + o? 'I swell up' > kesopko?
we + ča:pxe + o? 'he pulls up several beds' > wečapxo?
ke + še:cxe + o? 'I am satisfied' > kešecxo?

On this peculiar difference between short and long vowels vis-à-vis the (mora-deleting) rule of VOWEL ELISION, in fact the point of his paper, Kisseberth comments as follows:

(32) This divergence between short and long vowels has, of course, a rather clear explanation. Tonkawa does not tolerate, either in the underlying shapes of morphemes or in phonetic representations, triliteral clusters. [25] will not elide a short vowel [when flanked by a cluster] for the rather obvious reason that to do so would create inadmissible consonant clusters. We can also see now why shortening of long vowels may occur in the [same] context, even though short vowel deletion may not. If a vowel gets shortened, the underlying structure of the syllable is still preserved. We maintain the same sequence of vowels and consonants. (122–123)

Given this observation on the independent source of the blocking of VOWEL ELISION for short vowels flanked by a cluster, the question naturally arises how to represent this situation. In particular, one could ask whether the constraint on short vowel elision should be stated as part of the rule of VOWEL ELISION itself. Kisseberth, in fact, suggests that the answer to this question be negative. In particular, he argues:

(33) It seems [...] that there is an important distinction between *basic constraints* on the operation of a rule and *derivative constraints*. Basic constraints are peculiar to the rule itself, unconnected with any other facts about the grammar. Derivative constraints are simply reflections of some more general constraint that is not peculiar to the rule itself. Thus, the fact that only non-final stem vowels elide appears to be a basic constraint on VOWEL ELISION; but the fact that a short vowel does not elide if a triliteral cluster would result appears to be a derivative constraint, in the sense that it is reflective of a constraint operative elsewhere in the grammar (in particular, on the structure of morphemes). To build these constraints on the deletion of short vowels into the rule of VOWEL ELISION is to claim that they are arbitrary, idiosyncratic constraints. (128–129)[6]

He then goes on:

(34) [Recently], we have proposed to eliminate some restrictions from the structural descriptions of phonological rules by means of an additional piece of theoretical apparatus which we have referred to as 'derivational constraints'. The proposal runs as follows: a grammar may contain a set of derivational constraints, or output condi-

[6] Kenstowicz (1970) suggests that those parts of phonological rules violated in cases of 'overapplication' are the derivative rather than the basic parts.

> tions, which define conditions that a well-formed output string must meet; it is not, however, the last line of the derivation that must meet the output conditions, but rather the string resulting from an attempted application of a rule. If application of a rule to a given string yields an output that does not satisfy the derivational constraint, then the next rule applies not to the output of the preceding rule, but to the input [...].
>
> The notion of derivational constraints seems relevant to the Tonkawa case. Suppose we claimed that constraints on *sequences* of segments in morphemes automatically constituted derivational constraints. In particular, since Tonkawa has [a constraint] against triliteral clusters [...] in the underlying form of morphemes, it would also have [a derivational constraint] blocking the application of rules if their application would create such sequences. If such derivational constraints were operative in Tonkawa, and in particular controlled the output of VOWEL ELISION, that rule could be formulated so that the environment for short vowel deletion and long vowel shortening would be the same. Failure of short vowel deletion in the contexts C ___ CC, CC ___ C, and C ___ C would be the result of the failure of the output of the rule to satisfy the derivational constraints of the language. (131–132)[7]

It is shown in Phelps (1973) that the above account of Tonkawa fails, on several accounts. Firstly, she argues that there is no constraint against underlying triliteral clusters in Tonkawa, but rather one against clusters in general. If this is true, then clearly such a constraint cannot be invoked to explain why VOWEL ELISION allows deletion in between single Cs, but not when triliteral clusters threaten to be created. Naturally, in order for this reanalysis to be possible, the forms in (30) and (31), which have underlying clusters for Kisseberth, call for reconsideration. Phelps argues that those in (30) are compound forms rather than monomorphematic ones, and those in (31) have trisyllabic stems rather than bisyllabic ones: *so:paka*, *ca:pVxe*, and *śe:cVxe*, respectively (where V is indeterminable because of lack of crucial data). Secondly, she shows that the unwieldy rule (25) can be replaced with the much more attractive (35) (op. cit.: 72),

$$(35)\ \begin{bmatrix} \text{V} \\ +\text{STEM} \end{bmatrix} \rightarrow \varnothing \ / \ \text{V C} \_\_ (\text{V}) \ \text{C} \begin{bmatrix} \text{V} \\ +\text{STEM} \end{bmatrix}$$

given three assumptions: (i) rule (35) is a so-called iterative rule, left-to-right; (ii) Tonkawa long vowels are represented as sequences of short ones, i.e. Kisseberth's V: is VV for Phelps; and (iii) schema (35) has two subrules ordered disjunctively for the same domain, one with parenthesized V, the other without it. On these assumptions, notice the following. Firstly, (i), and in particular the requirement that the rule iterate from left to right, will

[7] Notice that the inclusion of the environment C ___ C in the last sentence is apparently a case of oversight.

ensure that VOWEL ELISION will select the correct vowel, and will never delete more than one short vowel per stem. Thus, in a form *we+notoxo+oʔ* (cf. (26)) both the first and second *o* meet its structural description, but the leftmost will be deleted first, giving *we+ntoxo+oʔ*. By this application, the second *o* is now deprived of its VC left-hand environment, and will fail to delete, as required. However, in a form *ke+soopaka+oʔ* (reanalysed from (31)) one half of the long vowel *and* one short *a* will be deleted. In the first step, the leftmost *o* will be deleted, so as to give intermediate *ke+sopaka+oʔ*. Proceeding eastward to another domain, by a second application VOWEL ELISION will delete the leftmost *a*, again as required. Notice that this analysis presupposes assumption (ii), where VV represents long vowels, and in this in fact formalizes the notion 'mora-loss'. Finally, notice that assumption (iii) prevents the rule from reapplying to the shortened version of an originally long vowel, as in *ke+sopaka+oʔ* above, where the leftmost *o* still meets the structural description of the rule, and in, for instance, *we+naate+oʔ* > *we+nate+oʔ* (cf. (29)), where the same holds for short *a*. In a detailed description of the relevant portion of the phonology of Tonkawa, Phelps argues that all three assumptions are in fact well founded, and cooperate to allow (35).

Presently much more important than the above reanalysis, however, is the fact that, even without these assumptions and their consequences, it is not at all clear how Kisseberth's suggestions can be made to work even under his own analysis of Tonkawa. In particular, Phelps points out quite correctly that in both papers on Tonkawa Kisseberth fails to formulate the rule of VOWEL ELISION simplified to its basic contents by the possibility to refer to derivational constraints. In fact, Phelps argues that "interesting results are not likely to be forthcoming" (69), for reasons such as the following. Firstly, Kisseberth himself admits (cf. (33)) that the last vowel of a stem never elides. This observation is expressed in the rule in terms of the right-hand context [V, +STEM], which cannot be traced back to a derivational constraint. Secondly, if the reason for the failure of short vowel deletion in between CC __ C lies in the derivational constraint against triliteral clusters, one expects that long vowel shortening will in fact take place in this environment. However, Kisseberth himself provides the example which falsifies this claim (1970b: 119): there is no shortening in *nes+kaana+oʔ* > *neskaanoʔ*. Clearly, this phenomenon cannot, again, be traced back to the derivational constraint against triliteral clusters, and VC will have to be added as the left-hand environment to the rule of VOWEL ELISION. Given these observations, it is also clear that the

environment of the rule should at least contain the 'two-sided open syllable' VC _ CV, with precisely the information provided which the derivational constraint was supposed to eliminate. Having given more examples of the same type in Kisseberth's work on Tonkawa, Phelps concludes that while the "foregoing catalog of errors in analysis does not demonstrate that derivational constraints are in general unnecessary or improductive of understanding of phonological processes, [...] the evidence from Tonkawa does not support such an addition to the theory of generative phonology" (136).

1.4. Yawelmani

At one stage of Kisseberth (1970c),[8] the author argues that the Yawelmani dialect of Yokuts, spoken in California, has the three phonological rules of (36).

(36a) $C \rightarrow \varnothing \; / \; C \begin{Bmatrix} C + \_ \\ + \_ C \end{Bmatrix}$

(36b) $\varnothing \rightarrow V \; / \; C \_ C \begin{Bmatrix} \# \\ C \end{Bmatrix}$

(36c) $\begin{bmatrix} V \\ -\text{long} \end{bmatrix} \rightarrow \varnothing \; / \; V\,C \_ C\,V$

Motivation for these rules is as follows. The top-branch of (36a) applies when a consonant-initial suffix is added to the so-called verbal 'zero-stem' (this stem lacks vowels and/or has short versions of long vowels vis-à-vis the regular stem); the bottom-branch of (36a) applies when one of the two cluster-initial suffixes of Yawelmani is added to a consonant-final stem. Cf. (37).[9]

(37) top:	hala:l + hatin + i:n		'lift up, desiderative future'
ZERO	hall		
(a)		∅	> hallatini:n (see below)
bottom:	giti:n + hnil + a + w		'armpit'
(a)		∅	> giti:nnilaw

[8] Part of the analysis below is repeated in Kisseberth (1973a).

[9] I ignore rules applying to the outputs of the rules discussed here, cf. Kisseberth (1970c).

VOWEL EPENTHESIS rule (36b) applies (a) when a suffix consisting of a single consonant is added to a consonant-final stem; (b) when a consonant-initial suffix is added to a cluster-final verb-stem; and (c) when triliteral clusters are created by zero-stem reduplication. Cf. (38).

(38a)	di:yl + t	> di:ylit	'guard, pass. aorist'
	xat + t	> xatit	'eat, pass. aorist'
(38b)	ʔilk + hin	> ʔilikhin	'sing, aorist'
	paʔt + tin	> paʔittin	'fight, pass. gerund'
(38c)	koy- > (zero red.) koyky-	> koyiky-	'butt, zero red.'
	lag- > (zero red.) laglg-	> lagilg-	'stay overnight, zero red.'

Finally, rule (36c) of VOWEL DELETION applies mostly to suffix vowels in those cases where a suffix is sandwiched in between a stem and another suffix, as in (39).

(39)	hall + atin + i:n	> hallatni:n	(cf. (37))
	laga: + mix + i:n	> laga:mxi:n	'stay overnight, comitative fut.'
	yolo:w + in + i:n	> yolo:wni:n	'assemble, medio-pass. fut.'

While the above three rules are, according to Kisseberth's analysis, part of a formal phonology of Yawelmani, there is in fact much more to be said about them than suggested by the above. In particular, although the individual rules of (36) are *formally* quite different, they are *functionally* the same in a quite striking manner. In fact, the complete set 'conspires' to yield phonetic representations which avoid word-final clusters, and medial triliteral clusters. and

(40) there is a significant sense in which Vowel Deletion is the *reverse* of Vowel Epenthesis. Recall that Vowel Epenthesis inserts a vowel just in those contexts where failure to do so would yield an unpermitted consonant cluster. On the other hand, Vowel Deletion serves to delete just those vowels *not* required by the constraints on consonant clustering. Observe that the context VC ___ CV *excludes* all the environments where deletion of the vowel would yield unpermitted clustering; – *#CC, *CC#, *CCC.

Whereas Vowel Epenthesis operates *positively* to eliminate the clustering violations which arise through suffixation, Vowel Deletion is formulated so that deletion of short vowels may *not* give rise to new instances of violation of the constraints. Despite this significant difference, it is clear that Vowel Epenthesis and Vowel Deletion are both crucially related to the consonant reduction processes discussed earlier. They are all part and parcel of the same basic phenomenon. (298–9)

Unfortunately, while the above remarks are clearly indicative of one *generalization* underlying the set of rules in (36), there is in the standard theory of generative phonology no way to express this generalization. Those means available to express generalizations, the so-called 'abbreviatory devices' (such as the braces in (36a) and (b)) are able to express only *formal* generalizations, to the exclusion of *functional* ones. And it is a functional generalization underlying (36).

In order to remedy this bias of the standard theory, Kisseberth proposes that ways should be created to both formally and in evaluation capture the sameness of the rules in (36). Towards this end, he makes the following two suggestions:

(41) To determine the relationship between the consonant reduction processes and Vowel Epenthesis, it is sufficient to examine the strings which are input to these rules and the strings which are output. In all cases, the input string will contain a violation of the clustering constraints, but the output will not. This relationship is so systematic that it appears quite feasible to construct a formal theory which would make rules having this property highly valued by the evaluation metric. (303)

As noted also in (40), Vowel Deletion is different from these rules, in that it does not break up existing clusters but rather avoids new clusters from arising. In order to highly evaluate this particular rule, Kisseberth suggests the following:

(42) let us incorporate into phonological theory the notion of a *derivational constraint*. Yawelmani would possess a derivational constraint which says that strings containing the sequences CCC, #CC, CC# are not possible outputs of any phonological rule if these sequences were not present in the input (i.e. a phonological rule may not *create* a violation of the clustering constraints). We might then redefine the notion of obligatory rule and say that an obligatory rule applies just in case (a) its structural description is satisfied by the input string and (b) the output string would not be in violation of the derivational constraint.

Given these proposals, we could then write [36C] as follows: (304)

(43) $\begin{bmatrix} V \\ -\text{long} \end{bmatrix} \rightarrow \varnothing \; / \; C \_\_ C$

He concludes his proposals as follows:

(44) By making obligatory rules meet two conditions (one relating to the form of the input string and the other relating to the form of the output string; one relating to a single rule, the other relating to all the rules in the grammar), we are able to write the vowel deletion rules in the intuitively correct fashion. We do not have to mention in the rules themselves that they cannot yield unpermitted clusters. We state this fact once in the form of a derivational constraint. (304–305)

Observe the resemblance between the proposal on Yawelmani in (42)–(44), and the one on Tonkawa in the previous section. The resemblance is turned even into an exact parallel when we add the fact that also in Yawelmani (at least in Kisseberth's analyses) the proposed derivational constraint derives from a condition on underlying morpheme structure (1970c: 294). However, while Kisseberth's Tonkawa example was called into question by Phelps on *language-internal* grounds, it is Kiparsky (1973b) who rejects Kisseberth's Yawelmani analysis from the *theoretical* angle. In particular, while he credits Kisseberth for being "the first to identify the phenomenon of conspiracies as a serious challange to the theory of generative phonology", he at the same time calls him to the stand for attempting to find a *formal* explanation (i.e., simplifications via the rule writing system) for a *functional* phenomenon. As a result of this error, Kiparsky argues, the theory of derivational constraints will encounter, for instance, the following formal difficulties. Firstly, consider a hypothetical language Zawelmani, different from Yawelmani only in that it allows VOWEL DELETION to create triliteral clusters. Thus, Zawelmani will not have a conspiracy against triliteral clusters, and one will be motivated to write the language-particular rule of VOWEL DELETION as in (43). But notice that, while the phonologics of Yawelmani and Zawelmani will be formally equally costly, yet "Zawelmani is Yawelmani minus the conspiracy! [...] This shows that the original program of converting functional unity of phonological rules into grammatical simplicity by means of 'derivational constraints' has not been carried out successfully" (77–78). Secondly, as already recognized by Kisseberth as a potential drawback (cf. (41)), the approach "offers no way of simplifying the statement of rules which 'actively' *eliminate* violations of the conspiracy, such as the consonant deletion or vowel epenthesis rules of Yawelmani" (78). And finally, "a conspiracy, even if its target is purely phonological, can involve more than just phonological rules. Morpheme structure rules, rules of derivational and inflectional morphology and even syntactic rules can participate in making the output conform to a phonological target, as Ross has shown for the English *VV conspiracy [cf. Ross 1973; Cook 1971]. Moreover, a phonological rule can function as part of a conspiracy indirectly, by causing or preventing the application of other rules in conformity with the target. In short, the formal devices by which conspiracies can be implemented in grammars are unlimited. This fact foils any attempt to translate the functional relationship of rules into formal simplicity" (78).

Given these difficulties, Kiparsky calls on his notion *opacity* (reverse:

transparency) (Kiparsky 1971) as a replacement for the theory of derivational constraints. While there are several types of opacity, the presently relevant type is defined as in (45).

(45) A process P of the form A → B / C __ D is *opaque* to the extent that there are phonetic forms in the language having A in the environment C __ D.

Furthermore, the claim is that *opacity adds to linguistic complexity*, motivation for which can be given on historical grounds. Given this, observe that, for instance, the VOWEL DELETION rule of Yawelmani (the cluster-avoiding rule, and the one simplified by Kisseberth) is prevented from "producing exactly those outputs which would make the other rules in the conspiracy opaque" (80) Since vowels are not dropped when the unpermitted clusters threaten to be created, the remaining rules are transparent (prevented from being opaque, and therefore *highly valued*). Similarly, among the 'active' rules, the absence of, for instance, VOWEL EPENTHESIS would make the CONSONANT REDUCTION rules opaque, and so on. In sum, then, the "explanation of conspiracies is [...] reduced to the theory of opacity. The fact that [...]

Languages tend to have conspiracies

follows from the more general fact that [...]

Languages tend to have transparent rules". (81)

1.5. Klamath

An analysis of part of the phonology of Klamath, a language spoken in Oregon, in Kisseberth (1972, 1973b, 1973c) is structured as follows. In prefixation with a certain class of prefixes (designated by * in Kisseberth's papers, this mark will be omitted here) the prefix-vowel is a copy of the stem-vowel. Furthermore, (i) the copy is short if the stem-vowel is long; (ii) the stem-vowel itself is deleted if short in an *open* syllable; (iii) the stem-vowel is replaced by *a* if short in a *closed* syllable. Examples are as in (46), where *hVs-* is the indirect causative, *snV-* is the direct causative, *sV-* the reflexive, and C_0V- the distributive (in all cases *-a* reflects the indicative).

(46a) hos + no:g + a 'ind. caus. + be cooked + ind.'
sno + qdo:č + a 'dir. caus. + rain + ind.'
sa + twa:q̇ + a 'refl. + smear + ind.'
go + go:y̆ + a 'distr. + feel passionate + ind.'

(46b) hos + tq̓ + a 'ind. caus. + be frightened + ind.'
so + ltq̓ + a 'refl. + thump + ind.'
sni + qw + a 'dir. caus. + smart + ind.'
pa + pg + a 'distr. + bark + ind.'
(46c) hos + čanw + a 'ind. caus. + vomit + ind.'
se + ʔalg + a 'refl. + call + ind.'
čo + čanw + a 'distr. + vomit + ind.'
m̓o + m̓alw̓ + a 'distr. + be ready + ind.'

The set of rules in (47), let us call it VOWEL COPY, will account for these data.

(47) (a) $V\ C_1 \begin{bmatrix} V \\ +\text{long} \end{bmatrix} \rightarrow \begin{bmatrix} 3 \\ -\text{long} \end{bmatrix} 2\ 3$
1 2 3

(b) $V\ C_1\ V\ C\ V \rightarrow 3\ 2\ \varnothing\ 4\ 5$
1 2 3 4 5

(c) $V\ C_1\ V\ C\ C \rightarrow 3\ 2\ a\ 4\ 5$
1 2 3 4 5

This set may be collapsed into one schema, but for the sake of clarity (47) will be used here.

The rule of VOWEL COPY enters into an ordering paradox with a rule of GLIDE VOCALIZATION, which converts glides into vowels in the environment __ {C, #}.[10] The derivation in (48a) shows that VOWEL COPY (b) *feeds* VOCALIZATION in preconsonantal position, while the derivations in (48b) show that VOCALIZATION *feeds* VOWEL COPY (b) in final position (all forms are distributive indicatives).

(48a) tV + tweq + a
'bore'
VC(b) te + tw q + a
VOC to:

(48b) dV + dewy sʔV + sʔedw
'fire a gun' 'count'
VOC i o
VC(b) de + dwi sʔe + sʔdo

[10] The vowel will be long or short, depending on the environment, cf. Kisseberth (1973b).

Notice that the order VOC < VC(b) in (48a) would incorrectly block the former, while the order VC(b) < VOC in (48b) would block the former, and could lead to incorrect *a*'s by VC(c). Kisseberth solves this paradox, not by separating the two subcases of VOCALIZATION which would mean that a generalization would be lost, but rather by an appeal to the cycle. If in the above examples, he argues, the non-prefixed stem constitutes a cycle of its own, VOWEL COPY will by its very formulation be postponed to the second cycle. Therefore, VOCALIZATION will be able to precede VOWEL COPY in (48b) on the first cycle, while it will follow VOWEL COPY in (48a), since it will be inapplicable on cycle one. Under this assumption, the derivations will proceed as in (49).

(49a)		tV [tweq + a]	(49b)	dV [dewy]	sʔV [sʔedwʔ]
I:	VOC	–		i	o
II:	VC(b)	te + tw q + a		de + dwi	sʔe + sʔdo
	VOC	o:		–	–

The attractiveness of this proposal is most usefully illustrated in those cases where VOCALIZATION is applicable twice, once feeding VC(b), once being fed by it:

(50)		sẇV [sẇew + y + s] 'fisherman'	lwV [lwel + y + s] 'killer'
I:	VOC	i	i
II:	VC(b)	sẇe + sw w + is	lwe + lw l + is
	VOC	o:	o:

Next, consider the following difficult cases. They have in common that in each case a *closed* syllable stem requires deletion of its stem-vowel by VOWEL COPY (b), rather than replacement by *a* by VOWEL COPY (c). Firstly, consider the required derivations in (51), where VC(c) would predict *a*.

(51)		sV + siwg + a 'kill'	gV + gayk̓ + a 'be silly'
	VC(b)	si + s wg + a	ga + g yk̓ + a
	VOC	o:	i:

These data could be brought into line, according to Kisseberth, in one of two ways. Either VC(b) could be modified so as to allow an optional glide

in between 3 and 4 of its structural description; or VC(c) could be allowed to generate *a* after which an additional rule of CONTRACTION could send *aw* > *o*:, and *ay* > *i*:. Clearly, given these data, either proposal works. Secondly, consider the required derivations in (52), although again VC(c) would predict *a* in the rightmost because of the *closed* syllable.

(52)	snV + ken + a	swV + swin + a	lV + leċn + a
	'snow'	'sing'	'weave'
VC(b)	sne + k n + a	swi + sw n + a	le + l ċn + a
n-DEL	ø	ø	ø
VOC	–	(bled by n-DEL)	–

In the leftmost derivation, VC(b) must be allowed to *feed* postconsonantal *n*-DELETION. If this is true, however, then for the derivation of *lelċa* VC(b) must be reformulated so as to allow an optional *n* in between 4 and 5 of its structural description. This *n* will be the same *n* to be deleted by *n*-DELETION. Finally, consider cases such as those in (53), where again *deletion* is required by VC(b), although *a* follows from VC(c).

(53)	qbV + qbaẏ + wapk	sm̓V + sm̓oq̇y + tk
	'will wrap the legs around, dist.'	'having a mouthful, dist.'
VC(b)	qba + qb ẏ + wapk	sm̓o + sm̓ q̇y + tk
VOC	i	i

Apparently, another revision of VOWEL COPY(b) is called for. Notice that the stems of (53) end in a post-consonantal glide, which suggests that together with *n* above a *glide* should be added in between 4 and 5 of VC(b). However, just the addition of 'post-consonantal glide' will not be sufficient as shown by the two derivations of (54). The leftmost (cf. (46c)), where VC(c) inserts *a*, shows that the relevant glide should not be followed by a vowel; similarly, the rightmost derivation shows that the glide cannot itself be followed by a glide-consonant sequence.

(54)	čV + čonw + a	wV + wenwy + tk
	'vomit'	'widows, dist.'
VC(c)	čo + čanw + a	we + wanwy + tk
VOC	–	i

In sum, the resulting structural description of VC(b) will be as in (55).

(55) $V\,C_1\,V\,(G)\,C\left\{\begin{matrix}(n)\,V\\ G\,C_x\end{matrix}\right\}$ where $C_x \neq G$ if C follows

The parenthesized glide will be superfluous if *siso*:*ga* and *gagi*:*ǩa* (cf. (51)) are derived by a rule of CONTRACTION.

Having given (55), Kisseberth goes on to argue that, of course, this is an unwieldy, unattractive structural description with all extras built in for just one reason: insertion of *a* by VC(c) should be blocked for some closed-syllable stems. Suppose, however, that at this point we retract completely and propose an extremely general analysis, in fact that of (56), where VOWEL COPY deletes short stem vowels in all cases, and a general rule of *a*-INSERTION breaks up triliteral clusters:

(56) VOWEL COPY (short vowels): $V\,C_1\,V\,C \rightarrow V\,C_1\,\varnothing\,C$
a-INSERTION: $C\,C\,C \rightarrow C\,a\,C\,C$

Notice that this analysis will account automatically for (a) the bottom two forms of (46b) (deletion in open syllable for *CVC* stems); (b) the bottom three of (46c) (deletion and *a*-INSERTION in *closed* syllables); (c) all forms in (48)–(50) which motivated the cycle (if VOCALIZATION bleeds *a*-INSERTION); (d) the difficult forms with preconsonantal glide in (51) (under the same assumption); (e) the difficult forms with *n* in (52) (if *n*-DELETION bleeds *a*-INSERTION); and (f) the forms in (54) with post-consonantal glide *and a*. This is, of course, an extremely interesting result, and leaves in fact only two types of problematic cases. Firstly, there is the question of where to put *a* in quadri-literal clusters, as in *hVs*+*čonw*+*a* > *hos*+*čnw*+*a* (cf. (46c)). Clearly, the generalization here is that, if *a* is inserted, it is put on the exact spot of the previously deleted stem-vowel: > *hos*+*čanw*+*a*. Secondly, there is the problem of how to *block a*-INSERTION in the triliteral clusters of (46b), and (53), respectively:

(57)

hVs + toq̇ + a	sV + ltoq̇ + a	qbV + qbaty + wapk
o ∅	o ∅	a ∅
		i
-s t q̇-	-lt q̇-	-qb t-

sm̀V + sm̀oq̇y + tk	
o ∅	VC
i	VOC
-sm̀ q̇-	cluster

Clearly, the generalization here is that *a* will be inserted only in C __ CC if at its place of insertion a stem-vowel was deleted by VOWEL COPY. As a result, *a*-INSERTION will have to be a *global* rule, which will have to have access to earlier stages of a derivation, in fact, in derivations such as those in (57) to the stage where the rule of VOWEL COPY applies, prior to VOCALIZATION, which is itself prior to *a*-INSERTION. Given the fact that the standard theory of generative phonology (*SPE*) does not allow for this type of looking-back globality of phonological rules, Kisseberth concludes his 1973b paper on Klamath as follows:

(58) In the present paper, I have tried to show that derivational history functions in Klamath grammar in a way that strongly suggests that present theory [in requiring (55)] does not permit an adequate characterization. (26–27)

It is shown in White (1973) that the claim in (58) is false in an extremely trivial way. In particular, it is wrong in requiring nonstandard global power for its rule of *a*-INSERTION. In order to see this, let us return to our point of departure, the quite general original rules of VOWEL COPY in (47). Vis-à-vis these rules, the three sets of awkward forms which motivated (55) or, for Kisseberth, a global rule of *a*-INSERTION, may be accounted for as follows. Firstly, the forms in (51) with preconsonantal glides may derive their phonetic long vowels by a rule of CONTRACTION, as pointed out by Kisseberth himself (1973b: 22, 25). Secondly, the difficult forms in (53) clearly require a *cyclic* rule of VOCALIZATION à la those in (49b) and (50), in order to trigger VC(b). It is obvious that, given the cycle of Kisseberth (1972, 1973b) these forms cannot motivate a global rule of *a*-INSERTION.

(59)	qbV + qbaty + wapk			smV + smoqy + tk		
I: VOC		i			i	
II: VC(b)	a	∅		o	∅	

Finally, given the fact that the rule of *n*-DELETION is shown to be cyclic in Kisseberth (1973d), the difficult forms of (52) cannot motivate a global rule of *a*-INSERTION either:

(60)	snV + ken + a			swV + swin + a			lV + lecn + a		
I: n-DEL		–			–			∅	
VOC		–			–			–	
II: VC(b)	e	∅		i	∅		e	∅	
n-DEL		∅			∅			–	
VOC		–			–			–	

Therefore, given a language-particular rule of CONTRACTION, as suggested by Kisseberth, and the phonological cycle, as argued for by Kisseberth, (58) is false. Q.E.D.[11]

1.6. Nootka

According to Campbell (1973), the phonology of Nootka, a language spoken on Vancouver Island, contains a counterexample to the extremely simple theory of Universally Determined Rule Application contained in Koutsoudas et al. (1971).[12] This theory consists of the two hierarchically ordered principles of (61).

(61) (i) PROPER INCLUSION PRECEDENCE: For any representation R, which meets the structural descriptions of each of two rules A and B, A takes applicational precedence over B with respect to R if and only if the structural description of A properly includes the structural description of B, where the structural description of a rule B is PROPERLY INCLUDED in the structural description of a rule A if and only if the structural description of B can be placed upon the structural description of A with some part of the structural description of A left over.

(ii) OBLIGATORY PRECEDENCE: Obligatory rules MUST be applied to any representation to which they CAN be applied.

As an illustration of OBLIGATORY PRECEDENCE, consider the rules from Southern Paiute in (62) in relation to an underlying form such as *paawa*.

(62) VOWEL DEVOICING

$$V \quad \# \qquad \downarrow \qquad [-\text{voice}]$$

GLIDE DEVOICING

$$\begin{bmatrix} +\text{son} \\ -\text{voc} \end{bmatrix} \quad \begin{bmatrix} -\text{cons} \\ -\text{voice} \end{bmatrix} \qquad \downarrow \qquad [-\text{voice}]$$

[11] In fact, White goes on to argue that also Kisseberth's arguments for the cycle are without support. Another non-global non-cyclic analysis of Klamath phonology can be found in Thomas (1974). A non-global analysis which argues in particular for a rule of CONTRACTION in Klamath, and a *limited* version of the cycle (the so-called 'strict cycle') can be found in Kean (1973, 1974). For critical comments on the latter, cf. Kaye (1975).

[12] A slightly revised version of this paper (not crucial to the present point) appeared in *Language* 1974.

Since there is no relation of PROPER INCLUSION between the rules in (62), OBLIGATORY PRECEDENCE predicts that the rules will apply whenever they can. The only rule applicable to *paawa* is VOWEL DEVOICING, giving *paawạ*; the only rule applicable to this representation is GLIDE DEVOICING, giving *paawạ*, as required.

As an illustration of PROPER INCLUSION PRECEDENCE, consider the rules from Latin American Spanish in (63) in relation to an underlying form such as *akeĺ*.

(63) DEPALATALIZATION: $\tilde{l}\#$ ↓ l DELATERALIZATION: $\tilde{l}$ ↓ y

Notice first of all that, given only OBLIGATORY PRECEDENCE, both DEPALATALIZATION and DELATERALIZATION will be applicable to *akeĺ*, giving a non-lateral non-palatal final segment by application of both rules. However, the last segment must be depalatalized only, not delateralized. This, then, is ensured by PROPER INCLUSION PRECEDENCE, since the structural description of DEPALATALIZATION properly includes that of DELATERALIZATION. DEPALATALIZATION will apply first, after which DELATERALIZATION will be no longer applicable.

Given these preliminaries, Campbell's counterevidence runs as follows. Nootka has the rules of (64).

(64a) $k \rightarrow k^w / o \_\_$

(64b) $k^w \rightarrow k \; / \; \_\_ \begin{Bmatrix} C \\ \# \end{Bmatrix}$

Firstly, notice that there is no PROPER INCLUSION relation between the structural descriptions of these rules. Secondly, however, notice also that for "a conflicting environment such as / o __ # [...], [principle (61ii), which] says that rules apply simultaneously where possible [...] would predict both *ok*^{w}*#* and *ok#*" (4, 7). Since the result of the rules in this environment should be *ok*, not **ok*^{w}, and since therefore the rules are crucially ordered as in (64), we have in fact a counterexample to the *UDRA*-theory in (61).

As pointed out in Pullum (1976), in his claim of having found a counterexample to the *UDRA*-theory, Campbell "is completely wrong" (93). In

order to see this, notice that OBLIGATORY PRECEDENCE does not predict, in Campbell's words, that "rules apply simultaneously where possible", but rather that they apply where possible period. Thus, given an underlying form *ok#*, ROUNDING will be the only rule applicable, giving intermediate *ok^{w}#*; to this representation, only DEROUNDING will be applicable, giving *ok#*. Since rules are not allowed to reapply non-consecutively (and are not allowed to apply vacuously as well, cf. Ringen (1976)), the derivation will terminate at *ok#*, as required.

Towards another end, the Nootka rules in (64) are given by Kisseberth (1976), with reference to Campbell (1973), as an awkward pair for those who should want to predict rule ordering universally by a principle of MAXIMAL TRANSPARENCY. That is, under this principle rules strive towards that order which guarantees maximal transparency within the set of rules, in the sense of Kiparsky (1971, 1973b) (cf. (45)). The interest of the case resides in the fact that, whatever way the rules in (64) will be ordered, one will always be opaque since these processes "cannot both be true of phonetic structure since they partially contradict one another" (47).

It is pointed out in Klokeid (1977) that the data from Nootka "which motivates the putative rule interaction has been wrongly used" (283). In fact, according to Klokeid, crucial data such as *pisatok* 'run', and *čok^{w}iyɔ'k* 'Duke of York' from Sapir and Swadesh (1939), which is apparently the data Campbell had in mind, does not appear to be strictly phonetic, and in fact final *ok^{w}* is found for such forms in the earlier work of Sapir. Klokeid concludes his brief note as follows:

(65) On the basis of a careful reading of the primary sources, then, there is no doubt that rules [64] are formulated incorrectly and that their interaction has been misrepresented. It has to be concluded that no theoretical results can be based on any such counterfactual assertions [...] (284)

1.7. Takelma

According to Iverson (1976) the phonology of Takelma, a language spoken in southwestern Oregon, contains an illustration of the hierarchical priority of the principle of PROPER INCLUSION PRECEDENCE over OBLIGATORY PRECEDENCE within the theory of Universally Determined Rule Application (cf. (61)). With reference to the two verbal rules in Kenstowicz and Kisseberth (1973: 7),

(66) (i) the aorist stem of verb bases ending in a consonant cluster is formed by placing a copy of the stem within the stem final consonant cluster [...]

(ii) The opposition between voiced and voiceless and also between glottalized and nonglottalized consonants is neutralized in favor of voiceless nonglottalized consonants in position before another consonant [...]

Iverson writes out the two formal rules in (67).

(67) Aorist V-COPY

$$V_i\ C\ C\ + \quad \uparrow \quad V_i$$

NEUTRALIZATION

$$C\ C \quad \downarrow \quad \begin{bmatrix} -\text{voice} \\ -\text{glottal} \end{bmatrix}$$

By the rule of NEUTRALIZATION, in a form such as *lo̱pdia^{u}ʔt* 'it will rain' *p̱* will be deglottalized. Furthermore, in the Aorist form *lo̱pdia^{u}ʔ*, where both rules are applicable, V-COPY will have to apply first, giving *lo̱podia^{u}ʔ*, a form to which NEUTRALIZATION is no longer applicable. Notice, firstly, that this interaction of the rules is crucial, since both the reverse order and simultaneous application give **lo̱podia^{u}ʔ* with incorrectly deglottalized *p*. Secondly, notice that this crucial interaction is predicted by PROPER INCLUSION PRECEDENCE, since the structural description of V-COPY properly includes that of NEUTRALIZATION.

It is pointed out in Trommelen and Zonneveld (1978) that the interaction of V-COPY and NEUTRALIZATION in Takelma cannot serve as an illustration of the *UDRA*-principle of PROPER INCLUSION PRECEDENCE and its priority over OBLIGATORY PRECEDENCE. This is so because the rule of VOWEL COPY is misformulated in such a way that the proper formulation will make the interaction of the rules unpredictable by PROPER INCLUSION PRECEDENCE.[13] The source of this misformulation is the verbal rule by Kenstowicz and Kisseberth (66i), who claim to have taken it from Sapir (1922). However, Sapir's verbal formulation of the rule is actually as follows:

(68) From a purely descriptive point of view, then, the most typical aorist formation in Takelma may be said to be characterized by the repetition of the stem-vowel immediately after the first consonant following the stem-vowel. (102)

This rule comprises two types of V-COPY, the first Sapir's Type 3 where the stem ends in a cluster and a copy of the stem-vowel is inserted into it, as in the alternation *lopdia^{u}ʔt* 'it will rain'/*lo̱podia^{u}ʔ* 'it rained', cited by

[13] Although not so within Iverson's overall variant of the UDRA-theory, cf. Trommelen and Zonneveld (1978).

both Kenstowicz and Kisseberth, and Iverson; the second is Sapir's Type 2, not noticed by either, where the stem ends in a single consonant, as in *śomdan* 'I shall cook it'/*śomoda^{e}n* 'I cooked it', where *d* is the initial consonant of the suffix. In fact, Sapir explains that at least historically many final stem clusters are an amalgamation of a single final consonant and a suffixal one, making the second type of V-COPY "probably the most numerously represented type of all" (98). Clearly, if by such data the rightmost *C* of V-COPY as formulated in (67) is rendered superfluous, the interaction of this rule and NEUTRALIZATION (with *CC* as its structural description) is consequently irrelevant as an illustration of the universal principle of PROPER INCLUSION PRECEDENCE.

2. Topics in Phonological Theory

Suppose we call the seven recent phonological analyses and reanalyses of Part 1 analyses and reanalyses of *hasty phonology*, respectively. On *hasty phonology*, taken as such, observe the following. Firstly, the original proposals within this type of phonology motivate their corresponding reanalyses not through any advancements of science (with the exception perhaps of the Yawelmani case in section 1.4), but rather for reasons such as the following:

(i) they fail for the same reason as the 'standard' proposals rejected (Piro);

(ii) they fail since they follow from an inadequate representation of the 'standard' proposals rejected (Lithuanian, Nootka);

(iii) they fail since they are not based on formal rules, where a formulation of the rules would reveal that they have the same properties of the 'standard' rules rejected (Tònkawa);

(iv) they fail since hypotheses proposed in one part of a paper go unrecognized in another, where recognition of the hypotheses of the former part would reveal that they obviate the need for the hypotheses of the latter part (Klamath);

(v) they fail since they are based on rules based themselves on inadequate data (Nootka);

(vi) they fail since they are based on inadequate renderings in secondary sources of rules and data from primary sources (Takelma).

Secondly, notice that the failures of the analyses of *hasty phonology* are not of the type where, to give an example, the order of two rules in one part

of an analysis is reversed without empirical consequences in another. Rather, the theory of phonology that is purportedly supported by the above *hasty* analyses is one with the following cooccurring characteristics:

(i) it has rule environment features;
(ii) rules may apply to representations which do not meet their structural descriptions;
(iii) morpheme structure conditions may serve as derivational constraints vis-à-vis some phonological rules;
(iv) segmental phonological rules may apply cyclically;
(v) phonological rules may be conditioned globally

(and (vi): rule ordering may or may not be universally predictable). Hence, in each case (bar (vi)) the hasty analysis motivates a sometimes slight, then again formidable addition to the 'standard' theory of generative phonology, which can be shown to be unmotivated upon reconsideration, for reasons such as those listed above.

Finally, and presently most importantly, notice that in each case of *hasty phonology* in section 1 are involved the names of Kenstowicz and Kisseberth. Before this loaded moral arouses suspicion, let me add immediately that firstly I do not, of course, bear a personal grudge against either linguist, that secondly I do not doubt that some of their work ranks among the best current generative phonology has to offer (say, Kisseberth's analyses on the abstractness of Yawelmani phonology (1969a, 1969b);[14] or most of

[14] Kisseberth (1969a, 1969b) contains an intricate counterexample to Kiparksy's (1968, 1973a) so-called Alternation Condition. A reanalysis is presented in Iverson (1975), claimed by the author to be in accord with Kiparsky's condition. However, Iverson's analysis fails for the following reason:

(i) As Iverson himself points out, so-called 'alphabet features' are excluded by the Alternation Condition:

> ...an analysis of Yawelmani which is prevented in principle from employing absolute neutralization (or distinguishing underlying segments in terms of uninterpretable diacritics) may not posit an underlying contrast between /u:/ and /o:/ (or between /o:, +D/ and /o:, −D/) [...]. (302)

(that the Alternation Condition is probably wrong on this point – cf. sections I and II on Piro and Lithuanian above – is, of course, another matter);

(ii) As Iverson and Ringen (1977) point out, stems which exceptionally fail to trigger VOWEL HARMONY in their suffixes (their example is from Turkish but holds for Yawelmani as well) should be marked with 'alphabet features' (it is shown in Zonneveld (1978) that Iverson and Ringen's argument fails, although their *aim* is correct);

(iii) As a result of the analysis of Yawelmani in Iverson (1975), some stems exceptionally fail to trigger VOWEL HARMONY in their suffixes. These stems are marked informally by Iverson as "/−Harmony/" (305), although they should be marked with an alphabet feature, in view of Iverson and Ringen (1977) and Zonneveld (1978).

their work on rule ordering (Kenstowicz and Kisseberth 1970, 1973a)); and thirdly that I do not wish to claim that they are the only, or even primary, representatives of *hasty phonology*. Rather, the original seven hasty analyses have been accumulated here since most of them, and many like them, appear and reappear in a for precisely that reason highly disappointing recent book: Michael Kenstowicz and Charles Kisseberth, *Topics in Phonological Theory* (Academic Press, New York, 1977). Thus, *Topics* is a book of the following organization:

Preface (ix–x)

1. The Problem of the Abstractness of Underlying Representations (1–62)
2. The Nonphonetic Basis of Phonology (63–130)
3. Constraints on Phonological Representations (131–154)
4. Natural Rule Interactions (155–176)
5. The Multiple Application Problem (177–196)
6. The Role of Derivational History in Phonology (197–230)

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in which:

(i) the Piro analysis of environment features appears on pp. 119–20;

(ii) a close kin of the Lithuanian analysis appears on pp. 120–121, where structural descriptions may be violated by strings of Chi-Mwi:ni, a Bantu language reappearing throughout the book where the source is, at least for the reader, 'personal communication' by one of the authors' students;

(iii) the problem constituted by the so-called Yawelmani triliteral cluster conspiracy is contained in a section on what is now called the 'duplication problem'; in this section, no reference is made to either derivational constraints, or Kiparsky's alternative;

(iv) the Tonkawa analysis is repeated on pp. 143–144, *pace* Phelps' elaborate reanalysis, which goes without reference;[15]

Therefore, *pace* Iverson's claims, his reanalysis is not in accord with Kiparsky's Alternation Condition. As a result, there are two analyses of the relevant portion of Yawelmani phonology, both in disharmony with the Alternation Condition.

[15] Curiously enough, though, this holds only for the theoretical device of derivational constraints, not for the bimoric representation of long vowels, and the left-to-right iterative rule of VOWEL ELISION, which are accepted in *Topics*, Chapter 5: 'The Multiple Application Problem'. This chapter contains Kenstowicz and Kisseberth (1973b), where these two modifications of Kisseberth (1970b) are introduced, with undue reference to Kisseberth (1970b) (albeit dated incorrectly as Kisseberth, 1971). Fortunately, in the relevant part of *Topics* this reference is omitted, but this time, of course, a reference to Phelps (1973) is lacking.

(v) part of the Klamath analysis reappears on pp. 223–224 (albeit in a somewhat different guise), *pace* Kean's, Thomas', and White's reanalyses, which go without reference;

(vi) the Nootka rules appear on pp. 171–172.

In brief (and perhaps put at its worst): *Topics* is (at least partially, although perhaps for the greater part) a book on *hasty phonology*, where in some cases analyses are repeatedly proven wrong by others for sometimes trivial reasons such as those enumerated above. Of course, extenuating circumstances immediately suggest themselves: it will be difficult for any phonologist (linguist, scientist) to abandon an analysis which at one time struck him as highly motivated and attractive. Or perhaps even better: the authors of *Topics* stand by their original analyses, and will prove themselves right later, albeit not this time. Nevertheless, even if one takes all this for granted, it is very difficult to understand why in *Topics* new analyses should be *added* which are objectionable for reasons curiously similar to those listed above. Although one cannot even begin to check each of the myriad of examples from very often exotic languages contained in *Topics*, consider in this respect the following brief sample of three.

2.1. Chi-Mwi:ni and Yawelmani

In Chapter 6 of *Topics*, Kenstowicz and Kisseberth (henceforth KK) discuss what was called the *Asymmetry Hypothesis* in their 1970 paper, under the new name of *Localist Assumption*. According to KK the localist assumption "requires that the SD of a rule refer only to properties present in the input structure itself" (200), and it may be illustrated schematically as follows. If a language has underlying *XBY*, and a rule of the form $A \rightarrow B / X \_\_ Y$, then if a further rule takes *XBY* as its input, according to the localist assumption three different situations may obtain:

(i) if the further rule takes as its input both underlying and derived *XBY*, it will be ordered *after* the A > B rule;

(ii) if the further rule takes as its input only underlying *XBY*, it will be ordered *before* the A > B rule;

(iii) if the further rule takes as its input only derived *XBY*, since it clearly cannot be ordered either before or after the A > B rule, it will be ordered *with it*, i.e., collapsed with it into a transformational schema.

The point of the presently relevant part of KK's Chapter 6 (pp. 197–218) is, then, to compare the localist assumption to the 'global' assumption, which deals with the three situations as follows:

(i) a universal statement will predict the required (natural) order;
(ii) the further rule will be *extended* with a global condition stating that it will apply only to underlying *XBY*;
(iii) the further rule will be extended with a global condition stating that it will apply only to the output of the A > B rule.

Notice that the global theory, at least within the present set-up, allows one to do without language-specific ordering constraints, and without the device of the transformational rule, at the expense of adding global conditions to individual rules. Notice furthermore that the trade-off between the two theories is completely straightforward for type (i) (the rules will be the same under both assumptions, only the latter theory will predict their interaction), and that the differences are in types (ii) and (iii). KK present several examples to show this, many of which are from Chu-Mwi:ni. Out of the latter, two run as follows.

Firstly, Chi-Mwi:ni has a rule changing *ɬ* of the perfective suffix *-i:ɬ-* to *z* after, for instance, *s* and *z*. Cf. (69).

(69) łum - i:ɬ - e 'he bit' bus - i:z - e 'he kissed'
kun - i:ɬ - e 'he scratched' was - i:z - e 'he made a will'
had - i:ɬ - e 'he said' uz - i:z - e 'he sold'
i- vuẏ - i:ɬ - e 'it trickled' yez - e:z - e 'he filled'

This rule, however, applies only when *s* and *z* are underlying, not when they come about by a process of MUTATION, which, for instance, turns *p* and *t* into *s* before the perfective suffix. Cf. (70).

(70)	*infinitive*	*perfective*	*gloss*
	ku - łip - a	łis - iɬ - e	'pay'
	ku - łap - a	łas - iɬ - e	'swear an oath'
	x - pit - a	pis - iɬ - e	'pass'

Clearly this is a case of type (ii), where the localist theory would order *ɬ* > *z* prior to MUTATION, and where the global theory would restrict *ɬ* > *z* in application in that only *underlying s/z* may serve as its trigger.

Secondly, notice that in (70) MUTATION is accompanied with a shortening of the perfective vowel which is long in (69). Given that indeed the long vowel is underlying there are two possible routes to get to the short one. Firstly, a shortening rule could precede MUTATION, in order

[15a] *i(:)* goes to *e(:)* by independent rule of Chi-Mwi:ni phonology, cf. *Topics*, p. 198.

to shorten the vowel of *-i:ɬ-* after voiceless stops. This analysis fails, however, since forms exceptionally not subject to MUTATION maintain a long vowel: *ɬap - i:ɬ - e* 'he tossed around', and so on. Secondly, a shortening rule could follow MUTATION, in order to derive a short vowel after *s* and *z*. However, in this case all forms in (69) would have to be specified as exceptions, since after underlying *s* and *z* the long vowel is preserved. Clearly, then, this is a case of type (iii), where the global theory would restrict the shortening rule after *s* and *z* in application in that only *s* and *z* from MUTATION may serve as its trigger. On the other hand, the localist theory would require MUTATION and SHORTENING to be collapsed into a transformational schema, as in (71).

$$(71)\ \ldots\ \begin{bmatrix} \text{C} \\ -\text{voice} \\ -\text{cont} \end{bmatrix} + \begin{bmatrix} \text{i:} \\ +\text{PERF} \end{bmatrix} 1\ \ldots$$

$$1 \quad 2 \quad 3 \quad 4 \Rightarrow \begin{bmatrix} 1 \\ \text{MUTATED} \end{bmatrix} 2 \begin{bmatrix} 3 \\ -\text{long} \end{bmatrix} 4$$

Within the localist theory, by (71) shortening is restricted to cases of mutation only, as required.

Given that both the localist and global theories are able to describe situations of types (ii) and (iii), one may rightfully ask which theory is to be preferred. On this point, KK first of all admit that "the transformational approach is (in at least some ways) more restrictive than the global-rule approach – that is, it is unable to describe situations that the global-rule approach is able to describe" (218). However, if it could be shown that the extra power of global rules is required by at least one phenomenon in at least one language, then, of course, the relative power argument fails. Notice what a situation of the required type would look like: a phonological rule will have to apply to derived forms only, and one should not be able to collapse the rules involved into a transformational schema. Furthermore, there is an additional complexity in that one would have to circumvent Kiparsky's (1973b) condition to the effect that "non-automatic neutralization rules apply only to derived forms" where, roughly, a rule $A > B / X \_\_ Y$ is 'non-automatic' if it has exceptions, and 'neutralizing' if there is underlying *XBY*. Thus, the case for global rules cannot be based on a non-automatic neutralization rule, given Kiparsky's condition. Under these limitations, KK offer the following example, again from Chi-Mwi:ni.

Chi-Mwi:ni has a rule of PRELENGTH SHORTENING which "shorten[s] a long vowel followed by another long vowel in the same

phrase" (207). However, there are complications in that (i) the rule does not apply to underlying pre-long long vowels, and (ii) it applies to long vowels in position before long vowels, derived, for instance, from short ones before the locative suffix, or by a morphological process inserting the passive suffix *-o:w-*. Cf. (72).

(72a)	fa:nu:si	'lamp'	la:lu:shi	'bribe'
	ka:ba:ṭi	'cupboard'	ba:ko:ra	'walking stick'
(72b)	fa:nusi: - ni	'in the lamp'		
	ka:bati: - ni	'in the cupboard'		
	mi - tana: - ni	'in the rooms'	(cf. mi - ta:na	'rooms')
	x - som - o:w - a	'to be read by'	(cf. so:m	'read')

On this case, notice in particular that it will not be easy to combine into one transformational rule the rules of PRELENGTH SHORTENING, PRE-LOCATIVE LENGTHENING, and PASSIVE INSERTION. Furthermore, KK claim that PRELENGTH SHORTENING is an *automatic* rule, since it has "no exceptions when applying in derived contexts" (218). Thus, on the basis of this example they conclude that "the choice between global rules and transformational rules cannot be made on the basis of the relative power of the two approaches, since the global power is required in any case" (218).

On this survey of KK's discussion of the localist and global assumptions, the following may be pointed out. Firstly, notice that all one is in fact offered as evidence for the latter, more powerful assumption, is (i) the four forms in (72) from an as yet (at least for the reader) unanalysed and inaccessible Bantu language, which show that PRELENGTH SHORTENING does not apply to underlying forms (and according to KK these four forms are loanwords), and (ii) the assertion, as yet equally uncheckable, that PRELENGTH SHORTENING is an automatic rule. If either of these arguments fails, the evidence for the global theory fails. Presently much more important than this, however, is the fact that KK's discussion appears to be curiously lopsided in that it may not at all be true that there is a trade-off situation between the global and transformational formulation of type (iii) rules. Rather, some of KK's own examples, both inside and outside *Topics*, suggest that there may be situations where adoption of the global theory forces one to accept transformational rules as well. In particular, consider first of all KK's *verbal* statement (cf. Phelps' objections to the Tonkawa analysis above) of the global condition on PRELENGTH SHORTENING in Chi-Mwi:ni (*Topics*: 208):

(73) V: → [−long] / __ X V:
Condition: (positive version) One of the vowels is short in UR;
(negative version) The vowels may not both be long in UR; if the two vowels are in the same morpheme.

In the light of the above, one would very much like to become acquainted with a formalized version of the verbal global conditions on (73). Perhaps somewhat clearer is another example from Yawelmani, discussed in Kenstowicz and Kisseberth (1970). Yawelmani has a so-called ECHO rule which, in stems of the form CCV:C places a short copy of V: into the preceding cluster: *ylo:w* > *yolo:w* 'follow', *pxa:t* > *paxa:t* 'mourn', and so on. A complication arises when the second C is either *h* or *ʔ*. In this case the copy is both short and non-high: *wʔu:h* > *woʔu:h* 'fall asleep', *mhu:h* > *mohu:h* 'dive', and so on, by so-called STRONG ASSIMILATION. In this case, because of the strict nature of the constraints on possible underlying Yawelmani stems, it will be true that STRONG ASSIMILATION will apply exclusively in cases of ECHO, and therefore, under the localist assumption the two rules could be collapsed into one. However, KK (1970) do not take this step. Rather, they formulate ECHO as in (74),

$$(74)\ \varnothing \rightarrow \begin{bmatrix} V \\ -\text{long} \\ \alpha\text{back} \\ \alpha\text{round} \end{bmatrix} / \#C\ \_\ C \begin{bmatrix} V \\ +\text{long} \\ \alpha\text{back} \\ \alpha\text{round} \end{bmatrix}$$

and state:

(75) The proper generalization would appear to be: an echo vowel lowers if followed by *h* or *ʔ* provided the vowel which was its source follows the *h* or *ʔ* [...] Suppose that the rule of Echo marked both the copied vowel and the original vowel as +Echo; then we might formulate SA as follows:

$$\begin{bmatrix} V \\ +\text{ECHO} \end{bmatrix} \rightarrow [-\text{high}] / - \begin{Bmatrix} h \\ ʔ \end{Bmatrix} \begin{bmatrix} V \\ +\text{ECHO} \end{bmatrix}$$

(514).

Crucially, notice firstly that STRONG ASSIMILATION in (75) is essentially a globally conditioned rule, and secondly that (75) contains a modification of ECHO (74) which has the effect of turning it into a transformational rule, in fact one like (76):

$$(76)\quad \underset{1\ 2}{\ldots\ C\ C}\begin{bmatrix} V \\ +\text{long} \\ \ldots \\ 3 \end{bmatrix}\ldots\ldots \Rightarrow 1 + \begin{bmatrix} V \\ -\text{long} \\ \ldots \\ +\text{ECHO} \end{bmatrix} 2 \begin{bmatrix} 3 \\ V \\ +\text{ECHO} \end{bmatrix}$$

In view of examples such as these, it appears that KK's account of the relation between the localist and global assumptions is in need of reconsideration.

2.2. Macushi Carib

In Chapter 5 of *Topics*, entitled 'The Multiple Application Problem', KK discuss several theories of multiple rule application, two of which will be relevant here: the standard theory with its *simultaneous application principle* of (77),

> (77) To apply a rule, the entire string is first scanned for segments that satisfy the environmental constraints of the rule. After all such segments have been identified in the string, the changes required by the rule are applied simultaneously. (178)

and the *directionally iterative theory* as exemplified in Phelps' Tonkawa analysis above. A simple example will show how in some cases rules will be identical under both theories, although their mode of application will differ. Thus, Hidatsa has a rule of FINAL MORA DELETION, as in *cixi-c/cix* 'jump (past tense/imp.)', *kikua-c/kiku* 'set a trap (id.)', and so on. Under theory (77), only one segment of the underlying forms will satisfy its structural description of the rule: the final mora of *cixi* and *kikua*, which will be deleted accordingly. Under the directionally iterative theory, the rule will have to apply from left-to-right, in which procedure the first segment to satisfy the structural description of the rule will again be the final mora. And again, it will be deleted. While this is a very straightforward example, there are many cases where the forms of the rules will differ per theory and these cases, according to KK, show that the directionally iterative approach is preferable to the simultaneous approach. Consider in this respect the following example, one KK label as "forceful" and "strong".[16]

[16] KK take this case from Kenstowicz and Kisseberth (1973b), with only stylistic modifications (with one exception to be pointed out below). I discuss it here under the 'new' analyses of *Topics* rather than as number eight of the *hasty* analyses of part 1 because to the best of my knowledge the present objections have not been raised anywhere before.

With reference to Hawkins (1950), KK state that the Macushi dialect of Carib has a rule deleting "odd numbered vowels counting from the beginning of the word (or certain other definable points) and subject to a number of restrictions" (183). Thus, according to Hawkins, *wanamari* 'mirror' becomes *wnamri* in isolation, while *u+wanamari+rï* 'mirror, 1sg., alienable possession' results in *wanmarrï̀* 'my mirror'. However, KK assume that "a case can be made" to describe the process not as deletion but rather as "a sharp reduction to a schwalike vowel" (183): *wənaməri*, and *əwanəmarərï̀*, respectively, and they go on to assume reduction rather than deletion in the remainder of their account, adding that "In any case, whether the process is described as a reduction or a deletion makes little difference to the present discussion" (183). Under this assumption, with reference to the two theories of rule-application under discussion, the two rules of (78) should be compared:

(78a) simultaneous: $V \rightarrow ə \,/\, \#\,(C_1\ V\ C_1\ V)_0\ C_1\ \_$

(78b) left-to-right iter.: $V \rightarrow ə \,/\, \left\{ \begin{bmatrix} \# \\ V \\ -\text{reduced} \end{bmatrix} \right\} C_1\ \_$

While these two rules are based on the two forms given, further forms motivate modifications. Firstly, "a vowel never reduces if it is followed by two or more consonants. Thus, in *ši ʔmərikəpé* 'little now', from /šiʔ-miri-ki-pe/, the first vowel does not reduce, since a cluster follows" (184). Secondly, "a vowel will reduce following a consonant cluster only if that cluster contains at most two elements, the first of which must be a sonorant" (184). Thus, reduction is allowed after the *ʔm* cluster above, and in *karaywa-pé* > *kəraywəpé* 'Brazilian now', but not after the clusters in *pakra-yamïnʔ* > *pakrayəmïnʔ* 'bush hogs', and *kratu-pé* > *kratəpé* 'alligator now'. Finally, the final vowel of the phrase is never reduced, apparently because it is always stressed: *piripí* 'spindle' > *pəripí*. Together, these observations motivate the following rule of VOWEL REDUCTION, left-to-right iterative:

(79) $\begin{bmatrix} V \\ -\text{stress} \end{bmatrix} \rightarrow ə \,/\, \left\{ \begin{bmatrix} \# \\ V \\ -\text{reduced} \end{bmatrix} \right\} ([+\text{son}])\ C \_\_ C\ V$

This time, KK do not formulate the alternative under the simultaneous theory, since "Attempting to incorporate such constraints into an infinite

schema version of vowel reduction presents gross difficulties. We leave this point for the reader to verify for himself" (184). One final piece of evidence is then claimed to be the *coup-de-grâce* to these attempts: underlying *pakapiʔpï* has an exceptional first vowel, which fails to reduce: *pakəpiʔpḯ* 'cowhide'. KK claim that "These facts follow automatically from the rule of reduction we have formulated, as long as the first vowel is marked as an exception. Such a form is difficult for the infinite-schema version of reduction to handle, because this approach attempts to determine from the original input string alone whether a rule applies at any point in the string" (185). They conclude:

(80) In our opinion these examples from Macushi argue strongly against the simultaneous principle... (185)

On the above account, it may be worthwhile to point out the following. Firstly, the exceptional form *pakəpiʔpḯ* from *paka+piʔpï*, by which form according to KK the inferiority of the simultaneous approach "is driven home forcefully" (185) is in fact an unexplained counterexample to KK's theory of exceptions as developed earlier in *Topics* (114–30). In particular, since exception properties are there claimed to be properties of *morphemes* rather than individual segments (after *SPE*, see also section 1.1 above on Piro), KK's claim that "since the first vowel exceptionally fails to reduce, the second one may [...], as long as the first vowel is marked as an exception" (185) is false: since both vowels are part of the same morpheme, if the first vowel is marked as an exception to reduction, so will be the second, resulting in **pakapiʔpï*, with no reduction at all. In actual fact, then, nothing at all is driven home forcefully by this example.[17]

Secondly, notice that (78b) and (79) are incorrect on one and the same point, even given KK's scant information. Since both formulations require a consonant immediately to the left of the focus, neither rule will apply to *u+wanamari+rï*, where the vowel to be reduced is phrase-initial. While this could be considered a minor, technical point, it is in itself significant for the third, much more important point to be made here. In particular,

[17] This is an objection to the *Topics* presentation of this case rather than that in Kenstowicz and Kisseberth (1973b). In the latter, KK note in the only non-stylistic deviation from *Topics*:

> It is of some interest that only the first vowel of /paka/ is an exception to Vowel Reduction, not the second as well; it seems then that segments rather than entire morphemes may be exceptions. (29)

It escapes me how anything can be "driven home forcefully" by an "it seems" analysis.

let us assume that we take KK's claims at their face value, and let us try to develop a *deletion* account of the same Macushi phenomena, this time, therefore, with a left-to-right iterative deletion rule. Towards this, consider firstly the string resulting from the deletion of initial *u* in the form under consideration: *wanamari+rï*. The question arises immediately here of how to differentiate between this representation, where the leftmost *a* should be skipped, and the form *wanamari* itself where, to the contrary, the leftmost vowel should be deleted. Of course, no immediate answer suggests itself, and even if it would, further difficulties arise if we proceed. Thus, consider the string *wanmari+rï* resulting from *u+wanamari+rï* by two applications of deletion. Crucial for this representation will be that a further application of deletion shall not delete the second *a*, but rather *i*. However, derivations such as *karaywapé* > *kraywpé* show that sonorant-initial clusters allow deletion, and in *wanmari+rï* we have in fact a sonorant-initial cluster immediately before *a*. Again, no immediate solution suggests itself.

On the basis of these very simple observations, therefore, one cannot escape the conclusion that, whatever 'gross difficulties' one will have to overcome in matching the Macushi Carib data with the theory of simultaneous application, both KK's claim as to the strength of their exception example, and their claim as to the irrelevance of the choice between a reduction and a deletion account of these phenomena are false, and hence their claim in (80) is false. Clearly, the reduction analysis is crucial to (80), and should be convincingly argued for first (in fact, against the primary source, Hawkins (1950)). Even then, KK face the task of formulating a rule which works.

2.3. Cuna and Yawelmani

In their Chapter 1: 'The Problem of the Abstractness of Underlying Representations', KK quite correctly stress the eventual cruciality of *external evidence* for phonological (linguistic) analyses:

> (81) In order to know which grammars speakers have arrived at (and which ones they have rejected), we must have the relevant external evidence. There is no other evidence that we can use; we cannot use internal evidence, for our goal is to discover what in fact counts as internal evidence [...]. The various kinds of internal evidence that linguists appeal to cannot be fully accepted until they can actually be shown to play a role in the grammar-construction of speakers. (3–4)

As a first step in the exposition of this chapter, the authors then go on to argue against the abstractness principle (the 'identity condition') in (82),

(82) URs and their associated PRs are in fact always identical. (5)

by several types of external evidence, such as nonsense forms, speech errors, and language games. Among the latter they give an example from a game played by the Cuna Indians, used by Sherzer (1970) as external evidence for an analysis where, in violation of the identity condition in (82), for instance [biriga] 'year' is derived from /birga/ by two crucially ordered rules of (i) PENULTIMATE STRESS, and (ii) *i*-INSERTION. That this analysis has some force is, according to Sherzer, shown by the game-derivations *argan* 'hand' > *ganar* and, importantly, *birga* > *gabir*, not *biriga* > **rigabi*.

In the light of this externally supported account of part of the phonology of Cuna, it is odd to happen upon the following in KK's Chapter 4 'Natural Rule Interactions'. In this chapter, the authors discuss an example from Yawelmani as evidence suggesting the incorrectness of a principle of 'maximal utilization' for the prediction of crucial rule interactions. The derivation involved is one where maximal utilization is irrelevant, since both rules will apply whatever their order.

(83)

	/ʔilk-hin/
PENULTIMATE STRESS	ʔ
EPENTHESIS	ʔilik-hin
	/ʔilk-hin/
EPENTHESIS	ʔilik
PENULTIMATE STRESS	ʔilík-hin

Given the fact that the bottommost derivation of (83) is correct,[18] KK argue that a principle of MAXIMAL TRANSPARENCY (see also section 1.6 on Nootka) will account for the order of the rules involved. They comment:

(84) The principle of maximization of rule application makes no claim about which of the derivations in [83] constitute the unmarked interaction of the rules. As far as this principle is concerned, the contrast marked/unmarked is inapplicable in these cases. But we suspect that [...] *ʔilikhin* is somewhat more expected than *ʔilikhin* [...]. If these intuitive judgments have some basis in fact, then a theory of natural rule interaction that includes interactions of the preceding type within its domain will be preferable to the principle of maximization of rule application, which fails to extend to these cases. (168)

[18] For the rule of EPENTHESIS, cf. (38) above.

and:

(85) epenthesis and penultimate stress [...] apply in this order to derive *Pilikhin* from /Pilkhin/. Applied in the opposite order, they would yield the incorrect **Pilikhin*. The latter is doubly opaque, since a stressed vowel appears in other than penultimate position and the penultimate vowel is not stressed [...]. Insofar as evidence can be gathered to support the claim that derivations producing forms such as *Pilikhin* [...] are in fact less marked than derivations producing forms such as *Pilikhin* [...], the principle of minimization of opacity will be supported: the unmarked derivations would in fact be the ones that yield more transparent rules. The fact that the minimization of opacity principle predicts that these derivations will be unmarked, whereas any principle based on the extent of utilization of rules does not, is likely to support the claim that opacity of rules rather than utilization of rules is the relevant consideration. (170)

On these two passages from *Topics*, it may be worthwhile to point out the following. Firstly, observe that an understanding of the account of Cuna phonology is hampered by the fact that the two forms adopted from Sherzer (1970) make one wonder about the phonological environment of *i*-INSERTION: if *i* is inserted into *bir-ga*, then what blocks it in *ar-gan*? Additional data would be relevant here, especially since Sherzer's article is not readily accessible. Much more important, however, is of course the blatant anomaly between, on the one hand, the crucial *external* evidence for a Cuna analysis where /birga/ goes to [bíriga] by the critically ordered rules of (i) PENULTIMATE STRESS, and (ii) EPENTHESIS of *i*, and on the other hand the *intuitive* evidence for the ordering (i) EPENTHESIS of *i*, and (ii) PENULTIMATE STRESS in Yawelmani, as support for the universal principle of MAXIMAL TRANSPARENCY. Not even a footnote indicates that the authors of *Topics* are aware of this anomaly.

3. Conclusions

(86) Nowhere in the book do we find a description of a sizeable amount of data from a single language that would illustrate the insights into phonological structure that the generative model affords. If limitations of space was the reason for this lack, it would have been far wiser to delete some of the less important material. A relatively in-depth description of a single body of data would have revealed far better "how generative phonology works and how the generative phonologist works" than the superficial treatment of a large number of topics.

(86) is a passage from Kenstowicz's (otherwise favorable) 1973 review of Schane (1973), and in the mind of the present reviewer it applies *verbatim* to Kenstowicz and Kisseberth's *Topics*. Furthermore, on the basis of the observations in sections 1 and 2 above, I finally conclude the following on

the goals and intentions of *Topics*. In their preface, the authors open their book as follows:

> (87) Our goal in writing this book has been to provide an up-to-date explication of some of the most important problems in current phonological theory. And though only a few, necessarily tentative, solutions are proposed, we nevertheless believe that the book contributes a much needed clarification and perspective on the issues involved. (ix)

My impression is that, as far as the goals of *Topics* are concerned, the authors succeed, not in the least since they themselves have been the ones to bring the problems up for the past ten years. However, for those who seek "tentative solutions", "much needed clarification", and "perspective on the issues", *Topics* is a big disappointment. One volume of *Hasty Phonology*.

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