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Remarks on
Slavic Accentology

For K. F. Taranovski on his sixtieth birthday
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0. This study of Slavic accentuation has been guided by two considerations that might be termed theoretical in the sense that they do not derive directly from the facts, but are rather ideas concerning the nature and organization of the data arrived at independently of the particular facts to be considered here. The strong empiricist strain dominant in much of modern linguistics has taught us to be rather skeptical about the value of such theoretical considerations. It is widely felt that theory should be closely linked to the facts, and any departure from "a close hugging of the phonetic ground" is regarded by many linguists as the surest road to disaster. This view seems to me quite mistaken. Theory must be more than a more or less elegant summary of the facts known to the theorist. It is only when theory makes claims about facts which are unfamiliar or totally unknown that theory exercises its true function in science, which is that of a tool for the discovery of facts. To illustrate this function of a theory is one of the aims of this paper. Its success or failure, therefore, is to be judged by the extent to which it succeeds or fails to deepen our understanding of the accentology of Slavic languages, which because of its complexity and intricacy has occupied the attention of linguists for a century or more.

The first of the theoretical considerations that play an important role in the present investigation was proposed by Nancy Woo in her dissertation (1969). She argued that "dynamic" tones such as "rising", "falling", or "fall-rise" were not to be included in the universal set of distinctive features; instead whenever phoneticians observed in a language such "dynamic" tones, these had to be explained as surface manifestations of underlying representations in which only "stationary" tones figure. Thus, for instance, Woo showed that in Northern Tepehuan "falling" and "rising" tones are always surface manifestations of sequences of two vowels, one having a "high" tone and the second, the neutral "nonhigh" tone. When the "high" toned vowel is first in the sequence, we observe "falling" tone; when it is second, we observe "rising" tone. It is, of course, always possible to represent "falling" and "rising" tones in this fashion. The fact that makes Woo's suggestion interesting is that when the "dynamic" tones are so represented the phonological description of Northern Tepehuan is significantly im-

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proved. Woo has shown that a similar situation prevails in a number of widely diver-
gent languages, that when "dynamic" tones are treated as purely surface phenomena,
not only is there no loss of generalization in the phonological description of the lan-
guage; instead the description can be deepened. These results are obviously of the
greatest interest but they fall short of conclusively establishing Woo's hypothesis con-
cerning the nature of prosodic features, so that further empirical testing of the hypoth-
esis is clearly indicated. The prosodic phenomena of the Slavic languages constitute
a good testing ground for Woo's hypothesis, and as will be shown below, provide
independent support for the hypothesis in a manner quite different from that of the
languages discussed by Woo.

The second theoretical idea that has guided this work was originally advanced by
Roman Jakobson in his report to the International Congress of Slavists held at Sofia
(1963), and in his contribution to the volume of studies in honor of J. Kuryłowicz
(1965). In its grossest terms the idea is that underlying all Slavic prosodic phenomena
is a pitch contour of the word that is much like that of a "terrace tone" language such
as Japanese. In Japanese the word is divided into two parts, an initial high pitched
portion, and a final low (or neutral) pitched portion (the latter may be lacking). In
order to specify the pitch contour of a word, it is, therefore, necessary only to indicate
the vowel after which the low pitched portion of the word begins. This initial marking
of the Japanese word is provided by the morphological component of the grammar, for
it depends on the morphemic composition of the word. The prosodic contour of the
word is established by special phonological rules which characteristically differ from
dialect to dialect but always take as their input the word with the specially marked
vowel as provided by the morphology. The phonological rules thus complete the speci-
fication of the pitch contour of the word. What is especially important here is that the
phonetic output is the product of two distinct components, the morphological rules
that determine the initial marking of the word, and the phonological rules that derive
the phonetic output from forms first operated on by the morphological component. I
shall try to show in the discussion that follows that an analogous situation prevails in
Slavic; i.e. the prosodic contour of words is determined by the interaction of the two
independent components, the morphology and phonology of the particular language.
I believe that much of the confusion that permeates Slavic accentological studies is due
to a failure to see that two totally distinct components—and hence distinct types of
process are involved.

1. We begin by considering what is perhaps the simplest case, the stress system of
modern Russian. We examine the stress contour of the inf. and 2nd sg. present forms

     v,irt,et,   v,ert,iš   'turn'

where the stressed vowels are represented in bold face. We shall assume that under-
lying these forms we have the strings

     v,ert, + e + t,   v,ert, + e + i + š

We postulate, moreover, the following rules:

(1)   H ASSIGNMENT, which places a diacritic feature [+H] on some vowel in the word. (Note that there are words that do not receive [+H] on any vowel.) This rule is part of the morphology.

H DISTRIBUTION, which places the diacritic feature [+H] on all vowels preceding (to the left of) the vowel marked [+H] by the H ASSIGNMENT rule.

VOWEL TRUNCATION, which deletes a vowel followed by a vowel (cf. Jakobson 1948).

STRESS ASSIGNMENT which places stress on the last (rightmost) vowel marked [+H]; or, if there is no such vowel, on the first vowel in the word.

NEUTRALIZATION rules which assign [−H] to all unstressed vowels, and convert unstressed [o, a, e] → [i] after "soft" consonants (ikanje), and → [e] elsewhere (akanje).

Given these five rules we derive the correct stress contours from underlying representations as shown:

v,ert, + e + t,	v,ert, + e + i + š	
+H	+H	H ASSIGNMENT
+H	+H	H DISTRIBUTION
	ϕ	VOWEL TRUNCATION
e	e	STRESS ASSIGNMENT
i		NEUTRALIZATION
v,irt,et,	v,ert,iš	

What is important about these derivations is that they capture quite naturally the feature that is at the heart of many Slavic accentual phenomena, i.e. when a potentially stressed vowel is deleted the stress moves towards the front of the word. It is essential to observe that there is no logical reason that this should be the case. It is equally plausible to suppose that when a potentially stressed vowel is deleted the stress moves towards the end of the word, or that the word becomes stressless. It is, therefore, a significant, though perhaps small point in favor of the proposed system of rules that of the three possible alternatives just discussed the rules pick the one that is empirically correct.

The same movement of stress towards the beginning of the word can be observed in forms with a zero desinence. In treating such forms I assume (following Lightner) that in underlying representations of modern Russian there are two reduced vowels, ъ, ь (the so-called *yers*) [1] which either appear on the surface as [o, e] respectively, or are deleted. To account for these facts we shall postulate the two rules:

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[1] We leave here unresolved the question as to the phonetic nature of the sounds represented by the symbols ъ, ь.

YER DELETION, which deletes yers word-finally, or if followed by a full vowel in the next syllable.

YER LOWERING, which turns all yers remaining after YER DELETION has applied, into [o, e].

We shall assume that YER DELETION and YER LOWERING apply after the VOWEL TRUNCATION rule but before the STRESS ASSIGNMENT and NEUTRALIZATION rules. Given these rules we can now show the way in which they operate in the derivation of the stress contours of such words as:

(2) stol   stala   'table'   (nom. sg. + gen. sg.)
     zajom   zajma   'loan'   (nom. sg. + gen. sg.)
     kiška   kišok   'intestine'   (nom. sg. + gen. pl.)

stol+ъ	stol+a	zajьm+ъ	zajьm+a	k išьk+a	kišьk+ъ	
+H	+H	+H	+H	+H	+H	H ASSIGNMENT
+H	+H	+H	+H	+H+H	+H+H	H DISTRIBUTION
			—not applicable—			VOWEL TRUNCATION
φ		φ	φ	φ	φ	YER DELETION
		o			o	YER LOWERING
o	a	o	a	a	o	STRESS PLACEMENT
	−H	−H		−H	−H	NEUTRALIZATION
stol	stala	zajom	zajma	kiška	kišok	

As noted above the actual placement of stress is determined by two separate factors: on the one hand, there are the phonological rules and, on the other hand, there are special morphological or readjustment rules—here represented by the H ASSIGNMENT rule—which assign the feature [+H] in the first place. In a way this division into two components is implicit in the traditional historical treatment of the problem, except that instead of assigning the feature [+H] which we shall identify as the equivalent of the phonetic feature *high pitch*, the traditional historical treatment postulated that special intonations were assigned by these rules: when the stress was on the stem as in the case of *zajom*, it was said that the stem had *acute* intonation; when it was on the desinence as in the word *kiška*, it was said to be *oxytone*, and when the word would have remained without [+H] by our rules, the traditional description said that it had *circumflex* intonation on the first syllable.[2] Sound laws (among them the much debated Law of Saussure-Fortunatov) as well as analogy were then adduced to account for the present day state of affairs in the individual languages.

In contrast to the traditional view I would regard the various classes of stems as being distinguished from one another not by means of a phonetic mark, but rather by means of a special morphological classifier, similar perhaps to the marker that tells us that in Latin *campus* belongs to the fourth declension, whereas *amicus* belongs to the second declension. I take it that such markers are utilized by the H ASSIGNMENT rule to determine which vowel (if any) is to be marked [+H]. In a study of the

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[2] We shall have something to say about the fourth class of words, the so-called neoacute, in the discussion below.

accentual pattern of the Russian nominal declension (Halle 1970) I suggested that Russian noun stems basically are categorized into four classes depending on whether or not they require desinential stress in the singular, the plural, in neither number, or in both numbers. In addition, there is a small number of nouns that require further sub-categorization. Whether this type of classification can be shown to hold for the accentual patterns observed in other types of words as well, is at present an open question which in my opinion is both of utmost difficulty and importance. I hope to devote to it a major investigation in the not too distant future.[3]

2. The set of rules that has been developed above can handle the prosodic contours of words in Slavic languages other than Russian with only minor modifications. Consider first Standard Serbo-Croatian, Štokavian. As is well known this dialect has four types of accented vowel: short rising `, long rising ´, short falling ˇ, long falling ^. The rising and falling tones do not occur freely in all positions in the word, as shown in Table 1 below (adapted from Ivić 1958):

TABLE 1

	Monosyllabic words	Polysyllabic words		
		Initially	Finally	Medially
Falling	Yes	Yes	No	No
Rising	No	Yes	No	Yes

These facts can be readily accounted for if we make two assumptions. First, we assume that Standard Štokavian had a system of stress rules much like Russian, except that the STRESS ASSIGNMENT rule locates the stress not on the last vowel with $[+H]$, but rather on the penultimate vowel with $[+H]$, if possible. In cases where only the first vowel in the word has $[+H]$, this vowel receives the stress; and when no vowel has $[+H]$ the first syllable in the word (including here the preposition, if any) is stressed. Second, we propose that the term "rising tone" in the traditional literature refers to a stressed vowel which is *followed in the same word by a vowel with* $[+H]$, whereas all other stressed vowels are said to have "falling" tone. Phonetically this makes good sense for we have assumed that $[+H]$ represents the tonal feature [High pitch], and, in fact, Ivić and Lehiste have shown in their detailed acoustic investigations of Standard Štokavian tones (1963) that "While the distinction between the two long accents might conceivably be based on information in the accented syllables themselves, in the

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[3] While this paper was in press I have had the opportunity to read the interesting dissertation of Herbert S. Coats (1970), which has shown me that the scheme proposed in Halle (1970) is in need of some revision. In particular Coats' study has made clear for me the absolutely pivotal position that is occupied in Russian phonology by a METATONY rule very similar to the identically named rule (22) of Slovenian discussed below. It is this rule rather than the H ASSIGNMENT which is responsible for the stem stress in plural forms of nouns with desinential stress in the sg. such as *čislo* 'number', *vereteno* 'spindle', *beda* 'sorrow', *sirota* 'orphan'. This result must be incorporated into any future study.

case of the two short accents this information is decidedly insufficient. The feature which was constantly present and appeared to carry the main burden of distinction was the relationship between the stressed and the post-tonic syllable. In the case of both the short and the long falling accents, the post-tonic syllable had a low fundamental frequency (or there was no post-tonic syllable in the same word—M.H.); in the case of both rising accents, the post-tonic syllable had a fundamental frequency that was either the same or higher than that of the preceding syllable" (p. 132).

Returning now to the facts represented in Table 1 we see that these are readily accounted for in terms of the Standard Štokavian stress rule and the interpretative convention proposed above. Since "rising" tone is the tone of a stressed vowel followed in the same word by a vowel with [+H], it follows immediately that "rising" tone cannot be found on the last syllable of polysyllabic words or on monosyllabic words, but can, of course, be found elsewhere. Since the stress in polysyllabic words is placed on the penultimate vowel with [+H], if possible, we shall have "rising" tone in polysyllabic words in all cases except when the H ASSIGNMENT rule either marks only the first vowel in the word or leaves the word unmarked. In this case, stress will be assigned to the first syllable of the word and the stressed vowel will have "falling" tone since it is *not* followed by a vowel with [+H]. Thus "falling" tone can be found only on the first or only syllable of the word as indicated in Table 1.

The facts represented in Table 1 are quite complex. They are handled with great simplicity and naturalness by the rule system proposed above. As this could hardly be an accidental byproduct of our rule system we take the case just examined as further evidence supporting the approach that we have taken here.

In addition to accounting for the peculiar distributions of the tones as well as being supported by the surface phonetics, the proposed stress assignment rule and the convention on interpreting "rising" and "falling" tones explains also the fact well known to all students of comparative Slavic accentology that in cognate words the accented vowel with "falling" tone in Standard Štokavian corresponds to the stressed vowel in Russian, whereas the accented vowel with "rising" tone in Standard Štokavian corresponds to the pretonic vowel in Russian.

(3)   Štokavian "falling" tones
    vȍdu 'water'   nȍsīš 'carry'   lȉpa 'linden'   zûba 'tooth' (gen. sg.)
      (acc. sg.)   (2nd sg.)

  Russian
    vodu 'water'   nos,iš 'carry'   l,ipa 'linden'   zuba 'tooth' (gen. sg.)
      (acc. sg.)   (2nd sg.)

  Štokavian "rising" tones
    sèstra 'sister'   jèzik 'tongue'   národa 'people' (gen. sg.)

  Russian
    s,istra 'sister'   jizyk 'tongue'   naroda 'people' (gen. sg.)

Needless to say, there are substantial differences between the Russian and Što-kavian rules for [+ H] assignment, but to the extent that these are the same, the difference in surface phonetics reflects differences between the Russian and Štokavian STRESS ASSIGNMENT and NEUTRALIZATION rules, of which, for our purposes, the former is the more important one.

3. We next turn to a different dialect of Serbo-Croatian, the Čakavian dialect of Noví which, for good reason, has occupied a central portion in all discussions of Slavic accentology ever since it was described by Belić in 1909. This dialect has, like those already examined, a rule assigning [+ H] which, except for certain deviations of detail, corresponds to that of Russian and Štokavian. It also has an H DISTRIBUTION rule and a STRESS ASSIGNMENT rule. The last of these is exactly like that of Russian, not of Štokavian, in that it assigns stress to the last [+ H] in the word.

(4)	Noví	Russian		
	gorà	gara	'mountain'	(nom. sg.)
	gȍru	goru		(acc. sg.)
	gȍre	gory		(nom. pl.)
	goràmi	garam,i		(instr. pl.)

If we assume that "rising" tone is, as in Štokavian, the consequence of a stressed vowel followed by a vowel with high pitch, then clearly we cannot expect this dialect to have vowels with "rising" tone. The dialect, however, has "rising" tones. According to all investigators, these "rising" tones are not identical with the rising tones of Štokavian. One's first impulse would be to say that the "rising" tone in the Noví dialect is to be represented by the feature [+ Rise].[4] This move, however, is one that I should like to avoid, for, as noted above, Nancy Woo has given strong reasons for believing that the framework of prosodic features does not include such dynamic tones as "rise" or "fall". As it is impossible at this point to resolve this question we shall provisionally introduce the feature [+ R] to designate the "rising" tone of Noví. I return to this question in the discussion of the Slovene data below, where a new interpretation is offered that leaves Nancy Woo's proposed limitation intact.

We assume, therefore, provisionally that in the Noví dialect there is operative a rule—we shall call it the NEOACUTE rule—which assigns the feature [+ R] to stressed vowels. Our task now is to characterize the conditions under which the NEO-ACUTE rule applies. The conditions show up most clearly in the examples (5) which should be compared with the Russian verbs discussed in §1.

(5)	ženìt 'marry' (inf.)	žènĭš (2nd sg.)
	pālìt 'burn' (inf.)	pãlĭš (2nd sg.)

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[4] We distinguish the Štokavian rising tone from the Čakavian and Slovene by using the diacritics ´ ` for the former and the diacritic ~ for the latter. We use ˇ and ⌒ to represent the falling short and long tones respectively in all South Slavic languages.

If we assume underlying representations like those postulated for the Russian verbs in § 1, we get

žen+i+t   žen+i+ī+š   pāl+i+t   pāl+i+īš
  +H   +H   +H   +H   H ASSIGNMENT

We observe immediately that the neoacute appears on a long vowel which in the underlying representation precedes a vowel with [+H]. However, as the infinitive form *pālĭt* shows, not every long vowel in this position has rising stress but only the long vowel that ends up with the stress. To achieve the result we need, we have to assume that the Noví dialect differs from the dialects reviewed so far in that before the TRUN-CATION rule it incorporates a NEOACUTE rule which assigns the feature [+R] to a long vowel when followed by a vowel with [+H]. In addition the dialect is subject to a NEUTRALIZATION rule which applies after the STRESS ASSIGNMENT rule and makes all unstressed vowels $\begin{bmatrix} -R \\ -H \end{bmatrix}$. With these modifications we can derive

the correct stress contours as shown:

žen+i+t	žen+i+ī+š	pāl+i+t	pāl+i+ī+š	
+H	+H	+H	+H	H ASSIGNMENT
+H	+H	+H	+H	H DISTRIBUTION
────	────	+R	+R	NEOACUTE
────	φ	────	φ	TRUNCATION
────	────	────	────	YER DELETION
────	────	────	────	YER LOWERING
i	e	i	ā	STRESS ASSIGNMENT
$\begin{bmatrix} -H \\ -R \end{bmatrix}$	────	$\begin{bmatrix} -H \\ -R \end{bmatrix}$	────	NEUTRALIZATION
ženĭt	žĕnīš	pālĭt	pālīš	OUTPUT

We can immediately test our proposal because we know of another set of forms where the neoacute ought to appear, i.e. in forms where a weak yer must be assumed to have [+H], e.g. in oxytone nouns similar to the Russian *stol – stalá*. And indeed we find as shown in (6a) that when such nouns have a long stem vowel they manifest rising tone; when the stem vowel is short, the tone is falling as shown in (6b).

(6) a.   bãn – bānǐ 'governor'   brȇst – brēstǎ 'elm'   sũd – sūdǎ 'law court'
          līh – līhǎ 'garden'   glãv – glāvǎ 'head'   trãv – trāvǎ 'grass'
     b.   kròv – krovǎ 'roof'   bòb – bobǎ 'pea'   bàt – batǎ 'club'
          màst – mastǎ 'juice'   čȅp – čepǎ 'stopper'   pòp – popǎ 'priest'

   The examples in (6a) and (5) are not the only cases where we find "rising" tone in the Noví dialect. It appears, for instance, in such forms as those in (7) which differ thus strikingly from those in (6b):

(7) stõl – stolà 'table'   dvõr – dvorà 'yard'   sestãr – sestrà 'sister'
stãrca – stàrac 'old man'

The simplest way to handle these cases would be by postulating a special rule that assigns both length and "rising" tone—i.e. $\begin{bmatrix} +R \\ +long \end{bmatrix}$—to stressed vowels before a liquid which may be word final or followed by at least one consonant; i.e. in the environment $[X\_\_\_L(C_1Y)]$. The proposed rule would have to apply after stress assignment and clearly cannot be combined in any way with the NEOACUTE rule.

A case of considerably greater interest is provided by the existence in the Noví dialect of such accentual doublets of the loc. pl. forms as those in (8):

(8) a. vlāsīh 'hair'   brēstīh 'elm'   krovīh 'roof'
  b. vlāsīh   brēstīh   krõvīh

We can readily obtain the forms in (8a) by assuming the H ASSIGNMENT rule assigns [+H] to the word final yer of the inflectional ending. The output is then derived in the manner of (9):

(9) krovīhъ
    +H   H ASSIGNMENT
  +H+H   H DISTRIBUTION
    +R   NEOACUTE
   ____   VOWEL TRUNCATION
     φ   YER DELETION
   ____   YER LOWERING
     ī   STRESS ASSIGNMENT
    −H   NEUTRALIZATION
  krovīh   OUTPUT

On the other hand to obtain *krõvīh* and the rest of the examples in (8b) we must assume that the dialect is subject to a special RETRACTION rule (10) which if it is made to apply before YER DELETION and before STRESS ASSIGNMENT can be stated as in (10).

(10) RETRACTION
$$V \longrightarrow \begin{bmatrix} -H \\ -R \end{bmatrix} \Big/ \begin{bmatrix} X\text{——}C_0 \begin{Bmatrix} ъ \\ ь \end{Bmatrix} \end{bmatrix} \text{ in certain cases}$$

It can readily be seen that this would give the correct outputs for the forms in (8b). It must also be noted that the RETRACTION rule is what has been called a "minor" rule, i.e. a rule whose application is highly restricted both morphologically and lexically. Belić (1909) suggests that "if the medial (i.e. stem—M.H.) syllable is short the stress goes to the very end, whereas if it is long, the stress (and it is ~) is on that syllable." (p. 210) Hence we get

(11) a. sokolĭh 'falcon'   prstenĭh 'ring' (with short stem vowels)
      b. golŭbīh 'dove'   kuhārīh 'cooks'
                             malīnīh 'raspberry' (with long stem vowels)

The rule, however, seems to be optional as shown by the examples (quoted from Belić) cited in (8) above.[5]

We note also that the inflectional ending of the gen. sg. of certain feminine stems exhibits rising pitch:

(12) ženẽ 'woman'   līhẽ 'garden'   gorẽ 'mountain'

We shall assume that there is a special rule that assigns a rising tone to this desinential vowel. This rule might conceivably be part of the rule mentioned above which assigns rising pitch to vowels followed by a sonorant which in turn is followed by a consonant or a word boundary.

4. There is a special Štokavian dialect group, the so-called Slavonian dialects, which exhibits both types of "rising" tone, the one we find in the literary Štokavian dialects as well as the one in the Čakavian dialects. The Slavonian dialects have been studied in some detail by various scholars, including S. Ivšić, who first drew attention to them in 1911, and P. Ivić, who devoted a chapter to them in his *Die serbo-kroatischen Dialekte I* (Mouton, 1958).

(13) vrãtim 'turn' (1st sg.)   vrátit (inf.)   nõž – nóža 'knife'
      tūrīt 'put' (3rd sg.)   túrit (inf.)   sačūvām 'keep' – čúvat (inf.)

To understand these examples we need to look at underlying forms of some of the forms just cited:

$$\begin{array}{cccc} +H & +H & +H & +H \\ \text{vrāti}+\bar{\imath}+m & \text{vrāti}+t & \text{nõž}+\text{ъ} & \text{nõž}+a \end{array}$$

We then see readily that the NEOACUTE rule will assign [+R] to the long vowel in the pre-H position. The TRUNCATION and YER DELETION rule will delete the last [+H] vowel in *vrātīm* and *nõž* respectively but not in *vrátit* and *nóža*, leaving us with distinct output forms

$$\text{vr} \begin{bmatrix} \bar{a} \\ +R \\ +\text{stress} \end{bmatrix} \text{t} \begin{bmatrix} \bar{\imath} \\ -H \end{bmatrix} \text{m} \qquad \text{vr} \begin{bmatrix} \bar{a} \\ +R \\ +\text{stress} \end{bmatrix} \text{t} \begin{bmatrix} i \\ +H \end{bmatrix} \text{t}$$

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[5] A retraction rule formally similar to (10) also appears to be operating in Modern Russian where it accounts for such accentual alternations as

ugla ~ ugal 'corner'   uzla ~ uz,il 'knot'   ugr,a ~ ugar, 'eel'
ugl,a ~ ugal, 'coal'   kruživa ~ kruživ 'lace'
bal,na ~ bol,in 'ill'   ravna ~ rov,in 'even'

I have discussed these cases in Halle (1971, to appear).

$$n \begin{bmatrix} \bar{o} \\ +R \\ +\text{stress} \end{bmatrix} \check{z} \qquad\qquad n \begin{bmatrix} \bar{o} \\ +R \\ +\text{stress} \end{bmatrix} \check{z} \begin{bmatrix} a \\ +H \end{bmatrix}$$

i.e. we get acute ′ when a $[+H]$ vowel follows; neoacute ~ when it does not.[6]

5. We now turn to what is without doubt the most complicated of the prosodic systems found in the Slavic languages—that of Slovene. The handbooks tell us that Slovene has three types of accented vowel: one short, and two long. The short vowel is said to have always falling pitch; whereas there is a contrast between the two long vowels, one is rising and the other is falling. The rising pitch of Slovene is not to be identified with that of Štokavian; it is rather like the Noví neoacute.

		'linden'	'mountain'	'path'	'crayfish'	'man'	'column'
(14)	N	lĩpa	gǫ̃ra	stəzã	rãk	mǫ̂ž	stəbə̃r
	G	lĩpe	gǫrẽ	stəzẽ	rãka	mǫžâ	stəbrã
	D	lĩpi	gǫ̃ri	stəzĩ	rãku	mǫ̂žu	stəbrũ
	Acc.	lĩpǫ	gǫrǫ̂	stəzǫ̂	rãka	mǫžâ	stəbə̃r
	Inst.	lîpǫ	gǫrǫ̃	stəzǫ̃	rãkom	mǫ̂žem	stəbrǫ̃m
	Loc.	lĩpi	gǫ̃ri	stəzĩ	râku	mǫ̂žu	stəbrũ
	N	lĩpe	gǫrẽ	stəzẽ	rãki	mǫžjẽ	stəbrĩ
	G	lîp	gǫrã	stəzã	râkǫv	mǫ̃ž	stəbrǫ̃v
	D	lĩpam	gǫràm	stəzàm	rãkǫm	mǫžẽm	stəbrǫ̃m
	Acc.	lĩpe	gǫrẽ	stəzẽ	rãke	mǫžẽ	stəbrẽ
	Inst.	lĩpami	gǫrâmi	stəzâmi	râki	mǫžmĩ	stəbrĩ
	Loc.	lĩpah	gǫràh	stəzàh	rãkih	mǫžẽh	stəbrẽh

As shown in the examples in (15) below the stress in Slovene words is placed on the same vowel as in Standard Štokavian rather than as in the Noví dialect:

(15)	Slovene	žẽna 'women'	kljũča 'key'	člǫ̃vek 'human being'
	Štokavian	žèna	kljúča	člòvek
	Noví	ženà	kljūčà	čovı̌k

I propose therefore that Slovene has a STRESS ASSIGNMENT rule that, like the rule in Standard Štokavian, assigns stress to the penultimate vowel with $[+H]$ if possible.[7]

There is, however, one fundamental difference between Slovene and Standard Štokavian. In Standard Štokavian nouns such as *lipa* which belong to the *acute*

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[6] The stress assignment rule of Slavonian is not perfectly clear to me as there seem to be a great many dialectal variations (see Ivić 1958, 285–290 and Ivšić 1913, 22–24). I shall assume here that the dialect from which the examples are drawn assigns stress to the penultimate vowel with $[+H]$, if possible, and to the only $[+H]$ otherwise.

[7] The location of stress in circumflex words—i.e. in words to which the H ASSIGNMENT rule does not apply—is somewhat different in Slovene and will be briefly discussed below (cf. rule (19) and discussion there).

category—i.e. which receive [+H] on the stem vowel by the H ASSIGNMENT rule
—have "falling" tones on this vowel; in Slovene, on the other hand, as shown in (14)
the tone in these forms is usually "rising". In order to account for this difference we
shall assume that in Slovene words with acute stems the H ASSIGNMENT rule places
[+H] not on the stem vowel but on the next syllable, e.g.

$$\overset{+H}{\text{līp}+a} \text{ 'linden'} \qquad \overset{+H}{\text{rak}+a} \text{ 'crayfish'} \qquad \overset{+H}{\text{dēklic}+a} \text{ 'girl'}$$

Subsequent to this the H DISTRIBUTION rule applies and converts these strings to

$$\overset{+H\ +H}{\text{līp}+a} \qquad \overset{+H\ +H}{\text{rak}+a} \qquad \overset{+H+H}{\text{dēklic}+a}$$

It is a well-known fact that in Serbo-Croatian acute stem vowels are always short,
whereas circumflex stem vowels maintain distinctive length, which is also maintained
in the stem vowels of oxytone stems. In terms of the rule system developed here this
suggests that for Serbo-Croatian a rule should be postulated which applies before H
DISTRIBUTION and shortens vowels marked [+H] by the H ASSIGNMENT rule.
While such a shortening rule is appropriate for Serbo-Croatian, it does not seem justi-
fied for Slovene. To see this consider how we would account for the Slovene forms
ràk (nom. sg.) and *lîp* (gen. pl.). If underlying representations are postulated that
correspond to the etymology, we should get long vowels in both words.

$$\overset{+H}{\text{rāk}+\text{ъ}} \qquad \overset{+H}{\text{līp}+\text{ъ}}$$

If there is a shortening rule in the grammar, this would normally be expected to apply
to the stem vowel in both words as both words are acute. But this does not conform to
the facts; in *ràk* the vowel is short; in *lîp* it is long. We should, therefore, assume that
there is no shortening rule in Slovene; instead of that the respective words appear in
the lexicon with distinctive length:

$$\overset{+H}{\text{rak}+\text{ъ}} \qquad \overset{+H}{\text{līp}+\text{ъ}}$$

The rules developed to this point will locate the stress in its proper position in the
Slovene words under discussion. They do not account, however, for the fact that the
stem vowel in the oblique case forms of *ràk* is long (e.g. *rāka* gen. sg.) nor for the differ-
ent tones on the stem and desinential vowels in (14). To account for the long vowel in
the oblique case forms we postulate a special LENGTH rule that lengthens stressed
vowels in nonfinal syllable (cf. (16) below). The vowel [ə] appears always as short: this
can be captured either by restricting the LENGTH rule or by adding a special rule to
the NEUTRALIZATION and REDUCTION rules. Since nothing of relevance to the
topic under discussion hinges on this decision I shall assume that the LENGTH rule is
limited to vowels other than *ə*, a fact which I capture by the asterisk on the symbol V*:

(16) LENGTH

$$\begin{bmatrix} \text{V*} \\ +\text{stress} \end{bmatrix} \longrightarrow [+\text{long}] \ / \ [\text{X} \underline{\qquad} \text{C}_0\text{VY}]$$

As a consequence of this rule the only position where stressed short vowels can be found in Slovene is the last syllable of the word.

The question of the tone features in Slovene is to be discussed next. Slovene has both rising and falling tones on stressed long vowels, whereas stressed short vowels have falling tone only.

The rising tone in Slovene is like that of the Noví dialect. It is found, however, not only in words that are cognate to the Noví words with rising pitch but also in words that are cognate to the Štokavian words with rising tone (cf. (15)), though as noted above the Slovene rising tone is phonetically a totally different phenomenon. We shall assume therefore that Slovene has a special rule assigning the feature [+R] to stressed long vowels in position before a vowel with [+H].

(17)   RISE

$$\begin{bmatrix} V^* \\ +\text{stress} \end{bmatrix} \longrightarrow [+R] \ / \ \begin{bmatrix} X\underline{\quad}C_0 \begin{bmatrix} V \\ +H \end{bmatrix} Y \end{bmatrix}$$

(In view of the LENGTH rule there is no need to restrict RISE to long vowels, but ə must be excluded.)

We observe immediately the formal similarity between the LENGTH rule (16) and the RISE rule (17). Both apply to stressed vowels other than ə in nonfinal syllables of a word. This suggests that the two rules should be ordered next to each other so that it should be possible to coalesce them into a schema with the help of the notational conventions of our theory. We shall not do it here since the RISE rule will undergo considerable modifications as the discussion proceeds. It suffices to note for our purposes that the two rules can be ordered adjacent to one another. If it is now assumed that the two rules follow the STRESS rule, forms such as *ráka*, with rising tone on the stem vowel, are readily explained.

The falling tone in Slovenian is found on stressed vowels when these are in the last syllable of the word. As noted above, in view of the LENGTH rule this is the only position where stressed vowels can be short. Moreover, because of the RISE rule falling tone can appear on long vowels only when the next vowel is not [+H], or if there is no vowel following. We shall assume then that *falling* is simply the term used to describe the quality of a stressed vowel that is not followed by a vowel marked [+H], and like Standard Štovakian, Slovene will have no special rule assigning the feature [+falling tone] to some stressed vowel.

These preliminaries out of the way, we now must consider more carefully the tonal features of the stem vowels in the declension of *lípa* and *ràk*. We have proposed above that in both declensions, the H ASSIGNMENT rule places [+H] on the desinence. We should therefore expect, in general, rising tones on the stem vowel. An examination of (14) reveals, however, that there are quite a number of forms where the stem vowel has falling tone. These must now be explained.

The appearance of falling tone in the nom. sg. *ràk* presents no difficulty as soon as

it is realized that this form has a yer as its desinence. Since this yer is deleted before stress is assigned the stressed stem vowel in these forms can never be subject to the RISE rule and hence the forms will appear with falling stress in the output.

To account for the falling tone in the instr. sg. and gen. pl. of *līpa* and in the loc. sg., gen. pl., instr. pl., loc. pl. of *răk* we must add a rule to the grammar. A straightforward solution is provided by a METATONY rule that in these cases changes [+H] in the last syllable of the word to [−H]; for example,

$$\begin{array}{cc} +\text{H} +\text{H} & +\text{H} -\text{H} \\ \text{līp} + \bar{\text{o}} \longrightarrow \text{līp} + \bar{\text{o}} \end{array}$$

We order this rule after the STRESS rule and before the RISE rule. Formally the rule might then read as

(18)   METATONY-1

$$V \longrightarrow [-H] \ / \ [X\underline{\hspace{1cm}}C_0] \left\{ \begin{array}{l} \text{instr. fem. sg.} \\ \text{instr. masc. pl.} \\ \text{loc. masc. pl.} \\ \vdots \end{array} \right\}$$

Since the RISE rule follows METATONY, the former can not apply in the cases under discussion, and these forms will appear in the output with falling tone as required.

Consider now the accentual patterns in the circumflex stems exemplified in (14) by *stəbɜ̀r*, *mȏž*, *gȭra*, *stəzǎ*. We note that in stems with *ə* as stem vowels the stress goes on the second syllable. Many of the forms of nouns with a full vowel in the stem also show stress on the second syllable. Moreover, forms with and without prepositions such as *gȯrȏ* but *nagȏro*, *gȯrȇ* but *nagȏre* provide further support for the proposal that in circumflex words stress goes on the second syllable. The major exceptions to this rule are forms with a full stem vowel such as *gȭra*, *gȭri*, *mȏžu*, all of which end with a short vowel. These forms require special treatment which cannot be discussed here. (I intend to deal with these forms in a subsequent publication.) Once these forms are excluded from consideration, the circumflex stems can all be said to be subject to (19):[8]

(19)   CIRCUMFLEX STRESS rule

$$V \longrightarrow \begin{bmatrix} +\text{stress} \\ +\text{H} \end{bmatrix} \ / \ [C_0(VC_0)\underline{\hspace{1cm}}X]$$

Given the above discussion of the conditions that determine falling tone on stressed vowels we should expect falling tones in all forms of circumflex nouns. An examination of the paradigms of *gȭra*, *stəzǎ*, *mȏž*, and *stəbɜ̀r* in (14), however, shows that we get rising tone on the desinences precisely in those cases where in the acute paradigms of *răk* and *līpa* the stem vowel has falling in place of the expected rising tone (cf. rule

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[8] I assume that (19) follows and is disjunctive with respect to the stress rules that apply to "acute" forms; i.e. to forms that contain a vowel marked [+H] by the H ASSIGNMENT rule. The rule (19) as stated supplies not only stress but also high tone ([+H]). This is required in order to insure the correct falling tone in such forms as *gȯrȏ možâ gorâmi*. It gains additional support in that it allows us to combine rules (18) and (20) into a single rule (see discussion at end of section 5).

(18)). For convenience we repeat in (20) below those case forms where acute nouns have falling tone on the stem, and circumflex nouns have rising tone on the desinence:

(20)	instr. sg. fem.	lîpo	gǫrõ	stəzǫ̃
	instr. pl. masc.	râki	mǫžmĭ	stəbrĭ
	loc. pl. masc.	râkih	mǫžẽh	stəbrẽh

In view of falling tone on the stem vowel in the loc. sg. *râku* it might have been expected that there would be a rising tone also on the desinence in *mǫ̂žu* and *stəbr̀u*. We recall, however, that rising tones can appear only on long vowels. Since the loc. sg. desinence has a short vowel, the absence of a rising tone in these forms is not a counter-example; it is rather a correct consequence of the fact that all short vowels must be [−R].

To account for the facts illustrated in (20), it would appear, therefore, that the grammar must include a rule which assigns [+R] to the stressed vowel in certain case forms of nouns with circumflex stems. In order to characterize uniquely the environment where the rule is to apply we recall that in nouns with circumflex stems the stressed vowel is the only vowel in the word that is [+H]. We provisionally formulate this rule as in (21):

(21)   METATONY-2

$$V \longrightarrow [+R] / [X\_\_\_C_0] \left\{ \begin{matrix} \text{instr. fem. sg.} \\ \text{instr.masc. pl.} \\ \text{loc. masc. pl.} \\ \vdots \end{matrix} \right\}$$

The solution that we are thus forced to by closely hugging the phonetic ground is not particularly attractive. By including both (18) and (21) in our solution we are stating in effect that two unrelated phonetic processes (the lowering of high pitch and the assignment of "rising" tones) take place in the same, highly idiosyncratic environment. Moreover, by adopting this solution we are giving up the interesting restriction proposed by Nancy Woo that "dynamic" tones such as "rising" or "falling" are not part of the universal feature framework and are always to be viewed as surface phenomena. An alternative solution seemed, therefore, highly desirable.

Our problem is to find a common denominator for the two processes represented in the rules (18) and (21). Suppose that "rising" pitches are basically "low" level tones, and that the rise in pitch that we perceive is due to a return of the voice from the "low" pitch inherent in the stressed vowel, to the average pitch of the utterance. If this idea is correct, then rule (21) should assign to the word final vowel instead of a "rising" tone, a low—below normal pitch—tone which we shall designate here by the feature [+L]. Rule (21) would then be rewritten as in (22).

(22)   METATONY

$$V \longrightarrow \begin{bmatrix} +L \\ -H \end{bmatrix} / [X\_\_\_C_0] \left\{ \begin{matrix} \text{instr. fem. sg.} \\ \text{instr. masc. pl.} \\ \text{loc. masc. pl.} \\ \vdots \end{matrix} \right\}$$

We have added the feature $[-H]$ on the right-hand side of the arrow to make explicit the fact that all "low" toned sounds are, by definition, $[-H]$. We see, moreover, that given this formulation, (22) is identical with (18) except for the appearance of $[+L]$ on the right-hand side of the arrow. This distinction, however, has no effect on the functioning of the rule, for the sole purpose of METATONY rule (18) was to block the RISE rule (17) from applying to forms such as those in (20), and this purpose is achieved regardless of whether or not $[+L]$ appears on the left-hand side of the arrow. Hence the single rule (22) can replace the two rules (18) and (21). In sum, if our assumption is correct that "rising" tones are surface manifestations of underlying "low" tones, then there is a single explanation—the assignment of a "low" tone to the last vowel in the word—for what on a more superficial view are two distinct processes: the replacement of "rising" tones by "falling" tones in one set of forms and the converse replacement of "falling" tones by "rising" in another set of forms.[9]

In addition to allowing us to deepen our description in the manner outlined the proposal to view "rising" tones as surface reflexes of "low" level tones has also direct support in the phonetics of Slovene. We suggested above that the "rising" pitch perception is due to the fact that on such tones the voice returns from a lower than average pitch level to the average pitch. Similarly one might suppose that the "falling" pitch perception is due to the fact that the voice returns from a higher than average to the

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[9] If we let METATONY apply to the fem. sg. forms of the preterit participle we can readily account for the tone alternations found in different forms of this participle. We distinguish here three types of cases. In oxytone forms we get such alternations as

| bȉl (masc.) | bȋla (fem.) | bȋlo (neuter) | 'beat' |
| mọ̑lčal | molčȃla | molčȃlo | 'be silent' |

To handle the acute and the circumflex stems the METATONY rule has to be extended so as to apply not only in the last syllable of the word, but also in the penultimate syllable:

$$V \longrightarrow \begin{bmatrix} +L \\ -H \end{bmatrix} \Big[X\underline{\quad}C_0 \big(\big[\begin{smallmatrix} V \\ -H \end{smallmatrix} \big] C_0 \big) \Big] \left\{ \begin{array}{l} \text{fem. sg. pret. part.} \\ \text{instr. fem. sg.} \\ \text{instr. masc. pl.} \\ \text{loc. masc. pl.} \\ \quad\vdots \end{array} \right\}$$

With this extension we can readily account for the tonal alternations in acute verbs such as, e.g.

        brȃl (masc.)   brȃla (fem.)   brȃlo (neut.)   'take'

We assume that the H ASSIGNMENT rule assigns $[+H]$ to the stem vowel. As a result we should get "falling" tone in all forms. The extended METATONY rule, however, applies to the fem. sg. forms and by assigning to the penultimate vowel the features $\begin{bmatrix} +L \\ -H \end{bmatrix}$ provides the stem vowel in these forms with "rising" tone.

Forms with circumflex stems behave similarly to forms with acute stems, e.g.

        kovȃl   kovȃla   kovȃlo   'forge'
        dajȃl   dajȃla   dajȃlo   'give'

The CIRCUMFLEX STRESS rule (19) accounts for the falling tone on the second syllable of these forms. In the fem. form the extended METATONY rule converts the "falling" to "rising" tone in the manner outlined above.

The extended METATONY rule applies also in nouns with polysyllabic stems such as

        dẹklica (nom. sg.)   dẹklico (instr. sg.)   'girl'

I hope to treat these metatonies in greater detail as well as other questions of Slovene accentology in a separate paper now in preparation. See also note 3.

average pitch. In fact, a number of phoneticians, among them Olaf Broch and J. Toporišič, have felt that the above is a fairly accurate description of the state of affairs, at least, in some instances. Thus, after the usual comments about rising and falling tones of stressed vowels, Broch notes (p. 326) ". . . in gewöhnlicher, rascherer Rede wird die Tonbewegung ausgeglichen. Zum Verlust der Tonbewegung scheint besonders geneigt die Silbe unter ˜, die sehr häufig von steigendem zu annähernd ebenem Ton übergeht; aber auch unter ⌢ verliert die Silbe oft einen Teil der Tonbewegung, und zwar den letzten, tiefen Teil.

Auf diese Weise entsteht aber zwischen den gegebenen langen Silben ein neuer tonischer Gegensatz; wenn auch die fallende und die steigende Bewegung schwindet, so bleibt doch, mehr oder weniger deutlich, für ⌢, die relativ hohe Tonlage und für ˜ die relativ niedrige Tonlage, welche ursprünglich nur dem Anfangsteil des betreffenden Akzentes eigen war." And in a footnote on the same page Broch adds: "Bei meinen Untersuchungen bemerkte ich nicht selten bei einem meiner Gewährsmänner die Neigung, für ⌢ einen höheren Ton als der der nichtakzentuierten Silben, für ˜ aber "Tiefton", einen entsprechend tieferen zu gebrauchen: ⌢ = ‾‾; ˜ = ▁▁. Jedoch dürfte dies individuell sein und vielleicht durch den Wunsch hervorgerufen, dem Beobachter die Unterscheidung der Typen zu erleichtern."[10]

In other words, the assumption that rising and falling tones are surface reflexes of stationary low and high tones, respectively, not only leads to a greatly simplified system of phonological rules, but is apparently quite directly supported by the phonetic actualization of the tones in normal, unforced discourse.

6. In concluding I should like to recall the two theoretical considerations that have guided this study. I believe that the data reviewed support quite strongly Nancy Woo's proposal that "dynamic" tones are always phonetic phenomena of a superficial sort similar perhaps to such other phonetic surface phenomena as the vowel transition associated with particular consonantal points of articulation, the greater loudness of low vowels, or the tendency not to release a stop when the next segment is also a stop. What is significant here is that when "dynamic" tones were viewed in this very special way, the phonological processes of the dialects examined became more transparent, more understandable. Needless to say that what has been brought out here is far from conclusive, but as a step towards establishing Woo's hypothesis it is surely not negligible.

The second hypothesis of importance was Roman Jakobson's insight that Slavic accentual phenomena are best viewed as deriving from a stage in which the language resembled a simple "terrace tone" language like Japanese. While Jakobson understood his proposal primarily in diachronic terms I hope that the discussion above has shown that the conception holds true also synchronically, where derivation is understood in

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[10] I have replaced Broch's diacritic mark ′ by ˜ to make it consistent with the usage of the rest of this article.

the normal sense of generative phonology. As in the case of the first hypothesis the significant fact is not that by using a particular approach a body of data can be catalogued, but rather that when this approach is used a host of complicated facts appear to fall neatly into place. Several examples have been cited in the body of the paper, but perhaps none is as impressive as the clear picture of relatedness among different dialects which emerges when we juxtapose, as in (24) below, the ordered sets of rules that had to be postulated to handle the particular data of the different dialects that have been studied here.

(24) Summary of rules discussed

Russian	Štokavian	Novi	Slavonian	Slovene
H ASSIGNMENT	H ASSIGNMENT	H ASSIGNMENT	H ASSIGNMENT	H ASSIGNMENT
H DISTRIBUTION	H DISTRIBUTION	H DISTRIBUTION	H DISTRIBUTION	H DISTRIBUTION
		NEOACUTE	NEOACUTE	NEOACUTE
VOWEL TRUNCATION	VOWEL TRUNCATION	VOWEL TRUNCATION	VOWEL TRUNCATION	VOWEL TRUNCATION
		RETRACTION		
YER DELETION	YER DELETION	YER DELETION	YER DELETION	YER DELETION
YER LOWERING	YER LOWERING	YER LOWERING	YER LOWERING	YER LOWERING
Assign stress in forms with H				
to last H	to penult H	to last H	to penult H	to penult H
	to last H		to last H	to last H
Assign stress in forms without H (circumflex)				
to first syllable	to first syllable	to first syllable	to first syllable	to second syllable
				to first syllable
				METATONY
NEUTRALIZATION	NEUTRALIZATION	NEUTRALIZATION		LENGTH
				RISE

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