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Studies in African Linguistics
Volume 5, Number 1, March 1974

GEMINATION AND SPIRANTIZATION IN BERBER: DIACHRONY AND SYNCHRONY[1]

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1. Introduction

Generative phonologists have become increasingly interested in questions relating to the psychological reality of grammars. It is clear that many different grammars can account for the data (i.e. be observationally adequate) but what is being sought is the unique grammar (if there is one) which will also represent a speaker's competence (i.e. is descriptively adequate). Various constraints have been proposed to accomplish this including the strong and weak alternation conditions (cf. Kiparsky [1968]), constraints on rule ordering (cf. Koutsoudas et alia [1971]; Vennemann [1973]; Hooper [1973]), markedness conventions (cf. Chomsky and Halle [1968]; Schane [1968]), etc. This paper is concerned with some aspects of this question as it relates to the representation of lexical formatives in Berber grammar.

The specific questions to be considered are those raised by the morphophonemic alternation between single and geminate consonants within the Berber languages of North Africa, and the occurrence of non-strident spirants, e.g. θ and ç , which alternate with geminate stops in the Northern and Central dialects of Morocco (e.g. Tirifiyt and Tamaziγt).[2]

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[1]I wish to gratefully acknowledge a number of comments and suggestions on earlier drafts of this paper (December 1971 and March 1973) by Professors Anttila, Bedell and Schuh. Special thanks are due to Professors Hyman, Vennemann, and most of all, to Professor Fromkin whose critical comments and insightful suggestions led me to undertake a number of revisions both in content and in style.

An abridged version of this paper was presented at the IVth Annual Conference on African Linguistics, Queens College, New York (April 1973). I wish to thank Professor Jeanette Harries, the Berberist at the University of Wisconsin, for her helpful comments and encouragements. Thanks are also due to another Berberist, Professor T. Penchoen, for being so helpful in discussing some of the data.

Any errors or omissions are my sole responsibility, however.

[2]Other Northern dialects such as Kabyle and Shawia are not included in this discussion.

The Southern dialects (e.g. Tachelḥiyt and Twareg) lack this series of non-strident spirants and exhibit instead simple stops in cognate alternating forms.

2. The Data

The simple consonant/geminate consonant alternations are illustrated by the following:[3]

		Zero Form	Intensive Form	Gloss
(1)	Tamaziɣt	eçmez	çemmez	'to scratch'
		eɣmes	ɣemmes	'to cover'
		ejnu	jennu	'to sew'
		eβnu	βennu	'to build'
		efḷey	feḷḷey	'to tear'
		emṛey	meṛṛey	'to rub'
		erẓem	reẓẓem	'to open'
		ens̤	ness̤a	'to wear'
(2)	Tachelḥiyt	b̤ez	ebb̤ez	'to peel'
		eft̤el	fett̤el	'to roll couscous'
		ebd̤u	bedd̤u	'to start'
		enẓu	neẓẓa	'to be sold'
		enk̤er	nek̤k̤er	'to get up'

The examples under (1) and (2) are merely illustrative of the fact that this alternation is pervasive throughout the dialects. Other examples could be cited to show that all consonants (except for the voiceless bilabial stop p; cf. below) are affected. The 'zero forms' (hereafter Z.F.) in the above examples represent the shape of the verb that is used in the imperative (2nd person singular). It is the simplest form in that it is the most morphologically unmarked. The 'intensive form' (hereafter I.F.) is the imperfect (or continuous and habitual) aspect, and as seen in the examples, is a morphologically 'marked' form.

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[3] The forms presented in all examples are given in broad phonetic transcriptions. It should be noted that j represents a voiced palatal fricative, the voiced counterpart of ç, and e represents a schwa. A dot under a consonant indicates that the consonant is pharyngealized.

In the Southern dialects (Tachelḥiyt and Twareg) the only apparent exceptions to the alternations between simple consonants and identical geminates are the alternations ḍ : ṭṭ and ɣ : qq as shown in (3):[4]

(3)

Tachelḥiyt	Z.F.	I.F.	Gloss
	ebḍu	beṭṭu	'to divide'
	ekḍu	keṭṭu	'to smell'
	neɣ	neqqa	'to kill'
	reɣ	reqqa	'to be warm'

These cases are actually the result of a very general rule applying to simple and geminate pharyngealized consonants; the simple pharyngeals are voiced and the geminates always voiceless. The consonants symbolized as ɣ and q are pharyngealized velars (or uvulars). The rule is simple (assume for now that the underlying segment is non-geminate, an assumption which will be justified below):

(4) $\begin{bmatrix}+\text{consonantal}\\+\text{pharyngealized}\end{bmatrix} \rightarrow$ [+voiced]/ X : where X ≠ identical C

Using Bach's neighborhood convention (cf. Bach [1968]), this rule states that a pharyngealized consonant is voiced when the preceding or following segment is not identical to it.

One problem, then, to be accounted for in synchronic grammars of Berber dialects is this occurrence of C/CC alternations. A second problem arises when the Central and Northern Berber dialects of Morocco are examined. These dialects have, instead of all of the above alternations, a series of non-strident spirants alternating with geminate stops. That is, instead of the t : tt alternation, we find θ : tt . This may be illustrated by examples from the Aït Ndhir dialect of Tamaziɣt where spirantization is particularly widespread.

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[4] Though this paper deals with underlying representation, I will not concern myself with the question as to whether neɣ 'to kill', for instance, is underlying neɣ or enɣ or nɣ . Rather, I will give all the examples in their broad phonetic transcription (cf. footnote 3 above).

(5)

	Z.F.		I.F.	Gloss
f : ff	enfeḏ	:	neffeḏ	'to throb'
	erfes	:	reffeṣ	'to dip'
β : bb	enβeš	:	nebbeš	'to be nosy'
	erβel	:	rebbel	'to ramble'
θ : tt	efθel	:	fettel	'to roll couscous'
	enθel	:	nettel	'to hide'
ð : dd	eβðu		βeddu	'to start'
	enðu		neddu	'to become buttermilk'
ḏ : ṭṭ	erḏel	:	reṭṭel	'to loan'
	eβḏu	:	βeṭṭu	'to divide'
j : gg	jen	:	eggan	'to sleep'
	erjem	:	reggem	'to insult'
ɣ : qq	neɣ	:	neqqa	'to kill'
	reɣ	:	reqqa	'to be warm'

Some additional facts should be noted prior to a discussion of the historical processes which gave rise to these alternations and dialect differences and to the discussion of how best to account for these facts in Berber synchronic grammars. Of particular interest is the fact that in no dialect do we find a p or pp (an exception is the baby talk word pappa 'bread'). This non-occurrence of the voiceless bilabial stop is also found in other languages in the area (Arabic, Hausa, Somali etc.) where only a two-way labial obstruent contrast is found, usually between b and f ; neither p nor v occurs. In addition, as noted above, the non-geminate pharyngealized consonants are automatically voiced. Furthermore, they are spirantized in Northern dialects as shown in (6):

(6) Tamaziɣt (Aït Ndhir)

Z.F.		I.F.	Gloss
enḏel	:	neṭṭel	'to bury'

(See also examples in (5))

Finally, the spirant alternants of the geminates kk and gg are the palatals ç and j respectively in the spirantizing dialects, as seen in (7) (however, see (13), (14), (15b) below and Appendix I):

(7) Tamaziγt (Near Demnate)

Z.F.	I.F.	Gloss
erçel	rekkel	'to kick'
erçem	rekkem	'to boil'
erjem	reggem	'to insult'
emjer	megger	'to harvest'

This fronting may be due to the need for 'maximal differentiation' between velars and uvulars.

The question of the systematic phonemic representation of the verbs in the Aït Ndhir dialect will be considered here. Specifically the paper will attempt to resolve the problem of whether underlying forms have geminates, simple stops, or spirants. The solution to the problem has direct bearing on phonological theory. An historical account of the development of these dialect differences is relevant to the discussion and will hopefully also contribute to our understanding of historical change in general.

3. Diachronic account

It is generally accepted that historically the Berber spirants derived from stops (cf. Laoust [1918] and [1939]; Loubignac [1924]; Renisio [1932]; Basset [1952]). This process illustrates the historical 'weakening' found in many languages. In the dialect under discussion, there appears to have been no conditioning factor other than that the stop that undergoes spirantization is non-geminate. Aït Ndhir shows the most complete process; other dialects show varying degrees of spirantization. Thus, for example, while the Aït Izdeg dialect of Tamaziγt exhibits a number of instances of *k → ç (and even *k → š), and *g → j , it exhibits only a few instances of *t → θ and *d → ð. This is illustrated in (8) (cf. Mercier's lexicon [1937]):

(8)

Tamaziγt (Aït Izdeg)			Gloss
a.	açez	< /akez/	'to recognize'
	arjam	< /argam/	'insult'
	ašal	< /akal/	'earth'
b.	iθri	< /itri/	'star'
	amaðal	< /amadal/	'side'

Unfortunately, the published description of many of the dialects (see references above) are so sketchy that the reader is unable to determine what sound changes are posited for which dialect. Thus, it is not possible at this time to illustrate or analyze all the inter-dependencies as, say, Foley [1969] has proposed. What is clear is that all dialects have spirantized *p to f .[5]

The relationship between the *p → f spirantization and the other cases of spirantization is not clear-cut. This *p → f change characterizes most of the vast Afro-Asiatic family, including Arabic, Hausa, Somali and also Berber. (A similar change characterizes Japanese, though the resultant f is further modified to h [Ultan 1970] .) This change may have triggered the chain of subsequent spirantizations that characterize many Berber dialects. But, it is clear that this change is separated from the other spirantizations by a considerable period of time.[6]

Also, it should be noted that the other Afro-Asiatic languages do not spirantize as does Berber. Furthermore, in Berber, the *p → f change is unlike the other changes in that it affects the geminates as well as the non-geminates; there is no Berber dialect where single f alternates with pf which might be assumed as an intermediate step. Thus, all Berber dialects reflect the historical context-free rule (9):

---

[5]This is assuming that Proto-Berber indeed had a *p .

[6]Borrowings with p from Latin are rendered with f , even in Tachelḥiyt, a non-spirantizing dialect. E.g. Latin pullus > Tachelḥiyt afullus 'chicken'. Yet, just as in native Tachelḥiyt morphemes, other stops remain unchanged in loan-words from Latin, e.g. Latin hortus > Tachelḥiyt urtu 'garden'. The Romans established their direct rule over Eastern North Africa shortly after the third Punic War. Parts of Morocco were colonized by the Romans from around 42 A.D. until the Arabic invasions (end of the seventh century, A.D.).

(9) *p > f

Moreover, the spirantizing dialects reflect additional historical rules resulting in the alternations: C_f^1 : C_s^2 (where C_f^1 = a single spirant and C_s^2 = a geminate stop).

Other than the voiceless labial spirantization, the only spirantization attested in all the Berber dialects I have investigated concerns the uvulars: all dialects appear to have a simple γ which alternates with qq .[7] Dialects such as Tachelḥiyt and Twareg, then, have only two cases of spirantization: f : ff and γ : qq ,[8] as shown in (10).

(10)

Tachelḥiyt			Twareg[9]			
Z.F.		I.F.	Z.F.		I.F.	Gloss
neγ	:	neqqa	enγ	:	negg (naqq)	'to kill'
reγ	:	reqqa	erγ	:	reqq (raqq)	'to be warm'
esfeḍ	:	seffeḍ	sfeḍ	:	seffeḍ	'to wipe'

Since the *p was presumably lost at an earlier period, possibly when this occurred in other Afro-Asiatic languages, and since at one stage speakers would hear only f and ff , this spirantization does not provide a viable model for stop/spirant alternations. We can hypothesize that the first spirantization in the later chain of historical development is an uvular pair. It is this pair, then, which may have triggered the rest, if triggering did indeed occur. It is, of course, possible

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[7] There are few instances of γγ however, e.g. aγγu 'buttermilk', taγγatt 'goat', etc.

[8] Actually the picture is not as clear as the previous authors would like us to believe. Spirantization is slowly spreading southwards. In 1971 I personally observed the spirantization of *k → ç and *g → j in the speech of a Berber from around Demnate. Doyle Hatt (personal communication) found this to be true of speakers of Tachelḥiyt, and Russell Schuh (personal communication) observed the same trends in the speech of some Twaregs. However, until a thorough investigation of this spread is done, I will assume only the two cases of spirantization illustrated in (10) for Tachelḥiyt and Twareg.

[9] The Twareg data, taken from Basset [1929], are reproduced here in their original transcription (cf. also footnote 4).

that each spirantization took place independently of the others when it was 'due' on the strength scale (Vennemann, personal communication).

Another indication that the labial change had little influence on subsequent spirantization is the relatively rare occurrence of β in Berber. There are some dialects that show an alternation between β and bb , but in many dialects the picture is one of general spirantization of single stops except for the labial *b . Thus, in addition to the spirantization problem, there is a labial problem. That is, whereas other places of articulation permit a four-way contrast (e.g. alveolar obstruents t , d , s and z) the labial position seems to permit only a two-way obstruent contrast between f and b . There appears to be some force in the language that strives to maintain this pattern.

A final case of historical change to be considered here is that of the fronting of the velars k and g . The spirantized realizations of these segments pose several questions. First of all, the expected spirants are ç and j , which are, in fact, widely attested in present day Berber dialects. However, some dialects have further modified these to š and ž while in other verbs the alternations are between šš , žž and š , ž , respectively as shown in the following examples.

(11) Tamaziγt (Aït Ndhir)[10]

	Z.F.	I.F.	Gloss
š : šš	mšeḍ	mešše ḍ	'to comb'
	enšef	nešše f	'to scratch'
ž : žž	eržem	režžem	'to lapidate'
	enžer	nežžer	'to saw'

The further change from č and j to š and ž , respectively, is not surprising. It has often been noted that [-back, -coronal] lingual continuents often become [+strident, +coronal] (cf. German ich which

[10] At first glance these forms would seem to pose a problem for the synchronic solution suggested below. However, these four verbs, borrowed from Arabic, are to my knowledge the only alternations between š/šš and ž/žž, and are therefore outside the main pattern.

dialectically becomes [š]. Chomsky and Halle [1968], claiming that š and ž are less marked than ç and j, posit 'linking rules' to account for this 'natural process'.

In Berber, however, both ç and š and j and ž occur in single dialects without any apparent conditioning factor. In (12) forms from Tachelḥiyt and Tamaziɣt are compared, in which it is seen that Tachelḥiyt k corresponds to Tamaziɣt ç.

(12)	Tachelḥiyt	Tamaziɣt	Gloss
	aksum	açsum	'meat'
	aksar	açsar	'slope'
	azukenni	azuçenni	'thyme'
	akuz	açuz	'weevil'
	akz	açz	'to remember'
	aseksu	aseçsu	'couscous strainer'
	aseksa	aseçsa	'chick'
	uska	usça	'hound'
	akurdu	açurðu	'kind of bug'

In (13), however, Tachelḥiyt k corresponds with Tamaziɣt š:

(13)	Tachelḥiyt	Tamaziɣt	Gloss
	akal	ašal	'earth'
	akabar	ašaβar	'caravan'
	akanif	ašanif	'grill'
	tarikt	θarišθ	'saddle'
	tanekra	θanešra	'awakening'
	tiškert	θiššerθ	'garlic'

We can see that it is not simply the case that in some dialects *k and *g have become ç and j, respectively, but that in others the process is extended further to yield š and ž. These dialects appear to represent "language change in progress" [Labov 1972].

In addition we also find the modification of *g to the glide y. The seven different realizations of Proto-Berber *agsum 'meat' as given in (14), show the changes which have occurred. These changes are all

attested in different dialects.

(14) *agsum (Proto-Berber)

a. agsum (no change)

b. aksum (devoicing)

c. açsum (devoicing and spirantization)

d. ašsum (devoic., spir., palataliz.)

e. ajsum (spirantization)

f. aysum (spirantiz., glide-creation)

g. ažsum (spirantiz., palatalization)

Not only do we find inconsistent historical reflexes in a single dialect, but, in addition, we find the same inconsistencies in borrowings from Arabic, where Arabic k is sometimes realized as ç and sometimes as š, again with apparently no statable conditioning factor(s):

(15)

	Arabic	Tamaziγt[11]	Gloss
a.	sellek	selleç	'to be lenient'
	esken	esçen	'to live'
	enker	ençer	'to deny'
	erkel	erçel	'to kick'
	ekra	içra	'he rented'
	(Arabic k → Tamaziγt ç)		
b.	eḥkem	eḥšem	'to rule'
	ekrem	ešrem	'to be dry'
	kemmel	šemmel	'to finish'
	lekta:b	lešta:b	'book'
	lehka:m	lehša:m	'judgment'
	(Arabic k → Tamaziγt š)		

There are some borrowings from Arabic which, to further complicate the problem, show phonetic k :

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[11] The Tamaziγt forms in (15a) would be representative of the transitionary dialects spoken near Demnate (cf. footnote 7 above).

(16)

Arabic	Berber	Gloss
le<u>k</u>tatbi i	a<u>k</u>tatbi	'secretary'
el ha<u>k</u>em	al ha<u>k</u>em	'judge'

We can now summarize the historical changes which have occurred.

(17)

a. p → f

b. q → ɣ

c. k → ç → š
   g → j → ž

d. t → θ
   d → ð

e. ṭ → ḍ

f. b → β

4. Synchronic account

While the summary of the historical changes reveals the differences observed in Berber dialects and explains the alternations that now occur, the problem of how to account for the present situation is not necessarily resolved by the diachronic account.

The two major questions discussed here which must be resolved concern the representation of the simple/geminate consonant alternations, and the stop/spirant alternations.

The examples given above (cf. (1), (2), (3) and (5)) show the alternations between simple and geminate consonants in the Zero and Intensive Forms of the verb, respectively. Clearly, if this is a predictable regularity it can best be accounted for by positing a single phonological representation of the stems and a rule (or rules) for the alternant phonetic forms. This possibility has been denied by previous writers like Bisson [1940] who stated: "Il faut connaître la forme d'habitude (i.e. Intensive Form) de chaque verbe, car il est <u>impossible</u> de la construire soi-même de façon certaine (emphasis mine, J.S.)." Despite this claim, such rules exist and can be stated so as to reveal the generalizations. For convenience sake examples of the alternations are given in (18) (cf. also (1), (2), (3) and (5) above).

(18) Tamaziγt (Aït Ndhir)

	Z.F.	I.F.	Gloss
a.	efθel	fettel	'to roll couscous'
	erẓem	reẓẓem	'to open'
b.	neɣ	neqqa	'to kill'
	ens	nessa	'to spend the night'
c.	seɣ	ssaɣ	'to buy'
	ɣer	qqar	'to call'
d.	ebδu	beddu	'to start'
	erzu	rezzu	'to look for'
e.	neqqer	ttneqqar	'to shake off'
	ferreɣ	ttferraɣ	'to pour'

The data in (18) show that Berber verbs behave differently with respect to the process of gemination (or lengthening) which takes place in the formation of the I.F. One pattern which emerges (from looking at the data) is that the selection of the consonant to be geminated (or lengthened) is dependent on the number of consonants in the stem of the Z.F. which is assumed here as the underlying stem. However, this leaves us with the problem of explaining the different behavior of the verbs in (18c). These verbs geminate (or lengthen) the first stem consonant instead of the second (cf. (18a, b, d)).[12] This points to a difficulty of the Berber verb system, a difficulty which may be resolved by the establishment of verb classes and the utilization of a diacritic feature $[-G_2]$ (where G_2 = gemination of second consonant) on the verbs in (18c). This diacritic feature would prevent the gemination of the second consonant and permit gemination of C_1.

The data in (18) are handled by a set of rules which stipulates that a simple C of the Z.F. becomes CC in the I.F., as well as other internal changes, such as vowel alternation, that sometimes occur. This

[12] In Twareg, which is regarded by Berberists as the most conservative Berber dialect, the tensing of the first consonant is not the exception but the norm for verbs with two consonants.

is assuming that the direction of the derivation is: Z.F. → I.F. (i. the Z.F. is the underlying form).

Conceivably, one might want to take another position. On the basis of the data given in (18) one could argue that it is just as reasonable to derive the Z.F. from the I.F.: all that is taking place, according to this alternative analysis, is the loss of gemination (or length) and some vowel alternations and deletion. There are other considerations, however, which make the derivation Z.F. → I.F. not only more motivated or more economical, but intuitively more satisfying.

A certain number of arguments--two of which I present here--can be brought forth against this alternative analysis (and hence, for the Z.F. to I.F. analysis). This is in addition to the fact that the Z.F. is the citation form, as well as the least morphologically marked one. First, the predicating power of the I.F. to Z.F. analysis is not as great as that of the Z.F. to I.F. analysis. This is illustrated in (19) which shows that the Past and the Z.F. have the same consonant structure.

(19) Tamaziγt (Aït Ndhir)

Z.F.	Past	I.F.	Gloss
əfθəl	-əfθəl-	fettəl	'to roll couscous'
neγ	-neγ-	neqqa	'to kill'
ebḍu	-ebḍ-	beṭṭu	'to divide'

Notice that if one starts with the I.F., then one is compelled to derive the Past from the Z.F., following the diagram given in (20):

(20)

This obviously points to the fact that a linguistically significant generalization is being lost, as other languages do not seem to operate in this way. Furthermore, it means that degemination rules must be written for both Z.F. and the Past. Also, the I.F. to Z.F. analysis would be at a loss to explain the alternations given in (21):

(21) Tamaziɣt (Aït Ndhir)

Z.F.	I.F.[13]	Past	Gloss
ggall	ttgalla	-ggull-	'to swear'
gganney	ttgannay	-ggunney-	'to wait'
qqim	ttɣima	-qqim-	'to sit'
qqar	ttɣara	-qqur-	'to be dry'
ǰiwen	ttgawan	-ǰiwen-	'to be full'
eč	ttetta	-eč-	'to eat'

If we start from the I.F., then we would have to say that what is taking place here is degemination of a stem consonant. Moreover, we would have to mark a great many verbs with lexical geminate with a [-Rule X] in the lexicon so as to insure that they do not undergo the degemination rule. Finally, the forms ǰiwen 'to be full' and eč 'to eat', would be very hard to derive from /tt-gawan/ and /tt-tta/ , respectively. Thus, we can see that the I.F. to Z.F. analysis makes the wrong predictions, leads to further complications, and proves to be very costly. No such complications result if the Z.F. to I.F. analysis is chosen.[14]

Another alternative solution would be to regard each case of alternation between a simple consonant and a geminate consonant as suppletive (not unlike English go : went) in which case we would be forced to recognize both C and CC for each morpheme. This does not exclude the possibility that where there are no alternating forms, surface CC's derive from underlying geminates. This is illustrated in (22) (cf. also (18e) above).

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[13]The prefixation of a tt is another means of forming the I.F. It is selected by verbs with lexical geminates and verbs with underlying plain vowels.

[14]Moreover, data from Kabyle-At Megellat (cf. Dallet [1953]) indicate that what is taking place is strengthening and not weakening, e.g. Z.F. efsu : I.F. feṣṣu 'to untangle' (where ṣ = ts), Z.F. erzu : I.F. reẓẓu 'to visit' (where ẓ = dz) (cf. also data from Tamaziɣt (Bou Hsousen) [Loubignac 1924]: Z.F. exsi : I.F. xeṣṣi 'to be extinguished', Z.F. exzen : I.F. xeẓẓen 'to hide'.)

(22) Tamaziγt (Aït Ndhir)

Z.F.		I.F.	Gloss
effeγ	:	tteffeγ	'to go out'
ekkes	:	ttekkes	'to take off'
eqqen	:	tteqqen	'to lock'

In these instances, to posit simple C's would strongly violate the naturalness condition. Such a solution would in actuality be a case of absolute neutralization where the morphemes would have to be marked by some diacritic to permit them to be operated on by a context-free C → CC rule, since all single C's in these morphemes would have to become geminate. Moreover, the contrast between simple and geminate consonants is a very basic one in Berber, as seen in (23).

(23) Tamaziγt (Aït Ndhir)

ass	'to tie'	as	'to fit'
aff	'to be full'	af	'to find'
suddem	'to drip	s-udem	'to the face'
uzzal	'iron	uzal	'hot period of the day'[15]

The conclusion then is to represent the alternating C/CC forms with a simple C and to represent non-alternating CC as derived from CC.

The second problem to be solved concerns those dialects like my own, in which simple stops have become spirants (cf. examples given in (5) for instance). Since these spirants alternate with geminate stops it is necessary to decide in some principled way as to whether the underlying segment is a stop or a spirant. This problem does not apply to dialects such as Tachelḥiyt and Twareg where spirantization has had little effect and where the only alternation of this kind is that between γ and qq, which, as stated above, is handled by a different rule.

(24) $\begin{bmatrix} + \text{ pharyngealized} \\ + \text{ back} \end{bmatrix} \rightarrow \begin{bmatrix} + \text{ voiced} \\ + \text{ cont.} \end{bmatrix}$ / X : where X ≠ identical C

---

[15] uzal is in the 'construct state'. The noun is in this state when it is the subject of a verb or the complement of a preposition. In the 'free state' the noun is azal . sudem 'to the face' is from s + udem where s = 'to'.

The alternation between f : ff presents no problem in this regard except for those phonologists who would totally violate the naturalness condition (cf. Postal [1968]) and posit an underlying p for the reason that a language with an f and no p would be considered 'unnatural'. This solution would require an absolute neutralization rule such that in all cases p → f and seems so unmotivated that one cannot really consider it seriously (cf. Kiparsky [1968] et alia).

There are also cases, though sporadic, in which b alternates with f as is shown by the following examples:[16]

(25) Tirifiyt (cf. Renisio [1932])

Senhaja	sg.	θašebbafə	'flute'
	pl.	θisebbabin	
Touzine	sg.	θajaʃbufθ	'cover, case'
	pl.	θijaʃbab	

This presents no problem if we posit an underlying b which undergoes the regular voicing assimilation rule found generally in Berber and which in some cases is optional.

(26) Tamaziγt (Aït Ndhir)

/aδ#θ+ddu/ → [atteddu]
Fut.-she-go 'she will go'

Since in these dialects β does not occur, clearly the underlying segment must be the stop b , which when non-geminate and devoiced becomes the only permitted voiceless labial f .

It may be noted that voicing assimilation is general throughout the Berber dialects, and that the spirantization of b to f occurs even in dialects where manner assimilation does not occur. In Tachelḥiyt, for example, we find the sequence ft in ifta 'he left'. The rule should, therefore, not include voicing and spirantization assimilation as one

---

[16] In Tamaziγt (Ait Ndhir) some Arabic loan words with b are rendered with f in the speech of country people: Arabic elbettix 'melon' Tamaziγt afettix ; Arabic lebṣel 'onion' Tamaziγt žefṣež , etc. In this speech, l → ž , or something very close to ž .

process. Since there is no dialect in which a p occurs, a segment structure condition for labials would be included. This constraint would reapply whenever applicable (cf. Stanley [1967]; Kisseberth [1970]; Shibatani [1973]). To include a segment structure condition in the grammar of Berber such as

(27) IF: $\begin{bmatrix} + \text{ anterior} \\ - \text{ coronal} \\ - \text{ voiced} \end{bmatrix}$

THEN: [+ continuant]

would reveal the historical spirantization of *p to f which has special status in the history of Berber. This is so because the *p to f spirantization has the following characteristics:

(i) It is also found in non-Berber Afro-Asiatic languages.

(ii) It has occurred in <u>all</u> Berber dialects.

(iii) It is true of the geminates as well as the single consonants. (In the I.F. of the verbs, for instance, ff occurs rather than pp which is not the case for other C/CC alternations.)

The representation of the labial consonants is thus straight-forward; we posit underlying b and f .

Let us now return to a dialect such as my own (the Aït Ndhir dialect of Tamaziɣt) where, as shown in (12) and (13), <u>all</u> simple stops are spirantized. Moreover, in the verb paradigm, instead of an alternation of simple/identical geminate stops, as in Tachelḥiyt (cf. (2) and (3)), the alternation exhibited by this dialect is one between non-strident spirants and geminate stops (cf. (5) above). Forms with lexical geminate stops like the ones given in (18e) and (22) do not alternate and are not affected by spirantization.

Since we have already concluded that the geminates in alternating forms should be derived from non-geminate consonants, the problem, then, is to decide whether the underlying segments should be spirants or stops. If stops are posited as the underlying segments, the grammar must include a spirantization rule that would be identical to the diachronic

rule. That is, it may be concluded that the diachronic rule is still operative, i.e. has been incorporated into the synchronic grammar of Aït Ndhir. With this rule in the grammar, one would claim that certain Arabic loan words are phonemically represented in Berber unchanged with the Arabic stops occurring in the lexical forms as shown in (28):

(28)

Arabic	Tamaziγt (Aït Ndhir)			Gloss
ɪetnayn	/ɪetnayn/	→	[ɪeθnayn]	'Monday'
ɪekta:b	/ɪekta:b/	→	[ɪešθa:b]	'book'

(via the rule: [- cont.] → [+ cont.] / X :
where X ≠ geminate)

Since the rule would not apply to underlying geminates, Arabic loan words with such geminates would not be affected, as shown in (29):

(29)

Arabic	Tamaziγt (Aït Ndhir)			
ettaman	/ettaman/	→	[ettaman]	'price'
eʃʕekkʷaz	/aʃʕekkʷaz/	→	[aʃʕekkʷa:z]	'cane'

This solution is observationally adequate and is also supported by concepts of markedness and implicational universals.

The proposed theory of markedness [Chomsky & Halle 1968] suggests that the non-strident spirants are more complex than the corresponding stops. Thus, θ is more complex than s which is more complex than t ; s must occur phonemically because of such alternations as in (30):

(30) Tamaziγt (Aït Ndhir)

Z.F.	I.F.	Gloss
efs̲er	fes̲s̲er	'to spread'
efs̲ey	fes̲s̲ey	'to melt'
exs̲ey	xes̲s̲ey	'to be extinguished'

The proposed solution then would be to have as systematic phonemes /t/ as well as /s/ which would be a more 'natural system' than one in which /s/ and /θ/ occur to the exclusion of /t/.

Further support for this solution may be drawn from the proposed implicational universals of Jakobson [1941, 1968] . Jakobson states:

> The acquisition of fricatives presupposes the acquisition of stops in child language; and in the linguistic system of the world the former cannot exist unless the latter exists as well. [1968:51]

Thus, the Aït Ndhir dialect, where spirantization is general, would be an obvious exception to this apparently well-established universal unless underlying stops are assumed for certain spirants. The fact that in non-alternating forms underlying geminates would occur phonemically would not help 'restore' a natural system since a language with geminates and no simple stops would also violate implicational universals.

There appears, then, to be strong evidence for positing underlying single stops and deriving the non-strident spirants (and geminates) from these segments. There is, however, counter-evidence which must be considered.

Since on the phonetic level no simple stops occur in this dialect, the solution posited above is a strong violation of the naturalness condition, and absolute neutralization results to some extent. That is, although some context is stated for the change from stop to spirant (i.e. the stop in question must be non-geminate), the stop will 'surface' as a spirant in all cases.

Furthermore, the spirants occur in the morphologically least marked category, the Z.F.; whereas phonetic stops, existing only as geminates, are found in the marked category, the I.F. One could argue that the spirants must be basic to the synchronic grammar, which is interesting in that such a solution would represent a further case of rule inversion [Vennemann 1972]. That is, at one stage in the history of the language a rule existed whereby the spirants were derived from stops; at present the rule would derive the stops from spirants.

Native speakers of this dialect never hear simple stops, except in Arabic and French loan words. Nor do they have access to the history of the language, nor to the comparative evidence which might lead to the positing of simple underlying stops. To argue for underlying simple stops because of markedness and implicational universals would be forcing the language to fit the theory rather than using language data to test

theoretical hypotheses. It should be noted, in addition, that other solutions attempting to arrive at a unique grammar using markedness conventions to determine the underlying representation of segments have been questioned. (See, for example, Schane's discussion of the underlying representations for French vendre 'to sell', and for German und 'and', which have been rightly criticized by Hyman [1970].)

The argument in favor of underlying non-strident spirants is not basically one of simplicity: although the spirantization rule would not be necessary, a rule which changes these spirants, when geminates, would have to be included:

(31) SD: $[-\text{ strident, } +\text{ cont.}]_1 \quad (\#) \quad [-\text{ strident, } +\text{ cont.}]_2$

SC: $[-\text{ cont.}]_1 \qquad\qquad [-\text{ cont.}]_2$

(where 1 = 2)

(For justification of transformational rules in phonology, see Chomsky & Halle [1968].) The parenthesized word boundary is required since two sequential spirants agreeing in point of articulation become geminate stops across morpheme and word boundaries as illustrated in (32):

(32) Tamaziγt (Aït Ndhir)

a. /#θ+axam+θ##θ+axaθar+θ#/ → [θaxamttaxaθarθ]

'tent' 'big' 'the big tent'

(θ##θ = tt)

b. /#aδ+ð##l+aweḏ##muḥa#/ → [add yaweḏ muḥa][17]

fut.dir. arrive Muha 'Muha will arrive over here.'

Moreover, the examples given in (16) above, illustrating the fact that some Arabic loan words occur with phonetic non-geminate stops, indicates that the spirantization rule, if posited, is no longer an obligatory rule. If words with a phonetic spirant are represented with a stop, one would no longer have to treat these loan words as exceptions

[17] Dir = directional particle. It is used with verbs of motion to indicate the direction of the movement. It could be translated as 'over here' or 'towards here'.

or marked as [+ foreign] or [+ late loans]. If these words are marked as [+ foreign] and the other Arabic loans are not so marked the diacritic would merely be another way of stating [- rule X] and would falsely differentiate between the loans in the language. If instead the [+ late loan] feature were used as the diacritic, this would also be a false representation since there is no justification for determining the relative dating of such loans, given that there are no written documents to support such a classification. Furthermore, speakers learning the language would certainly not have access to such knowledge. What they do have access to is the phonetic pronunciation of these forms. The solution with underlying spirants, then, permits us to account for the loan words which do not undergo spirantization in a simple way; whenever a word in the lexicon includes a simple stop in its matrix it must be a loan word from Arabic or French.

The solution whereby non-strident geminates occur phonemically in non-alternating forms also suggests a possible direction for changes which may occur in the language. There is already a trend in some dialects to reduce the geminates. Thus, the stressed form of the third person pronoun netta 'he', which has a geminate stop, is more and more being pronounced as enta . This is also observed in the feminine nouns ending with geminate tt , for example, θaḥanutt vs. θaḥanut 'shop' and θaxbutt vs. θaxbut 'little hole'. One may hypothesize that the next step for Berber is to simplify geminates into simple stops. Thus, instead of a surface contrast between θ and tt , which in some cases would both be derived from /θ/, the new contrast between θ and t would simplify the alternation rules and, possibly in the future, lead to a rephonemicization whereby there would be a contrast between /θ/ and /t/.

One might speculate further that an inverse rule inversion will take place whereby the spirants are once more derived from the simple stops. Using Vennemann's notion of rule inversion [Vennemann 1972] we can describe the Berber situation as in (33), where t is taken to represent stops.

(33) Stage I /t/ /tt/
(no rule)
Stage II /t/ /tt/
(rule: /t/ → [θ], if non-geminate)
Stage III : /θ/ /tt/
(rule: /θ/ → [tt] in the I.F.)
Stage IV /θ/ /tt/
(no rule)

Between Stage III and the predicated Stage IV there is likely to be a stage where the rule is θ → [t] in Intensives, etc., due to degemination. So the rule loss would actually affect this rule, rather than the original inverse rule.[18]

Similar conversions of contrast have been observed in numerous languages; they are the historical basis of 'consonant gradation' (as in Finnish) and have been called 'drag chains' [Martinet 1955; King 1970] We are therefore justified in expecting such a conversion of contrast in Berber, i.e. in predicting degemination and rephonemicization.

5. Conclusion

The standard theory of generative phonolgy [Chomsky and Halle 1968] does not provide the basis for a choice between the two solutions outlined above. The evaluation metric, even if we knew how to apply it in all cases (e.g. in choosing between rewrite and transformational rules), would not necessarily choose the solution with stops over that with spirants, although the second solution would be to some extent simpler, in that loan words would not have to be marked as exceptions to a spirantization rule. Dependence on the theory of markedness or putative implication universals should only be resorted to when the solution so based is more predictive and more in keeping with the language data. The more

[18] The rule in Stage III is what Vennemann would call a 'partial inverse rule'. Indeed it is the 'partial inverse rule' of the rule given in Stage II. This mechanism of grammar change, for which Vennemann coined the term 'rule inversion', has been shown convincingly to obtain in Chadic in an article by Russell Schuh [1972].

concrete solution (such as would be required by constraints similar to those proposed by Vennemann [1972] and [1973]) seems to meet the criteria of descriptive adequacy better than does the solution positing underlying single stops. It seems clear that the theory must be strengthened (made more explanatory) by weakening it, i.e. by including constraints which force us to 'hug the phonetic ground' when a choice is to be made between 'non-unique' solutions.

REFERENCES

Bach, Emmon. 1968. "Two proposals concerning the simplicity metric in phonology", Glossa 2:128-149.

Basset, André. 1929. La langue berbère, morphologie, le verbe. Paris: Leroux.

Basset, André. 1952. La langue berbère. Oxford: International African Institute.

Bisson, Paul. 1940. Leçons de berbère tamazight. Rabat: Moncho.

Chomsky, N. and M. Halle. 1968. The Sound Pattern of English. New York: Harper and Row.

Dallet, J. M. 1953. Le verbe kabyle: parler des At-Mangellat. Alger: Fort National.

Foley, James. 1969. "Phonological distinctive features", Folia Linguistica 4:87-92.

Hooper, Joan. 1973. Aspects of Natural Generative Phonology. Unpublished doctoral dissertation, University of California, Los Angeles.

Hyman, Larry. 1970. "The role of borrowing in the justification of phonological grammars", Studies in African Linguistics 1:1-48.

Jakobson, Roman. 1968. Child Language, Aphasia and Phonological Universals. The Hague: Mouton.

King, Robert D. 1969. "Push chains and drag chains", Glossa 3.3-21.

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

Kisseberth, Charles. 1970. "On the functional unity of phonological rules", Linguistic Inquiry 1.3:291-306.

Koutsoudas, Andreas, et alia. 1971. "The application of phonological rules", (to appear in Language).

Labov, William. 1972. Sociolinguistic Patterns. Philadelphia: University of Pennsylvania Press.

Laoust, Emile. 1918. Etude sur le dialecte des Ntifa. Paris: Leroux.

Laoust, Emile. 1939. Cours de berbère marocain: dialecte du Maroc Central. Paris: Paul Geuthner.

Loubignac, Victorien. 1924. Etude sur le dialecte berbère des Zaian et Ait Sgougou. Paris: Leroux.

Martinet, André. 1955. L'économie des changements phonétiques. Berne: Francke.

Mercier, Henri. 1937. Vocabulaires et textes berbères. Rabat: Céré.

Penchoen, Thomas G. 1973. Tamaziyt of the Ayt Ndhir. In Afroasiatic Dialects, Vol. 1, Berber, edited by W. Leslau and T. G. Penchoen. Los Angeles: Undena Publications.

Postal, Paul. 1968. Aspects of Phonological Theory. New York: Harper and Row.

Renisio, A. 1932. Etude sur les dialectes berbère des Beni Iznassen, du Rifet des Senhaja de Srair. Paris: Leroux.

Schane, Sanford. 1968. "On the non-uniqueness of phonological representations", Language 44:709-716.

Schuh, Russell. 1972. "Rule inversion in Chadic", Studies in African Linguistics 3:379-397.

Shibatani, Masayoshi. 1973. "The role of surface phonetic constraints", Language 49:87-106.

Stanley, Richard. 1967. "Redundancy rules in phonology", Language 43: 393-436.

Ultan, Russell. 1970. "Some sources of consonant gradation", Working Papers on Language Universals 2, Stanford University.

Vennemann, Theo. 1972. "Rule inversion", Lingua 29:209-242.

Vennemann, Theo. 1973. "Phonological concreteness in natural generative grammar". Ms.

APPENDIX I

Regarding the variation in the spirantization of underlying k's in spirantizing dialects (cf. Sec. 3 above), Tom Penchoen (personal communication), upon returning from a field trip, offers the following observation concerning possible conditioning factors for the changes k → ç and k → š in Tamaziγt: k goes to ç 1) when followed by an u (e.g. takurt → θaçurθ 'ball'); 2) in words containing s , z , š , ž whether adjacent to k or not (e.g. aksum → açsum 'meat'; cf. however my proto-Berber form for 'meat' in (14); ekrez → eçrez 'to plough'); 3) in verbs preceded by the causative prefix ss (e.g. kneḍ 'to burn' [+ intrans.] → sseçneḍ 'to burn' [+ trans.]). Apart from these cases, k → š. It should be emphasized that this observation, if it obtains, would apply only to Tamaziγt, because Tirifiyt, for instance, has weakened k's into š's in words containing š (e.g. ašsum 'meat', cf. (14) above). And even within Tamaziγt the weakening of k's in some dialects (Aït Izdeg and Zaian, for instance) is not governed by the conditioning factors mentioned above. Aït Izdeg (cf. Mercier [1937]), a dialect in transition (i.e. not totally spirantizing), exhibits the following facts: 1) Some k's do not go to ç's when followed by an u (e.g. afešku 'utensil', not *afesçu ; akuz 'weevil', not *açuz). 2) Some k's go to ç's before (or after) any other vowel (e.g. açabar 'caravan' < akabar ; açniw 'twin' < akniw ; içfer 'turtle' < ikfer). 3) k's go to ç's in words containing consonants other than s , z , š , ž (e.g. açtay 'remembrance' < aktay ; imçra 'tenants' < imkra ; eçti 'to remember' < ekti). 4) Aït Izdeg has alternative pronunciations for some morphemes (e.g. tafuçt and tafušt 'sun'; areçtu and arештu 'dough') as well as instances of just š < k (e.g. ašal 'earth' < akal; ašer 'to steal' < aker; šraḍ 'three' < kraḍ). These are but a few facts which indicate that the weakening of k to ç and to š does not seem to be conditioned in Tamaziγt (Aït Izdeg). This is particularly interesting in that, if there is conditioning, one would expect to find it to be operative in a dialect in transition such Aït Izdeg and not in the most advanced spirantizing dialect (Aït Ndhir)

on which Tom Penchoen's observation was apparently based. And even the Ait Ndhir dialect exhibits some instances of k → š before u (e.g. ağašu 'shoe' < adaku) and k → š in words containing š for instance (e.g. ašrǐš 'associate' < asrǐk).

Space not permitting, I will not go into the Zaĭan dialect of Tamaziɣt, a more advanced spirantizing dialect than Aĭt Izdeg, but a look at the data (cf. Loubignac [1924]) will also indicate that there are no statable conditioning factors for the different weakenings of k's. Moreover, a solution to this problem would be incomplete unless the other velar, g , is included. For, if the weakening of k is conditioned, one would expect a similar conditioning to obtain for g as well, since g sometimes weakens to j , other times to ž , and still other times into ɣ. As for the other stops there is, so far as I know, no conditioning factor for their spirantization other than the one repeatedly mentioned in the main body of the paper, namely, that they must be non-geminate.

Tom Penchoen's observation has since been included in his newly published grammatical sketch on Tamaziɣt [1973:26], though the observation is restricted there to the Aĭt Ndhir dialect only.

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ON THE DYNAMICS OF VELARIZATION AND LABIALIZATION: SOME BANTU EVIDENCE[1]

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1. Introduction

In the literature the term 'secondary articulation' is used in two senses:

(i) It frequently serves as a descriptive, classificatory tag, denoting the structure of segments such as k^w and p^y ; cf. Abercrombie [1967:61]: "...there are occasions when it is necessary to draw attention to aspects of the vocal tract other than place and manner of the stricture, and when this is so, we do it in terms of secondary articulations...We have here...another dimension of classification for segments...." Compare also Ladefoged [1971:59]: "Sounds can also be modified by secondary articulations which occur at the same time as the primary articulations."

(ii) Chomsky and Halle [1968:307 ff.] account for sense (i) but point out that (i) is the result of a PROCESS, viz. regressive assimilation (cf. for instance [1968:308]). We shall be attending primarily to sense (ii) in respect to labialization and velarization.

The strict sense of velarization (labialization) is: regressive assimilation of a consonant to the velarity (labiality) of the following sonorant. The regressive assimilation triggers a whole train of processes, and velarization (labialization) will frequently be used in this sense: a whole set of processes resulting from velarization proper (labialization proper). The main factors of velarization and

[1]Professor E.B. van Wyk has read and commented on an earlier draft. I have benefited greatly from numerous suggestions by Professors Larry Hyman and Thomas Hinnebusch. My thanks to each of these gentlemen; the responsibility remains my own, naturally.

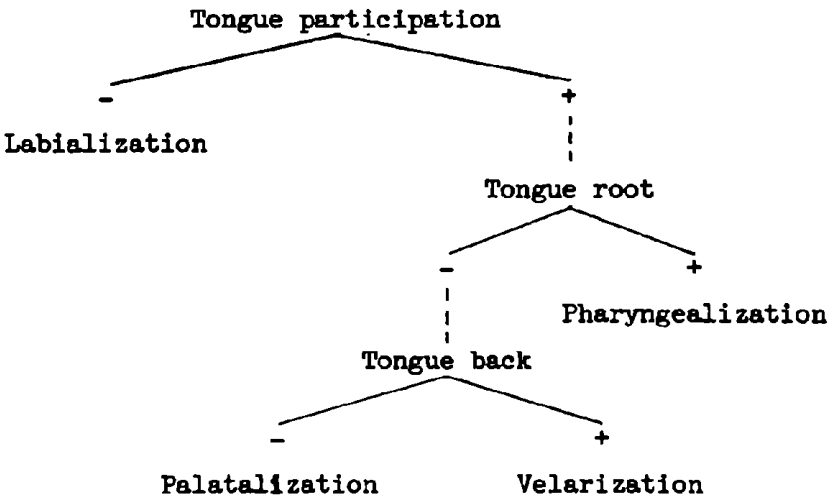
labialization viewed as functionally unified sets of different processes are regressive assimilation (velarization and labialization proper) and narrowing (also called hardening):

(1)

Velarization	
p	
p^{m}	Velarization proper
pf	Narrowing (Fricativization)
Labialization	
k	
k^{w}	Labialization proper
kp	Narrowing (Closure)

In terms of tongue body participation the secondary articulations may be classified as follows:

(2)



This classification is formally reflected as follows [Chomsky and Halle 1968:306, 310]:

(3)

Labialization:	[+ round]	i.e. $[k^{w}]$
Pharyngealization:	[+ low, + back]	i.e. $[p^{p}]$
Velarization:	[+ high, + back]	i.e. $[p^{m}]$
Palatalization:	[+ high, - back]	i.e. $[p^{y}]$

Such a classification is not an adequate reflexion of the similarity and complementarity of labialization and velarization:

(4) (i) Both are [+ grave] superimpositions.
(ii) Labialization is initiated with velars and velarization with labials.
(iii) Labialization may result in velar segments and velarization in labials.

The ambivalence of [+ round] seems to be part of the problem. This feature is characteristic of vowels and is related to [+ anterior, - coronal], i.e. [+ labial] in consonants. The problem is explored in Vennemann and Ladefoged [1972] and in Reighard [1972].

A secondary articulation is a type of regressive assimilation. This has been substantiated for labialization, velarization and palatalization, but not, as far as I know, for pharyngealization. Palatalization and pharyngealization are excluded from further consideration.

I shall try to account for the following main features of labialization and velarization:

(5) Labialization: gwa > gba > βa (gθa)
Velarization: bwa > bga > ga

Labialization is initiated with velars and velarization with labials. In both processes the secondary articulation is hardened, i.e. develops (maximally) into a closure. Finally, the processes may result in single segments, velars in the case of velarization and labials (implosives and, rather peripherally, clicks) under labialization.

2. Shona Velarization

2.1. Velarization as regressive assimilation. Velarization is a process of regressive assimilation under which a consonant takes on the velarity of a following [+ grave] sonorant. The process progresses dimensionally along the axes of place and manner of articulation: (i) labials are affected before linguals, (ii) glides are converted to obstruent glides, then to fricatives and finally to stops.

My data are drawn almost exclusively from Doke [1931], the extensive pioneering study of the process. In Bantu velarization manifests itself most clearly in Shona, especially the Zezuru dialect of Central Shona, but is attested also in Venda, Rundi, Nyiha, Tumbuka and Mang'anja. Its occurrence in Sotho and Nguni is subject to debate, but cf. Ponelis [1973].

The fact that velarization is phonologically a process of regressive assimilation is obscured in much of the literature, since on the one hand the w causing velarization is considered extraneous and on the other hand Doke's statement of the process seems to be at variance with its regressive assimilatory nature.

2.1.1. The status of w. Chomsky and Halle [1968:310] state that "Labialization combines quite commonly with velarization...." Trubetzkoy [1969:137-8] distinguishes between the correlation of full gutturalization (i.e. extreme velarization) and the correlation of labiovelarization. Trubetzkoy and Chomsky and Halle obviously follow Doke [1931:109 ff.], who distinguished between 'plain velarization', and 'velarization with semi-vowel', as in (6) below. The latter process is viewed by Trubetzkoy and Chomsky and Halle to be a product of velarization combined with labialization.

(6) a. Plain[2]

pkera	'child'	rambɣe	'buffalo'
pkisa	'absorb'	semŋa	'be hated'
kupkera	'to suckle'	mŋene	'owner'
bɣaŋa	'crush'	mŋara	'flint'
rušambga	'accident'		

[2]These are all Zezuru forms. ɣ is a voiced palatal fricative. Other graphs used elsewhere in the text are ɸ, a voiceless palatal fricative (the congener of ɣ); $\widehat{w}$, $\widehat{ɣ}$ and $\tilde{w}$ are used to indicate extremely narrow glides, respectively voiced, voiceless and nasalized. The term 'obstruent glide' will be used to characterize this set of segments collectively.

(6) b. With semi-vowel

tkwana	'little children'	tanŋwa	'be picked'
utkwu	'these'	rɬwa	'fight'
tkwaenda	'they travelled'	rɬwadza	'pain'
dɬwe	'drip, of rain'	biskwa	'be removed'
tandɬwa	'be driven away'	skwera	'spend the time'
kunŋwa	'to drink'	izɬwi	'word'
munŋwe	'finger'		

Clearly pk and tkw do not illustrate two distinct processes, viz. velarization as opposed to 'labiovelarization' but merely belong to different steps in the same velarization processes. Velarization affects labials first, hence they would be first to undergo a subsequent step, i.e. dropping of w . Doke gives very few examples[3] of velarized labials in combination with w , whereas all his examples of 'velarization with semi-vowel' contain dental and alveolar segments.

2.1.2. Doke's statement of the process. "Velarization is brought about by an abnormal raising of the back of the tongue towards the soft palate ..., instead of the usual slight raising effected in pronouncing the velar semi-vowel w "[Doke 1931:109]. A phonological explanation of this abnormal raising of the back of the tongue would necessarily entail assimilation to the preceding obstruent or nasal. This seems to be extremely plausible but conflicts with the conception of velarization as a regressive assimilatory process. The matter may be cleared up if Doke's definition is taken to apply to a later step in the process. First a consonant takes on the velarity of a following sonorant: C → C^{w} ; then C^{w} → Cw by other rules and Cw → C$\overset{\circ}{w}$ by Glide Narrowing.

On the surface Doke's Narrowing (= abnormal raising) analysis seems to handle the facts quite elegantly. This would derive the Tavara form -pɸa 'dry up' in the following way: -pwa 'dry up' → -pɸa (by Narrowing). The glide /w/ is narrowed ultimately to a voiceless palatal fricative ɸ .

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[3]These examples involve nasals. Their significance is discussed below.

This analysis, however, does not predict the Korekore form -φwa , where the glide is retained ; hence φ requires a different explanation. The derivation of this particular form is given at the end of the section on velarization (sec. 4). It briefly amounts to the following: -pwa 'dry up' → -pφwa (by Velarization, etc.) → -φwa (Cluster Initial Deletion).

The velarization analysis proposed in this paper also accounts for forms such as the following (where nonlabial segments precede the glide) -batwa 'hold' → -batφwa , twana 'little children' → tkwana (cf. (6) for more examples). The Narrowing analysis cannot explain the 'extraneous' φ and k .

2.2. Initial domain and spread of velarization. Velarization in Shona is induced by w , arising from Proto Bantu *uV becoming wV : *bua > bwa .[4]

(7)

-pú-	'dry up'[5]	>	-pφa , -pka
-búa-	'dog'	>	-bwa , -bɥa , -bga
-dúád-	'become ill'	>	-rwara , -rɥwara

2.2.1. The affected segments. The data allow only a few suggestions.

(8) a. $\begin{bmatrix}+\text{ ant}\\-\text{ cor}\end{bmatrix}$ precedes $\begin{bmatrix}+\text{ ant}\\+\text{ cor}\end{bmatrix}$

Labials precede alveolars.

b. [- son] precedes [+ son]
[p , b] precede [m].
[t , s , r , z] precede [n].

c. [- voice] precedes [+ voice]
[p] precedes [b].

---

[4] Proto Bantu *ɥ induces labialization, a rule that precedes velarization in time.

[5] The Bantu proto citations are taken from Guthrie [1967, 1970, 1971]. Guthrie lists his starred forms by a C.S. (= Comparative Series) number; these are not indicated here since the items are arranged alphabetically and can be easily located.

That labials precede alveolars has already been pointed out in sec. 2.2. above. It follows from an inventory such as Stevick's [1964:59] for Manyika:

(9) bɣ dw gw
px tw kw
mŋ nw

The labial series has already reached an advanced stage of velarization, fricativization and closure, whereas the other series still have w .

The evidence for the primacy of obstruents (8b) is rather scant and consists of two sets of free variants which have not undergone w - Absorption: Korekore: -yamwa ~ -yamŋwa 'suck'; ŋwana ~ mŋwana 'child'. Doke notes furthermore that -yamŋwa is "unique in its occurrence" [Doke 1931:113].

Closure (8c) seems to be lagging with the voiced labial b so that there are more fricativized forms than with p [Doke 1931:110-11]. Thi might indicate that velarization is initiated later in voiced segments.

2.2.2. The following vowel. Lanham [1955:46] points out that velarization (in Tonga) is favored before a , fluctuating before e and nonexistent before i . Hence there is a clear preference for the lower vowel. Doke's data confirm this: the vast majority of velarized clusters occur before a . This state of affairs might be ascribed to the process of gliding preceding velarization: vowels become glides first before low vowels.

2.3. The processes of velarization. The following rules are hypothesized: Velarization, Segmentation, Glide Narrowing, Fricativization, Backing, and Closure. Rules such as w -Absorption and Cluster Initial Deletion interact with those in the Velarization block but do not form part of it.

Doke [1931:110] gives the following steps, which are correct, minor details aside:

(10)	pwa	bwa	mwa
	pŵ̥a	bŵa	mw̃a
	pφa	bɣa	
	pka	bga	mŋa

2.3.1. Velarization. Underlying the account in 2.2. is the concept of precedence central to implicational spread. The velarization rule below (cf. 11) reflects the spirit of Chomsky and Halle [1968]: it is static and discrete. The rule is static in the sense of merely giving a picture of the outcome instead of the dynamics of the process (i.e. where it starts and in which direction it is heading). The discreteness of the formalized rule is above all a function of the way place of articulation is handled within the system of Chomsky and Halle. This might be remedied by the introduction of scalar features [Vennemann 1972] and a return to the traditional place of articulation continuum [Chen 1971:30-1].

Be that as it may the theory should allow for a precedence statement such as: Under velarization an obstruent with maximum (= maximally available) frontness takes on the color of the maximally back and high vowel following. Other precedence relations in this process include [- voice] >> [+ voice], [- son] >> [+ son];

(11) Velarization

$$[+\text{ant}] \rightarrow \begin{bmatrix} +\text{high} \\ +\text{back} \end{bmatrix} / \ \_\_ \ \begin{bmatrix} +\text{son} \\ +\text{high} \\ +\text{back} \end{bmatrix}$$

$$\left.\begin{matrix} p \\ b \\ m \\ r \\ t \end{matrix}\right. \rightarrow \left.\begin{matrix} p^{ɯ} \\ b^{ɯ} \\ m^{ɯ} \\ r^{ɯ} \\ t^{ɯ} \end{matrix}\right. / \ \_\_ \ w$$

The vagaries of the velarization inducing glide w will be left aside. The justification for its occurrence has been given in sec. 2.1. above. Compare 2.3.4. below for some remarks on w -Absorption.

2.3.2. Segmentation. The non-simultaneity of [+ high, + back], i.e. the velarization, is abundantly clear from more advanced stages, where the velarization is manifested as a segment following the velarized segment, cf. forms such as tkwana , utkwu , etc. in (6) above, where k is the reflex of earlier velarization. Doke [1931:111, fn. 13] remarks that bg may even be realized as [bᵊg]. Evidently a rule such as (12) is necessary:

(12) $\begin{bmatrix} +\text{ ant} \\ +\text{ high} \\ +\text{ back} \end{bmatrix} \rightarrow [+\text{ ant}] \begin{bmatrix} +\text{ high} \\ +\text{ back} \end{bmatrix}$

The forms Nambzya pw̥a 'dry up', Unyama mbŵa 'dog', Zezuru mw̃ana 'child', and Njanja nw̃a 'drink', contain obstruent glides which are rounded. The change in rounding, i.e. ^{w} becoming w , is probably attributable to the same universal marking convention concerning Round in vowels that are [+ high, + back]. In sum, then, C^{w} becomes Cw by Segmentation and Rounding Adjustment.

2.3.3. Hardening. Glide Narrowing, Fricativization, Backing and Closure are all aspects of Hardening.[6] These rules are obviously well spaced in time, hence it is tempting to assume an 'inner teleology' or global process within the development. Assimilation alone does not explain it all, since w becomes k even after s . Greenberg [1971:344] has noted that Saussure cannot account for the linguistic counterpart of the Sicilian Defense in chess. This may be interpreted as an implicit plea for the introduction of teleological considerations. The elements of the Sicilian Defense metaphor are to me the following: (a) It is not only states, but also processes that matter. (b) The Gestalt of a given process is not revealed in a specific state or even succession of states. A process is a dynamic entity. (c) Processes are not blind (like Neogrammarian sound laws) but operate in a specific way and in a specific direction (asymmetrically, cf. Chen [1971]).

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[6] It is not at all unreasonable to assume that the problems concerning the functional unity of Hardening might be solved by a dimensional (and nondiscrete) interpretation of phonological categories. The matter will not be pursued any further here.

Chomsky and Halle [1968:308] state that "...the degree of narrowing is determinable from other features of a particular sound." This is correct, with the exception of the obstruent glides; cf. sec. 2.3.3.1. below. However, this statement may also be taken to mean that the degree of narrowing is a high order feature determining the sound type. The fact that there is a change in sound class, then, follows from a change in stricture. There is no way to reflect this directly in the current formalism. Progression within a dimension (stricture/manner of articulation) rather than discrete change of category seems to be involved (cf. also sec. 2.3.3.1. below).

Another question is whether the degree of narrowing is predictable from the preceding segment (which induces the narrowing). There is no such regularity in the Shona data--suggesting that narrowing progresses on its own along the stricture dimension--but Chomsky and Halle [1968: 310-11] discuss a few cases where narrowing is indeed predictable in this way.

2.3.3.1. Glide Narrowing. This is ostensibly a rule assimilating voicing and nasality:

(13) Glide Assimilation

$$[+\text{ son}] \rightarrow \begin{bmatrix}\alpha\text{ voice}\\ \beta\text{ nasal}\end{bmatrix} \;/\; \begin{bmatrix}\alpha\text{ voice}\\ \beta\text{ nasal}\end{bmatrix} \;\_\_$$

However, the actual result is an extremely narrow obstruent glide $\hat{w}$ or $\hat{\underset{g}{w}}$. Within the current formalism the glides in question may be represented as follows:

(14)

	w	$\hat{w}$	$\hat{\underset{g}{w}}$	$\tilde{w}$	x	o
high	+	+	+	+	+	+
back	+	+	+	+	+	-
son	+	+	+	+	-	-
nasal	-	-	-	+	-	-
voice	+	+	-	+	-	-

This is unsatisfactory on the following counts: (i) w and $\hat{w}$ are not distinguished. (ii) It fails to bring out the relatedness of $\hat{w}$, $\hat{\underset{g}{w}}$,

$\tilde{w}$ as opposed to w .

Doke [1931:109] notes the narrowness of these segments on account of "an abnormal raising of the back of the tongue". It is not possible to express this in a rule such as the following:

(15) Glide Narrowing

$$\begin{bmatrix} +\text{ son} \\ +\text{ round} \end{bmatrix} \rightarrow [-\text{ son}]$$

This has the effect of changing w to x^w or γ^w instead of yielding the required outputs $\hat{w}$, $\hat{\underset{\circ}{w}}$ and $\tilde{w}$. It is not at all clear to me how the formalism could be modified to accommodate obstruent glides and capture the correct generalization.

2.3.3.2. Fricativization. This rule turns the voiceless and voiced obstruent glides $\hat{\underset{\circ}{w}}$ and $\hat{w}$ into fricatives, i.e. φ and χ :

(16) Fricativization

$[\hat{\underset{\circ}{w}}] \rightarrow [\varphi]$

$[\hat{w}] \rightarrow [\chi]$

Notice that the resulting fricative is a palatal and not a velar.[7] A possible explanation is fronting of w under Narrowing.

2.3.3.3. Backing and Closure. These are necessary to account for k , g h , ɦ < φ , χ ; cf. Karanga pɑa : Zezuru ipka 'sweet reed'; Zezuru imbχa : Hera imbga 'dog'; Korekore iφwa ~ ihwa 'sweet reed'; Korekore -ɦwa 'fight' < -rχwa . [h , ɦ] arise from the weakening of [x , γ]. The rules for these processes are stated as (17) and (18) respectively:

(17) Backing

$$[-\text{ back}] \rightarrow [+\text{ back}] \; / \; \begin{bmatrix} \overline{\quad} \\ +\text{ cont} \\ +\text{ high} \end{bmatrix}$$

i.e. $\varphi \rightarrow x$, $\chi \rightarrow \gamma$

[7] In Ladefoged [1968:32] a palatal fricative is attested under labialization.

(18) Closure

$$[+\ \text{cont}] \rightarrow \begin{bmatrix} -\ \text{cont} \\ -\ \text{round} \end{bmatrix}$$

i.e. x → k , ɣ → g , w̃ → ŋ

2.3.4. Other rules. There are a number of rules interacting with the velarization process, including w -Absorption, Stop Assimilation, Cluster Initial Deletion, Palatalization, and Weakening. These fall beyond our scope. w -Absorption has been mentioned in sec. 2.1. It depends on a number of factors, including the following:

(i) The nature of the cluster initial segment: w drops more readily (sooner) when this is a labial: Manyika pɸwiza > pɕiza 'giraffe'; Zezuru mŋwara > mŋara 'flint'. In this, the initial form of w -Absorption, the labial glide is absorbed into the labiality of the cluster initial, hence the name of the rule.

(ii) The operation of Cluster Initial Deletion hinders w -Absorption: Korekore iɸwa < ipwa 'sweet reed', cf. Zezuru ipka ; Korekore [-ɦwara] < -rwara 'be ill', cf. Budya -rwara . In these cases p and r respectively have been deleted and the glide has been retained.

However, the following Chopi and Venda forms have undergone both w -Absorption and Cluster Initial Deletion: Chopi: -gela < *-búéd- 'tell'; Venda: ɦalwa < bwalwa 'beer', ɦatsi < bwatsi 'grass', ɦana < bwana 'childhood'.

Further examples and derivations illustrating these processes are given in Appendix I.

3. Labialization

3.1. Introduction. Under velarization labial obstruents may become doubly articulated labiovelars and ultimately simple velars. It is hypothesized that labiovelar (and labial) obstruents in a variety of languages may be explained by the complementary processes of labialization, cf. *kua , *gua > k͡pa , g͡ba in a number of nonBantu Niger-Congo languages; *kʷa , *gʷa > pa , ba in some Indo-European languages; and *kua , *gua

etc. fa , va over an extensive part of the Bantu field.

3.2. The steps in labialization. The various steps in labialization are not instantiated as profusely as those in velarization. Analogous to velarization the following intermediate stages are assumed.

(19)

A	B[8]	
gwa	gwa	
$g^{w}wa$	$g^{w}wa$	1. Labialization
$g^{w}a$	$g^{w}a$	2. Glide Absorption
gwa	gwa	3. Segmentation
$g\hat{w}a$	$g\hat{w}a$	4. Glide Narrowing
gβa	gβa	5. Fricativization
-	gva	5a. Fricative Adjustment
gba	-	6. Closure
gba	g_{va} , ^{b}va	7. Subordination of inner closure
ba	va	8. Elimination of inner closure

3.2.1. Step 1: Labialization proper. The skeletal formalization of this process is:

(20) $C \rightarrow [+ \text{round}] / \_\_ \begin{bmatrix} + \text{son} \\ + \text{round} \end{bmatrix}$

(a) The conditioning environment. Proto Niger-Congo items with the canonical form *Cua are reflected as labiovelar stops in a number of daughter languages, whereas *Cu never is (cf. Westermann [1927:197 ff.] and sec. 3.2.6. below). Hence I take it that gliding converts *Cua to *Cwa before labialization sets in and that glides precede vowels in the hierarchy of this rule. In Bantu (cf. sec. 4. below) labialization operates before glides as well as vowels but the reflexes give no indication of the early precedence relations.

(b) The domain affected. The prime focus of labialization is on velars. Ladefoged [1968:5-13] almost exclusively cites labiovelars such as kp and gb . Westermann's reconstructions [1927] indicate that only

[8] Column B represents the typical development in Bantu, cf. sec. 4. below.

*k and *g are affected. The incipient labialization documented in Doke [1931:124] is confined to the velar segment h (cf. Korekore hwuni < huni 'firewood' and sec. 3.2.3. below). The development of the Proto Indo-European labiovelars in languages such as Greek, Old Irish and Old Cymric is so typical of the full labialization process that an early PRIE labialization rule can be hypothesized without too much wishful thinking, cf. *kʷokʷ- 'bake' > Proto Old Cymric *popi , and *gʷen- 'wife' > Old Irish ben . The point is now that the PRIE labiovelars *kʷ , gʷ , gʷh are labialized velars: "Der idg. Phonemtyp wird...allgemein als ein Velar mit gleichzeitiger Lippenrundung definiert..." [Szemerényi 1970:55].

Part of the Wichita stop system [Hockett 1955:102] is:

(21)
	t	k
		kʷ

It appears that the labial hole in the stop pattern is on the verge of being filled by a labialized velar.

The comparative Bantu evidence indicates the full extent of the process, all points of articulation being affected, but allows no conclusions regarding the implicational spread due to the great age of the process (cf. sec. 4. below).

(c) The labialization. It is not easy to decide the precise status of the [+ round] feature in the structural change of the rule. The rounding presumably extends through the whole of the consonant. This is clearly demonstrable in Sotho, where all linguals are rounded before rounded sonorants. The labialization is manifested as an extreme rounding affecting a given segment from beginning to end; cf. the following Northern Sotho forms where the rounding is signified by a raised ɣ :

(22)
[tšhɣukɣudɣu]	tšhukudu	'rhinoceros'
[-rɣoka]	-roka	'sew'
[-lɣoma]	-loma	'bite'

It seems, however, that the rounding may--and usually does--develop into an offglide. Hence:

(23) $\underset{[+\text{ round}]}{C} \rightarrow [C^{w}]$

$[C^{w}]$ is a segmental polyphthong (cf. sec.3.2.6. for discussion). The PRIE labiovelars instantiate this stage. In Sotho original clusters of lingual consonant and w are converted to C^{w} via labialization:

(24)

C	w	a	
C^{w}	w	a	Labialization
C^{w}		a	Glide Absorption

The $[^{w}]$ offglide is not by any means a separate glide but a rounded transition to the following nonround vowel, cf. Northern Sotho $[-š^{w}ɛu]$ -šweu 'white', $[-r^{w}ala]$ -rwala 'carry'. Kunene [1961:120] notes the following:

> The element w, when occurring immediately after a consonant or consonant combination, is anticipated in the articulation of this sequence, imparting labial characteristics, in the form of lip-rounding, to this consonant or consonant combination, and itself persisting after the articulation of such consonant or consonant combination, and being released by the movement of the lips towards the position of the following vowel.

Kunene interprets the rounding as a glide following the rounded segment, a conclusion which does not necessarily follow, but we shall leave the matter at that.

3.2.2. Step 2 : Glide Absorption. Nothing much need be said about this: the glide is absorbed into the rounding of the labialized segment.

3.2.3. Step 3: Segmentation. Like Glide Absorption this is a prerequisite to later stages. No function is claimed for this rule other than the development of a rounded element following the consonant affected by labialization. In other words, this distinct element may be a full glide or even the rounded offglide mentioned above. The following Korekore forms attest to Segmentation [Doke 1931:124]: hunI > hwuni 'firewood', hope > hwope 'sleep', hono > hwono 'mole'.

3.2.4. Step 4: Glide Narrowing. Glide Narrowing is hypothesized but not instantiated.

3.2.5. Step 5: Fricativization. In Bantu, Narrowing is terminated at this point. Step 5a: Fricative Adjustment is a 'natural segment' rule: the most natural labial fricatives are labiodental.

3.2.6. Step 6: Closure and double articulation. Compare the reflexes of the following "Western Sudanic" (i.e. Proto Niger-Congo) forms [Westermann 1927:197 ff.]:

(25)

*guà	'zerbrechen'	:	Ewe gbà, gbã; Ga gba
*guà	'viel'	:	Ewe gbàgbàgbà 'sehr viel'; Nupe gbãgba
*-guſ-	'Leopard'	:	Dɛ̄ gbſ; Akassele -gbé; Bulom -gbe
*-guò	'Widder'	:	Ewe -gbò; Nupe -gbo
*-kua-	'Weg'	:	Beri -kpa; Nupe -kpa
*-kuì	'gross, viel'	:	Ewe kpſ; Santrokofi kpi

Compare also Greenberg [1966:16, 20, 21]: no. 14 'die', no. 30 'leopard', and no. 40 'skin'. Westermann [1930:21] points out that Dahomey Ewe has gw and kw in the place of Ewe gb and kp .

Ladefoged [1968:5-13] has given detailed descriptions of Step 6. The facts are complex and involve the timing of closures and releases, the direction of the airflow and the airstream mechanisms used (cf. sec. 3.2.7. below). The phonological interpretation of double articulations in Chomsky and Halle [1968] is singled out for closer scrutiny.

SPE phonology equates segment with monophthong--especially in phonological representations. For example, diphthongs are analysed as realizations of underlying tense vowels (cf. Chomsky and Halle [1968:183]). The rule there does not reveal the exact nature of a diphthong, i.e. that it is a unitary vocalic segment with an acoustic structure that varies in time. The output of the SPE Diphthongization Rule is: [I] [y], [ū] [w], i.e. sequences of two separate segments. Naturally this has the highly satisfying effect of constraining the theory in such a way as to preclude different (not to say contradictory) feature specifications within a single segment. In the cases above the opposite specifications [+ voc] and [- voc] are assigned to two distinct segments:

(26) $\overset{T}{[+\text{ voc}]}\ \overset{y}{[-\text{ voc}]}$ ' $\overset{\bar{u}}{[+\text{ voc}]}\ \overset{w}{[-\text{ voc}]}$

A monosegmental interpretation is forced to assign these opposite values to one and the same segment:

(27)
$$\left[\overset{T}{[+\text{ voc}]}\ \overset{y}{[-\text{ voc}]}\right]_{\text{Seg}}$$

Evidently, the unconstrained use of opposite features within a single segment may so seriously weaken a phonetic theory as to neutralize every theoretical claim it has to make. I should, however, like to plead the case of the constrained use of non-homogeneous feature specifications in a small range of cases, the segmental polyphthongs. Andersen [1972] has explicated the usefulness of such a concept in a wider context. His segmental diphthong is equivalent to segmental polyphthong as used in this study. Compare Andersen's definition [1972:18]: "...a single segment whose central phase is acoustically heterogeneous in its temporal development, rather than presenting a steady state".

A diphthong is a kind of vocalic polyphthong. Other polyphthongs include secondary articulated consonants, i.e. consonants with offglides: k^{y} , k^{w} , p^{w} ; affricates: ts , kx ; doubly articulated sounds such as $\widehat{gb}$, $\widehat{kp}$, and clicks. Only secondary and doubly articulated obstruents fall within our purview.

Notice that the alphabetic phonetic notation used here represents the relevant segments as polyphthongs. This, the binary feature system does not do:

(28)

k^{w}	$\widehat{gb}$
− cont	− cont
− voice	+ voice
+ high	+ high
+ back	+ back
+ round	+ round

This essentially timeless, monophthongal interpretation of all segments fails in the Nupe case reviewed in Chomsky and Halle [1968:311].

Historically, the Nupe labiovelars $\widehat{kp}$ and $\widehat{gb}$ are extremely labialized velars developing from *kwV and *gwV, cf. the beginning of this subsection and Westermann [1927:197 ff.]. Being doubly articulated segments--and the only two in the Nupe system--they are phonologically opaque from a synchronic point of view and could be either extremely labialized velars or extremely velarized labials.

Chomsky and Halle [1968] invoke the Nupe phonological system in order to decide the issue. They interpret $\widehat{kp}$ and $\widehat{gb}$ as extremely velarized labials. Consider the following. The phonological system of Nupe contains segments such as k and $\widehat{kp}$ and rules such as exemplified in (29):

(29) $/k\ ,\ \widehat{kp}/ \rightarrow [k^{w}\ ,\ \widehat{kp}^{w}]$

and palatalization:

(30) $/k\ ,\ \widehat{kp}/ \rightarrow [k^{y}\ ,\ \widehat{kp}^{y}]$

cf. [Smith 1967; Hyman 1970].

Specifying $\widehat{kp}$ as a velar with (extreme) rounding would fail to distinguish $\widehat{kp}$ from $\widehat{kp}^{w}$ (and $[k^{w}]$), since the only feature configuration available would be:

(31)
$$\begin{bmatrix} - \text{ ant} \\ - \text{ cor} \\ + \text{ high} \\ + \text{ back} \\ + \text{ round} \end{bmatrix}$$

The $\widehat{kp}$ x $\widehat{kp}^{w}$ distinction might be salvaged by rejecting the principle that "...the particular degree of rounding...can be determined by the phonological rules of the language..." [Chomsky and Halle 1968:311] and by specifying degree of rounding: p of $\widehat{kp}$ being, say [+4 round] and ^{w} of k^{w} and $\widehat{kp}^{w}$ [+1 round]. Nevertheless, no amount of juggling will save the $\widehat{kp}$ x $\widehat{kp}^{w}$ distinction since the feature [+ round] is reserved for the p portion.

By regarding $\widehat{kp}$ as a labial with extreme velarization, i.e.

(32)
$$\begin{bmatrix} + \text{ ant} \\ - \text{ cor} \\ + \text{ high} \\ + \text{ back} \end{bmatrix}$$

the k^w x $\widehat{kp}$ x $\widehat{kp}^w$ contrast is easily captured. However, the problem now is $\widehat{kp}^y$, the palatalized extremely velarized labial, since, as Professor Hyman (personal communication) points out, the velarization [+ high, + back] is incompatible with the palatalization [+ high, - back] in the same segment.

I submit that this particular dilemma is the result of an exaggerated insistence on the monophthongal nature of segments. Once this requirement is relaxed to allow a polyphthongal interpretation of double articulation the whole problem concerning the phonological opacity (are the segments velarized labials or labialized velars?) and the phonological representation of $\widehat{kp}$ and $\widehat{gb}$ in Nupe vanishes: synchronically they are neither labials with extreme velarization nor velars with extreme labialization but labiovelars: doubly articulated polyphthongs.

The processes of extreme labialization of k and extreme velarization of p may have precisely the same outcome: a labiovelar stop, written $\widehat{kp}$, which can only be:

(33)
$$\left[\begin{bmatrix} - \text{ cont} \\ - \text{ voice} \\ + \text{ high} \\ + \text{ back} \end{bmatrix} \begin{bmatrix} - \text{ cont} \\ - \text{ voice} \\ + \text{ ant} \\ - \text{ cor} \end{bmatrix}\right]_{\text{Seg}}$$

Furthermore, the existence of kp^y forces the acceptance of a hierarchical arrangement of polyphthongs with $\widehat{kp}$ as one unit and ^{y} as another:

(34)
$$\underset{\text{Seg}}{[\ [\widehat{kp}]\ ^y\ ]}$$

3.2.7. Step 7: Inner release and double articulation. In regard to the timing of releases in doubly articulated segments Chomsky and Halle [1968: 324] state:

> The order of release of the different closures is governed by a simple rule. In sounds without supplementary motions, the releases are simultaneous. In sounds produced with supplementary motions, closures are released in the order of increasing distance from the lips. The reason for this ordering is that only in this manner will clear auditory effects be produced, for acoustic effects produced inside the vocal tract will be effectively suppressed if the vocal tract is closed.

Compare the following remarks of Ladefoged on Kalabai $\widehat{gb}$ [1968:10]: "...the velar closure must have been completely released while the lips remained closed for a further 50 msec...." [Emphasis mine, FP].

This contravention of the Chomsky-Halle release principle accomplishes a subordination of one stricture to another: the g -stricture could eventually become a modification of b . The Chomsky-Halle principle could be extended in the following way to account for this: primary release of inner closures result in their subordination.

For Yoruba ɓ the following development may be hypothesized: $\widehat{gb}$ > g_b > ɓ .

(i) $\widehat{gb}$ is a doubly articulated, extremely labialized g .

(ii) g_b is a b with velaric action: when the inner stricture is released first it becomes secondary in terms of the extended Chomsky-Halle release principle.

(iii) ɓ is an implosive. Velaric action induces lowering of pressure in the mouth so that air flows into the mouth on release of the labial closure (cf. Ladefoged [1968:9]).

This conclusion is supported by the following considerations:

(i) Ladefoged [1968:6-7] has found that implosive ɓ in Igbo is not always implosive, the stable mark distinguishing it from b being velaric action (heightening of the back of the tongue). This may be a result of the transition from Step 2 to 3 above.

(ii) The large formant transitions of implosive ɓ are similar to those of g͡b [Ladefoged 1968:13, and Plate 4B].

(iii) In Soso, Ladefoged informs us [1968:14] that "...there is also a fully voiced g͡b which verges on the implosive".

(iv) Igbo has k͡p and ɓ but no g͡b [Ladefoged 1968:59]. It seems plausible that ɓ derives from g͡b if due consideration is taken of (i) above.

(v) If ɗ occurs, so does ɓ but not vice versa. A possible explanation is that ɓ arises from labialization of g , which, being a velar, leads the labialization process.

Greenberg [1970] gives three ways in which implosives arise, this being his second (1970:28-30).

The extended Chomsky-Halle release principle also accounts neatly for the development of the bilabial nasal click in Idoma [Ladefoged 1968:12] from an extremely labialized velar nasal:

(35) ŋʷ Labialization
ŋm Closure and double articulation
ᵑm Subordination of inner closure
ŋʘ Modification of primary (labial) closure

We may assume a similar development via double articulation and the subordination of inner closure for the Greek, Old Irish and Old Cymric labials from PRIE labiovelars, whereas Wichita kʷ is evidently on its way to [p] (cf. sec. 3.2.1(b)).

But a teleological explanation seems to be called for in view of the following symmetry:

(i) Velarized labials may result in velars. Compare the Chopi and Venda examples in sec. 2.3.4. above.

(ii) Labialized velars may yield labials, as implosive ɓ in Igbo.

Such changes could be described in terms of normal and extended versions of the Chomsky-Halle release principle, but in the end, the timing

of releases itself requires explanation. Could it not be that the 'velar' part of a velarized segment and the 'labial' part of a labialized segment bear some kind of 'focus'?

3.3. Labio-alveolar fricatives. These doubly articulated fricatives arise from combinations of labial (labiodental) fricatives and spirants. In Sotho (and Shona) the cluster itself arises from palatalization: fl > fsl > f͡sl .

(36) Shona

*-pik-	>		-f͡sika	'arrive'
*-pip-	>	Zez.	-f͡sipa	'become black'
*-bɨád-	>		-β͡zara	'bear child'
*bi- Class 8 IP	>		β͡zi-	

(37) Sotho

lefifi	> lefsifsi	> leswiswi	'darkness'
lefika	> lefsika	> leswika	'stone, rock'

This is progressive assimilation induced by a consonant and does not fall within the scope of the present account. Notice that Sotho goes one step further: the labio-alveolar fricative is changed to a rounded spirant: f͡s > sʷ (cf. Ponelis [1973] for details).

4. Labialization in Bantu

4.1. Introduction. The earliness of this rule in Bantu is reflected by the following.

(i) Labialization is attested in a wide variety of Bantu languages, including Rundi, Nkoya, Manyika, Pende, Sagala, Zulu and Bemba.

(ii) It functions before the 7 > 5 neutralization in the vowel system, e.g. Zulu: *b → v /__ ɥ ; ɓ elsewhere: *-bɥn- > -vun- 'harvest'; *-bumba > -ɓumba 'clay for pottery'.

(iii) Labialization precedes velarization in the languages where both rules are operative (e.g. Rundi). The interaction between these rules points to the following: (a) Velarization and labialization take place

before the highest back sonorant (vowel) available. (b) Stops take precedence over fricatives. Together, (a)+(b) explain the fact that when labialization changes *p and *b to fricatives before *ụ , velarization attacks the stops before *u (and not the fricatives before *ụ); cf. Rundi: *-bụ́n- > Rundi -vun- 'break'(tr.); *-bú́ɗ- > Rundi -byir- 'tell'

(iv) There is extensive neutralization of obstruents before ụ which is evident from the many cases of multivalence among Guthrie's reflexes. Generally:

(38) *p , t , k → f /__ ụ
*b , d , g → v /__ ụ

(v) The process covers a large and continuous area in the central to southern heartland of the Bantu field (cf. Topogram 14 in Guthrie [1967:79]).

4.2. Initial domain and spread of labialization. The assimilation determinant is the high back *ụ , the highest back vowel in the Proto Bantu four height system. Labialization Proper conceivably preceded Gliding, since no difference as to Labialization could be established between the environments /__ụ and /__ŵ , where ŵ developed from ụ by Gliding. Note however, that the glide undergoes Absorption in a number of languages, cf. the reflexes of *-kụ́a 'die':

(39)

No Glide Absorption (Bemba, Ila)	Glide Absorption (Nyoro, Zulu)	
k ụ a	k ụ a	
kʷ ụ a	kʷ ụ a	Labialization
kʷ ŵ a	kʷ ŵ a	Gliding
	kʷ a	Glide Absorption
pf w a	pf a	Narrowing, etc.
f w a	f a	Cluster Simplification

The affected segments are voiced and voiceless plosives, nasals remaining unaffected. All three primary Proto Bantu series--velars, alveolars and labials--participate in the process.

4.3. The processes of labialization. Since it is an ancient rule the stages are poorly attested in Guthrie's data. The rules above generate derivations such as the following:

(40)					
	pɥ	tɥ	kɥ	dɥ	
	pʷu	tʷu	kʷu	dʷu	Labialization
	pwu	twu	kwu	dwu	Segmentation
	pŵ̥u	tŵ̥u	kŵ̥u	dŵu	Glide Narrowing
	pfu	tfu	kfu	dvu	Fricativization
		pfu	pfu	bvu	Stop Assimilation
	Pfu	Pfu	Pfu	ᵇvu	Stop Subordination
	fu	fu	fu	vu	Stop Elision

The change *p , t , k → f and *b , d , g → v is not mere fricativization. Pure fricativization would have resulted in f θ x β ð ɣ .

Hardening goes no further than the fricative stage, hence pfu tfu kfu bvu dvu gvu do not develop further into *ppu tpu kpu bbu dbu gbu .

The Stop Assimilation and Fricativization stages are exemplified in Appendix II with forms from Guthrie [1967, etc.].

4.4. Rule interaction. Languages such as Nyekyosa [Guthrie 1971:56], Bemba [Guthrie 1971:57], Sagala [Guthrie 1971:47], Sango [Guthrie 1971: 51], and Zulu have reflex patterns such as the following:

(41)		-i	-ɥ[9]
*p	>	f	f
*t	>	s	f
*k	>	s	f

The fact that *p → f /__i might be explained by the following assumptions:

(a) Labialization and palatalization both spread from velars to labials, with palatalization trailing labialization (i.e. being initiated

[9]Details such as Bemba š for s are not reflected in (41).

after it).

(b) Labialization reaches the labial series first and spreads to labials before ¡ by phonetic analogy.

However, these assumptions are not borne out by Mambwe [Guthrie 1971: 56]:

(42)

		-¡	-ụ
*p	>	f	f
*t	>	s	s
*k	>	s	f

The implicational spread explanation above might be salvaged in the following way. Palatalization is the earlier rule, which spreads first to the alveolar series. Labialization then jumps the alveolar series while palatalization is still 'busy' there to operate on the labial series.

However, the data seem to point to the existence of an intensity dimension within implicational spread to the effect that a given series is more susceptible to a given rule than another series. The processes in (42) illustrate that alveolars palatalize more readily, whereas (41) and (42) together exemplify the greater susceptibility of labials to labialization. The assumption of an intensity scale explains why phonetic analogy takes place before ¡ making it unnecessary to state phonetic analogy as a separate principle.

4.4. Swazi labialization. In Swazi there is labialization of lax voiced and voiceless, aspirated alveolar stops: in both the release is slow. In (43) compare the following instances of this type of labialization, which occurs before back vowels and before the glide w .

(43) a. th > tf :

-ltfu	'ours'	Zulu	-ethu
litfole	'calf'	Zulu	ithole
umtfolo	'acacia caffra'	Zulu	umtholo
butfongo	'sleepiness'	Zulu	ubuthongo
-tfwala	'carry'	Zulu	-thwala
-tsatfu	'three'	Zulu	-thathu

(43) b. d > dv :

indvodza	'man'	Zulu	indoda
lidvolo	'knee'	Zulu	idolo
-dvuma	'flavorless'	Zulu	-duma
indvuna	'headman'	Zulu	induna
-dvwa	'alone'	Zulu	-dwa

What is different about this kind of labialization is that it affects only alveolars.[10]

5. Conclusion

I have tried to put forward a unified explanation of a number of seemingly disparate phenomena in terms of processes of secondary articulation. It is argued that the secondarily articulated segments arising via Velarization and Labialization Proper undergo Hardening, become doubly articulated and are eventually simplified to labial and velar obstruents, respectively. The possibility strongly presents itself that the rule hierarchies (implicational spread phenomena) and the dimensional progression of rules (as under Hardening) may be accounted for adequately only within a nondiscrete phonology.

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[10] Swazi and Lala (i.e. Tekela) palatalization before front vowels is constrained in exactly the same way.

REFERENCES

Abercrombie, David. 1967. Elements of General Phonetics. Edinburgh: Edinburgh University Press.

Andersen, Henning. 1972. "Diphthongization", Language 48.11-50.

Chomsky, Noam and Morris Halle. 1968. The Sound Pattern of English. New York: Harper and Row.

Chen, Matthew. 1971. "Metarules and universal constraints in phonological theory", Papers on Linguistic Analysis 13.

Doke, Clement M. 1931. A Comparative Study in Shona Phonetics. Johannesburg: Witwatersrand University Press.

Greenberg, Joseph H. 1966. Languages of Africa (second revised edition). Bloomington: Indiana University Press.

Greenberg, Joseph H. 1970. "Some generalizations concerning glottalic consonants, especially implosives", Working Papers on Language Universals 2, Stanford University.

Greenberg, Joseph H. 1971. "Is language like a chess game?" Language, Culture, and Communication, ed. by Anwar S. Dil, 330-52. Stanford: Stanford University Press.

Guthrie, Malcolm. 1967, 1970, 1971. Comparative Bantu. London: Gregg.

Hockett, C.F. 1955. Manual of Phonology. Bloomington: Indiana University Press.

Hyman, Larry M. 1970. "How concrete is phonology?" Language 46.58-76.

Kunene, D.P. 1961. The Sound System of Southern Sotho. Unpublished Ph.D. thesis, University of Cape Town.

Ladefoged, Peter. 1968. A Phonetic Study of West African Languages (second edition). Cambridge: Cambridge University Press.

Ladefoged, Peter. 1971. Preliminaries to Linguistic Phonetics. Chicago: University of Chicago Press.

Lanham, L.W. 1955. A Study of Gitonga of Inhambane. Johannesburg: Witwatersrand University Press.

Ponelis, Fritz. 1973. "Studies in Northern Sotho phonological dynamics". Mimeo.

Reighard, John. 1972. "Labiality and velarity in consonants and vowels", Papers from the VIII Regional Meeting, University of Chicago: Chicago Linguistic Society.

Smith, N.V. 1967. "The phonology of Nupe", Journal of African Languages 6.153-69.

Stevick, Earl W. 1964. "Two Bantu consonant systems", Language 40.58-74.

Szemerényi, Oswald. 1970. Einführung in die vergleichende Sprachwissenschaft. Darmstadt: Wissenschaftliche Buchgesellschaft.

Trubetzkoy, N.S. 1969. Principles of Phonology. Translated by Christiane A.M. Baltaxe. Berkeley: University of California Press.

Vennemann, Theo and Peter Ladefoged. 1971. "Phonetic features and phonological features", Working Papers in Phonetics 21.13-24. UCLA.

Vennemann, Theo. 1972. "Phonetic detail in assimilation: problems in Germanic phonology", Language 48.863-92.

Westermann, Diedrich. 1927. Die westlichen Sudansprachen und ihre Beziehungen zum Bantu. Berlin: De Gruyter.

Westermann, Diedrich. 1930. A Study of the Ewe Language. Translated by A.L. Bickford-Smith. London: Oxford University Press.

Ziervogel, Dirk. 1951. A Grammar of Swazi. Bantu Grammatical Archives, No. 3. Johannesburg: Witwatersrand University Press.

Ziervogel, Dirk, P.J. Wentzel and T.N. Makuya. 1972. A Handbook of the Venda Language. Manualia, vol. 10. Pretoria: University of South Africa.

Appendix I

A. Examples

*-tapwa	>	-tapɸa	'be captured as spoil'
*-pwa	>	-pka	'smash'
*-pwira	>	-pŵ̥ira	'dry up'
*-bwe	>	-bɏe	'stone'
*-bwaira	>	-bgaira	'wink'
*mwana	>	mŋana , mw̃ana , mŋwana , ŋwana	'child'
*-nwa	>	-nŋwa , -ŋwa	'drink'
*-batwa	>	-batɸwa , -batkwa	'be held'
*-twa	>	-twa , -tŵ̥a , -tɸwa , -ɸwa , -tskwa , -tsɸwa	'pound'
*-pindwa	>	-pindɏwa	'be entered'
*-biswa	>	-biskwa	'be removed'
*-zuzwa	>	-zuzɏwa	'be shaken'
*-rwa	>	-rɏwa , -gwa	'fight'

B. Derivations

In these derivations different dialect forms are generated.

*-dúád- 'be ill'

Budya -rwara , Karanga -rɏwara , Korekore -ɦwara , Manyika -gwara

rwara	
rɯwara	Velarization
rwwara	Segmentation
rŵwara	Glide Narrowing
rɏwara	Fricativization
rɣwara	Backing
rgwara	Closure
gwara	Cluster Initial Deletion
ɣwara	Cluster Initial Deletion
ɦwara	Weakening

*-pú- 'dry up'

Korekore -ɸwa , Tavara -pɸa , Zezuru -pka , Nambzya -pŵ̥a

pwa	
$p^{ɯ}wa$	Velarization
pwwa	Segmentation
pŵ̥wa	Glide Narrowing
pɸwa	Fricativization
pxwa	Backing
pkwa	Closure
pka	w -Absorption

pɸwa

Cluster Initial Deletion   w -Absorption

ɸwa   pɸa

pŵ̥wa > pŵ̥a by w -Absorption

The precise derivation of pɸa is opaque since w -Absorption may either precede or follow Fricativization.

*-búa 'dog'

Korekore -mbwa , Urungwe -ŋgwa , Budya -mbɣ̵a , Hera -mbga , Unyama -mbŵa

mbwa	
$mb^{ɯ}wa$	Velarization
mbwwa	Segmentation
mbŵwa	Glide Narrowing
mbɣ̵wa	Fricativization
mbɣ̵a	w -Absorption
mbɣa	Backing
mbga	Closure
mbgwa	

mgwa Cluster Initial Deletion

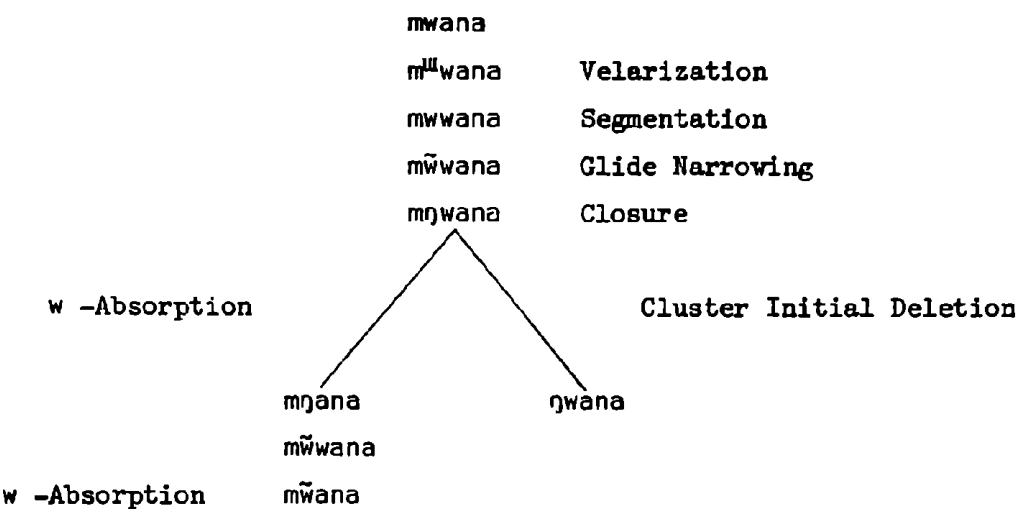
ŋgwa Nasal-to-Stop Assimilation

mbw̃wa

mbw̃a w -Absorption

*mu-ana 'child'

Korekore mwana , mŋwana ; Zezuru mw̃ana , mŋana ; Lilima ŋwana



'To pound'

Guta -twa , Hungwe -tsǫwa , Jindwi -tw̥a , Garwe -tǫwa , Rozwi -ǫwa , Zezuru -tskwa

twa

tʷwa Velarization

twwa Segmentation

tw̥wa Glide Narrowing

tǫwa Fricativization

tsǫwa Palatalization

tsxwa Backing

tskwa Closure

tw̥wa

tw̥a w -Absorption

tǫwa

ǫwa Cluster Initial Deletion

Appendix II

A. Examples

*p > pf :

*-pụ- > Manganja -pfu 'stomach';

*-pụko > Venda pfuko 'mole'.

*t > pf :

*-tụ > Manyika -pfu 'flour';

*-tụ- > Venda -pfa 'spit';

*-tụd- > Manyika -pfur- 'forge'.

*k > kf :

*-kụ́ba > Ngom kfuba 'chicken'

*k > pf :

*-kụ́dû > West Kongo pfudu 'tortoise';

*-kụkam- > Ha -pfukam- 'kneel';

*-kụmbat- > Manyika -pfumbat- 'hold in arm or hand'.

*b > bv :

*-bụ́da > Tetela -bvula 'rain';

*-bụ́n- > Cewa -bvun- 'harvest'.

*d > bv :

*-dụ́ad- > Gogo -bvwal- 'wear'; Manganja -bval- ; Manyika -bvar-.

*g > bv :

*-gụ́i > Cewa -bvi 'arrow';

*-gụbú > Manganja -bvuu 'hippo';

*-gụ́n- > Chopi -bvun- 'help';

*-gụnd- > Manyika -bvund- 'become rotten'.

B. Further Examples

*b

*-bụn- 'harvest' > Zulu, Tumbuka, Unguja -vun- ; Cewa -bvun-

*d

*-dụkut- 'blow bellows' > Unguja, Luba-Katanga -vukut- ; Bemba -fukut- ;[1] Manganja -bvukut-

*g

*-gụnd- 'become rotten' > Unguja, Zulu -vund- ; Manyika -bvund- ; Lenje -fund-

*p

*-pụk- 'dig up, fling up (earth)' > Kele -fụ- ; Shambala, Lwena, Bemba -fuk-

*t

*-tụ́d- 'forge' > Mvumbo -pfule- ; Tiene -tful ; Pfokomo -fuy- ; Unguja -fu- ; Central Kongo -ful- ; Manyika -pfur-

*k

*-kụkam- 'kneel' > Rundi, Central Kongo, Lwena, Luba-Katanga, Bemba, Ila -fukam- ; Ha -pfukam-

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[1] In some languages the voiced-voiceless contrast is neutralized under labialization: [+ voice] → [- voice]. This is a manifestation of a widespread strengthening rule functioning in the environment of high vowels and/or nasals.

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THE HISTORICAL DEVELOPMENT OF SOUTHWESTERN MANDE CONSONANTS[1]

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1. Introduction

Southwestern Mande (SWM) constitutes a set of five closely related languages spoken in the republics of Guinea, Liberia, and Sierra Leone. The distribution of the five SWM languages: Mende, Loko, Bandi, Loma and Kpelle is shown on the map in (1) below.

These languages are characterized by a well-developed system of morpheme-initial consonant alternation, a phenomenon which has long been recognized by linguists as an important area of research. Early investigations of SWM initial consonant alternation [Eberl-Elber 1937 and Hintze 1948] focused on the grammatical environments in which these alternations took place, while later investigations [Manessy 1964, Meeussen 1965, and Bird 1971a] sought a phonological explanation for this phenomenon.

This paper reconstructs the historical development of SWM initial consonant alternation by demonstrating how the consonant system of each of the modern SWM languages developed from the consonant system of Proto-Southwestern Mande as the result of simple, natural phonological changes.[2]

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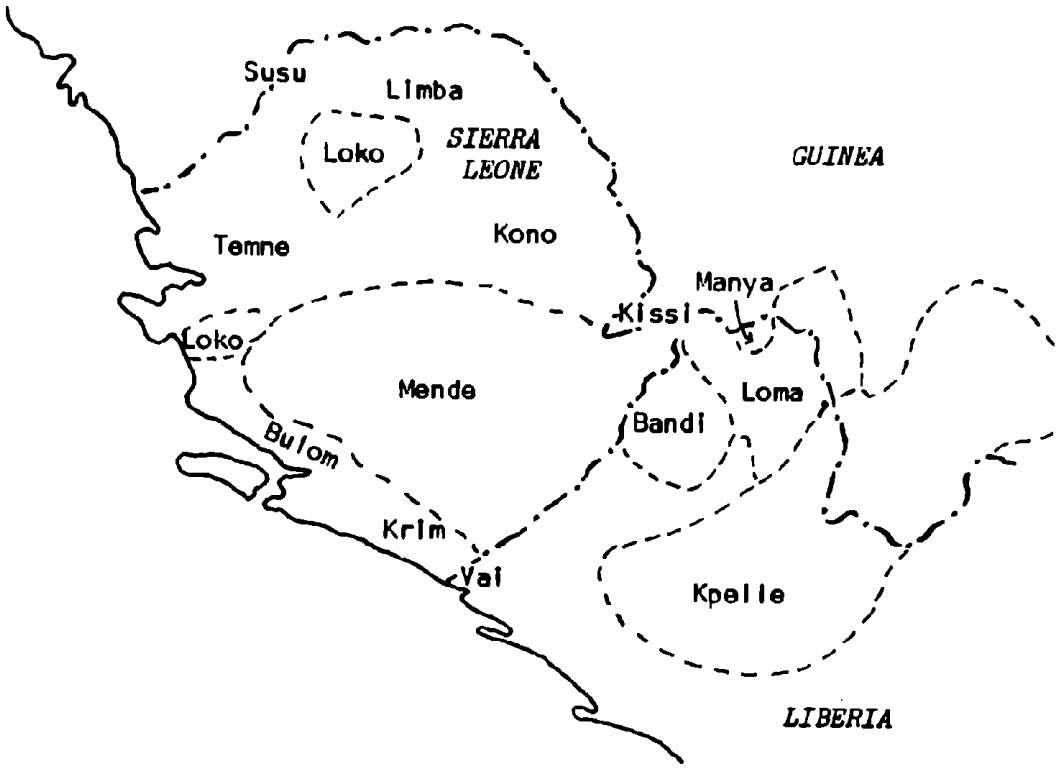
[1]This paper was originally presented to the Fourth Annual Conference on African Linguistics, Queens College, Flushing, New York, April 4-6, 1973. It has greatly profited from discussions which I have had with a number of scholars. I am particularly indebted to William E. Welmers for the insight, wisdom, and information he so gratiously offered. And while he does not agree with all the conclusions presented here, this in no way diminishes the importance of his contribution.

Also at this conference, Larry Hyman presented a complementary paper dealing with the same subject, later published as "Notes on the history of Southwestern Mande"[Hyman 1973]. While Hyman did not at that time have access to the additional SWM data gathered during my field investigation of 1971-2, many of his conclusions are in accord with my own. Since the time of the original presentations, each of us has had the opportunity to read and comment on the other's paper. Consequently, this version of my paper has benefited from and incorporated many of Hyman's suggestions as will be noted. This version also contains a discussion of some of the more important discrepancies between the two papers.

[2]The rules provided in this paper are diachronic. The question of the types of synchronic phonological rules used in the treatment of this phenomenon has not fully been answered. For a more complete discussion of this problem, see Dwyer [1973].

(1) The distribution of the Southwestern Mande languages



Section 2 of this paper describes the consonant alternations of each of the modern SWM languages and the conditions under which they occur. Section 3 describes the historical development of these alternations, and section 4 discusses some alternative proposals concerning the historical development of SWM consonants.

2. The Alternations

The oppositions strong - weak and heavy - light - nasal are useful in the description of SWM consonant mutation. Each alternating consonant has a strong and a weak variant. The strong variant is usually the more fortis member of the two, either a voiced, geminate, or prenasalized consonant. The terms: light, heavy, and nasal, describe the three series of strong - weak alternations. The underlying consonants of the

light series are voiceless obstruents: p , f , t , s , k , and kp . The underlying consonants of the nasal series are: m , n , ny ,[3] and ŋ . No obvious class, however, describes the heavy series which includes the liquid l , the glides: y , w , and ɣ , and the implosive ɓ . The important characteristics of this series are that the members are voiced, non-nasal, and not true vowels (i.e., not [- consonantal, + vocalic]). The initial consonant alternations of the five Southwestern Mande languages are listed in Table I.[4]

In SWM, strong surface consonants are generally derived from an underlying sequence of a nasal followed by a consonant.[5] Correspondingly, when the underlying consonant is not preceded by a nasal, its surface realization is weak. A phonological alternation between strong and weak initial consonants can occur because in some grammatical environments, the given initial consonant is preceded by a morpheme bearing a final nasal consonant, and in other grammatical environments the given consonant is not preceded by a morpheme bearing a final nasal consonant. Thus, the conditioning environments of these alternations can be established by identifying those morphemes which bear final nasals and by identifying the environments in which they occur.

The morphemes include three syllabic nasals and a number of (CV)CV(ŋ) nouns and verbs. The three syllabic nasals as reconstructed for Proto-SWM are as follows: *ń- 'my', *ǹ$_{\bar{1}}$ 'his', and *ǹ$_{\bar{2}}$ 'prereference'.[6]

While it is not clear whether *ǹ$_{\bar{1}}$ 'his' and *ǹ$_{\bar{2}}$ 'prereference' consist of one morpheme or two in Proto-SWM, there is no doubt that

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[3]Following traditional orthography, SWM palatal nasals are transcribed with the digraph ny .

[4]The SWM languages also contain morphemes with strong initial consonants which do not mutate. These morphemes can, for the most part, be identified as borrowings which have been acquired since the establishment of consonant mutation in SWM.

[5]Due to the uncertainty of the synchronic status of the phonological rules (see footnote 2), the term underlying can only be taken tentatively.

[6]See section 3.4. for a brief description of the various reflexes of these possessive pronouns.

Table I: Southwestern Mande initial consonant alternation

The Light Series

Loko		Mende[7]		Bandi		Loma		Kpelle		
St	Wk	St	Wk	St	Wk	St	Wk	St_1	St_2	Wk
p	b	p	β/w^b	p	v	p	β/w^b	bb	mb	p
f	h	f	v	f	h	f	v	vv	mv	f
t	l	t	l	t	l	t	l	dd	nd	t
h	h	h	h	s	h	s	z	zz	nz	s
k	γ/w^a	k	g	k	γ/w^a	k	$\eta/\gamma/w^d$	gg	ng	k
kp	b	kp	gb	kp	b	kp	b	ggb	ngb	kp
		s	ǰ							

The Heavy Series

Loko		Mende		Bandi		Loma		Kpelle		
St	Wk	St	Wk	St	Wk	St	Wk	St_1	St_2	Wk
mb	b	mb	b	mb	γ/w^c	bb	β/w^b	m̀	ḿ	b
nd	l	nd	l	nd	l	dd	l	ǹ	ń	l
nj	y	nj	y	nj	y	zz	y	ǹy	ńy	y
ng	Ø	ng	y	ng	y	gg	$\eta/\gamma/w^d$	ŋ̀	ŋ́	γ
ng	Ø	ng	w	ng	w	gg	$\eta/\gamma/w^d$	ŋ̀w	ŋ́w	w

The Nasal Series

Loko		Mende		Bandi		Loma		Kpelle		
St	Wk	St	Wk	St	Wk	St	Wk	St_1	St_2	Wk
m	β/w^b	m	m	m	$\tilde{y}/\tilde{w}^c$	m	m	m̀	ḿ	m
n	n	n	n	n	n	n	n	ǹ	ń	n
ny	ny	ny	ny	ny	$\tilde{y}$	ny	ny	ǹy	ńy	ny
ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ	ŋ̀	ŋ́	ŋ

(a) $w/\_\ V_{[+rd]}$ $\quad \gamma/\_\ V_{[-rd]}$

(b) $w/\_\ V_{[+bk]}$ $\quad \beta/\_\ V_{[-bk]}$

(c) $w/\_\ V_{[+bk]}$ $\quad \gamma/\_\ V_{[-bk]}$

(d) $\eta/\_\ \tilde{V}$ $\quad w/\_\ V_{[+rd]}$ $\quad \gamma/\_\ V_{[-rd]}$

(e) vowels following underlying nasals are nasalized on the surface

[7] The s - ǰ alternation in Mende represents a recent development. The Mende reflex of Proto-SWM *s is h (Proto SWM: *sua 'animal' Mende: hua 'animal').

historically these two prefixes are cognate. They are distinguished here primarily to facilitate the presentation. The Kpelle version of this morpheme also carries the meaning 'prereference', indicating that the noun to which it is affixed has previously been mentioned in a given dialogue or text. In the remaining SWM languages, this prefix, $\underline{n_2}$ (with a non-high tone) in Bandi, Loko, and Mende and $\underline{\acute{n}_2}$ in Loma, is prefixed to almost all noun phrases and with no apparent change in meaning.[8] Examples of the SWM noun phrases both with the $*\underline{n_2}$ prefix and without the $*\underline{n_2}$ prefix are given in (2) below:

(2)	with the $*\underline{n_2}$ prefix	without the $*\underline{n_2}$ prefix
Proto-SWM	*n̲péré-ʃ 'the house'	*ʃ-péré-ʃ 'your house'
Loko	p-pɛ́lɛ́-ʃ " "	bʃ-bɛ́lɛ-'ʃ " "
Mende	p-pɛ́.ɛ́-ʃ " "	bʃ-βɛ́.ɛ-'ʃ " "
Bandi	p-pɛlɛ́-'ʃǀ " "	ʃ-βɛ́lɛ-'ʃǀ " "
Loma	p-pɛ́lɛ́-ʃ " "	ɵ-βɛlɛ́-ʃ " "
Kpelle	b-bɛ́rɛ́-ʃ " "	ʃ-pɛ́rɛ́-ʃ " "

In addition to these syllabic nasals, SWM has numerous morphemes, both monosyllabic and bisyllabic, which bear final nasal consonants. These morphemes all conform to the formula $\underline{(CV)CV\eta}$. Except for Mende, where all morpheme-final nasals have been lost, and for Kpelle, these morpheme-final nasals also interact with following initial consonants to produce strong surface consonants. Examples of these derived strong consonants are given in (3) below in the column glossed 'the old bee'. Corresponding weak consonants are given in the column glossed 'the old house' The base for of the adjective 'old' is either wóvá or pólɔ́ ; the base form of 'bee' is kómíŋ ; and the base form of 'house' is either pérɛ́ , pɛ́lɛ́ or pɛ́.ɛ́ , depending on the language.[9]

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[8] For a more detailed statement concerning the distribution and meaning of the prefix of prereference and the definite suffix in Kpelle, see Welmers [1970].

[9] The use of a period (.), as in pɛ.ɛ 'house', indicates that a sequence of two vowels separated by the period should be interpreted as long. A sequence of two vowels not separated by a period may then be used to represent short contour tones as a sequence of two tones (e.g., lʃ and ʃǀ). For more details, see Dwyer [1973].

(3)	the old bee	the old house
Proto-SWM	*ǹ$_2$kómĩ́ŋ+pɔ̀lɔ̀-'í	*ǹ$_2$pɛ́rɛ́+pɔ̀lɔ̀-'í
Loko	k-kóŵĩ́ŋ+góhá-'í	p-pɛ́lɛ́+óhá-'í
Mende	k-kómĩ́+wóvɛ-'í	p-pɛ́.ɛ́+wóvɛ-'í
Bandi	k-koŵĩ́p+pɔ́lɔ́-'íi	p-pɛl'ɛ́+wɔ́lɔ́-'íi
Loma	k-kómĩ́p+pɔl'ɔ́-í	p-pɛ́lɛ́+wɔl'ɔ́-í
Kpelle	g-gómĩ́m+pɔ̀lɔ̀-'í	b-bɛ́rɛ́+pɔ̀lɔ̀-'í

The same morphemes which strengthen following consonants, <u>(CV)CVŋ</u>, also take a strong definite suffix allomorph (-ngí , -ggi , or ∅, depending on the language); while those followed by weak consonants, <u>(CV)CV</u>, take a weak suffix allomorph (-í , or -i , depending on the language). These allomorphs are exemplified in (4) below:

(4)	the bee	the house
Proto-SWM	*n$_2$kómĩ́ŋ-í	*n$_2$pɛ́rɛ́-í
Loko	k-kóŵĩ́ŋg-í	p-pɛ́lɛ́-í
Mende	k-kómĩ́-í	p-pɛ́.ɛ́-í
Bandi	k-koŵĩ́ng-í	p-pɛlɛ-ii
Loma	k-kómĩ́gg-í	p-pɛ́lɛ́-í
Kpelle	g-gómĩ́ŋ-∅	b-bɛ́rɛ́-í

Additional examples showing the correspondence of Kpelle morpheme-final nasals to the strong suffixes of the other SWM languages appear in (5) below:

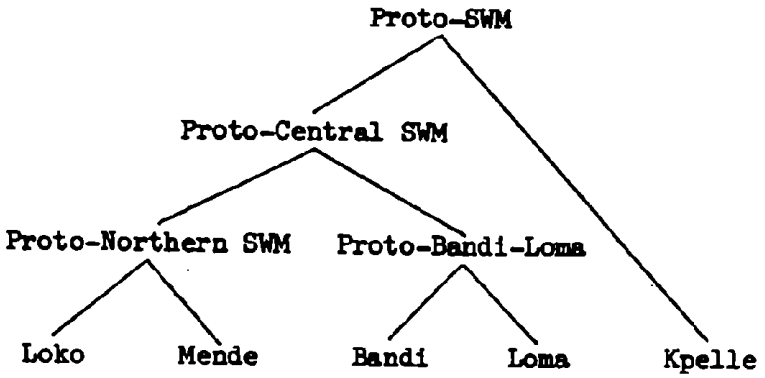
(5)	the shadow	the (his) hand	the thorn	the cobra
Proto-SWM	*ǹ$_2$nĩnɛ̃ŋ-í	*ǹ$_2$wuŋ-í	*ǹ$_2$γallíiŋ-í	*ǹ$_2$wurúuŋ-í
Loko	nɛ̃n'ɛ̃́ng-í	ngúng-í	ngal'íng-'í	ngul'úng-'í
Mende	nɛ̃nɛ̃-'í	ngu-'í	ngal'í-'í	ngul'í-'í
Bandi	nɛ̃nɛ̆ng-'í	ngungi-'i	ngaling-'í	ngulung-'í

(5)(cont.)	the shadow	the(his)hand	the thorn	the cobra
Loma	nĨnĨgg-i	ggúgg-ſ	ŋáiſgg-ſ	ggúiugg-'ſ
Kpelle	ŋĨnĨŋ	ŋwuŋ	ŋaiſiŋ	ŋwurúuŋ
	the sun	the leaf	the mortar	the cow
Proto-SWM	*ŋ̀₂fóló-ſ	*ŋ̀₂láɣá-ſ	*ŋ̀-konláa-ſ	*ŋ̀₂nĨnka-ſ
Loko	f-fó.ó-ſ	ndáɣá-ſ	k-kond'á-'ſ	nĨkk'á-ſ
Mende	f-fóló-ſ	ndáwɛ́-ſ	k-kond'ɛ́-'ſ	nĨkka-'ſ
Bandi	f-foló-ſi	ndaɣ'á-ſi	k-kondɛ-'ſi	nĨkka-ſi
Loma	f-fóló-ſ	ddáɣá-ſ	k-kóddá-ſ	nĨ́kká-ſ
Kpelle	v-vóló-ſ	na.a-l	k-konáa-i	nĨŋa-i

3. The Development of the Alternations

This section contains a summary of the major consonant developments which have taken place in SWM including those which have led to the establishment of the initial consonant alternations in SWM. In this presentation, I have assumed the existence of four hypothetical languages: Proto-SWM, the ancestor of all the modern SWM languages; Proto-Central SWM, the ancestor of all of the SWM languages but Kpelle; Proto-Northern SWM, the ancestor of Loko and Mende; and Proto-Bandi-Loma, the ancestor of Bandi and Loma. With the use of these reconstructed languages, the diachronic development of SWM consonants can be presented as a series of natural phonological developments. Furthermore, these hypothetical stages of SWM also permit the description of the diachronic development of the SWM tonal systems in a like manner. The relationship between the modern SWM languages and their reconstructed ancestors is shown in (6) below:

(6)



3.1. Proto-Southwestern Mande. Proto-SWM has been reconstructed with three series of underlying consonants. These are given in (7) below.

(7) light *p , *f , *t , *s , *k , *kp

heavy *w , *l *y , *ɣ *β

nasal[10] *m , *n , *ny , *ŋ , *ŋw

The reconstructed consonant alternations of Proto-SWM are given in (8) below.[11]

(8)

light			heavy			nasal		
st_1	st_2	wk	st_1	st_2	wk	st_1	st_2	wk
pp	m̀p	p	m̀	ḿ	β	m̀	ḿ	m
ff	m̀f	f						
tt	ǹt	t	ǹ	ń	l	ǹ	ń	n
s	ǹs	s	ǹy	ńy	y	ǹy	ńy	y
kk	ŋ̀k	k	ŋ̀	ŋ́	ŋ	ŋ̀	ŋ́	ŋ
kkp	ŋ̀kp	kp	ŋ̀w	ŋ́w	w	ŋ̀w	ŋ́w	ŋw

The above alternations (8) are the result of three phonological rules: Nasal Point Assimilation, Nasal Absorption, and Gemination. Each of

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[10] Vowels following underlying nasals are [+ nasal]. This condition must prevail prior to the application of the diachronic rules presented here.

[11] The two types of strong consonants used in this figure arise because of the selective nature of the Gemination rule (see (12)).

these rules involves the interaction of a nasal and a following consonant. The nasals involved in these processes are as follows: *ɲ- 'my', *$ɲ_1$ 'his' and *$ɲ_2$ 'prereference'.

The first rule states that all nasal consonants assimilate to the point of articulation of the following consonant. This rule is commonly found throughout the world's languages and requires no further discussion.

Nasal Absorption can be thought of as two rules, Nasal Manner Assimilation (9) and Nasal Simplification (10). The first of these rules states that a heavy consonant assimilates fully to the manner of articulation of the preceding nasal consonant.

(9) Nasal Manner Assimilation (Proto-SWM)[12]

NC_{heavy}	→	NN	e.g.,	mɓ	→	mm
				nl		nn
				ny		nny[13]
				ŋɣ		ŋŋ
				ŋw		ŋŋw

Nasal Simplification immediately follows Nasal Manner Assimilation. This rule applies to sequences of two identical nasals, either those which are the result of the nasal being followed by another nasal or as the result of Nasal Manner Assimilation rule. Nasal Simplification reduces a sequence of two identical nasals to a single nasal segment. Without this rule, surface geminate nasals, for which there is no acoustical evidence, would be derived.

(10) Nasal Simplification (Proto-SWM)

NN	→	N	e.g.,	mm	→	m
				nn		n
				nny		ny
				ŋŋ		ŋ
				ŋŋw		ŋw

[12]Nasal Manner Assimilation is essentially the same as the Akan rule known as "Progressive Non-Vowel Assimilation" [Schachter and Fromkin 1968].

[13]The letter sequence nny represents a geminate palatal nasal.

Nasal Manner Assimilation and Nasal Reduction can be written as a single process, Nasal Absorption (11), and is done so in the remainder of this paper because of the lack of evidence to support the independent existence of each rule.[14]

(11) Nasal Absorption (Proto-SWM)[15]

$NC_{\{[+heavy]\ [+nasal]\}}$	→	N	e.g.,	mm	→	m	mб	→	m
				nn		n	nl		n
				nny		ny	ny		ny
				ŋŋ		ŋ	ŋɣ		ŋ
				ŋŋw		ŋw	ŋw		ŋw

Gemination (12), the remaining Proto-SWM consonant rule, states that when an unstressed low-toned nasal prefix, $*\grave{n}_1$ or $*\grave{n}_2$, is followed by a voiceless consonant, the feature values of this nasal prefix lose their distinctiveness and assimilate to those of the following consonant producing a fortis or geminate consonant.

(12) Gemination (Proto-SWM)

NC_{vls}	→	$C_{vls}C_{vls}$	e.g.,	m̀p	→	pp	ḿp	→	no change
				m̀f		ff	ḿf		" "
				ǹt		tt	ńt		" "
				ǹs		ss	ńs		" "
				ŋ̀k		kk	ŋ́k		" "
				ŋ̀kp		kkp	ŋ́kp		" "

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[14] Hyman (personal communication) has pointed out that Nasal Absorption can be viewed as an example of Jacobsonian rephonologization. The only distinctive characteristic of the preconsonantal nasal is its nasality. The reinterpretation of this nasality as a feature of nasality on the following non-nasal segment does not affect the distinctiveness of the two representations:

$n+C_hV > NV$ (C_h = heavy consonant)

$n+NV > N\tilde{V}$

The rephonologization argument supports the view that Nasal Absorption is a single historical process.

[15] The natural class of nasals and heavy consonants can be defined as being voiced and not including true ([+vocalic, -consonantal]) vowels.

In Proto-SWM, as in most modern SWM languages, stress is generally assigned to the first high tone in the nominal phrase.[16] Consequently, phrase-initial low-toned nasals are never stressed while phrase-initial high-toned nasals are always stressed. As a result, Gemination applies to low-toned nasals and not to high-toned nasals because of the location of the stress. The reduction of marked features in an unstressed segment is a very common event. Therefore, the fact that low-toned (unstressed) nasals geminate through the reduction of marked features while high-toned (stressed) nasals do not can be considered a natural phonological process.

3.2. The development of modern Kpelle from Proto-SWM. The system of Kpelle initial consonant alternation can be derived by adding one rule, Post-Nasal Voicing (13), to the Proto-SWM list of rules. This rule states that a voiceless obstruent becomes voiced when preceded by a nasal prefix (and in some dialects of Kpelle by any nasal).

(13) Post-Nasal Voicing (Kpelle)

$$N\text{-}C_{vls} \rightarrow N\text{-}C_{vd}$$

This rule, when coupled with the Proto-SWM gemination rule, produces a three-way surface alternation in the Kpelle light series (between C_{vls}, $\acute{N}\text{-}C_{vd}$, and $C_{vd}C_{vd}$). The development of this three-alternation is demonstrated in the following Kpelle derivations (14):

(14)	Gloss	your back	my back	his back
	Base	ſ-pólù	ń-pólù	ǹ-pólí
	Homorg Nasal		ḿ-pólù	m̀-pólù
	Nasal Absorption			
	Post-Nas Voice		ḿ-bólù	m̀-bólù
	Gemination			b-bólù
	Surface	ſ-pólù	ḿ-bólù	b-bólù

[16] Stressed syllables are slightly louder and slightly longer than unstressed syllables.

In order to derive voiced geminate consonants from underlying $\dot{N}$-C_{vls} sequences, the Post-Nasal Voicing rule must apply before the Gemination rule. Were the ordering reversed, the Gemination rule would destroy the potential input for the Post-Nasal Voicing rule.[17]

Voiced geminate consonants in Kpelle have been described by Welmers [1962] as having "heavy voicing." Heavy voicing means that the period of duration of voicing is longer than that used for a normally voiced obstruent. The use of a geminate consonant adequately expresses this fact. Furthermore, the use of geminate consonants permits a fairly natural derivation of surface consonants with extra heavy voicing.

3.3. The development of Proto-Central SWM. In Proto-Central SWM, a very important lexical change took place: the Proto-SWM prefix of prereference, *ṅ͡ɔ , was reinterpreted as a nominal prefix, and, as such, was added to virtually all phrase-initial (non-possessed) nominals in Proto-Central SWM. Because this prefix is a nasal, the initial consonant of all nominals in Central SWM to which it is attached is strong. The distribution of this prefix in Proto-Central SWM sharply contrasts with that of Proto-SWM and Kpelle where, as a prefix of prereference, *ṅ͡ɔ generally appears only before noun phrases which are definite.

The development of Proto-Central SWM further involved the broadening of the Gemination rule to include all nasals and the establishment of the Weak Consonant Voicing rule, the Nasal Expansion rule and the weakening

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[17] Operating on the hypothesis that new rules usually appear at the end of the ordered list of rules, one would have expected Post-Nasal Voicing to have followed Gemination in Kpelle. Quite possibly this situation existed in an earlier stage of Kpelle (i.e., Pre-Kpelle). Were Gemination to precede Post-Nasal Voicing in Pre-Kpelle, the initial consonant of phrases such as 'his back' would remain voiceless (e.g. *p-pulu 'his back') because the Gemination rule would eliminate the preconsonantal nasal. Since the sequence: Gemination - Post-Nasal Voicing, is a bleeding order, the reordering of these rules in modern Kpelle can be viewed as a simplification and a natural diachronic development.

rules. The surface alternations produced by these innovations are given in (15) below:

(15)

light			heavy			nasal		
base	weak	strong	base	weak	strong	base	weak	strong
p	b	pp	ɓ	ɓ	mb	m	m	m
f	v	ff						
t	d(l)	tt	l	l	nd	n	n	n
s	z	ss	y	y	nj	ny	ny	ny
k	g(ɣ)	kk	ɣ	ɣ	ng	ŋ	ŋ	ŋ
kp	gb(ɓ)	kkp	w	w	ng	ŋw	ŋw	ŋw

(the consonants in brackets are the results of the weakening rules)

In Central SWM, the structural description of the Gemination rule restructured to include all sequences of a nasal followed by a voiceless obstruent. This includes both high and non-high-toned nasals as in (16) below.[18]

(16)

	Bandi			Kpelle		
underlying	ń-ko.o-ſ	ſ-ko.o-ſ	n_1-ko.o-ſ	ń-ko.o	ſ-ko.o	n_1-ko.o
surface	k-kó.o-'ſi	ſ-wó.o-'ſi	k-ko.o-ſi	ŋ-go.o	ſ-ko.o	g-go.o
gloss	my belly	your ___	his ___	my belly	your __	his __

[18] Proto-Central SWM differs tonally from Proto-SWM in that Proto-Central SWM has only a two-way tonal contrast (high and non-high), this being the result of the merger of the Proto-SWM *low and *mid levels.

This view differs from that of Hyman [1973] who assumes that Proto-SWM has only four tonal classes with only a two-way tone contrast. I claim that this is an accurate description of Pre-Proto-SWM. The difference between these two positions is the point in the history of SWM when the fifth tonal class (*low-low) appeared. Hyman, citing arguments from Welmers ([1961] "Internal evidence of borrowing in Kpelle") concludes that the fifth tonal class must have been acquired through borrowing in Pre-Kpelle. However, these class 5 nouns have demonstratable cognates in the other four SWM languages which cannot be attributed to borrowing (Me: bɔlɔ 'hat', Kp: bɔ̀lɔ̀ 'hat'; Me: tɔndɔ 'chisel', Kp: tɔ̀nɔ̀ 'chisel'). Thus, one must conclude that these morphemes must have existed in Proto-SWM. Now, the arguments provided by Welmers for Kpelle can be applied to Proto-SWM with the conclusion that the fifth tonal class was acquired through borrowing in Pre-Proto SWM (for more details, see Dwyer [1973]).

Unlike Kpelle and Proto-SWM, the Central SWM gemination rule also includes morpheme-final nasals as in (17) below:

(17)	Bandi	Kpelle
underlying	n-kɔ́w̃ĺŋ+kɔ́w̃ĺŋ-ĺ	kɔ́mĺŋ+kɔ́mĺŋ
surface	k-kɔ́w̃ĺk+kɔ́w̃ĺng-'ĺ	kɔ́mĺŋ+kɔ̀mĺŋ
gloss	bee+honey-the	bee+honey

Virtually all the Central SWM consonants not strengthened by the Gemination rule are found in an intervocalic position. This is due to both a broadened application of the Gemination rule and the above mentioned reinterpretation of the PSWM $*\grave{n}_2$ prefix. These unstrengthened intervocalic consonants become voiced in Central SWM by a rule called Weak Consonant Voicing (18).

(18) Weak Consonant Voicing (Proto-Central SWM)

$$C_{vls} \rightarrow C_{vd} \; / \; V\_\_V$$

The Central SWM Weak Consonant Voicing rule and the Kpelle Post-Nasal Voicing rule apply in mutually exclusive environments. This gives the impression that half of the Kpelle consonants are mutating the wrong way (see Table I above).

Despite the Weak Consonant Voicing rule, voiceless obstruents do appear in the surface structure of all of the Central SWM languages as evidenced by the following Bandi examples (19):

(19) Bandi (tones omitted)[19]

lappi	fight
kottu	stone
massa	chief
nikka	cow
tukkpɔ	walking stick(staff)

[19] As in Loma, Bandi geminate consonants are traditionally written as non-geminate (e.g., nĭka 'cow' instead of nĭkka) because of the lack of a contrast between geminate consonants and their non-geminate counterparts.

These voiceless obstruents do not voice because they are geminate and, therefore, do not fit the structural description of the Weak Consonant Voicing rule. These geminate consonants are derived from Proto-SWM sequences of a nasal followed by a voiceless consonant and the broadened Central SWM gemination rule as follows (20):

(20)

Proto-SWM[20]		Proto-Central SWM	Gloss
*lampl	Gemination →	*lappl	fight
*kontu		*kottu	stone
*tiŋkpɔ		*tikkpɔ	staff
*niŋka		*nikka	cow
*mansa		*massa	chief

Additional support for the reconstructions in (20) is given in section 3.3.

The last major development in Central SWM is the expansion of nasal consonants into a sequence of a nasal consonant followed by a voiced stop. This rule applies only when the vowel following the nasal consonant is non-nasal. It will be recalled (see Table I above) that vowels which follow underlying nasals are nasalized while those derived from sequences of a nasal followed by a heavy consonant are not. This Nasal Expansion rule (21) has also been observed in Matakali [Gudshinsky, Popovitch, and Popovitch 1970].

(21) Nasal Expansion (Proto-Central SWM)

$$N \rightarrow NC_{vd} \;/\; \_\_[-\text{nasal}]$$

e.g.,

m	→	mb
n		nd
ny		nj
ŋ		ng
ŋw		ng

[20] The Kpelle reflexes of these forms are as follows: namu 'fight', konu 'stone', tuŋwɔ 'staff', and nĩŋa 'cow'. No Kpelle reflex has been found for PSWM *mãnsa 'chief'.

Like the other Central SWM nasal rules, Nasal Expansion applies to all nasals (not followed by a nasalized vowel). This includes phrase-initial nasal prefixes as in (22):

(22)	Bandi			Kpelle		
underlying	ń-lá-ſ	ſ-lá-ſ	n_1-lá-ſ	ń-lá	ſ-lá	$ɲ_2$-lá
surface	ndá-ſi	ſ-lá-ſi	nda-'ſi	ńá	ſ-lá	ɲá
gloss	my mouth	your __	his __	my mouth	your __	his __

and morpheme-final nasals as in (23):

(23)	Bandi	Kpelle
underlying	n-ków̃ĩ́ŋ+wúlú-ſ	$ɲ_2$-kómĩ́ŋ+wúlú-ſ
surface	k-ków̃ĩ́+ngúlú-'ſi	k-kómĩ́ŋ+wùlù-i
gloss	bee+tree-the	Pref-bee+tree-the

and morpheme medial nasals as in (24):

(24)	Proto-SWM	Bandi	Kpelle	Proto-SWM	Bandi	Kpelle
underlying	*konlá̀a[21]	kondá	konáa	*ŋɔ̃nĩ̀	ŋɔ̃nĩ́ĩ́	ŋɔ̃nĩ
surface	*konáà	kondá	konáà	*ŋɔ̃nĩ	ŋɔ̃nĩ́	ŋɔ̃nĩ
gloss	mortar	mortar	mortar	bird	bird	bird

Furthermore, the ngſ - ſ alternation of the definite suffix in Loko and Bandi and the gi - i alternation in Loma are also consequences of the Nasal Expansion rule. In Proto-SWM, the definite suffix is *-ſ as it is in modern Kpelle.[22] In Central SWM, this suffix is said to have two allomorphs. The -ngſ allomorph follows nouns which historically end in a nasal consonant. In fact, these nouns generally have cognates in modern Kpelle which still have morpheme-final nasals (see (5) above). This observation was first reported by Heydorn [1940]

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[21] The reconstructed form *konla 'mortar' is proposed instead of *konda on the basis of the argument presented in 3.1. that Proto-SWM has no underlying *d . However, either of these forms would produce the observed SWM surface reflexes.

[22] The definite suffix in Kpelle is deleted following a nasal consonant:

Kpelle	underlying	$ɲ_2$-kómĩ́ŋ-ſ	'preref-bee-the'
	surface	g-gómĩ́ɲ	

and has been reiterated by Bird [1971a] and by Welmers [1971].

With the introduction of the Nasal Expansion morpheme-final velar nasals were converted to ng . This development when coupled with the definite suffix *-ɾ produced the -ngɾ definite suffix allomorph (i.e., ...ŋ-ɾ > ...ng+l = ...-ngl). The derivation of Proto-Central SWM 'the bee' and 'the tree' in (25) below further demonstrates the development of the ngɾ - ɾ definite suffix alternation.

(25)	Proto-Central SWM	the bee	the tree
	Base	n̄kómī́ŋ-ɾ	n̄wúlú-ɾ
	Homorganic Nasals	ŋ-kómī́ŋ-ɾ	ŋ-wúlú-ɾ
	Nasal Absorption		ŋwúlú-ɾ
	Gemination	k-kómī́ŋ-ɾ	
	Nasal Expansion	k-kómɾng-ɾ	ngúlú-ɾ
	Reinterpretation[23]	k-kómī́-ngɾ	
	Surface	k-kómī́-ngɾ	ngúlú-ɾ

The Nasal Expansion rule and the morpheme-final velar nasal are also useful in explaining the development of the plural suffix alternation, nga - a (e.g., ...ŋ+a > ...ng+a = ...+nga).

Many of the members of the heavy consonant series of Proto-SWM are the result of the weakening of voiced stops. These weakenings (26) have also been observed in Northern Mande [Bird 1971b, and Welmers 1958].

(26) Velar weakening Alveolar Weakening Labial Weakening

g → ɣ d → l b → β
gb → ß

(Velar Weakening converts a voiced velar stop into a voiced velar continuant. Because labio-velars have a velar component, voiced labio-velar stops are also weakened by this rule)

---

[23] This reinterpretation may be only one made by some linguists on the basis of the surface data of these languages and not one that has been made by Central SWM speakers.

In Proto-Central SWM, both Velar and Alveolar Weakening apply to the voiced obstruents which were derived as a result of the Weak Consonant Rule. These weakenings resulted in the alternations: k - ɣ , kp - b , and t - l (see (15)).

Mende weak consonants do not show the effects of the application of the Velar Weakening rule. The rejection of this weakening rule appears to be a Mende linguistic simplification. The fossilized Mende compound nje+wúlo 'aunt' (literally mother+small) provides ample evidence that these weakenings used to exist. Normally an initial k in Mende, such as the k in Mende kulo 'small' ought to become a g rather than w when occurring in a weak environment as in (27):

(27) Mende underlying n͡ɣʃla+kúló-ʃ

surface ngʃla+gule-'ʃ

gloss dog+small-the

Thus Mende apparently discarded the Proto-Central SWM weakening rules in all cases save for a few fossilized compounds.

Labial Weakening does not occur in Loko and is apparently a development which took place in Loma, Bandi, and Mende independently.

3.4. The development of Loma. The final major consonant rule development in Southwestern Mande involved the reordering of the Nasal Expansion rule. In Proto-Central SWM and in all of the descendants of Proto-Central SWM but Loma, this rule is ordered following the Gemination rule. In Loma, the Nasal rule is ordered preceding the Gemination rule. The reordering in Loma produces a feeding ordering because the Nasal Expansion rule provides additional input for the Gemination rule. And such a reordering is a simplification in the Kiparskian sense and can be regarded as a natural, anticipated development. As a result of this development, Loma has both voiced and voiceless surface geminate consonants. These are derived in (28) below:

(28) Loma	underlying voiceless	underlying heavy
Base	n-t	n-l
Homorganic Nasal		
Nasal Absorption		n
Nasal Expansion		nd
Gemination	t-t	dd
Surface	tt	dd

The voiced geminate consonants, like the voiceless geminate consonants in Loma, are usually transcribed in the linguistic literature as a single segment. This is because the corresponding single segment consonants have undergone weakenings (26) and consequently no longer contrast with the geminates only with respect to gemination.

The reordering of the Nasal Expansion rule has resulted in the gemination of all underlying sequences of a nasal followed by a heavy consonant. This includes the strong suffixes (29), morpheme-final nasals (30), morpheme-medial nasals (31), and all nasal prefixes (32):

(29)	Proto-SWM	Bandi	Loma
underlying	*ǹ$_2$-kómī́ŋ-í	n$_2$-kómī́ŋ-í	ń$_2$-komīŋ-ı
surface	*k-kómī́ŋ-í	k-kow̃'ī́ng-ı	k-kómī́gg-ı
gloss	bee-the	bee-the	bee-the

(30)	Bandi	Loma
underlying	n$_2$-ków̃īŋ+wúlú-í	ń$_2$-komīŋ+wulu-ı
surface	k-kow'ī́+ngúlú-'íı	k-kómī́+ggulu-'í
gloss	bee+tree-the	bee+tree-the

(31)

	Proto-SWM	Bandi	Loma
underlying	*ǹ$_2$-lámbáŋ-ſ	n$_2$-lámbáŋ-ſ	ń$_2$-labbaŋ-l
surface	*ǹámáŋ-ſ	ndamb'áng-ſ	ddábbágg-l
gloss	crocodile	crocodile	crocodile
underlying	*n$_2$-konlàà-ſ	n$_2$-kondá-ſ	ń$_2$-kodda-l
surface	k-konáa-ſ	k-konda-'ſi	k-kóddá-ſ
gloss	mortar-the	mortar-the	mortar-the

(32) Bandi

underlying	ń-lá-ſ	ſ-lá-ſ	n$_1$-lá-ſ
surface	ndá-ſi	ſ-lá-ſi	nda- ſi
gloss	my mouth	your mouth	his mouth

Loma[24]

underlying	n-la-i	e-la-i	ń$_1$-la-i
surface[25]	dda-l	e-la-i	ddá-ſ
gloss	my mouth	your mouth	his mouth

The major consonantal rule developments are summarized in Table II below:

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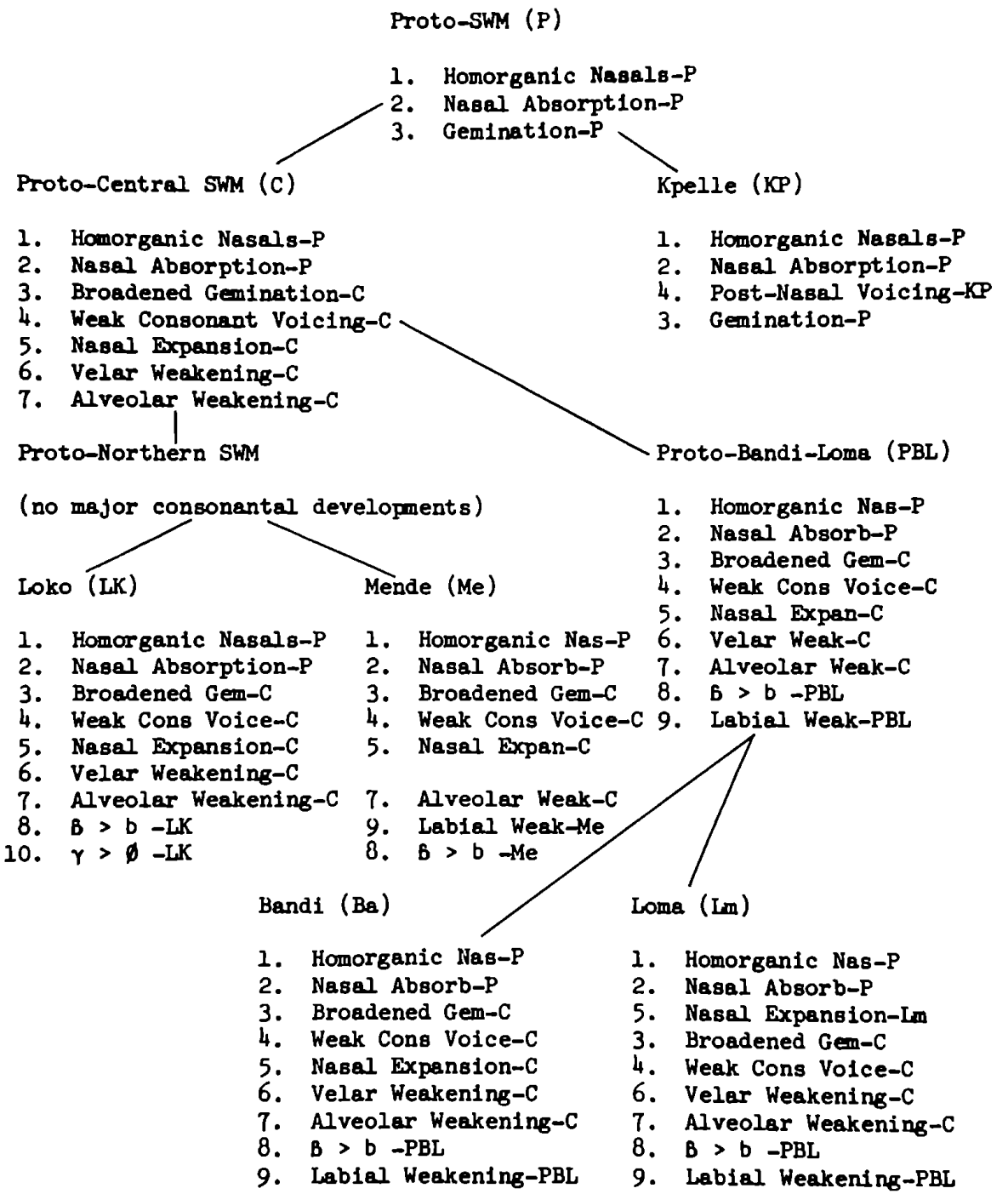
[24]Loma has also undergone a tonal inversion, an historical development which reversed the values of the underlying Loma tones (see Dwyer [1973]).

[25]Because both underlying high tones and non-high tones produce surface voiced geminate consonants, the resultant gemination can no longer be uniquely attributed to low tonedness.

Table II:


Proto-SWM (P)
1. Homorganic Nasals-P
2. Nasal Absorption-P
3. Gemination-P
Proto-Central SWM (C)
1. Homorganic Nasals-P
2. Nasal Absorption-P
3. Broadened Gemination-C
4. Weak Consonant Voicing-C
5. Nasal Expansion-C
6. Velar Weakening-C
7. Alveolar Weakening-C
Kpelle (KP)
1. Homorganic Nasals-P
2. Nasal Absorption-P
4. Post-Nasal Voicing-KP
3. Gemination-P
Proto-Northern SWM
(no major consonantal developments)
Proto-Bandi-Loma (PBL)
1. Homorganic Nas-P
2. Nasal Absorb-P
3. Broadened Gem-C
4. Weak Cons Voice-C
5. Nasal Expan-C
6. Velar Weak-C
7. Alveolar Weak-C
8. ß > b -PBL
9. Labial Weak-PBL
Loko (LK)
1. Homorganic Nasals-P
2. Nasal Absorption-P
3. Broadened Gem-C
4. Weak Cons Voice-C
5. Nasal Expansion-C
6. Velar Weakening-C
7. Alveolar Weakening-C
8. ß > b -LK
10. γ > Ø -LK
Mende (Me)
1. Homorganic Nas-P
2. Nasal Absorb-P
3. Broadened Gem-C
4. Weak Cons Voice-C
5. Nasal Expan-C
7. Alveolar Weak-C
9. Labial Weak-Me
8. ß > b -Me
Bandi (Ba)
1. Homorganic Nas-P
2. Nasal Absorb-P
3. Broadened Gem-C
4. Weak Cons Voice-C
5. Nasal Expansion-C
6. Velar Weakening-C
7. Alveolar Weakening-C
8. ß > b -PBL
9. Labial Weakening-PBL
Loma (Lm)
1. Homorganic Nas-P
2. Nasal Absorb-P
5. Nasal Expansion-Lm
3. Broadened Gem-C
4. Weak Cons Voice-C
6. Velar Weakening-C
7. Alveolar Weakening-C
8. ß > b -PBL
9. Labial Weakening-PBL

4. Alternative Analyses

In this section, four issues are discussed: a) the possibility that all the underlying consonants of the heavy series could have been stops, b) the possibility that heavy voicing and low tone are manifestations of the same distinctive feature, c) the possibility that what I have claimed to be low-toned nasals, $\grave{n}_1$ and $\grave{n}_2$, are not nasals at all, but low-toned vowels, and d) that the underlying Proto-SWM pronouns *ń- and *$\grave{n}_1$ are *ŋɔ́ and *ŋɔ̀ respectively.

4.1. Underlying stops. Before resolving the issue of whether all underlying Proto-SWM heavy consonants are stops or not, it is necessary to establish that there is only one series of heavy consonants in SWM. The development of the heavy series in SWM appears to be the result of a number of mergings of voiced stops with liquids and glides. This can be seen in the following comparison (33) of Proto-SWM and Northern Mande cognates.[26]

(33) 1. Proto-SWM *w corresponds to Northern Mande b or w.

PSWM:	*wuru	'tree'	Bambara:	yiri	'tree'
			Susu:	wuri	'tree'
PSWM:	*waʔ	'big'	Bambara:	ba	'big'

2. Proto-SWM *l corresponds to Northern Mande d or l.

PSWM:	*la	'mouth'	Bambara:	da	'mouth'
			Susu:	dɛ	'mouth'
PSWM:	*la	'place'	Bambara:	la	'place, in'

3. Proto-SWM *y corresponds to Northern Mande dj or y.

PSWM:	*ya	'water'	Bambara:	dja	'water'
			Susu:	ye	'water'

4. Proto-SWM *ɣ corresponds to Northern Mande x or k.

PSWM:	*ɣalo	'moon'	Bambara:	kalo	'moon'
			Susu:	xalo	'moon'

[26] The Bambara data is from Travele [1913] and the Susu data is from Houis [1963].

(33) 5. No correspondences involving Proto-SWM *ɓ have yet been established with Northern Mande. Possibly, the reconstruction of 'big' in Proto-SWM is *ɓaŋ rather than *wa (see 33-1). This assumption is based on the barely possible interpretation of 'crocodile' as a compound meaning 'big mouth' (Bandi ndamb'áng-ſ 'the crocodile' < PSWM *la-n-ɓaŋ 'mouth-it-big').

These mergings could have been the result of a weakening of the stop series or a strengthening of the heavy series. The strengthening hypothesis is less likely for the following reasons:

(a) Merging through strengthening would result in a language with no liquids and no glides, an infrequent situation in language.[27]

(b) Even if the underlying consonants in Proto-SWM are all stops, it is still necessary to postulate weakening rules to account for the weak allophones of the heavy series in SWM (ɓ , l , ɣ , ɤ , and w). As long as both hypotheses require weakening rules, it is at least more economical on a synchronic plane to claim that both these mergings and these weak allophones are the result of the same weakening rules.

(c) Except for the implosive ɓ , these is no evidence to support the existence of underlying voiced stops in any of the SWM languages.[28] All of the surface voiced stops in SWM can be derived from the underlying ɓ , l , ɣ , ɤ , and w through the application of the Nasal Absorption, Nasal Expansion and Gemination rules.

(d) Moreover, voiced velar stops have not been observed in Northern Mande either. SWM's voiced velar, ɣ , corresponds either to Northern Mande's x , as in Susu, or k , as in Bambara. Thus no concrete evidence exists to support an underlying voiced velar stop in either branch of Western Mande. Welmers [1958], assuming that SWM heavy consonants

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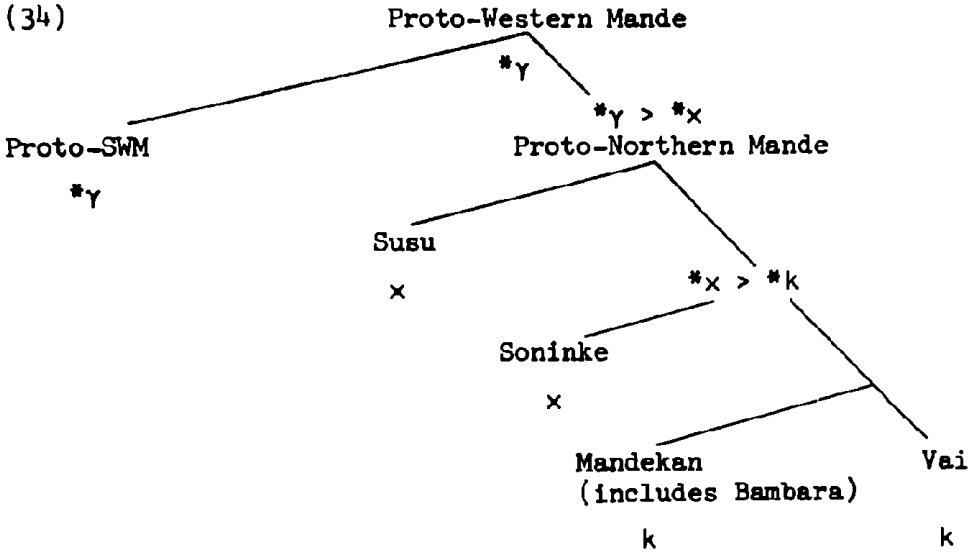
[27] Hyman has pointed out (personal communication) that it is his understanding that Proto-Bantu has been reconstructed without underlying glides

[28] The presence of a morpheme-initial implosive ɗ in the north-east dialects of Kpelle [Welmers 1962] in place of an initial l , Hyman argues (personal communication), suggests the possibility of a second noncontinuant *d in the Proto-SWM heavy series.

were stops, postulated a voiced velar stop *g for Proto-Western Mande, the immediate ancestor of Northern and Southwestern Mande. Welmers then concluded Proto-Western Mande *g weakened to *x (as in Susu) and then *x > k (as in Bambara). However, if the Proto-SWM heavy velar consonant is *ɣ rather than *g, the Proto-Western Mande equivalent can also be given as *ɣ. This permits the description of the development of voiced velars in Western Mande as follows (34):

(34)



(e) The alternations ng-ɣ and ng-w can best be described if each alternation has a distinct underlying consonant. Were the two weak variants of these alternations, ɣ and w, in complementary distribution, only one underlying consonant, say ɣ would be necessary. Yet in Mende, for example, the weak allophones of these alternations are almost, but not completely, in complementary distribution: the allophone ɣ appears when followed by i, e, ɛ, a, and ɔ; the allophone w appears when followed by u, o, and ɔ as in the following examples (35):

(35) Mende	ngeie-i	the sky	nya+ɣeie-i	my sky
	ngɔmbu-i	the fire	nya+ɣɔmbu-i	my fire
	nguli-i	the tree	nya+wuli-i	my tree
	ngɔiɛ-i	the sobbing	nya+wɔiɛ-i	my sobbing

If both ɣ and w are derived from the same source, then it is difficult to show how both ɣ and w can occur before ɔ. If, on the other hand, the ng-ɣ alternation is derived from an underlying ɣ (later ɣ > y) and the ng-w alternation is derived from an underlying w, then this occurrence can be explained as follows: first the near complementary distribution of ɣ and w is the result of two phonological processes: one which states that a vowel which follows w must be rounded (e.g., wi > wu, we > wo, wɛ > wɔ, and wa > wɔ), and one which states that ɣ, when followed by u or o must be rounded (e.g., ɣu > wu and ɣo > wo). These two processes produce the near complementary distribution of ɣ and w. Once ɣ and w developed near complementarity, ɣ shifted to y resulting in the present day Mende situation.

These arguments weigh heavily in favor of *ƃ, *l, *y, *ɣ and *w being the underlying consonants of the heavy series in SWM.

4.2. Plus lowered. It has been proposed that extra heavy voicing is related to low tone by the feature [+lowered] [Bird 1971a]. This proposal makes it possible to state that the development of extra heavy voicing in Kpelle is an assimilation of the feature [+lowered] of the low tone of the nasal ǹ- by the following consonant.

Yet this approach does not explain why only low toned nasals in Kpelle cause extra heavy voicing and why other types of low tones in Kpelle do not. For example, in Kpelle there is a lowering rule which applies to certain nominal compounds and noun-adjunctive adjective constructions. This rule lowers the tones of the vowels of the second constituent of these constructions, but does not cause extra heavy voicing in the consonants. This is true of Southwestern Kpelle, the dialect described by Welmers [1962] and my own observations of Central Kpelle where a morpheme-final nasal causes the voicing of a following voiceless obstruent as in the example in (36) below.

(36)

Southwestern Kpelle	kálɔ̀ŋ	chief	pɔ́lɔ́	old	kálɔ̀m+pɔ̀lɔ̀	old chief
Central Kpelle	kálɔ̀ŋ	chief	pɔ́lɔ́	old	kálɔ̀m+bɔ̀lɔ̀	old chief

Were the feature [+lowered] to apply to the consonants of the second constituent as well as the vowels, extra heavy voicing would be anticipated (e.g., **kɑ́lɔ̀m+bbɔ̀lɔ̀ 'old chief'). If [lowered] is a feature of both sonorant and non-sonorant segments, then the Kpelle Lowering rule must be written so that it excludes non-sonorant segments. If, on the other hand, the feature used to mark low tones were not a characteristic of non-sonorant segments (such as the tone feature [low]), this awkward situation would not arise.

A second weakness of this approach arises with the existence of heavily voiced consonants which cannot be derived from a preceding low tone. In Loma, for example (37 below), heavily voiced consonants are derived from nasals which are high-toned as well as from nasals which are not.

(37) Loma	surface	underlying	gloss
	ddɛγɛ	n-lɛγɛ	my brother
	ddɛ́γɛ́	ń-lɛ́γɛ́	his brother

My investigations of heavily voiced consonants indicate that the difference between heavily and normally voiced consonants in Kpelle and Loma is not primarily one of quality, but one of the duration of the voicing of the segment. This fact is aptly rendered by representing heavily voiced consonants as geminate.

4.3. The possibility of *ə̀. It has been suggested that what I and others have called a low-toned nasal, *n̄- , is actually a low-toned vowel, most likely *ə̀ [Welmers 1971]. The basis of this argument is that the third person singular pronoun in Northern Mande is not a nasal, but a vowel, usually ə̀. This argument would be stronger, were it not for the rather poor correspondence, as evidenced by (38) below, of the SWM and Northern Mande personal pronouns.

(38)	Bandi	Kpelle	Bambara [Sauvant 1956]	
my	ń-	ń-	ne	
your	ɲ-	ɲ-	i	
his	n-	ǹ-	a	
our$_1$	muú	kú	an	
our$_2$	niɲ			
your	wú	ká	au	
their	ttiɲ	ddɲ	u	(PSWM: *ǹtɲ)

Nevertheless, because there is some pronoun correspondence between Northern and Southwestern Mande, *à would be a likely candidate for this particle were it not for a number of situations which require that this particle bear a nasal component. Nasality is, after all, the crucial difference between these two proposals. Both *à and *ǹ- are sonorant (tone-bearing) and low-toned; only *ǹ- , however, is [+nasal].

The first of these situations is the broadening of the Gemination rule in Proto-Central SWM (see 3.3.) to include both the particle in question and the high-toned nasal *ń- 'my', but not the high-toned non-nasal *ɲ- 'your'. This development can be seen as a simplification of the Gemination rule (the inclusion of all nasals) only given the *ǹ- hypothesis. Given the *a proposal, the motivation behind this development is unclear at best.

The second of these situations concerns the process which has been termed Nasal Absorption (11). This process states that when the particle in question combines with a heavy consonant, the result is a nasal with the point of articulation of the heavy consonant. The resultant nasality is a natural consequence of the *ǹ- proposal, but a spurious development given the *à proposal.

Thirdly, the Nasal Absorption process is necessary to describe the development of SWM medial consonants. If the *à proposal is followed, then the development of SWM initial and medial consonants must be considered as the result of different processes, even though their result

is the same. Again, given the *ṅ- hypothesis, the development of SWM initial and medial consonants can be seen as the result of the same processes.

One of these processes, Nasal Absorption, is necessary to demonstrate why Kpelle medial nasals may correspond with either Central SWM nasals, NC_{vd} sequences or voiceless stops. Some comparisons of Mende (a Central SWM language) and Kpelle are given in (39) below.

(39) 1. Kpelle medial nasal corresponds to Central SWM medial nasal:

Kpelle:	ŋɔ̃nɪ̃	'bird'	Mende:	ŋɔ̃nɪ̃	'bird'
Kpelle:	mɛ̃nɪ̃	'hear'	Mende:	mɛ̃nɪ̃	'hear'

2. Kpelle medial nasal corresponds to Central SWM NC_{vd}:

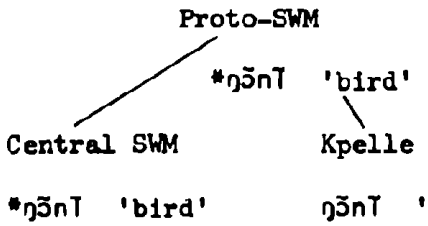
Kpelle:	kpɪnɪ	'night'	Mende:	kpindi	'night'
Kpelle	kona	'mortar'	Mende:	konda	'mortar'

3. Kpelle medial nasal corresponds to Central SWM voiceless stops:

Kpelle:	tuŋwɔ	'staff'	Mende:	tikkpɔ	'staff'
Kpelle:	fuŋa	'powder'	Mende:	fukka	'powder'
Kpelle:	nɪ̃ŋa	'cow'	Mende:	nɪ̃kka	'cow'
Kpelle:	mɪ̃na	'spoon'	Mende:	mɪ̃tta	'spoon'

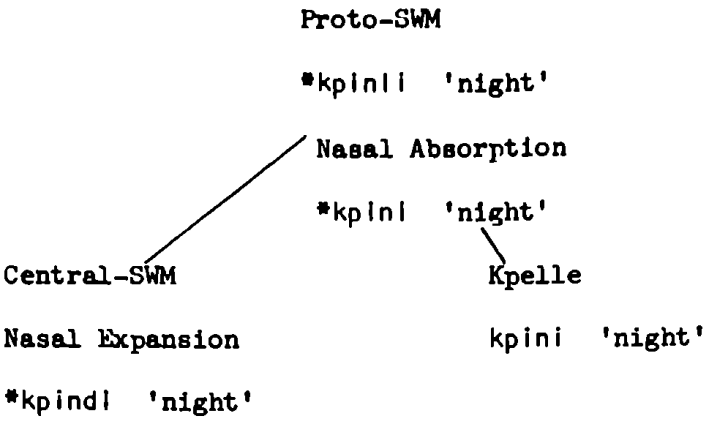
The first set of correspondences represent reflexes of Proto-SWM medial nasals (40):

(40)



The second set of correspondences represent reflexes of Proto-SWM medial $*NC_{heavy}$ sequences and the effects of the Nasal Absorption and Nasal Expansion rules (41):

(41)



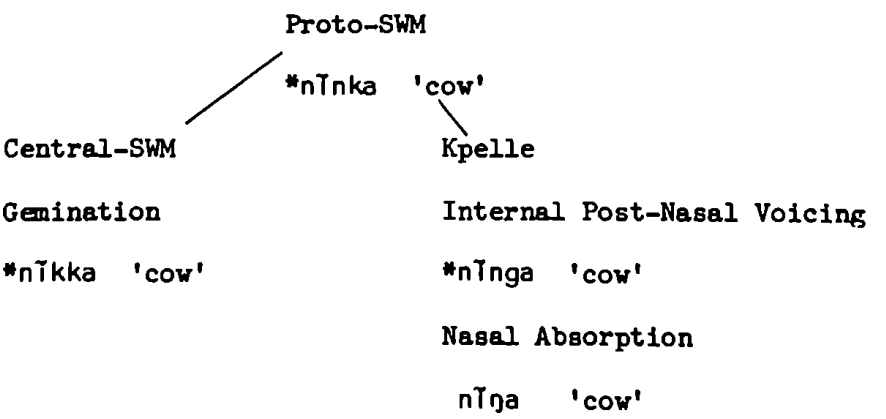
The third set of correspondences represent reflexes of Proto-SWM medial *NC_{vls} sequences and the effects of the Gemination rule, and a rule called Internal Post-Nasal Voicing (42), a Kpelle rule which applies before Nasal Absorption and voices medial consonants which are preceded by a nasal.

(42) Internal Post-Nasal Voicing (Kpelle)

$$C_{vls} \rightarrow C_{vd} \; / \; +...N\_\_...+$$

The third set of correspondences are derived as follows (43):

(43)



The intermediate stage of the Kpelle development is supported by the following set of Vai (a Northern Mande language) cognates (44). Here, the Internal Post-Nasal Voicing rule applies in the absence of

the Nasal Absorption rule:[29]

(44) Vai [Westermann 1927]

tungbɛ 'staff'

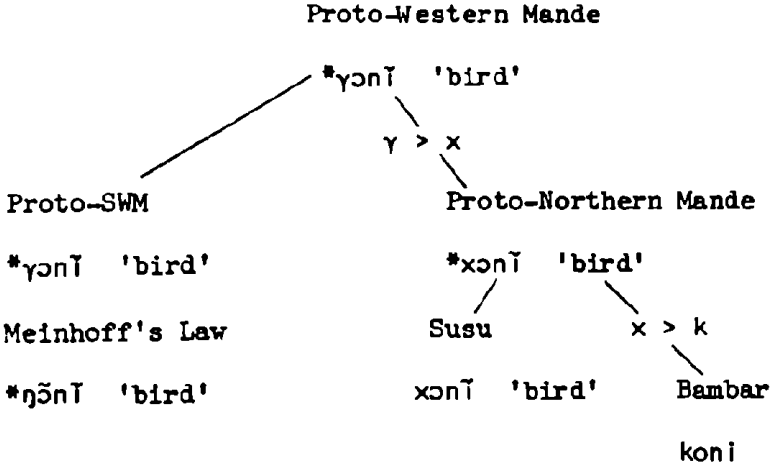
fungu 'powder'

ningɛ 'cow'

manja 'chief' (c.f. Bandi: mãssa 'chief')

Further evidence of nasality before voiceless stops in Proto-SWM comes from the morphemes glossed 'bird' and 'spoon'. Each of these morphemes illustrates a SWM development akin to Meinhoff's law [Bennett 1967]. This variant states that morpheme-initial heavy consonants become nasal if the medial consonant is nasal. The development of Proto-Western Mande *ɣɔnĩ 'bird' is illustrated in (45) below:

(45)



The Western Mande morpheme *binta 'spoon' also undergoes Meinhoff's law (*binta > *mĩnta) indicating the presence of a medial nasal and the presence of medial NC_{vls} sequences in Proto-SWM. The medial consonant development of Proto-SWM *mĩnta 'spoon' (46) follows the same medial consonant development as Proto-SWM *nĩnka 'cow' (43).

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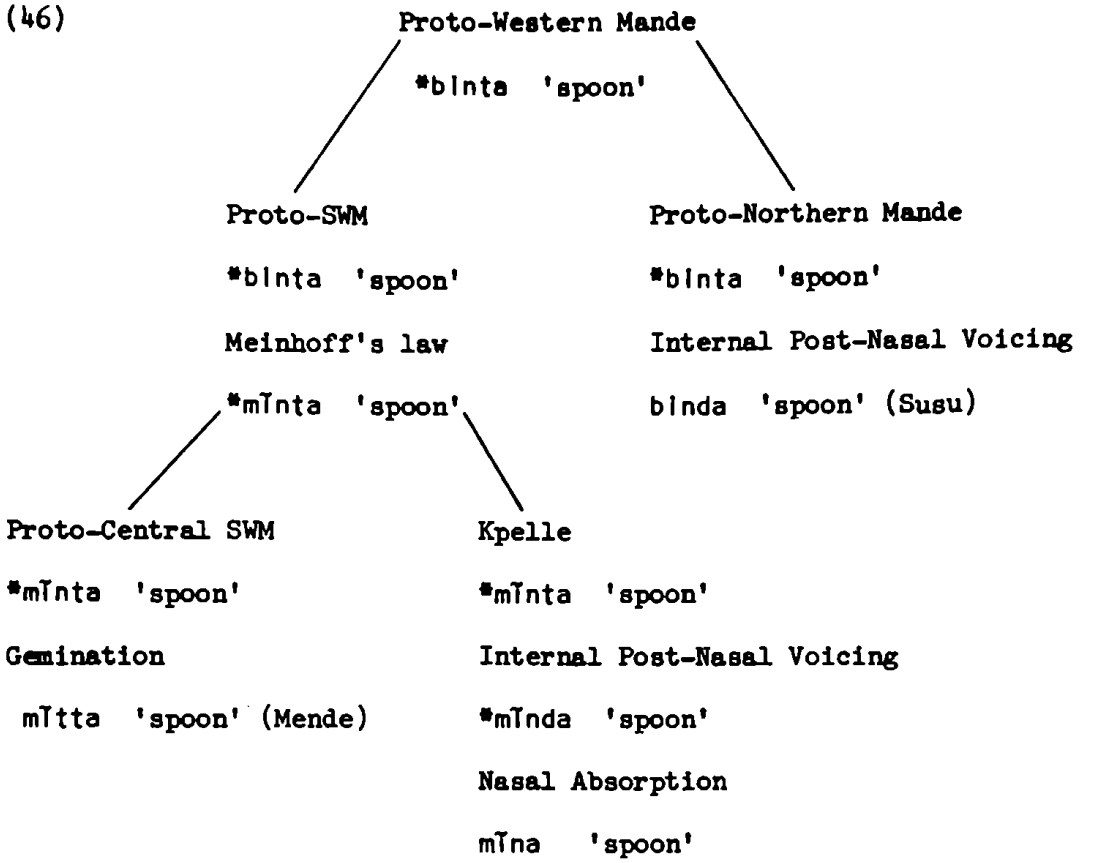
[29] Because the Post-Nasal Voicing rule appears in only some of the Northern Mande languages and only one of the SWM languages, I feel that its presence in Kpelle and Vai must be due to some reason other than common genetic inheritance.

(46)



From the arguments and data presented here, one can see that the development of SWM medial consonants must be viewed in terms of nasal-consonant sequences and the Nasal Absorption, Nasal Expansion and Gemination rules, exactly those rules which were proposed for the development of SWM initial consonants. Were the low-toned nasal *ǹ- replaced by the non-nasal *d̀ , this generalization would be lost.

4.4. <u>The possibility of ŋɔ</u>. The reconstruction of Proto-SWM 'my' and 'his' presented here differs from Hyman [1973] who reconstructs them as *ŋɟ and *ŋɟ̀ respectively. We both believe that the two sets of pronouns are related, but through different processes: Hyman believes that *ɲ́- 'my', for example, is derived from *ŋɟ through vowel deletion and tone transferral, while I claim that *ŋɟ is morphemically complex, containing the pronoun *ɲ́- and the particle of alienation *wɔ. Because the development of the SWM pronouns is extremely complicated and irregular, it could be the topic of a lengthy article itself.

Table III: Southwestern Mande possessive pronouns

Familial Possession	Mende	Loko	Bandi	Loma	Kpelle	PSWM
my	nyá	nɨ	nɨ	n	ń	*ń
your	bɨ	bɨ	ɨ	e	ɨ	*ɨ
his	ngɨɨ	ngɨɨ	ngɨɨ	ń	ǹ	*n-
our$_1$[30]	--	nɨɨ	nɨɨ	dée	--	--
our$_2$	muú	muú	muú	gée	kú	?
your	wuú	wú	wú	wo	ká	?
their	tɨɨ	tɨɨ	tɨɨ	tée	ddɨ	*ǹ-tɨ
Corporal Possession						
my	nyá	nyá	ń	n	ń	*ń
your	bɨ	bɨ	ɨ	e	ɨ	*ɨ
his	ngɨɨ	alάa	n	n	ǹ	*ǹ
our$_1$	--	nɨɨ	nɨɨ	dée	--	--
our$_2$	muú	muú	muú	gée	kú	?
your	wuú	wú	wú	wo	ká	?
their	tɨɨ	tɨɨ	tɨɨ	tée	ddɨ	*ǹ-tɨ
Alienable Possession						
my	nyá	nɨ	nɨ	na-n	ŋ́	?
your	bɨ	bɨ	ɨ	ya	ɨ	?
his	ngɨɨ	ngɨɨ	ngɨɨ	ná-ń	ǹ	?
our$_1$	--	nɨɨ	nɨɨ	dáa	--	?
our$_2$	muú	muú	muú	gáa	ká	?
your	wuú	wuú	wú	wa	ká	?
their	tɨɨ	tɨɨ	tɨɨ	táa	ddɨ	*ǹ-tɨ

[30] Loma, Bandi, and Loko draw a distinction between inclusive (our$_1$)

The sketchy outline of the SWM possessive pronouns (Table III) is offered in order to demonstrate why I differ with Hyman [1973] with respect to the Proto-SWM form of the above mentioned prnouns.

Southwestern Mande expresses three types of possession: familial, corporal, and alienable. Familial possession concerns one's relationship with his family (my father); corporal possession, with body parts (my foot); and alienable possession, with all other objects (my rice). These different types of possession not only correspond to different semantic categories, but to different morphological and phonological (including segmental and tonal) differences as well. The following discussion concerns only the morphological differences of the various SWM pronouns whose underlying representations are given in Table III above.

With the exception of the syllabic, tone-bearing nasals, which have already been discussed, and the short rising tone (e.g., ĭ , ŭ), which is reduced to either a simple high or non-high tone, the underlying representations of (47) are virtually identical to their corresponding surface representations. Yet, in order to clearly demonstrate this relationship, the following corporal possessive paradigm is offered.

(47) Corporal possession in SWM[31]

	Loko	Mende	Bandi	Loma	Kpelle
my	nyá-wo.o-'ɾ	nyá-go.e-'ɾ	k-kó.o-'ɾ̀	k-ko.ogg-'ɾ	ŋ́-go.o
your	bɾ-wo.o-'ɾ	bɾ-go.e-'ɾ	ɾ-wó.o-'ɾ̀	e-wo.ogg-'ɾ	ɾ-ko.o
his	alá-wo.o-'ɾ	ngɾ-go.e-'ɾ	k-ko.o-'ɾ̀	k-kó.ógg-ɾ	g-go.o
our$_1$	nɾ-wo.o-'ɾ	---	nɾ-w'ó.o-'ɾ̀	dɾ-wó.ogg-'ɾ	---
our$_2$	mú-wo.o-'ɾ	mú-go.e-'ɾ	mu-w'ó.o-'ɾ̀	gɾ-wó.ogg-'ɾ	kú-ko.o
your	wú-wo.o-'ɾ	wú-go.e-'ɾ	wú-wó.o-'ɾ̀	wo-wo.ogg-'ɾ	ká-ko.o
their	ttɾ-wo.o-'ɾ	ttɾ-go.e-'ɾ	ttɾ-w'ó.o-'ɾ̀	ttɾ-wó.ogg-'ɾ	ddɾ-ko.o

---

and exclusive (our$_2$) first person plurals. Eastern Kpelle, according to Lassort [1952] also has this distinction.

[31]The morpheme glossed as 'belly' has shifted its class membership in Loma, for here it behaves like those morphemes which historically end in a velar nasal. This suggests the possibility that in Loma this class distinction may be marked with a diacritic feature rather than phonetically.

While the SWM pronoun development is not entirely regular, a few observations can be made. First, the Loma alienable possessive pronouns can be easily derived from the corporal possessive pronouns through the addition of a particle -a and the elision of the pronoun vowel (note, however ya from i-a). Likewise, the Kpelle pronoun ŋɔ́ 'my' can be viewed as morphemically complex (ŋ+wɔ). Furthermore, this situation can be seen even more clearly in an eastern dialect of Kpelle where in careful, deliberate speech, as reported by Lassort [1952:329] in (48) below, the entire paradigm of corporal pronoun plus wɔ is present.

(48)

	Alienable	Alienable	Corporal
	Careful Speech	Normal Speech	Familial
my	w̃ɔ (high tone)	ŋə (high tone)	ŋə (high tone)
your	e wɔ	yɛ	e
his	w̃ɔ (low tone)	ŋə (low tone)	ŋə (low tone)
our	ku wɔ	kuo	ku
your	ka wɔ	ka	ka
their	di wɔ	die	di

(Lassort uses the schwa in the above examples to indicate a syllabic nasal. Thus ŋə is equivalent to ŋ.)

Lassort further mentions that pɔ 'trace' and 'ye 'hand' can be used in place of wɔ. This fact demonstrates that the sequence: pronoun - particle of alienation - alienable noun, is quite common in Kpelle. In contrast to the eastern dialect of Kpelle described by Lassort [1952], the dialect described by Welmers [1962] has preserved the morphological distinction between alienable on one hand, and corporal and familial on the other in the first and third person singular only.

5. Summary

This paper has outlined the major consonant developments of Southwestern Mande. It has shown that only one set of rules is necessary to describe the development of both medial and final consonants and initial consonant alternation. It has shown that initial consonant alternation has risen through the interaction of a low-toned nasal prefix with a

following consonant. Subsequent consonantal developments were shown to be natural developments which in most cases appeared to be simplifications in the Kiparskian sense.

REFERENCES

Bennett, P. 1967. "Dahl's Law in Thagicu", African Language Studies 8.

Bird, C. 1971a. "Observations on initial consonant change in Southwestern Mande", in Papers in African Linguistics, pp. 153-74. Edited by C.W. Kim and H. Stahlke. Edmonton, Alberta and Champaign, Illinois: Linguistic Research, Inc.

Bird, C. 1971b. "Some observations on the phonology of Mandekan: Diachronic and synchronic regularity", Studies in African Linguistics, supplement 2.

Dwyer, D. 1973. A Comparative Tonology of Southwestern Mande Nominals. Doctoral dissertation, Michigan State University, Lansing.

Eberl-Elber, R. 1937. "Der Konsonantische Anlautwechsel am Hauptwort in der Sprachengruppe Gbande-Loma-Mende", Mitteilungen der Ausland Hochschule an der Universitat Berlin Jargang 15.

Gudshinshky, S., A. Popovitch and F. Popovitch. 1970. "Native reaction and phonetic similarity in Maxakali phonology", Language 46.1:77-88.

Heydorn, R. 1940. "Die Sprache der Bandi im nordwestlichen Liberia", Zeitschrift für Eingebornen Sprachen 31:81-114, 108-27.

Hintze, F. 1948. "Zum konsonantischen Anlautwechsel in enigen westafrikanischen Sprachen", Zeitschrift für eingebornen Sprachen 2:164-82, 322-35.

Houis, M. 1963. Etude descriptive de la langue Susu. IFAN, Dakar.

Hyman, L. 1973. "Notes on the history of Southwestern Mande", Studies in African Linguistics 4:183-96.

Lassort, R. 1952. Grammaire Guerzé. Mémoires de l'IFAN no. 20:303-423. Dakar.

Manessy, G. 1964. "L'alternance consonantique initiale in Manya, Kpelle, Loma, Bande, et Mende", Journal of African Languages 1.1:162-78.

Meeussen, A. 1965. "A note on permutation in Kpelle-Mende", African Language Studies 6.

Sauvant, M. 1965. Grammaire Bambara. Issy les Moulineaux.

Schachter, P. and V. Fromkin. 1968. A Phonology of Akan: Akuapem, Asante, and Fante. Working Papers in Phonetics 9. UCLA.

Travele, M. 1913. Petit dictionaire Francais-Bambara et Bambara-Francais. Paris.

Welmers, W. 1958. "The Mande languages", Georgetown Series on Language and Linguistics 11.

Welmers, W. 1961. "Internal evidence of borrowing in Kpelle", General Linguistics 4:1-9.

Welmers, W. 1962. "The phonology of Kpelle", Journal of African Languages 1:69-93.

Welmers, W. 1970. "The morphology of Kpelle nominals", [to appear in the Journal of African Languages].

Welmers, W. 1971. "Niger-Congo Mande", in Current Trends in Linguistics, Number 7, Linguistics in Sub-Sahara Africa, edited by T.A. Sebeok. Mouton, The Hague.

Westermann, D. 1927. Die westlichen Sudansprachen und ihre Beziehungen zum Bantu. Berlin: Reimer.

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A NOTE ON GLOBAL RULES IN BANGUBANGU TONE

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1. Introduction

Recently McCawley [1973] has claimed that standard phonological theory, through its requirement that rules should be local, cannot account for some complicated cases, such as the tonal system of Bangubangu. (A local rule, when applying to a given string in a derivation, makes use of phonological information contained in the string itself, whereas a global rule in addition relies on phonological information contained in some previous string of the same derivation; in both cases, grammatical information can be used.) McCawley also submits two sets of rules for deriving Bangubangu tones; the first makes use of a "spurious" mid tone, the second contains global rules. The aim of the present paper is (1) to evaluate McCawley's arguments about the insufficiency of local rules, (2) to examine the validity of his global rules, and (3) to make some suggestions about other possibilities for an analysis of Bangubangu tone.

2. Local Rules

In the first case adduced by McCawley two possible derivations are given for the phonetic string [...mulondó múyende] '(put) the jar into the house':

(a)	/mu lóndo	mu ki endé/
Raising	ó	
Spreading		ú
Lowering	o	e

Formalizing these rules, we obtain:

Raising:
$L \rightarrow H \;/\; H \_\_$

Spreading:
$L \rightarrow H \;/\; H\ \# \_\_$

Lowering:
$H \rightarrow L \;/\; L \_\_ \left\{ \begin{matrix} H_1 \\ \#\# \end{matrix} \right\}$

Here, McCawley's argument is: "lowering must be global, since it is the highs that were high before High Shift that get lowered, not the ones that it (or Terminal High Spreading) created." It is true that only non-derived highs must be lowered; but since every derived high is preced by high, any non-derived high can be identified at this stage through the fact that it is the first of a pair (or a sequence) of highs, or that it is preceded by low (or both conditions taken together). The environment given in the formalization, then, is doubly sufficient, and a global rule is superfluous.

(b) /mu lóndo mu kl endé/

Shift		o	ó				
Spreading				ú			
Lowering						e	

Formalized rules:

Shift:

HL ⟶ LH

Spreading:

L ⟶ H / H # ____

Lowering:

H ⟶ L / ____ # #

The difficulty about lowering does not arise here, and it can be observed that the lowering rule can be ordered before spreading or even before shift. The necessity of a global rule in this case is claimed by McCawley on the basis of a contrast with another string: [mbeté namáfumú] 'knives and spears', with the following derivation:

/n péte ná ma fúmu/

Shift	e	é	a	á	u	ú			

The argument is: "in such an example, Terminal High Spreading would incorrectly make the first syllable of the second word high unless it were allowed to refer to the tone which that syllable had before High

Shift." That is, the rule should not apply to derived low, but only to underlying low. Now, derived low is followed by high (as a result of HL ⟶ LH), whereas underlying low is followed by low. All that has to be done, then, is to add the mention of a following low to the environment of the spreading rule, thereby making it non-applicable to mbeté namáfumú:

Spreading:

L ⟶ H / H # ___ L

It can be verified that this addition has no undesirable results in (a) or (b). Again, a global rule appears not to be necessary.

The second case where according to McCawley a rule must be global is found in the examples [nilúcliná] 'I am afraid' and [ʃiiyégélá nádí níluclíná] 'I don't go (around) with it (because) I am afraid'. The first is straightforward if (final) lowering is ordered before shift:

/ni lú clín á/

Lowering	a
Shift	li á

The second requires a special rule, once more not applicable to (mbeté) namáfumú. For this rule we can take advantage of a difference in environment: namáfumú is preceded by LH # (:mbeté), whereas ...nilúcliná is preceded by HH # (:nádí); the same is true of the other known example: [guiúvulá] 'you want' but [hícú gúluvulá] 'if you want'. The rule--apparently a late rule--will be:

Reversal:

LH ⟶ HL / HH # ___ LH

Once more, the necessity of a global rule is not proved. But it must be admitted that the basis for the reversal rule is very narrow, and we may assume that there are other difficult cases in the tonal system of Bangubangu. In order to deal with these, one of the following options will have to be adopted: (1) using "interim" features, such as mid tone or extra high, which are absent both in depth and in surface;

(2) using some feature which is present in surface; (3) making use of global rules. It will be clear that (2), if at all possible, is the most satisfactory choice.

3. Global Rules

McCawley's second rule set includes three global rules: 7, 9, and 10. Of these, it looks as if rule 9, as it stands, is not applicable to any string: it converts to high some syllables which were high before rule 4, but none of the rules 4-8 rewrites anything as low; in effect, then, rule 9 always applies vacuously.

Rule 10 converts all highs which were high before rule 4 into low (except in the first syllable of a verb); in so doing, it yields wrong results in the following cases, taken from McCawley's derivations: *bónítagána instead of [bónítágána] 'they have called me', from /bá ó ní tágan á/; *?uyítagéʒééna instead of [?uyítágéʒééna] 'to call each other', from /ku yí tágan ʒeen á/; *níluclíná instead of [nílúclíná] 'I am afraid', from /ni lú clín á/, as well as all other cases of localization. It is not clear whether it will be possible to restrict rule 10 in such a way that these undesirable results are avoided.

4. Suggestions

4.1. Rising tones must be introduced by rules, perhaps by late rules, since they are present in surface. Moreover, every rising tone corresponds to an underlying high. Therefore it is an attractive possibility to convert most underlying highs into rising by a not too late rule, instead of changing them into low by the shift rule. The result would be that the desired distinction between derived high and non-derived high is no longer a problem. Whether this should be handled by a new feature [+ rising] or by the device of overspecified features, viz. [[-h] [+h]], is a significant question in itself.

4.2. "Predeterminants" could be treated by setting up the three formatives in question with an additional segment [-vo, -co, +hi], or [+vo, -co, -sy, +hi], all other features being either negative or unspecified: n'- 'it is', nda'- 'it is not', -a'- tense sign in

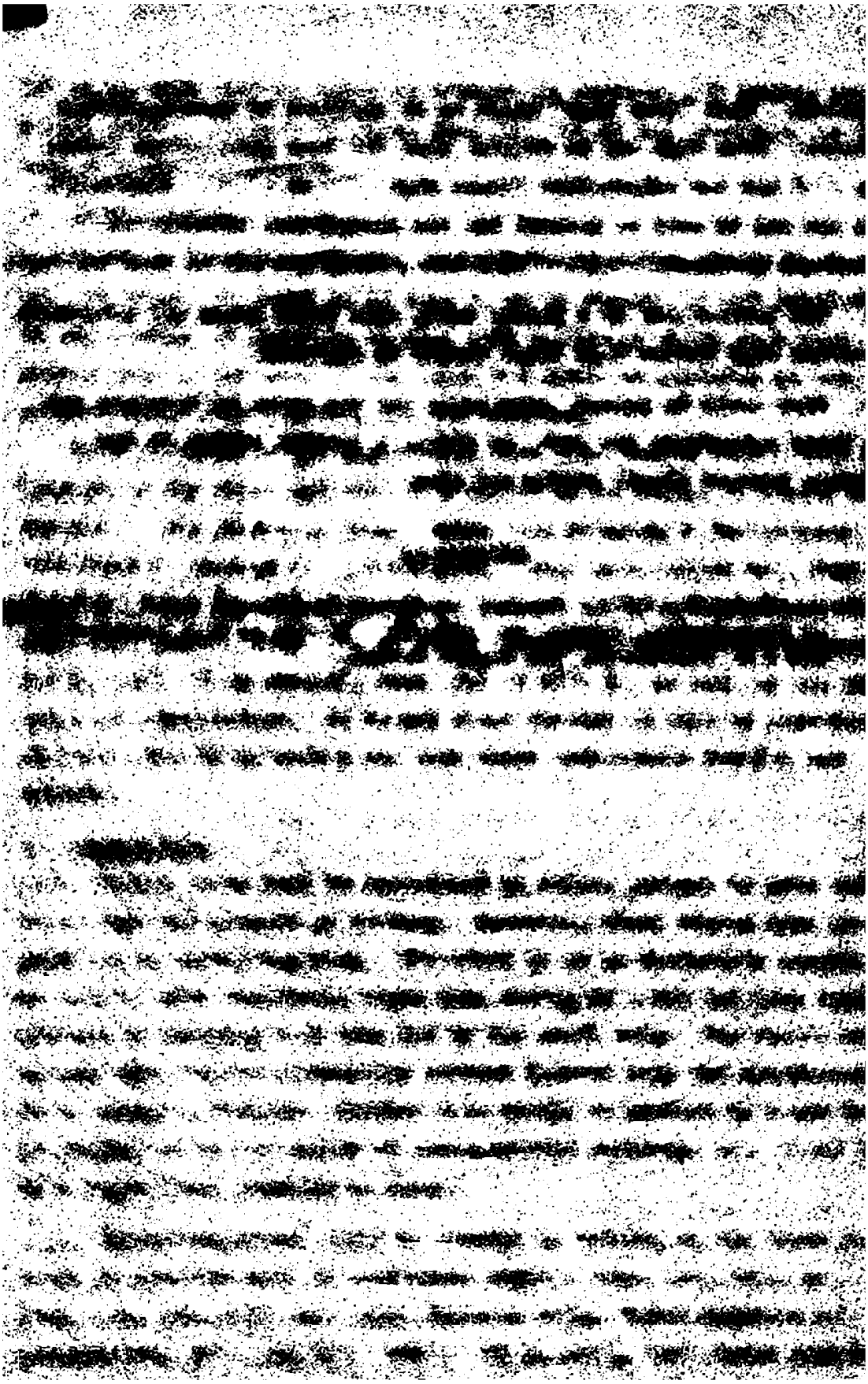
relatives. Such "free high" would be an instance of underspecified features. Free high can be helpful also for tone parallelism (tense sign -ˊ-) and for subjunctive (tense sign -ˊˊ- or -ˊˋ-). Similarly, free low can be used to account for the exceptional behavior of pronominal prefixes: ˋyú-, ˋbá-, etc., which are low in word initial.

4.3. The possibility of a fairly early rule which makes all extension syllables high before high final should be explored.

4.4. Much could be gained, expecially for the rules of doubling and for those concerning the verb, by giving a special status to the boundary between (last) prefix and stem.

REFERENCES

McCawley, James D. 1973. "Global rules and Bangubangu tone", in Issues in Phonological Theory, pp. 160-168. Edited by M.J. Kenstowicz and C.W. Kisseberth, The Hague: Mouton.



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DERIVATION AND SIMPLIFICATION BY ADOLESCENT DIOULA SPEAKERS

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1. Introduction

This paper is based on part of the research for my dissertation, done in Ivory Coast during the period of October 1970 through July 1972, and supported by grants from Stanford University. The research took place in Bouaflé, a medium sized town near the center of the country, with a mixed ethnic population. The general purpose of the research was to compare Dioula as it is spoken by primary speakers with the Dioula spoken as a second language in inter-ethnic communication. In this particular section, evidence was found of simplification comparable to that found in many pidgin languages. The Dioula language is part of Mandingue, of the Mande sub-group of Niger-Congo. Dioula is also called Malinké and Bambara, depending to some extent on social and geographic factors. The examples of derivation were elicited with an oral questionnaire which was tape recorded. This particular section of the questionnaire consisted of sentences to be translated from French to Dioula. The other parts of the questionnaire, including lexical items and free questions, were elicited in Dioula. Judging from the lack of French borrowings, either lexical or structural, the use of French did not seem to influence the derivation responses. All the speakers were first and second year pupils at a local secondary school, about 14 to 15 years old. The speakers were divided into two groups: The first group, D-I, was comprised of pupils who spoke Dioula as their first language. They were chosen to create a balance in what are reported to be geographic dialect areas according to their respective regions of origin. The second group, D-II, were speakers from other ethnic groups who spoke Dioula as a second language. In this case the group was balanced according to the primary language of the speaker. The D-I group had eleven speakers, the D-II thirteen.

2. Derivation in Dioula

The formation of new words by affixation is a rich process in Dioula.

Dumestre [1970] gives six "derived" or "integrated" verbals and twenty-two nominals in his grammar of Dioula. In the present study I have considered both derived (derivation with no change in word class) and integrated (derivation with a change in word class) words together under the title of derivation. I chose to investigate fifteen derivations cited by Dumestre (see Appendix). These fifteen derivations appear to be fairly frequent. They are found not only in Dumestre's grammar, but also in the Delafosse [1955] dictionary. While Delafosse marked some derivations as rare in his dictionary, none of these fifteen were so marked. I have no other information, however, that indicates the frequency of these derivations in current Dioula speech. For this reason, the overall percentages of use for any derivation in this research cannot be adequately evaluated. The interest lies in those derivations where the two groups differ in frequency of use, and especially in those derivations where the difference is a qualitative difference in formation.

One other problem deserves mention. The purpose of the test was to determine the speakers' ability to use certain derivational affixes. Real words in Dioula were used instead of nonce forms, as it was felt that the speakers would not respond to nonce forms. It was therefore possible for the speakers to produce a derived word as a vocabulary item without knowing the derivational process. For many items in the test, the responses were so varied that vocabulary learning did not seem to be influential. In other cases the base morpheme was sufficiently uncommon to minimize this effect also. In two cases, where one word of a derivation was consistently given correctly and the other word not at all (/dumuni/ 11.b. and /sigilan/ 15.a.), these two words were considered to have been learned as vocabulary, and thereby eliminated from further consideration.

In Dioula it is also possible to derive new words by suffing lexemes. The lexemes /če, muso/ 'man, woman' are often suffixed to animate lexemes: /dɔgɔ-če/ 'little brother', /kɔrɔ-muso/ 'elder sister', /so-muso/ 'mare', /misi-muso/ 'cow'. The D-II group often used this process, though the lexemes they affixed were not ones normally used by Dioulas. In addition to lexical derivation, there are other compound words which are unique, such as /nɛgɛ-so/ 'bicycle', from /nɛgɛ/

'metal, iron, and /so/ 'horse'.

Similar word formation is found in other languages of this sub-group. For Susu, a language from Guinea closely related to the Malinké group, Houis [1963] gives six derivations of lexical origin, of which two do not have corresponding free lexemes now, and seven other derivations created by affixation. One of the derivations of lexical origin (but without a current corresponding lexeme), /-ka/ 'locative of origin', is cognate with /-ka/ from Dioula. Another lexical derivative, /-di/ 'diminutive', is probably cognate with /dẽ/ 'child in Dioula, which is sometimes used as a diminutive, in the sense of 'offspring of', such as /misi-dẽ/ 'calf'.

3. Results of the Tests of Derivation

3.1. General results. An analysis of variance with unequal N's was done for each derivation separately; the sum of the means for all derivations was calculated and the two groups were compared on this basis also (see table 1). Group D-I (N 11) are the primary language speakers; Group D-II (N 13) are the vehicular language speakers. The speakers had from one to three attempts (depending on the derivation) to give the correct form. The percentage of correct responses for each speaker was noted, then converted by an arc sine value for the purpose of the analysis of variance.

Those derivations where the between group variance has a lesser probability than 1% were derivations known fairly well to members of D-I, and almost not at all to those of D-II. The variance on the sum of derivations also had a less than 1% probability. Those derivations where the between group variance has a probability of between 1% and 5% were derivations known to members of group D-I to some extent, and almost not at all to those of D-II. The derivations having a greater than 5% probability of between group variance were known very little or not at all to either group, although this last set of results is mixed. It should be noted that all significant (less than 5%) variances favor the D-I group.

It should be remembered here that these results are based on a test of production and not of comprehension. It is possible that the speakers, especially those of D-I, understood more derivations than they ordinarily

Table 1: Analysis of Variance--Tests of Derivations

	Derivation	Number of trials per speaker	(1) group % of correct responses D-I (N 11)	D-II (N 13)	critical value of F
2.	Verb redup.(2)	2	0%	4%	
4.	Adj. /man/	1	0%	0%	
5.	Augment.	2	77%	42%	
6.	Dimin.	2	9%	4%	
10.	Verb /man/	1	45%	15%	greater than 5%
11.	Verb /li/	3	42%	33%	
12.	Verb /bali/	2	0%	0%	
13.	Verb /len/	2	0%	0%	
15.	Instrumental	2	36%	23%	
3.	Adj /ya/ (verb)	3	37%	10%	5%--1%
7.	Origin	1	36%	0%	
1.	Trans. verb	2	41%	0%	
8.	Ord. Num.	1	91%	8%	
9.	Adj /ya/ (nom)	2	59%	8%	less than 1%
14.	Agentive	2	50%	1%	

(1) These percentages are of course not used in the analysis of variance. They are given here only to provide the reader with a more precise indication of the direction of the variance than would be provided by "low use, high, etc."

(2) See Appendix for a fuller description of the derivations. Numbers refer to the number of the derivation in the Appendix.

produced. Also, the expression asked for can often be rendered in other ways than by a derivation. Sometimes the so-called "wrong answers' denote lack of response; the speaker simply said he didn't know. However, many of the "wrong answers" were paraphrases expressing, some better than others, the requested idea. These alternate answers will be discussed further below. The more interesting results of the present research having to do with simplification were found in these alternate answers.

3.2. Results by derivation

3.2.1. Derivations with no significant between group variance. Derivations 2, 4, 6, 12, and 13 had very low scores for both groups. Derivation 2, reduplication of the verb to express a repeated action, was not used, but reduplication of other forms was quite frequent. The two sentences should have been:

(2a) /a ka sogo tige tige/
'he cut the meat into little pieces' (/tige/ 'cut')

(2b) /a ka a sen ko ko/
'he kept washing his feet again and again' (/ko/ 'wash')

For the first sentence, most speakers added the word 'little' /fitini/ and repeated it without repeating the verb, i.e.:

/a ka sogo tige fitini fitini/

For the second sentence, there was more variety in the answers, but often the speaker repeated the whole predicate, also adding other words, i.e.:

/a ka a sen ko...ka a sen ko/

Only one speaker, from group D-II, repeated the verb alone.

Derivation 4, adjectival plus /-man/ to form a nominal, was not used. The speakers, especially those of D-I, often changed vocabulary to contrast the sentences. The sentences elicited were:

(4a) /a gbã no/ 'it is hot'

(4b) /gbã-man lo/ 'it's the heat'

The speakers used the adjectival /gbã/ for the first, then made a

sentence with the noun /tile/ 'sun' for the second.

Derivation 6 was the diminutive /-nin/. To express the diminutive the speakers used either /fitini/ 'little' or /deni/ 'child'. The final syllable of these words resembles the diminutive, but the two words are autonomous morphemes. Group D-I used the two words appropriately. That is, /deni/ was always used for 'puppy' (i.e. /wulu-deni/), and sometimes for 'little bird', interpreting 'little' to mean 'baby'. /fitini/ was sometimes used with bird, interpreting 'little' as size, but was never used for 'puppy'. Members of D-II, however, generalized /fitini/ as a diminutive marker, using it for 'puppy' and 'little bird' indiscriminately. There was very little use of /deni/ by group D-II. /fitini/ was probably generalized by group D-II simply because it is a very frequent word in Dioula, and is well known by everyone. Even foreigners who know no more than ten words in Dioula know /fitini/. This word is also used as a brand name of infants' wear sold by the Chaine Avion stores throughout the country. In the lexicon section of the research, two D-I speakers used the diminutive /-nin/ for 'path', but no D-II speaker did so.

Derivation 12, a verbal plus /-bali/ meaning 'deprived of, lacking', was not used at all, nor was Derivation 13, a verbal plus /-len/ to form a nominal. Derivation 13 will be further discussed with Derivation 11.

Derivations 10, 11, and 15 were used somewhat by the two groups. That Derivation 10, a nominal formed from an integrated verbal plus /-man/ was used at all is remarkable, because no speaker used a very similar derivation, that of nominal from adjectival plus /-man/ (4). One case of an 'integrated verbal' given by Dumestre [1970:49] was an 'adjectival plus ø', so it is not evident why the nominalization of an adjectival and that of an adjectival plus ø have given such different results. In the discussion of these two derivations in Dumestre [1970:52-53], two classes of adjectives were implied. This is so because the integrated verbal had two translations of 'it is black': /a ka fin/ adjectival, and /a fin na/ verbal. "It is sweet' had only one, the adjectival /a ka di/. One would like to know which adjectives can be verbals, which cannot, and if it was

this difference that was significant in the results of the speakers.

In derivation 11, the nominal formed by the verb plus /-ɪi/ seemed to replace the nominal formed by the verb plus /-ɪen/ (Der. 13), even though the nominal /-ɪi/ was not regularly employed. The derivation /-ɪen/ was never used, but for the two sentences used to elicite this derivation the speakers ofter gave /-ɪi/. The sentence, 'The meal was yesterday', was eliminated from the analysis because the derived term, /dumũni/ (11b), is well known as a vocabulary item. Almost all the speakers gave the form /dumũni/ and only one speaker gave /tagaɪi/ in the preceding sentence (11a) 'leaving is painful'. Judging by these two sentences, /-ɪi/ did not seem to be known. But when the two sentences where /-ɪen/ was expected were considered, /-ɪi/ did have a wider use, as it replaced /-ɪen/. The analysis of variance for Derivation 11 was based on sentences 11a, 13a,b.

Derivation 15 is the instrumental, a verbal plus /-ɪan/. Again, for one of the sentences (15a) it is likely that the derivation was learned as a vocabulary item. All the correct answers for D-II and most of those for D-I used this word, /siginan/. Since there were not all that many correct answers, however, the case is not as clear as that of /dumũni/, and the item was retained in the analysis of variance calculations. In the lexicon, D-I speakers used the affix for three words; the D-II speakers did not use it at all.

Derivation 5, the augmentative /-ba/, was the best known to both groups. In most instances where the speaker did not use the affix /-ba/, he used the independent morpheme /gbeɪe/ 'big, fat', often with reduplication. In the lexicon, both goups used the affix also.

3.2.2. Derivations with a significant (5% or less) between-group variance. In all of the following derivations, the D-II score was always very low. Derivations 1, 3, and 7 were used somewhat by the D-I speakers. Derivation 1 changed an intransitive verb to a transitive. While the actual derivational affix /ɪa-/ was not used often, the other verbal marker in the transitive sentence, /ka/, was widely used by both groups. Sentence (1a) was the intransitive:

(1a) /musa wuli la/ 'Moussa got up'

Its transitive pair should have been:

(1b) /musa ka tabali la wuli/ 'Moussa lifted the table'

but was often given as:

/musa ka tabali wuli/

The marker /ka/ was given by Dumestre [1970] as the marker for the 'accomplished' in transitive verbs, active voice. The suffix /-la/ was given as the marker for the accomplished for transitive verbs in passive voice and for intransitive verbs. These markers, with the addition of an object in the transitive sentences, sufficed for all the D-II speakers and for more than half the D-I speakers to distinguish the transitive from the intransitive, without the prefix /la-/.

Derivation 3 was an adjective plus /-ya/ meaning 'to become X'. Most of the incorrect answers could be translated by 'he is X', instead of 'he has become X'. The word /sisan/ 'now, immediately', was used several times by D-I and D-II speakers, almost always without /-ya/, giving the impression that this word expressed the idea of 'become' for some speakers.

Derivation 7, nominal plus /-ka/ 'inhabitant of', had many alternate answers not using the derivational affix. 36% of the D-I respondants used the verb /bo/ 'to come', as in 'he comes from...'. 15% of the D-II answers used /bo/ and another 23% of the D-II answers were with /sigi/ 'sit', which was not used by D-I at all.

Derivation 9 and 14 received moderate use by the D-I's. Derivation 3, the derivation of a verbal 'to become' from an adjectival, has already been discussed. This derivation can also be used as a nominal (derivation 9). With the adjectival /jugu/ 'wicked' one can form the following sentences:

(9) a. /a ka jugu/ 'he is wicked'
b. /a jugu-ya-ra/ 'he has become wicked'
c. /jugu-ya lo/ 'it's wickedness'

It is the last sentence which is of interest now. D-I speakers used

/Jugu-ya/ as a nominal in 59% of the cases, while those of D-II used it in 8% of the cases (one case). Most of the D-II groups simply said they didn't know how to say sentence (9c).

The agentive, Derivation 14, is formed from a verbal (which can be a nominal plus /ka/ 'do') plus /-la/. 50% of the D-I answers were correct, as against only 4% of the D-II answers. The speakers, more in D-II than in D-I, used the word /mɔgɔ/ 'person' instead of the derivational affix. Two D-I speakers used /mɔgɔ/, while six D-II speakers did so. In addition, two other D-II speakers used other 'person' lexemes, /ce, denl/, in place of the derivation. The words for 'butcher' and 'vendor' in the lexicon showed similar results to the sentences. In the agentive, then, we again see the replacement of a derivational affix by independent lexical items.

The last derivation to be mentioned is Derivation 8, the derivation of an ordinal number from the cardinal. This was very well known by the D-I group, and almost not at all by the D-II group. Members of D-II used the cardinal form exclusively in most cases for both cardinal and ordinal. There were two instances of borrowing from French in D-II and one in D-I. This was the only derivation for which speakers borrowed from French.

4. Geographic Dialects in D-I

The distribution of the number of derivations known by a speaker was parallel to that of the lexicon. That is, the group from the center-north (Korhogo, Boundiali, Sikasso, Faraba) knew the most, with those from Odienné second. The following table gives the average number of derivations known by the speakers of each geographic group.

Table 2: Geographic Areas

Center-North	9.25
Odienné	7.30
Séguéla	6.50
Touba, Man	5.00

5. Primary Languages of D-II

The speakers of Akan and Krou languages had about the same average knowledge of the derivations, 1.75 and 2.0 derivations per speaker respectively. The Western Mande group know the derivations better, with

an average of 3.23 derivations per speaker. It would be helpful to know if some of the derivations tested are cognate with these speakers' first languages as Dioula is also a Mande (Eastern) language. The four Mande speakers did not all know the same derivations, but their three respective first languages could have retained different derivations from Proto-Mande. Considering the derivations which were known by the Mande speakers, two of these derivations were cognate in Dioula and Gouro (the only other Mande language in question for which a grammar was available).

Gouro		Dioula	
/nɛ/ 'child, dim.'		/-nin/	'diminutive'
Verbal /-li/	'nominal'	Verbal /-li/	'nominal'

The instrumental in Gouro is /-fɛ/. In Dioula the word /fen/ means 'thing', and was sometimes used to express the instrumental instead of the inflection /-lan/. One other derivation used by the Western-Mande group was the agent /-la/, and for that the derivation in Gouro is /-za/.

6. Simplification in the Derivational System and Pidginization

The system of derivation, such as has been examined here on the level of every-day usage, was limited as measured against an ideal grammar for the primary speakers (D-I), and much more severely reduced for the secondary speakers (D-II). More important than this difference in quantity of derivations correctly used, as demonstrated by the analysis of variance of the speakers' scores, was the rather widespread tendency to replace the affix of the derivation with a lexeme. Both groups did this, but the practice was more common in the D-II group. Both groups frequently used a lexeme for the diminutive. For the augmentative and the agentive D-II speakers used lexemes considerably more than those of D-I. Another derivation, /sun/, to indicate the tree or plant bearing a particular fruit, was elicited in the vocabulary section. D-II speakers substituted the lexeme /yiri/ 'tree, plant' exclusively, while D-I speakers preferred /-sun/, the derivational affix. D-II speakers also used the lexeme for 'thing', /fen/, instead of the instrumental derivation. The replacement of the affix by a separate lexeme constitutes a true simplification

in the language, for no information has been lost to complicate or confuse communication. The two terms (lexeme and derivational affix) in each case have the same meaning, but now there is one term where there were two. The lexeme alone has the roles of a functional morpheme and of a word.

This development in the derivational system is paralleled by certain developments in pidgin languages and by the child learning his mother-tongue. To quote Traugott [1972]:

> If a language is used in rather limited ways, in other words, has attached to it a narrow set of appropriateness conditions, we should expect a rather limited set of derivations (given a generative semantic point of view). We would therefore predict a relatively small number of surface possibilities, and that is of course exactly what we find. Compared to non-pidgin languages, pidgins certainly have highly simplified surface structures....(p. 44)

And in referring to language acquisition:

> It seems to me that a natural syntactic process gives distinct surface expression to grammatical categories such as tense, aspect, mood, conjunction, negation, quantification, and so forth. Ideally they will be expressed analytically, that is periphrastically, though under the influence of the input, they may be expressed agglutinatively or even inflectionally. In the earliest stages of acquisition, however, they are nearly always periphrastic....(p. 16)

In the present research on Dioula a reduced number of derivations was found, as predicted above. There was also a tendency to express the idea of the derivation by an analytic expression, a free lexeme, instead of by an inflection. These tendencies were found in both groups, but they were more marked in the second language speakers.

In speaking of West African Pidgin English, Agheyisi [1971:54-55] also remarked that tense, number, aspect, etc. are expressed by lexemes instead of by inflection. She noted the lack of derivations and also the polyvalence of certain forms. This polyvalence was evident in D-II speakers, who used one form (the cardinal) for both the cardinal and

ordinal numbers. Almost all the D-I speakers made the distinction between the two sets.

Traugott [1972:33] also pointed out the use of adverbs to replace the tense markers in pidgins. A similar substitution for a derivation was found in the Dioula speakers for Derivation 3 (adjectival plus /-ya/ meaning 'become'). Several speakers, this time more in D-I than in D-II, used the adverb /sisan/, 'now, immediately' instead of the affix, to translate a sentence such as 'my father has become old'. One D-I speaker and one D-II speaker used both the adverb and the affix.

In the case of Dioula, then, one finds parallels to tendencies characteristic of pidgin languages, and to the acquisition of a first language by the child. The reduction of surface markers such as inflection, has also been noted in simplified registers (i.e. baby talk, foreigner talk) by Ferguson [1971]. The fact that these tendencies were found principally in the Dioula-as-second-language group (D-II) suggests that these tendencies may characterize language learning in general, whether first, second or pidgin (I am excluding here the acquisition of a foreign language in a classroom). The presence of these tendencies in telegraphic style, foreigner talk, etc. shows them to be part of the adult language potential as well. What evidence there was of these tendencies in the D-I group may be explained by the age of the speakers. As they were young adolescents, it is quite possible (though I do not have empirical evidence) that they had not completely learned their first language (Dioula) and that derivations are acquired late. These cases may then be considered under the category of a child's acquisition of his first language.

REFERENCES

Agheyisi, R. 1971. West African Pidgin English: Simplification and Simplicity. Stanford University. Ph.D. dissertation.

Benoist, J. 1968. Grammaire Gouro, Groupe Mandé-Côte d'Ivoire, Documents No. 3, Afrique et Langage.

Delafosse, M. 1955. La Langue Mandingue et ses dialectes, 2e Volume, Dictionnaire Mandingue-Français, Librarie Orientaliste, Paris: Paul Geuthner.

Dumestre, G. 1970. Eléments de Grammaire Dioula. Doc. linguistique XII, Institut de Linguistique Appliquée, Université d'Abidjan.

Ferguson, C. 1971. "Absence of copula and the notion of simplicity: a study of normal speech, baby talk, foreigner talk, and pidgins", in D. Hymes, Pidginization and Creolization of Language. Cambridge University. 141-150.

Houis, M. 1963. Etude Déscriptive de la langue Susu. Mémoires de l'IFAN #67, Dakar.

Traugott, E. "Historical linguistics and its relation to studies of language acquisition and of pidgins and creoles", lecture given at University of California, Santa Cruz, August, 1972.

APPENDIX: The Derivations

The derivations were taken from Dumestre, Eléments de Grammaire Dioula, pp. 47-57. The English sentences are translations of the French sentences used to elicite the derivations.

1. Transitive verb derived from an intransitive verb:
   (a) /musa wulila/ 'Moussa got up'
   (b) /musa ka tabali la-wuli/ 'Moussa lifted the table'
   (c) /musa bɔ·la/ 'Moussa went out'
   (d) /musa ka a la-bɔ/ 'Moussa made him go out'

2. Verbal reduplication:
   (a) /a ka sogo tige-tige/ 'He cut the meat into little pieces'
   (b) /a ka a sen ko-ko/ 'He washed his foot over and over'

3. Adjectival plus /-ya/, 'become':
   (a) /wulu jugu-ya-ra/ 'The dog has become mean'
   (b) /mɔgɔ ca-ya-ra/ 'The people have become numerous'
   (c) /n face kɔrɔ-ya-ra/ 'My father has become old'

4. Nominal from an adjectival plus /-man/:
   (a) /a gba-na/ 'It's hot'
   (b) /gba-man-lo/ 'It's the heat'

5. Augmentative:
   (a) /bon-ba be yan/ 'There is a big house over there'
   (b) /a ka muru-ba san/ 'He bought a big knife'

6. Diminutive:
   (a) /kɔnɔ-nin dɔ be sanfɛ/ 'There's a little bird up there'
   (b) /a ka wulu-nin san/ 'He bought a puppy'

7. Region, origin:
   (a) /ce nin ye bwake-ka ye/ 'This man is from Bouake'

8. Ordinal numbers:
   (a) /saba-nan/ 'third'

9. Nominal from a verbal (adj. -ya) plus ∅:
   (a) /a ka jugu/ 'He is mean'
   (b) /a jugu-ya-ra/ 'He has become mean'
   (c) /jugu-ya lo/ 'It's meanness'
   (d) /a ka kɛnɛ/ 'He's in good health'
   (e) /a kɛnɛ-ya-ra/ 'He's gotten well'
   (f) /kɛnɛ-ya lo/ 'It's health'

10. Nominal form an integrated verbal plus /-man/:
   (a) /a ka fin/ 'It's black'
   (b) /fin-man lo/ 'It's blackness'
   (c) /a ka di/ 'It is sweet'
   (d) /di-man lo/ 'It's sweetness'

11. Nominal from a verbal plus /-li/:
   (a) /taga-li ye fen gbeleman ye/ 'Leaving is painful'
   (b) /dumun-ni-kɛra kunu/ 'The meal was yesterday'

12. Verbal plus /-bali/:
   (a) /dugu nin mɔgɔye malo-bali ye/ 'The people of this village are shameless'
   (b) /sun don-bali/ 'He who doesn't fast'

13. Nominal from a verbal plus /-len/:
   (a) /sogo tige-len lo/ 'It's cut meat'
   (b) /mɔ-nin-men lo/ 'It's something cooked'

14. Agent:

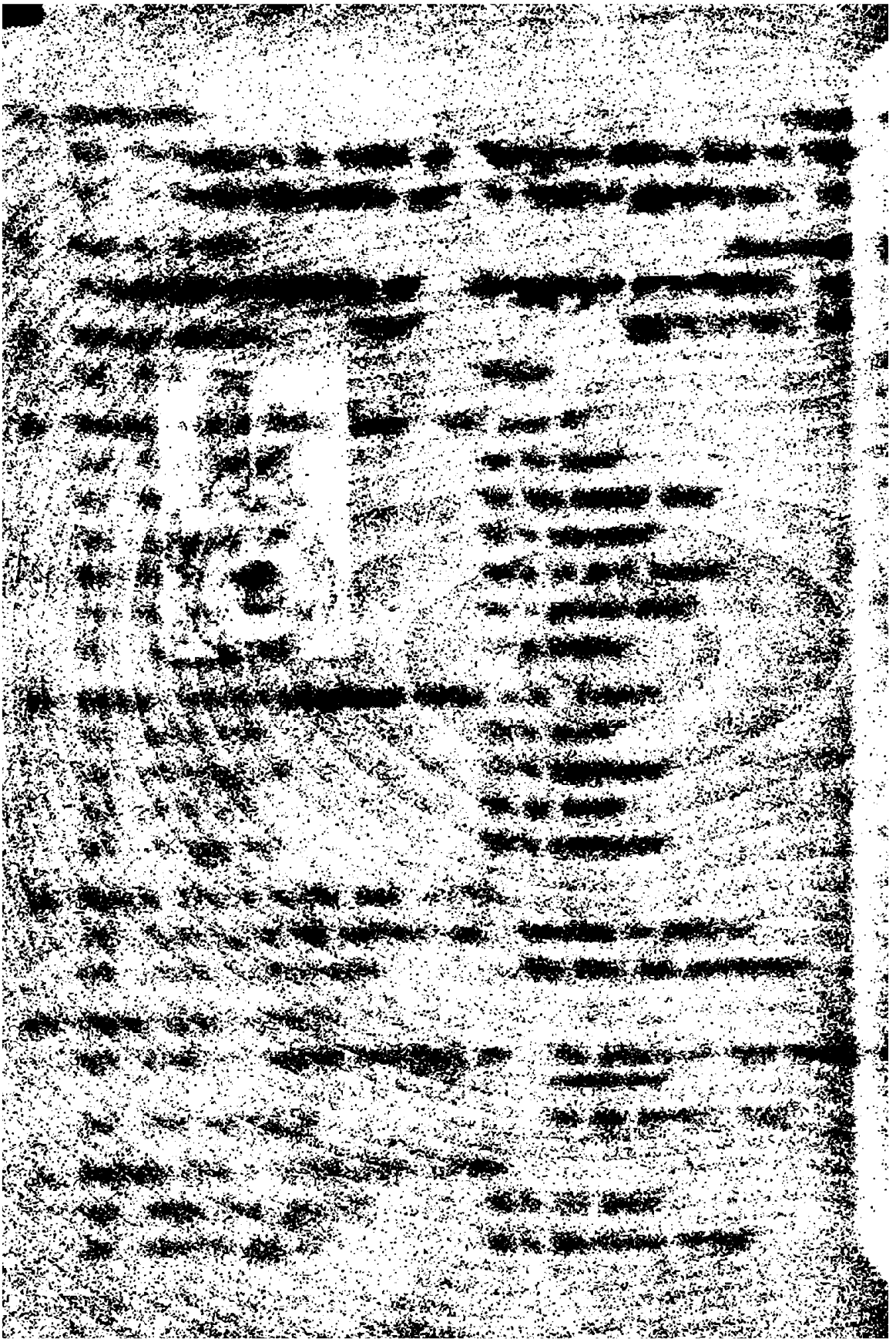
(a) /n face ye sɛnɛ-ke-la ye/ 'My father is a farmer'

(b) /baara-ke-law be yan/ 'The workers are here'

15. Instrument:

(a) /a sigilen be sigi-lan kan/ 'He is seated on the seat'

(b) /kulisija-lan/ 'belt'



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SYNTACTIC CHANGE IN LAKE-BANTU: A REJOINDER[1]

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1. Introduction

In the last issue of SAL Wald discussed a case of two converging syntactic changes in the lake area of North-East Bantu (Ganda, Nyankore, Luhya, Haya). The changes involve the complementary functional distribution of two morphemes in the grammar, the copula ni and the Pre-Prefix vowel (henceforth PP). Briefly stated, Wald suggests that in the Lake-Bantu area the copula ni as a predicate marker represents a more recent innovation, while the use of the PP as an attributive (contrasting with predicative) marker is an older stage in the grammar of Lake-Bantu languages. In other words, Wald suggests that the contrast ATTRIBUTIVE/PREDICATIVE for adjectives, verbs, possessives or nouns, was initially marked by the prefix-morphology contrast VCV/CV , but was later replaced by the contrast CV/ni-CV , respectively. In the course of his argument Wald makes a number of assumptions that, I believe, are open to questions. Some of those are not essential to the argument, and will not be discussed here in much detail.[2] Others, more germain to the argument, are:

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[1]I am indebted to Benji Wald, A.E. Meeussen, Erhard Voeltz and Martin Mould for helpful comments on an earlier version of the manuscript.

[2]Wald also assumes that the o- and e- vowels in the PP in Luganda arise as a result of vowel-fusion with a preceding morpheme a-. This assumption has no shred of evidence to support it. The lowering of the initial vowels u-/i- to o-/e- is currently in the middle of happening in KinyaRwanda. There are several ways one could view this process. First one may view it as a partially grammar-influenced dissimilation. One may also view it as a natural lowering rule in word-initial position. Finally, a suggestion for which I am indebted to Martin Mould, one may concede that the spirit of Wald's interpretation of this phenomenon was indeed correct in the following way: Many words in the discourse preceding both object and subject nouns are verbs. And in Bantu in general many of those are likely to end with the neutral vowel -a . And as Wald [1973] points out, the fusion: a + u > o and a + i > e is a widespread rule in Bantu. Thus many PP's in Bantu tend to be pronounced, in rapid speech, as o- , e- due to this process. This may very well influence their form in isolation as well, or at the very least accelerate other natural processes.

(a) That the copula ni is an innovation in the Eastern Bantu zones;

(b) That the PP was a pre-noun demonstrative in Proto-Bantu and later, (following de Blois [1970]), a definitizer.

In this paper I would like to show that there exist both factual and theoretical grounds for believeing that the replacement process described by Wald went on in exactly the opposite directionality. That is, the copula ni is not an innovation in the Eastern Bantu zones but is rather reconstuctible to Proto-Bantu and most likely, in some form or other, also to Proto-Niger-Congo. And further, there exists an alternative--and perhaps more plausible--scenario for explaining the introduction of the PP into the morphology of noun modifiers, one which depicts this process as a natural outgrowth of the function of the PP in Proto-Bantu as a referentiality marker on nominals.

2. The Copula ni in Bantu

At the crux of Wald's argument lies the assumption that the copula ni is an Eastern-Bantu innovation. This argument is supported by the fact that in languages west and north-west of the east Congo dividing line, i.e. languages chiefly of the Western and North-Western Bantu zones, the copula ni is not attested. Even disregarding the fact that Meeussen [1967] has reconstructed both ni and its negative counterpart tɨ for for Proto-Bantu (as well as the inflected copulas -li and -ba , to be discussed later on), I would like to suggest that the assumption of the loss of ni in the Western and North-Western zones is much more plausible than the assumption of its innovation in the Eastern zones. The argument for the loss hypothesis rests first on a number of patterns observed in Bantu languages outside the North-East corner. It is further augmented by a more careful re-examination of at leat one North-West Bantu language (Lomongo), and is further strengthened by considering related languages in Niger-Congo. I will begin the discussion by citing the distributional pattern of ni in a number of languages from Central, Eastern, Southern and North-Eastern Bantu.

2.1. Bemba (Central Bantu). In this language in most predicate environments ni was deleted and replaced by a high-tone, long vowel CVV prefix. Further (with names, pronouns and demonstratives standing as an exception), ni is used only before non-referential predicates, while -li (or -ba) are used for referential predicates. Thus:

(1) umu-ana ali umu-puupu 'The child is the thief' (ref.)

(2) umu-ana múu-puupu 'The child is a thief' (non-ref.)

(3) umu-ana ali umu-suma 'The child is the good one' (ref.)

(4) umu-ana múu-suma 'The child is good' (non-ref.)

For morphologically defective noun classes, i.e. 1a/2a and 9/10 in which the morphology makes it difficult to accomodate a VCV/CV́V contrast, ni appears in non-referential predicates:

(5) umu-ana ali im-fumu 'The child is the chief' (ref.)

(6) umu-ana nii-m-fumu 'The child is a chief' (non-ref.)

(7) umu-ana ali kaleemba 'The child is the writer' (ref.)

(8) umu-ana ni-kaleemba 'The child is a writer' (non-ref.)

For pronouns, demonstratives and names, which naturally appear only as referential predicates, ni is obligatory, but so is -li . This suggests to me that ni here is a purely morphological-support device and had no significance in meaning. Thus:

(9) umu-ana ali ni-uyu 'The child is this one'

(10) umu-ana ali ni-Mubanga 'The child is Mubanga'

(11) umu-ana ali ni-iwe 'The child is you'

What is also of interest, for the eventual reconstruction of the semantics of ni as against -li and -ba , is that in past tenses (or future) -li/-ba rather than ni are used--and the prefix of non-referential predicates is CV without the extra-high tone:

(12) umu-ana á-à-ll umu-puupu 'The child was the thief' (ref.)

(13) umu-ana á-à-ll mu-puupu 'The child was a thief' (non-ref.)

(14) umu-ana á-à-ll umu-suma 'The child was the good one' (ref.)

(15) umu-ana á-à-ll mu-suma 'The child was good' (non-ref.)

The use of ni as 'morphological-support' for defective noun classes, pronouns, names and demonstratives has been extended to non-present tenses too--but there again it appears together with -ll/-ba :

(16) umu-ana á-à-li kaleemba 'The child was the writer (ref.)

(17) umu-ana á-à-li ni-kaleemba 'The child was a writer' (non-ref.)

(18) umu-ana á-à-li ni-uyu 'The child was this one'

(19) umu-ana á-à-li ni-iwe 'The child was you'

(20) umu-ana á-à-li ni-Mubanga 'The child was Mubanga'

Given the data above, one may reconstruct the senantics/syntax of ni in Bemba as such:

(a) Third person (noun class) subjects
(b) Present-habitual tense
(c) Non-referential (i.e. attributive) predicates

Of these three, (a) and (b) are attested in Swahili (Eastern Bantu), Siluyana (Lunda-type Central Bantu) and KinyaRwanda (North-Eastern Bantu), where the use of ni is not reduced as in Bemba. In all three languages, further, there is a tendency to dispense with ni optionally. In two of them, Siluyana and KinyaRwanda, locative predicates require -li in the present tense, as is also the case in Bemba:

(21) umu-ana a-ll ku-no 'The child is here'

(22) *umu-ana ku-no

Finally, while these three languages do not have the referential/non-referential contrast in predicates as does Bemba, in all three ni may not appear when the subject is first or second person. It thus seems that at the very least conditions (a) and (b) above governed the use of

ni in Proto-Bantu, with the possible addition of (c). The copulas -li and -ba functioned in the predicate-copulative paradigm in other environments, and where ni is lost they may invade its end of the paradigm and replace it.

What is also of interest in van Spanndonck's [1971] suggestion that in Luba and perhaps in other Bantu languages, the loss of ni resulted in the absorption of its high-tone on the CV prefix of the predicate noun.

Another area of great interest, in Bemba as well as in other languages where ni has largely disappeared from simple copular-predicate sentences, is its survival in two special environments which are semantically and diachronically related to predicate-copular structures: Cleft sentences and WH-questions. In cleft sentences in Bemba one gets exactly the same distribution of ni as in copular-predicate sentences:

(23) ni-uyu-mupuupu nàà-mweene 'It's this thief that I saw' (ref.)

(24) múu-puupu nàà-mweene 'It's a thief that I saw' (non-ref.)

And ni survives in non-referential nouns of the defective noun classes, as in:

(25) ni-uyu-kalulu nàà-mweene 'It's this hare that I saw' (ref.)

(26) ni-kalulu nàà-mweene 'It's a hare that I saw' (non-ref.)

The semantic-syntactic relation between cleft sentences and WH-questions has been discussed extensively in the literature, and for recent Bantu references see Takizala [1972] and Heny [1971]. In Bemba there are three WH-question patterns: cleft, pseudo-cleft and 'unmarked order'. In the cleft pattern (as well as in the pseudo-cleft, which represents the 'regular copular-predicate' construction here), one finds obligatory reflexes of ni . Thus:

Subject:

(27) n-ani àà-boombele 'Who (is it who) worked?'

(28) ni-bani bàà-boombele 'Who (are they who) worked?'

Accusative:

(29) n-ani wàà-mweene 'Who (was it that) you saw?'

(30) ni-bani wàà-mweene 'Who (were they that) you saw?'

Dative/prepositional:

(31) ni-kuli-ani wàà-seendele icitabo 'It's from whom that you received the book?'

Locative:

(32) ni-kwi àà-ile 'It's where-to that he went?'

Temporal:

(33) ni-lilali àà-ishile 'It's when that he came?'

This pattern of survival of ni in Bemba is important for the following reason: Further below I will show that in other languages of the Eastern zones the copula ni is lost in the simple copular-predicate construction, but its reflexes are still attested in two grammatical environments: Cleft sentences and WH-question words. One may thus consider these two environemtns as relic environments for the copula ni .

2.2. Nyanja (Eastern Bantu). My data from Nyanja are derived from Price [1966]. In this language one finds a number of areas where ni has survived (provided one accepts the survival hypothesis). To begin with, the reflex n- rather than *ni is attested before consonants, conforming to the universal reduction of ni morphemes in most Bantu languages (e.g. in class 9/10 and for the 1st person singular pronoun). Further, one still finds n- in Nyanja in a small number of predicate-adjectives, as in:

(34) ku-nama n-ko'ipa 'Lying is bad', 'Lying is of badness'

(35) ci-manga ci n-c'a-nga 'This maize is mine'

(36) ma-laya wa n-ga-c'abe 'This garment is no good'

One further finds the survival of ni/n- in non-cleft (or pseudo-cleft) WH-questions, as in:

(37) n-kuni zo'uma n-zi-ti 'Which is the dry firewood?'
wood dry ni-AG-what

(38) mu-dzi wo n-zi-ti 'Which is that village?'
village that ni-AG-what

(39) mi-nda ya-bwiro n-ji-ti 'Which are the good gardens?'
gardens of-goodness ni-AG-what

The more common copula in Nyanja is a fusion of ni > n with -li , yielding the expected ndi , as in:

(40) ny-alugwe ndi ci-lombo c'a-ukali
leopard is animal of-fierceness
'The leopard is a fierce animal'

(41) eeni ma-sitolo ndi Amwenye
owners stores are Bahais
'The store-keepers are Bahais'

(42) Dr. Livingstone ndi m-zungu wo'yamba kudza kuno
Dr. Livingstone is white-man of-first to-come here
'Dr. Livingstone is the first white man to come here'

Much like in Bemba, Swahili and Siluyana, ni is not used in Nyanja in the past tense, but is replaced by -li , as in:

(43) Cidyaonga a-na-li mfumu ya-ki-kulu ya-Angoni
Cidyaonga AG-PAST-be chief of-bigness of-Ngoni
'Cidyaonga was the great chief of the Ngoni'

Next one sees ni > n surviving in the use of the fused ndi in cleft sentences, as in:

(44) n-di-ne.... 'It's I (who)....'

(45) n-di-ye w-a-ti-itana 'It's he who called them'
be-he PRO-PAST-them-call

One finds a similar use of ndi in pseudo-clefts, as in:

(46) w-a-ku-cita ici si-n-di-ne 'Whoever did this is not I'
PRO-PAST-do this NEG-be-I

Finally, one finds reflexes of ni > n in WH-question pronouns, whether or not in cleft constructions:

(47) n-d(i)-ani mzungu yo 'Who is that European?' (cleft)

(48) n-na-li-po n-d(i)-ani 'Who was here?' (pseudo-cleft)

(49) antu a-na-bisala bwa-n-ji 'How did the people hide?'(pseudo-cleft)

(50) ci-lombo cy-a-n-ji cy-a-pha nkuku 'What animal killed the chicken?

(51) kodi mu-funa n-d(i)-ani 'Whom are you looking for?'(pseudo-cleft)

To sum up the situation in Nyanja, I think one could see how -li has invaded the paradigm and fused with ni in simple copular constructions, cleft and pseudo-cleft. But a reflex of ni survives in some adjectives and, in particular, in WH-interrogative pronouns.

2.3. SeSwati (Southern Bantu). My data on this language are derived from Ziervogel [1952]. One doesn't find ni here at all in simple predicate-copular constructions. However, one finds its reflex n- in cleft constructions, where it is augmented by (and thus preserves!) old reflexes of the PP as well as, perhaps, old reflexes of the secondary-concord of nasal-prefix noun classes. Thus:

(52) um-fati 'woman' n-gu-m-fati 'it's a woman'

(53) ema-kuba 'hoes' n-ge-ma-kuba 'it's hoes'

(54) aba-fati 'women' n-ge-ba-fati 'it's women'

In most cleft constructions, the morpheme n-gu has been generalized, as in:

(55) ngu-phansi 'It's below'

(56) ngu-kuphi 'Where is it?'

(57) ngu-loyi 'it's this one'(cl. 1)

(58) ngu-laba 'it's those ones'(cl. 2)

(59) ngu-lolu 'it's this one'(cl. 5)

(60) ngu lo-wanti 'it's the broad one'(cl. 1)

(61) ngu la-bangekho 'it's the absent ones'(cl. 2)

(62) ngu le-li-ngakhali 'it's the one which doesn't cry'(cl. 5)

One also finds ngV in cleft-forms of pronouns, as in:

(63) ngi-mi 'it's I'

(64) ngu-we 'it's you'

(65) ngi-lo 'it's it'(cl. 5)

(66) ngu-lo 'it's it'(cl. 11)

(67) nga-bo 'it's them'(cl. 2)

(68) nga-wo 'it's them'(cl. 6)

One finds similar reflexes of ni > n in various WH-interrogatives, as in:

(69) ngu-muphi umtfana 'Which boy?'

(70) ngu-mtfana muphi 'Which boy?'

(71) ngu-bani loyi 'Who is this one?'

(72) u-khuluma nga-bani 'Who are you talking about?'

(73) lu-swane lu-nje nga-bani 'The child looks like who?'

(74) ngu-kuphi lapha a-khona 'Where is it that he is?'

(75) u-sebenta n-jani 'How does he work?'

(76) u-ta-ku-ya ni-ni 'When will you go?'[3]

(77) u-sebenta nga-ni 'Why does he work?'

Thus, if one accepts the identity of n with *ni , then the survival of ni in cleft and WH-interrogative patterns conforms well to what has been shown in Bemba and Nyanja.

2.4. The copula ni outside the East-Bantu zones.

2.4.1. Lomongo (North-Western). My data for this language are derived from Hulstaert [1966]. Lomongo is presumably one of the languages in the

[3]This is perhaps a case of non-reduction of ni > n due to a prohibition, in most Bantu languages, on identical CC or NN clusters.

zones where the copula ni is not attested. However, here one finds the the reflex n- of ni in precisely the same environments as is to be expected from the discussion above. Thus in WH-interrogatives, one finds:

(78) n-á 'What?', 'Which?'

(79) n-kó 'Where?'

(80) ǒlé-n-kó 'which ones?'

(81) bá-n-gá 'how many?'

(82) ǒkékó élé-n-kó 'what time?'

Similarly, in cleft constructions one finds:

(83) ń-k-onǐngá 'it's only the friend'

(84) ǒki-m-osángáká ńk-endé 'who I said is already here'(pseudo-cleft)

(85) ole wéká nd-ónko 'the one who accused him is this one'(ps.-cleft)

One also finds a reflex of ni > n in the comparative preposition 'be like', as in:

(86) bomóng'ésé n-gá bofaya 'The locals are like the foreigners'

(87) elongi ǒkáé n-gá saányi 'His face is like a basin'

To sum up, then, while the data here represent only one North-Western language, it nevertheless shows that ni could not have been an Eastern-Bantu innovation.

2.4.2. Kihung'an (Western). For the data on this language I am indebted to Alexis Takizala (in private communication). While this language replaced *ni with an inflected copula on the paradigm of CV-e (with the CV- standing for the noun-class agreement morpheme), two potential survivals of *ni are found in WH-question pronouns. Thus the morpheme for 'who' is na . The morpheme for 'what', which also figures in many other WH-questions, is k^hi synchronically. But one could argue that the aspiration is directly related to a lost n . To support this consider the following:

(87a)

verb stem		with 1st person singular (ŋ-)	
ku-beet	'hit'	m-beet	'hit me'
ku-tal	'look at'	t^hal	'look at me'

The form of PB mu-ntu 'person' in Kihung'an is muu-t , with the long vowel presumably arising from the original presence of the now-lost n . The loss of /n/ before voiceless stops in Bantu is a rather widespread process, and it is often coupled with the aspiration of those stops. The data in (87a) above stongly suggest that the aspiration in k^hi 'what' in Kihung'an is a result of the loss of an underlying /n/.

2.4.3. Others. Meeussen (in private communication) has suggested to me that there exist tonological evidence, in the form of a 'ghost' high tone (or 'tonal raising') in predicate environments in a number of Western Bantu languages, such as Tsio, Kongo-Ntandu, Yaka, Suku and Mbala. This certainly corresponds to the tonal raising observed in Bemba (see section 2.1. above) in identical environments, as well as to what van Spaandonck [1971] has suggested for CiLuba. Alexandre [1966] also notes the presence of n(i) in Bulu.

To sum up, then, the contention that the copula ni was restricted to the Eastern zones of Bantu cannot be supported. Further below I will also show that comparative Bantoid and Niger-Congo evidence suggests that ni goes back much further than Proto-Bantu.

2.5. Luganda and the Lake-Bantu area. It is certainly true that in Luganda one finds no use of ni in simple copular-predicate constructions. The more baffling fact about Luganda, however, is that it shows no traces of ni or n- in either cleft, pseudo-cleft or WH-interrogatives. This by itself certainly requires an eventual explanation. However, the copula ni is attested marginally in Haya and more than marginally in Ru-Nyankore. It is fully productive (i.e. used in simple copular-predicate constructions) in Luhya (Martin Mould, in private communication). It is fully productive in much the same way in KinyaRwanda, where it appears in

clefts, pseudo-clefts and WH-interrogatives, as in:[4]

(88) ni-nde wà-giye 'It's who who came?' (cleft)

(89) inzu ni n-nini 'The house is big'

(90) uwà-giye ni-nde 'The one who came is who?' (pseudo-cleft)

(91) ni-iki kyà-mənətsə 'What got spilled?' (cleft)

(92) ni-mu-gitondo yà-giye 'It's in the morning that he left' (cleft)

(93) ni-ku-išuli yà-giye 'It's to school that he went' (cleft)

(94) ni-he yà-giye 'Where did he go?' (cleft)

(95) ni gute yà-giye 'How did he go?' (cleft)

(96) umwaka ušize ni wo yà-je-mo 'Last year is when he came'

It seems that in the lake area only in Luganda, Lusoga and Lunyoro, which represent a close dialect cluster, the copula ni is not attested (for this observation I am indebted to Martin Mould, in private communication).

2.5. Summary. I have shown that in many languages where ni does not function in simple predicate constructions, its reflexes may nevertheless be found in cleft and WH constructions. One may argue that perhaps those constructions represent the locus of innovation, rather than the locus of survival as I have been claiming all along. It seems to me that there are strong reasons for suspecting that the pattern is indeed a relic/survival--rather than an innovative pattern:

(a) Both cleft and WH-interrogative environments, which are diachronically as well as semantically related, are highly-marked special constructions. It is highly unlikely for a language to introudce a copula there, rather than in the unmarked predicate constructions. In particular, cleft constructions are likely to be of lower frequency than simple predicate constructions, and thus an unlikely environment for innovation, but a typical relic environment.

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[4] For the KinyaRwanda data in this paper I am much indebted to Charles Uwimana and Alexandre Kimenyi.

(b) WH-interrogative pronouns usually fuse into single words. And this is precisely a situation where one finds relics of older syntax.

(c) In Bemba in simple predicates one finds ni only in morphologically-irregular noun classes, pronouns, demonstratives and names. This is again a typical relic environment rather than an innovation pattern.

(d) When one considers languages in which ni is at all attested, one comes up with an implicational pattern: All the languages that have ni in simple predicates, also have it in cleft and cleft-WH constructions, but not vice versa. That is:

[simple] ⊃ [cleft, WH]

This is a strong suggestion of a dependency. That is, while the existence of ni in cleft and WH can be predicted from its existence in simple predicates, the existence of ni in simple predicates cannot be predicted from its existence in cleft and WH constructions.

It seems to me that the weight of the evidence, as well as the theoretical considerations presented above, militate much more strongly against the innovation hypothesis and for the survival hypothesis.

3. The Pre-prefix Vowel in Bantu

3.1. Reference and definiteness. While de Blois [1970] suggests that the PP was a definitizer in Proto-Bantu, I think there are grounds for believing that it was either a referentiality marker or both a referentiality marker and definitizer. These two semantic functions form a natural class, where [+ definite] is a discourse feature relevant mostly to nominals which have been marked already as [+ referential]. A situation of the VCV/CV contrast functioning only for referentiality (but not for definiteness) may be seen in Bemba (for a detailed discussion see Givón [1972]), where in non-opaque environments, i.e. in environments where nouns are obligatorily referential, one finds only VCV prefixes:

(97) umuana aa-somene icI-tabo 'The child read a/the book' (ref.)

(98) *umuana aa-somene cI-tabo

In non-negative environments one finds a VCV/CV contrast:

(99) umuana aa-fwaayile uku-soma icí-tabo (ref.)
(a) 'The child wanted to read the book' (def.)
(b) 'The child wanted to read a book' (indef.)

(100) umuana aa-fwaayile uku-soma cí-tabo (non-ref,)
'The child wanted to read some book'

Finally, in negative opaque environments the [+ ref.,- def.] interpretation is ruled out, so that the referential (VCV) noun is automatically interpreted as definite. This particular 'change' is apparently a semantic universal (see the discussion of Dzamba, KinyaRwanda and Luganda below; see also Givón [1974 (forthcoming)]). Thus:

(101) umuana taa-somene icí-tabo (ref.)
(a) 'The child didn't read the book'
(b) *'The child didn't read an indefinite book' (*indef.)

(102) umuana taa-somene cí-tabo (non-ref.)
'The child didn't read a/any book'

It is thus not unreasonable to assume that the identification of [+ referential] with [+ definite] in the scope of negation is perhaps responsible for the extension of the VCV/CV contrast in Bantu from referentiality to definiteness. A situation of this extended type may be observed in Dzamba (see Bokamba [1971]), where in non-opaque environments --i.e. where a nominal is obligatorily referential--the VCV/CV contrast functions for definiteness, as in:

(103) oSalomi aeneki omu-ana 'Salome saw the child' (def.)

(104) oSalomi aeneki mu-ana 'Salone saw a child' (indef.)

In a negative opaque environment, where referential nouns universally must be definite, the VCV/CV contrast functions for referentiality, as in:

(105) oSalomi teeneki omu-ana emba (ref., def.)
'Salome didn't see the child'

(106) oSalomi teeneki mu-ana omba (non-ref.)
'Salome didn't see a/any child'

In non-negative opaque environments in Dzamba, the VCV/CV contrast still signals referentiality. However, while in Bemba it is the VCV (referential) prefix which is ambiguous between (referential) definite and indefinite, in Dzamba it is the CV prefix which is ambiguous between non-referential and referential-indefinite. Thus:

(107) oSalomi a-zingaki na-ene omu-ana (ref., def.)
'Salome wanted to see the child'

(108) oSalomi a-zingaki na-ene mu-ana
(a) 'Salome wanted to see a child' (ref., indef.)
(b) 'Salome wanted to see some child' (non-ref.)

The extension of the REF/NON-REF distinction to DEF/INDEF thus seems to be a natural process.

In the Lake-Bantu area, specifically in Luganda and KinyaRwanda, one finds traces of the REF/NON-REF VCV/CV contrast at least in two environments. One of those is in objects of negated verbs, a situation comparable to the one discussed above for Bemba and Dzamba. For example, in KinyaRwanda[4] the morphological VCV/CV contrast is lost here, but the semantic contrast REF/NON-REF is intact. Thus, the VCV prefix is obligatorily interpreted as non-referential:

(109) nhi-ya-bonye umu-nhu 'He didn't see any man'

In order to obtain a referential (and thus automatically definite) interpretation, the object NP must be pre-posed, i.e. it must undergo a topic-fronting movement (and the obligatory pronominalization associated with it):

(110) umu-nhu nhi-ya-mu-bonye {'He didn't see the man' / 'As to the man, he didn't see him'}

The semantic connection between definite, pronominal and topic need not be belabored here. It seems reasonable to assume that when the language lost the VCV/CV contrast in this environment, it capitalized on the

universal redundancy rule:

(111) [+ referential] --> [+ definite] / NEG-verb [----]$_{object}$

and then also on the existing topic-movement rule (which obviously applies only to definite objects), and thus maintained the contrast intact.

In Luganda (see Mould [1972]) the situation is virtually the same, except that the non-referential object noun, which remains behind the negated verb, receives a CV prefix, while the pre-posed referential/definite noun receives the expected VCV prefix:[5]

(112) ya-gula eki-tabo 'You bought a/the book'

(113) ta-ya-gula ki-tabo 'He didn't buy any book' (non-ref.)

(114) eki-tabo, ta-ya-ki-gula {'He didn't buy the book' / ' As to the book, he didn't buy it'}

3.2. Reference and non-restrictive modifiers. There is another area of natural extension of the VCV/CV referentiality contrast in Bantu, and this area is particularly relevant for understanding how the VCV prefix, i.e. the PP, invaded the noun-modifiers paradigm and in due course became a marker for attributives, as in Luganda.

In Bemba (for details see Givón [1972]), the VCV/CV contrast also functions to differentiate non-restrictive from restrictive embedded modifiers (relative clauses, adjectives, nouns, possessives). Thus, for example:

(115) abantu abà-à-ishile 'The people, who (all) came,...' (NR)

(116) abantu bà-à-ishile 'The people who came...'(not those who didn't)(R)

(117) abantu aba-suma {'The people, who were (all) good...' (NR) / 'The people, the good ones,...' (NR)}

(118) abantu ba-suma 'The good people...' (R)

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[5]For these data I am indebted to various manuscripts of L. Walusimbi [1971].

(119) abaana aba-a-ndi 'The children, those that are mine,...' (NR)

(120) abaana ba-a-ndi 'My children...' (R)

In Givón [1972] I argued that this is a natural semantic extension of the REF/NON-REF contrast. Briefly, one notes that only referential nouns, quite universally, may be modified by non-restrictive modifiers. Thus:

(121) nshia-mweene aba-ana bà-à-ishile (R)
'I didn't see the children who came'

(122) nshia-mweene aba-ana abà-à-ishile (NR)
'I didn't see the children, who (all) came'

(123) nshia-mweene ba-ana bà-à-ishile (R)
'I didn't see any children who came'

(124) *nshia-mweene ba-ana abà-à-ishile (*NR)
*'I didn't see any children, who (all) came'

Thus, since the deleted equi-noun within the non-restrictive ('parenthetic') relative clause must have been referential, it is predictable in Bemba--where an anaphoric pronoun must show the same VCV/CV type prefix as its co-referent deleted noun--that a VCV prefix will mark the NR modifier. This is provided that one accepts the assumption that anaphora is indeed involved in NR relative clauses. That is, that the underlying structure of a sentence such as (122) above is something like:

(125) 'I didn't see the children, (I mean) those children who came'
'I didn't see the children, those who came'
'I didn't see the children, who came'

For the regular assumption of the deleted noun's prefix by an anaphoric pronoun in Bemba, consider the following:

(126) nshia-mweene aba-ana ba-suma
'I didn't see the good children'

==>

nshia-mweene aba-suma
'I didn't see the good ones'

(127) nshi a-mweene ba-ana ba-suma
'I didn't see any good children' ==>

nshi a-mweene ba-suma
'I didn't see any good ones'

(128) nshi-mweene aba-ana bà-à-ishile
'I didn't see the children who came' ==>

nshi a-mweene abà-à-ishile
'I didn't see the ones who came'

(129) nshi a-mweene ba-ana bà-à-ishile
'I didn't see any children who came' ==>

nshi a-mweene bà-à-ishile
'I didn't see any (ones) who came'

In the Lake-Bantu area it is of interest to note that at least in a number of languages the VCV/CV contrast functions here much the same way as it does in Bemba, i.e. to differentiate between NR/R modifiers, respectively. Thus, in a number of KinyaRwanda dialects,[4] one finds this contrast to be quite regular (tho the optionality with some morphemes may suggest that it is still spreading):

(130) abaana bà-ryamye ubu 'The children who're now asleep'(R)

(131) abaana abà-ryamye ubu 'The children, who are (all) now asleep'(NR)

The pattern has been partially extended to object relatives (where it does not exist in Bemba):

(132) umusozi (wo) du-tuye-ho 'The village where we live' (R)

(133) umusozi uwo du-tuye-ho 'The village, where we live' (NR)

Similarly, with adjectives:

(134) abagabo bá-nini 'The big men' (R)

(135) abagabo abá-nini 'The men, who are (all) big' (NR)

According to Martin Mould (in private communication), a situation similar

to KinyaRwanda and Bemba is observed in a number of other Lake-Bantu languages.

In Luganda itself, where as Wald [1973] has shown the VCV/CV contrast distinguishes attributives (modifiers) from predicatives, non-restrictive modifiers are not embedded, but are rather post-posed to the end of the sentence. Thus, in object relative clauses one finds:[5]

(136) omu-wala gwe njagala ye atalii-wo (R)
'The girl that I like is not here'

(137) omu-gala ye atalii-wo gwe njagala (NR)
'The girl is not here, the one I like'

Then, for adjectives, similarly:

(138) omusajja omu-rungi a-genze 'The good man left' (R)

(139) omosajja a-genze omu-rungi 'The man left, the good one' (NR)

Finally, for subject relative clauses, one finds:

(140) abasajja aba-a-genda ba-rungi (R)
'The men who left are good'

(141) abasajja ba-rungi aba-a-genda (NR)
'The men are good, the ones who left'

To sum up, then, it seems that in the Lake-Bantu area the same natural extension of the VCV/CV morphology from signalling the REF/NON-REF distinction to signalling the NR/R distinction, as seen in Bemba, is well attested. One may further suggest that Luganda (and its close cluster of LuSoga, LuToro, LuNyoro) probably had that extension at some earlier date, and this can explain how the VCV prefix invaded the noun-modification paradigm. Finally, when Luganda stopped embedding NR modifiers and started post-posing them, there was no more need for a VCV/CV contrast in the attributive position, and the VCV prefix became generalized--especially that these languages had also lost the copula ni . The CV form of the prefix thus remained the form for the predicative.

4. Discussion

Following the data presented in the preceding sections, one could now propose an alternative scenario to the syntactic development in the Lake-Bantu area and re-interpret the Luganda situation as such:

(a) Luganda has the VCV/CV contrast for referentiality, a contrast which probably goes back to Proto-Bantu;

(b) Like Bemba, Rwanda and Luhya, Luganda also extended that contrast to mark the NR/R contrast for embedded modifiers;

(c) At a certain point, for reasons yet to be clarified, Luganda lost the copula ni ;[6]

(d) The loss of ni created a situation whereby CV prefixes marked both predicatives and attributives (modifiers);

(e) Since the embedding of NR modifiers is much less universal, being that they are parenthetic statements and are semantically conjoined rather than subordinated,[7] it was relatively easy for Luganda to move NR modifiers out of the noun phrase altogether and post-pose them--together with their original VCV prefix;

(f) As a result of this movement, the VCV prefix was not needed any more to mark NR modifiers, which were now marked by their post-posed syntactic position;

(g) The VCV prefix was freed to be used for all attributives (embedded noun modifiers), contrasting them with the CV prefix or predicatives.

Two other points should be also mentioned here. The first concerns ressons for the loss of ni in many Bantu languages. In general all over the Bantu area ni segments (i.e. class 9/10 prefix, first person singular pronoun and the copula ni) tend to get assimilated and reduced before consonants--first to n and then, in many languages (this is particularly

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[6] See comments below concerning the phonetic naturalness of the loss of ni segments in Bantu.

[7] That is, NR relative clauses contain part of the <u>new</u> information, rather than old (presupposed) information.

true for class 9/10 prefixes), on to complete zero. The reflex n- tends to lose its articulatory position, tends to get devoiced before voiceless consonants, tends to fuse with the following voiced consonant (Meinhoff's law) or with the following voiceless consonant (cf. SiLuyana). In other words, the loss of n --once it became a bound morpheme--is a highly predictable outcome of natural assimilation rules in Bantu.

The second point involves the following considerations: There are strong grounds for believeing that cognates of ni exist in other Benue-Kwa and Niger-Congo languages. Thus, for example, in Yoruba the morpheme ni is used both as a locative copula and as a focus-cleft morpheme, as the following data from Stahlke [1974] attest:

(142) ọmọ nâ ni ibi 'The child is here'
ajá kpa adìẹ 'The dog killed the chicken'
adìẹ ni ajá kpa 'It's the chicken that the dog killed'
ajá ni ó kpa adìẹ 'It's the dog that killed the chicken'

As Lord [1973] has recently shown, there is a natural development in Benue-Kwa by which a copulative verb meaning 'be at' or 'be with' becomes either a locative preposition/post-position or a comitative/associative/instrumental one. With this in mind, one finds an instrumental ni preposition in Yatye [Stahlke 1970]; ni 'be at' or 'at' in Yoruba [Lord 1973]; ní 'be at' in Igbo [Lord 1973]; na 'at', 'in', 'on' in Igbo [Lord 1973]. One finds nin 'with' in Bambara (Mande);[8] ne 'with' in Mooré [Peterson 1971](Gur); ni 'with' in Sup'ide [Welmers 1950](Gur); nì 'be at' in Wara [Prost 1968](Gur); ne as an instrumental post-position in Kru [Givón 1974b](Kwa); one also finds a copulative/predicative morpheme n- in Tiv [Abraham 1940](Bantoid). Now, the universal relationship between locative and existential (be-pred) expressions has also been noted by Clark [1970] and Lyons [1967]. It is thus reasonably safe to assume that the Bantu existential copula ni is a natural semantic extension of the locative copula/verb ni 'be at', 'be with' in Niger-Congo. This makes Wald's contention that ni is an innovation of Eastern-Bantu all the less plausible.

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[8] For the data I am indebted to Karen Courtenay and Ibrahima Coulibaly.

REFERENCES

Abraham, R.C. 1940. The Principles of Tiv. London: Crown Agents.

Alexandre, P. 1966. "Systeme verbal at predicatif du Bulu", Languages et Litteratures de l'Afrique Noire I, Paris.

Bokamba, G. 1971. "Specificity and definiteness in Dzamba", Studies in African Linguistics 2.3:217-238.

Clark, E.V. 1970. "Locationals: A study of the relation between 'existential', 'locative' and 'possessive' constructions", Stanford Working Papers on Language Universals #3.

de Blois, K. 1970. "The augment in the Bantu language", Africana Linguistica IV, Tervuren: Musée Royal de l'Afrique Centrale.

Givón, T. 1972. Studies in ChiBemba and Bantu Grammar, Studies in African Linguistics, supplement #3.

Givón, T. 1974, forthcoming. "The presuppositions of negation".

Givón, T. 1974b. "Serial verbs and syntactic change: Niger-Congo", to appear in C. Li (ed.), Proceedings of Conference on Word-order and Word-order Change, Santa Barbara, January 26-28, Amsterdam: Reidel.

Heny, F. 1971. "Focus and interrrogatives in Bali", paper read to the 2nd Conference on African Linguistics, UCLA (Ms.).

Hulstaert, G. 1966. Grammaire du Lomongo, 3iem Prt, Syntaxe, Tervuren: Musée Royal de l'Afrique Centrale, serie IN-8, #58.

Lord, C. 1973. "Serial verbs in transition", Studies in African Linguistics 4.3:269-96.

Lyons, J. 1967. "A note on possessive, existential and locative sentences", Foundations of Language 3:390-396.

Meeussen, A.E. 1967. "Bantu grammatical reconstructions", Africana Linguistica III, Tervuren: Musée Royal de l'Afrique Centrale.

Mould, M.J. 1971. "The syntax and semantics of the initial vowel in Luganda", in E. Voeltz (ed.), Proceedings of the 3rd Conference on African Linguistics, Bloomington: Indiana University Press.

Peterson, T. 1971. Mooré structure: A generative analysis of the tonal structure and aspects of the syntax, Ph.D. dissertation, UCLA.

Price, T. 1966. The Elements of Nyanja. Blantyre, Malawi.

Prost, R.P.A. 1968. Deux langues Voltaïques en voie de disparition: Le Wara et le Natioro, Université de Dakar, Documents Linguistiques.

Stahlke, H. 1970. "Serial verbs', Studies in African Linguistics 1.1: 60-99.

Stahlke, H. 1974. "Ross' constraints and related problems in Yoruba", Studies in African Linguistics vol. 5 (to appear).

Takizala, A. 1972. "Focus and relativization: The case of Kihung'an", Studies in African Linguistics 3.2:259-287.

van Spaandonck, M. 1971. "On the so-called reversing tonal system of ChiLuba: a case for re-structuring", Studies in African Linguistics 2.2:131-144.

Wald, B. 1973. "Syntactic change in the lake area of Northeast Bantu", Studies in African Linguistics 4.3:237-268.

Welmers, W. 1950. "Notes on two languages of the Senufo group", Language 26.4:495-531.

Walusimbi, L. 1971. A number of unpublished manuscripts on Luganda grammar, UCLA.

Ziervogel, D. 1952. The Grammar of Swazi. Johannesburg: Witwatersrand University Press.

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(Report received from Jan Voorhoeve)

Leiden University, Netherlands
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Program:

F. Heny (Dept. of Linguistics, University of Massachusetts, Amherst)
"Ganda tone as pitch-accent"

A. E. Meeussen (Musée Royal de l'Afrique Centrale, Tervuren, Belgium)
"Notes on tone in Ganda"

W. Leben (Committee on Linguistics, Stanford University, Stanford, California)
"Introduction to suprasegmental phonology"

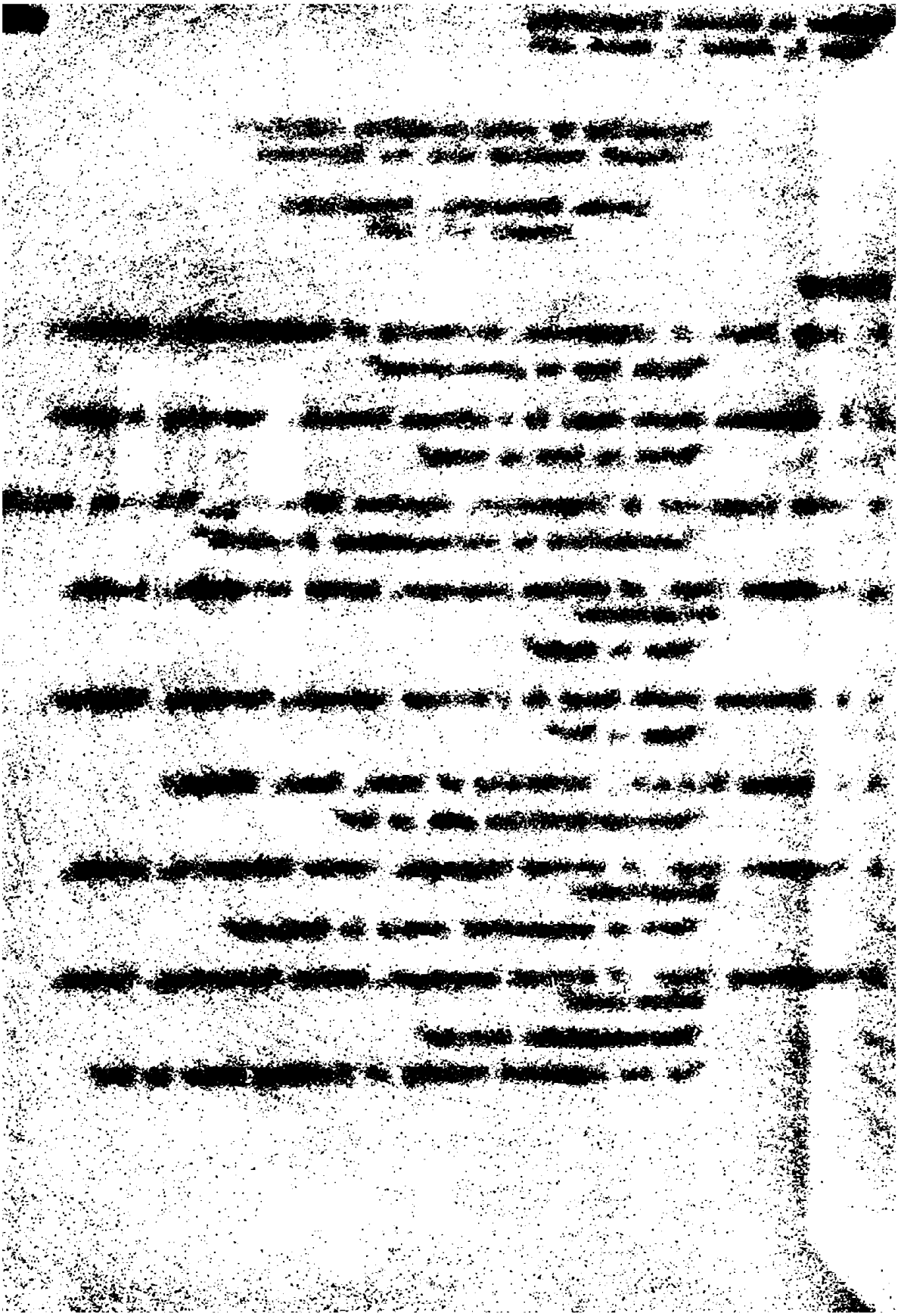
J. Voorhoeve (Dept. of African Languages, Leiden University, Leiden, Netherlands)
"Tone in Mende"

A. E. Meeussen (Musée Royal de l'Afrique Centrale, Tervuren, Belgium)
"Tone in Tiv"

J. L. Doneux (C.L.A.D., University of Dakar, Dakar, Sénégal)
"Contreproposition pour le Tiv"

J. Voorhoeve (Dept. of African Languages, Leiden University, Leiden, Netherlands)
"Note on unspecified vowels in Bamileke"

T. Schadeberg (Dept. of African Languages, Leiden University, Leiden, Netherlands)
"Suprasegmental history"
"On the segmental reality of floating tones in Ewe"



Studies in African Linguistics
Volume 5, Number 1, March 1974

FIFTH ANNUAL CONFERENCE ON AFRICAN LINGUISTICS

Stanford University
March 29-31, 1974

Friday, March 29

Symposium on Linguistics and African Languages: Contributions of Mutual Interest.

1. Joseph H. GREENBERG, "Language as culture history: the Bantu example"

   Discussant: A. E. MEEUSSEN

2. Eric Ofoe APRONTI, "Sociolinguistics and the question of a national language: the case in Ghana"

3. Paul SCHACHTER, "A non-transformational account of serial verbs"

   Discussant: Herbert STAHLKE

4. Peter LADEFOGED, "Contributions of African linguistics to phonetic theory"

5. Larry M. HYMAN, "Contributions of African linguistics to phonological theory"

   Discussant: Chin-W. KIM

Saturday, March 30

Syntax

1. Isaac GEORGE (U. of Ibadan), "Verb serialization in Nupe: lexicalization and higher predicates"

2. John Bryson EULENBERG (Michigan State U.), "Towards a general copula theory"

3. Carol LORD (UCLA), "On causatives in some Kwa languages"

4. Erhard F. K. VOELTZ (Indiana U.), "Inalienable possession in Sotho"

5. David O. OKE (U. of Ife), "Syntactic correlates of notionally defined adverbial phrase types in Yoruba"

6. Frank R. BRANDON (U. of Texas, Austin), "Structure of the finite verb in Swahili"

7. Talmy GIVÓN and Alexander KIMENYI (UCLA), "Truth, belief and doubt in KinyaRwanda"

Phonology

1. Peter GINGISS (U. of Houston), "Phonological process in Worodugukan"

2. Paul AOKI (U. of Washington), "An observation of vowel contraction in Xhosa"

3. Robert K. HERBERT (Ohio State U.), "Seven will get you five: Luganda vowels"

4. Karen H. EBERT, "Partial vowel harmony in Kera"

5. Jilali SAIB (UCLA), "Schwa insertion in Berber and the problem of multiple application of phonological rules"

6. George N. CLEMENTS (MIT), "Vowel harmony in Ewe"

7. Martin MOULD (UCLA), "On the origin of consonant gemination in Luganda"

8. Thomas HINNEBUSCH (UCLA), "Restructuring and Natural Generative phonology in Kamba"

Sunday, March 31

Language Relatedness and Contact Phenomena

1. Harold C. FLEMING (Boston U.), "Omotic as a branch of Afroasiatic"

2. Clifford HILL (Columbia U.), "Variability of reference in relational terms in West African languages"

3. Gayle PARTMANN (Southern Illinois U.), "A preliminary report on a sociolinguistic project for educational evaluation in Ivory Coast"

4. Philip A. S. SEDLAK (Stanford U.), "Generational language shift and linguistic diversity measures: a Kenya case"

5. Anthony LEWIS (UCLA), "Possible African linguistic survivals in the Palenquero Creole dialect"

6. Charles DE BOSE (Stanford U.), "Papiamento plurals"

7. Colston R. WESTBROOK (Contra Costa College), "Disguised tonal retentions in Afro-American speech"

Syntax

1. Patrick R. BENNETT (U. of Wisconsin), "Focus, temporal 'downstep' and embedding in Kikuyu"

2. Olusola AJOLORE (U. of Lagos), "Learning Yoruba focus sentences"

3. Eyamba G. BOKAMA (Indiana U.), "A counterexample to Bach's 'Questions'"

4. El-Rashid ABU BAKR (U. of Khartoum), "Syntactic emphasis in the spoken Arabic of the Sudan"

5. Claude HAGEGE (U. de Poitiers), "The 'adjective' in some Central African languages"

6. Alexis TAKIZALA (UC San Diego), "On the similarity between nominal adjectives and possessive forms in Kihungan"

7. Sahnny JOHNSON (Indiana U.), "The Bambara postpositional system"

Tonology

1. Laura F. MEYERS (UCLA), "Tone patterns in Hausa"

2. Carl R. LAVELLE (UCLA), "An experimental study of Yoruba tones"

3. Jean M. HOMBERT (UC Berkeley), "Universals of downdrift: their phonetic basis and significance for a theory of tone"

4. Maurice TADADJEU (Georgetown U.), "Floating tones, spreading, and downstep in Dschang-Bamileke"

5. Ian MADDIESON (UCLA), "A new cause of tone splitting: evidence from Yoruba"

6. David DWYER (Michigan State U.), "Loma: a language with inverted tones"

7. Ivan R. DIHOFF (U. of Wisconsin), "The tonal intricacies of the verbal in Chori"

8. Cheryl AUSTEN (Indiana U.), "Anatomy of the tonal system of a Bantu language"

Business meeting, Sunday, March 31

The business meeting of the Fifth Annual Conference on African Linguistics was held on Sunday, March 31. The following resolutions were adopted:

1. The proceedings of future annual conferences on African Linguistics will be published by Studies in African Linguistics. The host institution will be responsible for selecting the papers for the conference, editing the proceedings and presenting SAL with a camera-ready copy. The editor(s) will receive full credit for editing the proceedings.
2. The Sixth Annual Conference on African Linguistics will be held in the Spring of 1975 at Ohio State University, Columbus, Ohio. Members of the Department of Linguistics of OSU will be responsible for organizing the conference. For inquiries please write: Robert Herbert, Department, Ohio State University, Columbus, Ohio.
3. The participants in the Fifth Annual Conference expressed their thanks to Will Leben and the Stanford Committee on Linguistics for organizing a beautiful conference.