

NASALS AND NASALIZATION IN KWA¹

Larry M. Hyman
Linguistics Program
University of Southern California

0. Introduction

Within the Kwa sub-branch of Niger-Congo a considerable number of languages are found which exhibit a surface contrast between oral and nasalized vowels. Although many linguists have reported such findings (see bibliography), only slight mention is normally made of the following three characteristics of such languages:

- i. in many Kwa languages, mid vowels, e.g. [e] and [o] do not occur nasalized
- ii. in many Kwa languages, at least one voiced alveolar consonant, e.g. [l], does not occur before nasalized vowels
- iii. in many Kwa languages, [n] (and sometimes [m]) does not occur before mid vowels, e.g. there are often no [ne] and [no] sequences.

It would seem that these three restrictions on nasalized vowels and on nasal consonants are somehow related and any historical account would have to explain their presence in the synchronic phonologies of so many Kwa languages.

There have been surprisingly few attempts at such an explanation. To my knowledge, no one has published any explanation for i. at all (I shall provide a possible answer later in this paper). Why should only [+high] and [+low] vowels be allowed to occur nasalized and not [e] and [o]? And yet, such a system is found over and over in Kwa. Thus, the

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This solution works only because in languages such as Yoruba and Nupe, vowels occurring after [l] are always oral, while vowels occurring after [n] are always phonetically nasalized. Thus, Ladefoged [1964] and others have chosen to represent the complementary distribution of [l] and [n] by means of one underlying segment /l/ (this position is challenged by Stahlke [forthcoming]). All of the relevant derivations of [l] and [n] in Yoruba are seen in (4):

- (4a) /li/ --> [li] /lu/ --> [lu]
 /le/ --> [le] /lo/ --> [lo]
 /lɛ/ --> [lɛ] /lɔ/ --> [lɔ]
 /la/ --> [la]
- (4b) /lĩ/ --> [nĩ] /lũ/ --> [nũ]
 /lã/ --> [nã]

However, by collapsing the observations in ii. and iii. in such a way, we are right back at the initial problem stated in i.: we have no [ne] and [no] (= [nẽ] and [nõ]) because we have no /lẽ/ and /lõ/ (see ii.) and we have no /lẽ̃/ and /lõ̃/ because we have no [ẽ] and [õ] (see i.). So, the whole problem revolves around the question: why no [ẽ] and [õ]? And, although we have no answer to this question at this time (see below, however), we can be sure that the correct answer depends upon the answer to a more crucial question -- in fact, the most crucial question: why nasalized vowels?

Several conventions will be followed in this paper. First, nasalization will be marked by a tilde over vowels, e.g. [ã], only when the nasalization represents a phonological property of a given language. For example, in all languages a vowel that is adjacent to a nasal consonant must become at least slightly (perhaps imperceptibly) nasalized (cf. Ohala [1971]) and yet we should not wish to claim that all languages have a phonological rule that nasalizes vowels before and after nasal consonants. Instead, what we have to determine is whether a given language has 'phonologized' this phonetic universal which is due to the timing factors between the movements of the soft palate and the other articulators.

The term 'phonologized' should not be confused with the term 'phonemicized'. In order for nasalization to become phonologized, it is only necessary that the process exceed the degree that can be said to characterize all languages. At this point nasalization becomes language-specific and must be marked in a broad phonetic transcription. Thus I will transcribe the verb 'to shine' in Nupe as [ná̃], but as [ná] in the closely related Gwari language. (Actually, /ã/ is realized as [ẽ] in Nupe, but I shall ignore this detail throughout the discussion.) Although the vowel in 'to shine' in Gwari cannot completely escape the nasalizing effect of the preceding /n/, this fact cannot be attributed to the phonological nature of Gwari, but rather to the phonetic nature of all human speech. A universal phonetic tendency is said to become 'phonologized' when language-specific reference must be made to it, as in a phonological rule. A phonetic property becomes 'phonemicized' when contrastive reference must be made to it, as in underlying phonemic forms. Thus, nasalization is said to be phonologized if a rule is required in the language that nasalizes vowels in the context of nasal consonants. Nasalized vowels are phonemicized when they cannot be predicted by rule, but rather must appear in the lexicon. A number of phonetic processes are best viewed in this light. Chen [1969] reports, for instance, that vowels tend universally to become longer before voiced consonants, but that English has exaggerated this effect beyond what can be attributed to universal phonetics. English has, therefore, phonologized vowel length before voiced consonants, though it has not phonemicized vowel length. For more discussion of this notion of 'phonologization', see Hyman and Schuh [forthcoming].

A second convention that will be followed concerns the identification of proto forms. Proto-Kwa forms are identified by the abbreviation PK, e.g. PK *b̃́(k) 'hand'. Intermediate historical forms are simply identified by the asterisk, e.g. *b̃́ 'hand' for Proto-Niger-Kaduna. While I will be discussing both synchronic and diachronic properties of Kwa languages, it is hoped that this will cause no confusion. I have divided the paper into three sections. First, I shall discuss the source of nasalized vowels in Kwa. Second, I shall turn to regressive nasal

assimilation of consonants. And, finally, I shall turn to the synchronic implications of the historical analysis.

1. The source of nasalized vowels in Kwa

It is accepted by most phonologists that nasalized vowels derive from earlier states of oral vowels in proximity with nasal consonants (see in particular Ferguson [1966], Foley [1972], Greenberg [1966], Lightner [1970], Schane [1968, 1972], Stahlke [1971a]). Examples of such derivations are numerous in the literature (consult Schane's treatment of French [1968] for a prime example). The most common origin of contrastive nasalized vowels seems to be syllable final sequences of oral vowel followed by nasal consonant (VN^{\S}). This source, which Kwa specialists had for years informally relied on, has recently appeared in print (Stahlke [1971a]) and has in fact been the only one considered for Kwa. According to the argument, nasalized vowels derive from VN^{\S} sequences (where the symbol \S is borrowed from Hooper [1972] and Vennemann [1972] to mark syllable boundaries), as in rule (5),

$$(5) \quad V > [+nasal] / \text{ ______ } N^{\S}$$

and then the syllable final N is deleted:

$$(6) \quad N > \emptyset / [+nasal] \underset{V}{\text{ ______ }}^{\S}$$

This solution has been so obvious and so appealing that it has met with virtually no opposition as a diachronic explanation of the facts.

In fact, Paul Schachter and Theo Vennemann have independently shown me [personal communications] how such an analysis might even account for the frequent absence of [ẽ] and [õ] in Kwa languages. The argument is as follows. Suppose that at some point in history all Kwa morphemes were of the structure +CVC+ (cf. the claim made in Hyman [1972b] that Proto-Kwa word structure was $*(C)\dot{V}-CVCV$ for nouns and $*CVCV$ for verbs, where the final vowel may have been a suffix in both cases). Let us assume that C can stand for any non-vowel, i.e. for either a true consonant, a glide or a liquid.⁴ Let us also say that at this stage

⁴I claim later in this paper that there were no liquids in Proto-Kwa. There quite possibly were no glides either.

the vowel inventory lacked [e] and [o]. We now say that Proto-Kwa *CVNV first loses the final vowel to yield *CVN, which then develops into [CṼ]. Since V cannot be [e] or [o], we do not obtain *CeN and *CoN nor their derived counterparts *[Cē] and *[Cō]. We complete the picture by saying that the phonemic vowels /e/ and /o/ arise from older sequences of vowel followed by glide, i.e. *ay becomes /e/ and *aw becomes /o/. Thus, the reason we have no nasalized mid vowels is that at the time vowels become nasalized, there were no mid vowels [e] and [o] in the language. The absence of [ẽ] and [õ] is therefore accounted for by the mutual exclusivity of final /y/, /w/ and /N/. Notice how the loss of the final nasal consonants by (6) would be just one instance of a more general consonant deletion process, since we know that Kwa languages have in many cases dropped non-nasal consonants as well. Unfortunately, little if any evidence can be brought forth in favor of proto vowel plus glide sequences.

Considerable evidence for the treatment of nasalized vowels as the historical product of proto *VN[§] (via the sound changes in (5) and (6)) is however available. While I know of no extensive well-documented study, occasional correspondences with Bantu cannot be missed. In (7) I have compared three Nupe forms with the corresponding proto roots I have reconstructed for Proto-Bamiléké, which I consider to be Bantu:⁵

(7)	Nupe	ḡã	:	PBké	*`gãm'	'to speak'
	Nupe	kã(nã)	:	PBké	*`kãn'	'monkey'
	Nupe	kã	:	PBké	*`kãŋ'	'to fry'

Here we see that while Nupe has /ã/ in all three words, Proto-Bamiléké possessed three distinct morpheme-final nasal consonants. It seems then that in the derivation of nasalized vowels in Kwa (with reservations about certain dialects of Akan), the distinction between final /m/, /n/ and /ŋ/ has been neutralized. Other such examples are readily available.

Evidence like that presented in (7) should be enough to convince any skeptic that the proto language that was the ancestor of Nupe (as representative of Kwa) and Bamiléké (as representative of Benue-Congo), for

⁵For a justification and discussion of these proto forms, see Hyman [1972a].

which I shall use the ad hoc label Benue-Kwa, did not have nasalized vowels, but instead allowed morpheme-final nasal consonants. In the remainder of this paper I shall, however, present problems with this analysis. The view that has been presented here is that nasalized vowels arise from the historical changes represented in (8):

(8) (a) (b) (c) (d)
 PK *CVNV > CVN > CṼN > CṼ

In stage (a) Proto-Kwa forms are reconstructed as bisyllabic (these can alternatively be interpreted as having a morpheme boundary as in *CVN+V). In stage (b) the final vowel is lost. In stage (c) vowels are nasalized before syllable final consonants, and in stage (d), the final nasal consonants are lost. The position I shall argue for in this section is that most Kwa languages did not develop nasalized vowels in this way, and that stage (b), where CVN is recognized as an intermediate reconstruction, has no historical validity.

One very common characteristic of languages such as French is that the final nasal consonant that conditions vowel nasalization appears in synchronic morphophonemic alternations. Thus, in French, one says *bon garçon* [bɔ̃ garsɔ̃] 'good boy', but *bon ami* [bɔ̃n ami] 'good friend'. The proto form of 'good' is *bon and the synchronic reflex is [bɔ̃] before a consonant (cf. *bonté* [bɔ̃te] 'goodness') or word boundary (i.e. where *n would be in syllable-final position), but [bɔ̃n] before a vowel (i.e. where *n would be in syllable-initial position, e.g. [bɔ̃^ɣ nami]). However, nothing of the kind occurs in any Kwa language to my knowledge.⁶ If we say that *CVN is the immediate source of [CṼ] and that *N is dropped so as to create a CVCV structure, why then does no Kwa language manifest this [N] in order to break up vowel clusters? Instead, what you find in Kwa languages where, say, a derivational vowel suffix follows a nasalized vowel is either that represented in (9a) or (9b), assuming there is no elision:

⁶Stahlke [1971a] presents some data from Ewe reduplication which he claims to be evidence for a final nasal.

(9a) /C \tilde{V} ₁/ + /V₂/ → [C \tilde{V} ₁V₂]

(9b) /C \tilde{V} ₁/ + /V₂/ → [C \tilde{V} ₁ \tilde{V} ₂]

Why does no known Kwa language yield such forms as [CVNV] when a vowel suffix is added? In other words, why are there no alternations of the type we find in French? In the Fe'fe' dialect of Bamiléké (Bantu) a final consonant which has fallen always reappears before a vowel, e.g. *'kán' 'monkey' becomes [ŋkǎe] in Fe'fe', but compare [ŋkeən+à] 'my monkey'.

Why not in Kwa?

Similarly, why are there apparently no Kwa languages where in some villages one finds [C \tilde{V}] and in others [CVN]? (The Akan dialects covered by Schachter and Fromkin [1968] only marginally provide such an instance, since in the Asante dialect, word-final /ŋ/ becomes [ĩ], thereby creating [C \tilde{V} ĩ] sequences.) Such a situation exists in Bamileke and Welmers [1968] presents similar data from two villages of Jukun (Benue-Congo):

(10)	<u>Takum</u>	<u>Wukari</u>	
	/gbám/	/gbǎ/	'be strong'
	/tána/	/átǎ/	'house'
	/bana/	/ábǎ/	'stone'

(The Togoremant languages, as reported by Heine [1968], may seem to constitute a counter-example, but as we shall see, they add support to the historical analysis I shall propose below.) Finally, if nasalized vowels derive from final nasal consonants in Proto-Kwa, where do the final nasal consonants in Akan dialects arise from? E.g. /ohín/ 'chief' and /apím/ 'a thousand' in Fante (taken from Welmers [1946]). These apparently require a different source.

These facts show that it would be somewhat questionable to suggest /CVN/ as an underlying synchronic analysis of [C \tilde{V}] in Kwa (see also my discussion of Stahlke [1971a] below). There are no alternations, no dialect variations and if nasalized vowels derive from VN^s sequences, the time depth of this derivation would appear to be very great. And yet, if it is so great, then how have so many Kwa languages maintained for such a long time such similar features as, say, the restrictions on

[e] and [o] in i. above? (There are, however, exceptions, most notably in Ewe, Togoremnant and Lower-Niger (i.e. Igbo) clusters, though the absence of [ě] and [õ] characterizes the Akan, Yoruba, Edo and Niger-Kaduna clusters. There is a similar restriction in Grebo, a Kru language (see below).)

At this point I should like to suggest that Proto-Kwa *CVNV did not develop into CVN, and that rather than losing the second vowel, Kwa languages first lose the first vowel by syncope, creating CNV sequences. Finally, I should like to argue that it was intermediate *CNV that developed into [CṼ].

The first argument in favor of *CNV comes from Gwari (also known as Gbari, Gbali and Gbagyi), a language closely related to Nupe. (The two constitute the major representatives of what I term the Niger-Kaduna sub-branch of Kwa, named after the two rivers that delimit Nupe and Gwari country.) Compare the Gwari forms in (11) to the forms we saw in (7) above:

- (11) Gwari [gṅà] 'to speak'
 Gwari [òkṅǎ] 'monkey'
 Gwari [kṅà] 'to fry'

From these forms we observe that Gwari not only permits CN clusters, but also, when the following vowel is /a/, nasalization is not phonologized (i.e. the vowel is not nasalized any more than can't be avoided; cf. Hyman and Magaji [1970]). The corresponding phonological forms are /gṅà/, /òkṅǎ/ and /kṅà/, respectively, where the nasal consonant is made homorganic to the preceding oral consonant by means of a rule of progressive assimilation, as in (12)

- (12) N → [a F] / [a F] _C ____

One can say with certainty that Nupe (cf. the forms in (7)) has developed nasalized vowels from CNV sequences and that Gwari maintains the older forms. Further evidence for this is obtained from the following observations: in Nupe, *ki becomes [čĩ]; however, *kni becomes [kĩ] and not [čĩ]. If we analyze Nupe [čĩ] as /ki/ and [kĩ] as /kni/, thereby

mirroring the historical development, then we can see why the first /k/ is palatalized, while the second remains [k]. Palatalization of /k/ must precede the creation of [ĩ] in Nupe. (The situation is a little more complicated than this because *tʃi also becomes [čĩ] and this time *tʃNi becomes [čĩ].)⁷ Thus, we have shown that at least in the Niger-Kaduna sub-branch of Kwa, the immediate source of nasalized vowels was *CNV. Actually, Gwari is right now in the process of developing nasalized vowels itself! For example, *kNu and *gNu are already pronounced [kŋũ] and [gŋũ], where the nasal release is not particularly pronounced. While I analyze both [CNV] and [CṼ] as /CNV/ in Gwari, the phonetic realization will depend in each case on the particular combination of C, N, and V. For example, /sNi/ is pronounced [sĩ].

The question, of course, is whether Niger-Kaduna independently developed CNV out of CṼ or whether other sub-branches of Kwa developed CṼ out of CNV. The first alternative seems very unlikely, given that Gwari sequences of /CNa/ are always pronounced with an oral vowel. If CNV developed out of CṼ, then not only would the consonant have to become nasally released, but /ã/ would have to be denasalized. Since N is specified only as a homorganic nasal, it seems much more natural to speak of the nasality as having shifted from the consonant to the vowel, i.e. [CNV] becomes [CṼ]. The reverse (with denasalization of V) would be very strange indeed.

Notice that CNV derives further support from other Kwa languages. Kay Williamson has informed me [personal communication] that nasal release on consonants (that which I equate with underlying /CN/) occurs in some of the languages of the Niger Delta that she has worked on. Professor Williamson has brought a number of facts to my attention, that can best be explained by recognizing an intermediate historical *CNV stage. Although she will be shortly reporting on these findings, it is interesting to note here how Williamson combines a *CNV reconstruction with a process of metathesis that occurred in Ijọ. Starting with *V-CNV, Williamson notes two possible synchronic reflexes. One is given in (13):

⁷I am equating nasally released consonants with CN clusters.

- (13) (a) (b) (c)
 *V-CNV > VCN̄V > VCV̄ (if C is not a stop)

The historical derivation in (13) takes place if the pre-nasal consonant is not a stop. In stage (a), forms are reconstructed with a vowel prefix and a CNV syllable. In stage (b), the post-nasal vowel becomes nasalized, and in stage (c), the nasal is lost. The other possible synchronic reflex is seen in (14), and is found only when the consonant is a stop:

- (14) (a) (b) (c)
 *V-CNV > VNCV > V̄NCV (if C is a stop)

Again, forms are reconstructed in stage (a) with a vowel prefix and a CNV syllable. (In both (13) and (14) it is of course possible to go back one step further than Proto-Ijọ *V-CNV and propose Proto-Kwa *V-CVNV.) In stage (b) we note that when the consonant is a stop, it metathesizes with the nasal so that *VCNV becomes VNCV. In stage (c), the metathesized nasal nasalizes the preceding vowel. By (14), Proto-Ijọ *àdná 'wrestle' becomes [ãndá] (cf. Williamson [1965]). In addition, Carrell [1970] chooses /CnV/ to represent syllables that are characterized by nasalization throughout in Igbo. (Although her arguments center around the relative 'economy' of recognizing /CnV/ rather than an underlying contrast between oral and nasally released consonants, it is interesting that she did not consider /CVn/ as a possible solution.) If we assume that Proto-Igbo was characterized by CNV sequences, then we are able to explain the presence of aspirated and breathy voiced stops in certain central dialects, e.g. Owerri (cf. Armstrong [1967]): *á'gnú 'leopard' > á'gnú > á'gnú > á'ghú > á'ghú (optional loss of nasalization on the vowel). If the consonant preceding /N/ is a non-continuant it becomes aspirated in some Igbo dialects. If the consonant is a continuant, it is realized as nasalized, e.g. /àhNú/ 'body' --> [ãhú].⁸

⁸It is possible that Igbo, like Ijọ, underwent such a process of metathesis and that sequences of N + stop later developed into aspirated stops. Thus, the development of aspirated stops can be explained as a process of strengthening, as in the following derivation:

Evidence for intermediate *CNV is also found in Ewe. Here it is necessary to turn to synchronic phonology, where the search for deep underlying phonological forms has generally paralleled the aims of historical reconstruction. Stahlke [1971a] discusses the process of verb reduplication as evidence for recognizing /CVN/ as the underlying representation of [C \tilde{V}]. His attempt is to rid the system of underlying nasalized vowels. He provides the following data:

- (15) do 'to borrow' --> dodo
 sē 'to be hard' --> sesē

The general rule is that C_1V_1 reduplicates as $C_1V_1C_1V_1$, except that the reduplicated vowel cannot be nasalized, as we see in (15). Stahlke then introduces -- and rejects -- a reduplication rule such as (16):

- (16) RED --> $C_1 \begin{matrix} [-nasal] \\ V_1 \end{matrix} / \text{---} C_1 V_1$

Rule (16) "forces redundancy into the phonology and causes us to lose generalizations" [p. 244]. He then proposes that the underlying form of 'to be hard' be /sēN/ and restates the reduplication rule as (17):

- (17) RED --> $C_1 V_1 / \text{---} C_1 V_1$

$$* V-CV_1NV_2 > V-CNV_2 > V-NCV_2 > V-NC^hV_2 > V-C^hV_2$$

In stage (a), a vowel prefix and a bisyllabic stem is set up for nouns. In stage (b), V_1 is syncopated. In stage (c), the nasal is metathesized, if the preceding consonant is a stop. In stage (d), this consonant becomes aspirated (or, presumably, breathy voiced), since the preceding nasal creates a strengthening environment. Finally, this nasal is lost in stage (e). If stage (d) is not postulated, then it is not clear how or why nasally released stops should develop into aspirated and breathy voiced stops. Notice, also, that such a reconstructed intermediate *V-CNV₂ for Williamson's Lower-Niger sub-branch of Kwa accounts for why CnV often works better than CVn as an orthographic convention for nasalized vowels in these languages (see Williamson [1970]). The CnV convention best recapitulates the historical development, I would claim.

While the [-nasal] specification of V_1 in (16) is viewed as a loss of generality, it is questionable whether the alleged generality of (17) is sufficient justification for the abstract synchronic representation /sɛN/. In other words, it is just as plausible that native Ewe speakers have internalized underlying forms such as /sɛ̃/ and rule (16), and one must confront the complication that has been introduced into the grammar, namely the two synchronic correlates of rules (5) and (6) (given above) which convert /sɛN/ to [sɛ̃]. His argument for Yoruba is even weaker. In Yoruba, the vowel in the reduplicated syllable is always [i], as we see in Stahlke's examples in (18):

- (18) ku 'to die' --> kiku
 kũ 'to fill' --> kikũ

He rejects the reduplication rule in (19):

- (19) RED --> $C_1 \begin{bmatrix} +\text{high} \\ -\text{back} \\ -\text{nasal} \\ V_1 \end{bmatrix} / \text{--- } C_1 V_1$

and concludes:

"Just as in Ewe, the reduplicated vowel is non-nasal. For Yoruba also, then, we suggest that in the underlying forms there are no nasalized vowels and that these are derived, as in Ewe, either from a sequence of nasal consonant plus vowel, or by regressive assimilation from a final nasal consonant which is later deleted" [p. 245].

However, the weak argument Stahlke proposes for Ewe is proven faulty when applied to Yoruba. In Yoruba reduplication, how can one say any more than that C_1 is reduplicated and [i] is inserted? The problem is that Stahlke treats the [i] of kiku as a reduplication in some respect of /u/ (notice that he writes V_1 instead of simply V in the structural change of (19)). If we get kikũ (and not *kĩkũ) because underlyingly we have /kuN/, then why do we get kiku and not *kuku? Stahlke recognizes /CVN/ for Yoruba and the revised reduplication rule in (20):

- (20) RED --> $C_1 \begin{bmatrix} +\text{high} \\ -\text{back} \\ V_1 \end{bmatrix} / \text{--- } C_1 V_1$

(20) looks like a general reduplication rule, because V_1 is reduplicated in the structural change of the rule. However, there is no reason to claim [i] as a reduplication of V_1 . Instead, the rule should be revised as in (21):

$$(21) \quad \text{RED} \rightarrow C_1 \begin{bmatrix} +\text{high} \\ -\text{back} \\ -\text{round} \\ -\text{nasal} \\ \text{V} \end{bmatrix} / \text{---} C_1 V_1$$

This rule states that whatever the features of V_1 , the reduplicated vowel is [i].

While the case for /CVN/ in Yoruba is extremely weak, the argument made for Ewe may still appeal to some. However, some additional data which are taken from Ansre [1963] (cf. Westermann [1930: 181]; also Stahlke [1971b]) are presented in (22):

(22)	fo	'to beat'	-->	fofo	'beating'
	kpɔ	'to lead'	-->	kpɔkpɔ	'leading'
	syá	'to dry'	-->	sásyá	'drying'
	dzrá	'to sell'	-->	dzádzrá	'selling'

(I have taken the liberty of changing Ansre's siá to syá under the impression that i is non-syllabic and non-tone-bearing, this permitting a generalization I shall make below.) What these additional data show is that in reduplication, if there is a sonorant (represented by R = resonant) between C_1 and V_1 , it is not reduplicated.⁹ Thus, the reduplication rule in (17), taken from Stahlke [1971a], needs to be extended to include these data (cf. Stahlke [1971b]):

$$(23) \quad \text{RED} \rightarrow C_1 V_1 / \text{---} C_1 (R) V_1$$

But now we see that if the sonorant (or resonant) R is [-nasal], it comes between C_1 and V_1 and is not reduplicated, and if the sonorant is [+nasal], in Stahlke's CVN solution, it comes after V_1 and also is not reduplicated.

⁹Theo Vennemann has informed me that Gothic reduplicates in a similar fashion, e.g. *grof* becomes *gegrot*.

Why not combine N with the other sonorants and say that Ewe has morphemes of the structure CV and morphemes of the structure CRV, of which CNV is one instance.¹⁰ We could add, then, a rule that converts /CNV/ to first [CÑV] and then to [C̃V], both applying after reduplication. Notice that while I believe to have shown why /CNV/ would be at least as plausible as /CVN/ as a synchronic solution, it may still be that the best solution of all is the one that posits /C̃V/ and the reduplication rule in (16). The /CNV/ solution provides a neat reduplication rule, but requires additional P-rules to derive phonetic [C̃V]. Unlike the abstract Yawelmani solution proposed by Kisseberth [1969], these underlying /CNV/ sequences are recognized for the purpose of one rule only, and therefore can be viewed as ad hoc. The /C̃V/ solution, on the other hand, does not require additional P-rules, but the resulting reduplication rule (which says: don't reduplicate post-consonantal non-nasal sonorants and don't reduplicate the nasality of nasalized vowels) is less general, though possibly still correct. What I do claim, however, is that CNV represents a true diachronic fact in the history of Ewe.

Perhaps we can extend our conclusion that Ewe once had CNV to include other Kwa languages, since remnants of such sequences are found elsewhere in reduplication. In Nupe, for instance, /Cĩ/ and /Cũ/ reduplicate as [CĩCĩ] and [CũCũ], while /Cã/ reduplicates as [CĩCã], i.e. with an oral vowel, as in (24):

(24) tĩ 'to plait' --> tĩtĩ
 tũ 'to send' --> tũtũ
 tã 'to rub on' --> tĩtã

At some intermediate stage, forms such as [tĩtĩ] and [tũtũ] must have been prevalent. A later assimilation was introduced, but was restricted

¹⁰The one problem with this analysis is that there are morphemes such as [gblẽ] 'to be spoiled', which reduplicates as [gbegbĩẽ]. This morpheme would presumably have to be recognized underlyingly as /gblNe/ if /CNV/ is to represent [C̃V] synchronically. This is hardly an improvement over the /CVN/ analysis of Stahlke, who would set up /gblen/. Thus, it is not quite true to say that /l/, /r/ and /y/ share the same 'slot' with /N/, though we still can say that sonorants come between the initial consonant and the vowel.

to environments where reduplication created successive syllables with like high vowels. Schachter and Fromkin [1968] present basically the same findings for Akan:

- (25) sĩ 'to hang on' --> sĩsĩ
 sũ 'to cry' --> sũsũ
 sã 'to tie up' --> s₁sã

Conceivably there was a time when both Nupe and Akan had CNV and the reduplicated form was then CVCNV (later modified, of course, to CVCṼ). One inexplicable fact is that Gwari Kuta (the main Gwari dialect and the one described in Hyman and Magaji [1970]) completely reduplicates the verb, as we see in the forms in (26):

- (26) gâ 'to give' --> gâgâ
 gṛâ 'to speak' --> gṛâgṛâ

This situation is exceptional even in Niger-Kaduna alone, where we expect a high vowel in the reduplicated syllable (cf. the corresponding Nupe forms yiyâ and gigâ). In addition, if Gwari Kuta were like Ewe, then we would expect *gâgṛâ instead of gṛâgṛâ. It might look as though Gwari Kuta is the most conservative language of them, maintaining complete reduplication in all cases, but it is possible that Gwari reintroduced complete reduplication.¹¹ (No Niger-Kaduna language has CLV sequences.) Idoma, on the other hand, does not have nasalized vowels or CN clusters,

¹¹There is reason to believe that Ewe, which completely reduplicates the stem vowel, once had only high vowels in the reduplicated syllable. Thus, compare the following remnants taken from Westermann [1930: 90]: dzudzɔ 'to rest', from dzɔ 'to wait'; gbugbɔ 'to return', from gbɔ 'to return' etc. It is also interesting to note that Schachter and Fromkin report the following reduplicated forms [1968: 167], where the final nasal consonant is reduplicated:

- [sɛ̃mʔ] 'strip' --> sɛ̃msɛ̃mʔ --> [sɛ̃nsɛ̃mʔ]
 [pãŋʔ] 'leave a space' --> pãŋpãŋʔ --> [pãmpãŋʔ]

A corrective rule is required to nasalize the reduplicated high vowel. Thus, Akan CVN reduplicates as CVN̄CVN and not as CVCVN as in Ewe.

but does have CLV sequences. Reduplication in Idoma (see Abraham [1967]) is accomplished by prefixing o- (mid tone) to the verb and then reduplicating the whole thing (placing low tone on the initial o-). Vowel elision then occurs: the first instance of V_1 drops before the second (mid tone) o-:

- (27) ma 'to remain silent' --> o + ma
 --> ò + ma + o + ma
 --> òmoma

The interesting thing about Idoma is that /l/ (which is syllabic, carrying tone) is also elided before the mid tone o-:

- (28) bià 'to remember' --> o + bià
 --> ò + bià + o + bià
 --> òbobià

Thus we have another language where a post-consonantal sonorant is not reduplicated. Returning to Akan, Bill Greenberg has brought to my attention that there are certain CVLV verbs that function as if they were monosyllabic (while there are others that function as bisyllabics). Thus, Christaller [1933] includes the following two verbs with their corresponding reduplicated forms in his dictionary:

- (29) sɔrɪ 'to be careful about' --> sɔsɔrɪ
 sɔrɪ 'to rise' --> sɔrɪsɔrɪ

The first functions as monosyllabic with high vowel reduplication; thus, Schachter and Fromkin recognize this word as sɔr and insert the vowel ɪ. The second behaves as a polysyllabic verb, which normally reduplicates completely as in the example. The first form suggests a possible explanation for why sonorants are not reduplicated in Ewe: if the ɔ of sɔsɔrɪ were to fall, we would be left with susrɪ (and the root would presumably be srɪ). Now we must take another look at Ewe. Perhaps CLV sequences derive from an older CVLV sequence, where the first vowel was syncopeated. Synchronic evidence in another Kwa language, Grebo, in the Kru sub-branch, is reported by Innes [1966]. The forms in the left hand column of (30) represent the pronunciation in slow speech, while the forms in the right hand column represent the pronunciation in rapid speech:

(30)	pědě	plě	'bald patch'
	bódó	bló	'chalk'
	kidě	klě	'chest'
	geda	gla	'divide'
	kpoda	kpla	'sew'
	gbudó	gbló	'room'
	fodo	flo	'emptiness'

If Ewe /kplɔ/ 'to lead' (see (22)) were historically *kpVlɔ (or perhaps *kpVdɔ; see below), then we can understand how the reduplicated form [kpɔkplɔ] came into being. But how does this explain the lack of nasalization on [sɛsɛ̃]? Evidence has been provided for a proto form *sNɛ. Might this have come from an older *sVNe, as hypothesized earlier? One example is found in Gwari Kuta:

(31)	Proto-Bantu	*tanu	:	Gwari	ñtnũ	'five'
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Innes presents in addition to the data in (30) the following data in (32):

(32)	pone	plě	'rat'
	kene	klě	'wickerwork basket'
	kpona	kplã	'snore'
	fona	flã	'wood-boring insect'

(In Grebo the so-called 'muffled' vowels /ě/ and /ó/ do not occur nasalized.) We might be tempted to conclude from (32) that nasalized vowels arise from the process of vowel syncope followed by the denasalization of /n/ to [l], as in (33):

(33)	*pone	>	poně	>	pně	>	[plě]
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However, Innes reports that oral voiced stops do not occur before nasalized vowels in Grebo (cf. discussion below). Thus it is possible to consider the underlying forms of those words in (32) to be as in (34):

(34)	/podě/	'rat'
	/kedě/	'wickerwork basket'
	/kpodã/	'snore'
	/fodã/	'wood-boring insect'

Having recognized these forms, we now see the relationship between these and the forms given in (30). Roughly speaking, /d/ is pronounced [d] intervocalically before an oral vowel, [n] intervocalically before a nasalized vowel and [l] after a consonant. (My limited knowledge of Grebo has not permitted me to make any conclusions about the apparent contrast between [d] and [l] in initial position.) If we assume that the underlying forms in (34) are also the historical forms, then Grebo appears to add little to our understanding of the origin of nasalized vowels. At this point, let us then consider the many Kwa languages that have restrictions on consonants that precede nasalized vowels.

2. Regressive nasal assimilation of consonants

In a number of Kwa languages non-strident voiced consonants become nasal before nasalized vowels.¹² In some languages (e.g. Grebo, some Akan dialects) the picture is complete: no voiced oral consonants appear before nasalized vowels in surface forms. Thus, Schachter and Fromkin [1968] report the following derivations for their dialects of Akan:

(35)	/bã/	-->	[mã]	'give'
	/dã/	-->	[nã]	'and'
	/yã/	-->	[ỹã]	'receive'
	/wãdĩ/	-->	[wãñĩ]	'scrape'
	/hũ/	-->	[hũ]	'fear'

The forms for 'receive' and 'scrape' have the possible free variants [ɲã] and [ɲwãñĩ], respectively.

In other languages, however, there is some variation, most notably with respect to the voiced labial and alveolar consonants. Thus, while all relevant Kwa languages appear to nasalize both glides and liquids occurring before nasalized vowels, some Kwa languages, such as Nupe, have a contrast between /b/ and /m/ before nasalized vowels, as well as a contrast between /d/ and /n/:

¹²I specify these consonants are non-strident in order to include languages such as Nupe where [dzṼ], [vṼ], etc. are found.

(36)	[ba]	'to cut'	[da]	'to get wet'
	[bã]	'to break'	[dã]	'to be in'
	[mã]	'to give birth'	[nã̃]	'to shine'

While the processes in (35) explain why Schachter and Fromkin set up only underlying initial /b/ and /d/ (and not /m/ and /n/), it is not possible to do the same for Nupe, as we can see from the contrasting forms in (36). However, it is possible to recognize underlying /lṽ/ for phonetic [nṽ], since the same distribution is found in Nupe as in Yoruba (cf. (3) and (4) above). Thus, 'to shine' could be represented as underlyingly /lã̃/, which is then converted to [nã̃] by means of a rule of regressive assimilation such as the one given in (3) above. Since no final consonants occur in Nupe, we can thus claim that Nupe has no underlying /n/. But what about the contrast between /b/ and /m/? Where is the voiced oral consonant that would be in complementary distribution with [m]? It can't be [w], for instance, because /wã/ 'to catch' is realized either as [wã̃] or [ɲwã̃]. In fact, there is no corresponding oral consonant... and yet there had to be one, historically, because we do not find sequences of *me and *mo in Nupe. In other words, there seems to be a constraint on vowels that appear after /m/, namely only [ĩ], [ũ] and [ã]. We could say that underlying sequences of /mi/, /mu/ and /ma/ become phonetic [mĩ], [mũ] and [mã] by means of a rule of progressive assimilation as in (37):

(37) V --> [+nasal] / m ____

But this would hardly explain why there are no sequences of /me/ and /mo/. Instead, we must insist that the correct underlying representations of the occurring sequences are /mĩ/, /mũ/, and /mã/. But then, the nasality of /m/ would seem to be redundant. For, historically, it was. In fact, we needn't go far to find the answer to this diachronic puzzle.

In closely related Gwari there are two voiced oral labial stops: /b/ and implosive /ɓ/ (cf. [bã] 'to count' and [ɓã] 'to shatter'). It is now recalled that Gwari has sequences of /CNV/ where Nupe has /Cṽ/. Thus the forms in (41) from Gwari should be compared with the Nupe forms in the second row of (36), repeated below:

- (38) Gwari [bmà] 'to break' [dná] 'to be in'
 cf. Nupe [bã] 'to break' [dã] 'to be in'

It happens that /b/ and /d/ do not occur in [CNV] sequences in Gwari, at least in surface forms. Underlyingly, however, it is possible to recognize /bN/ and /dN/ on a par with /bN/ and /dN/, the former sequences being realized phonetically as [m] and [n], respectively:

- (39) Gwari /bNa/ --> bma --> [ma] 'to give birth'
 Gwari /dNá/ --> dná --> [ná] 'how much'
 cf. Gwari /bNà/ --> [bmà] 'to break'
 Gwari /dNá/ --> [dná] 'to be in'

Thus, we would have to claim that Proto-Kwa had an implosive /b/.

This claim seems to me to be beyond question.¹³ Some Proto-Kwa reconstructions with *b are: *bɔ 'hand',¹⁴ *bɪ 'child' and *bá 'they' (cognate with Proto-Bantu class two prefix *ba, which possibly also reconstructs as *ba, the way it appears in Basaa). The verb 'to come' must also reconstruct with an initial *b, though the identity of the proto vowel is uncertain. Reflexes of these proto forms are seen in various Kwa languages in (40). The Edo (Degema) forms are taken from Thomas and Williamson [1967], the Akan forms from Christaller [1933]. The one Ebrié form is taken from Dumestre [1970]. Blanks mean that I am unaware of the word in that language.

(40)	Edo	Yoruba	Gwari	Nupe	Akan	Ebrié
*bɔ 'hand'	ùbó	ɔwó	obwá	egwa	ɔbasa	/mɔɔ/
*bɪ 'child'	bfe ?	bɪ (vb.)	eɪí	egi	ɔbá	
*bá 'they'	ubáɔ	wá	bá	a	wɔ	
*bV 'come'		wá/bɔ	bé	bé	bà	

Additional cognates can be obtained for 'hand' (= 'arm' in Akan), 'child' (= 'to bear a child' in Yoruba) and 'to come' from Armstrong [1964]. The

¹³While I was in Ibadan, Ben Elugbe mentioned to me that Kay Williamson had reconstructed implosive consonants for Kwa as well.

¹⁴These Proto-Kwa forms most likely should be reconstructed with a morpheme-final consonant, e.g. *bɔk 'arm' (cf. Efik ubɔk, Proto-Bantu *boko).

presence of an implosive /ɓ/ in the form for 'hand' in Edo, Gwari and Ebrié (= Akan), three different sub-branches of Kwa, would seem to suggest that other Kwa languages not having /ɓ/ have lost that sound (Yoruba, for instance, has changed *ɓ into /w/ in three of the forms in (40)). Additional forms supplied by Armstrong from West Atlantic (e.g. Fula Bi'ɔi 'child') and Benue-Congo (e.g. Ufia kɔ-ɓɔ 'hand') strongly suggest that *ɓ should be reconstructed for all of Niger-Congo. Thus, returning to our discussion of nasals in Kwa, we are on solid ground when we analyze Gwari [mV] as historical *ɓN. In fact, we can go one step further.

Dumestre [1970] reports that in Ebrié, an Akan dialect spoken in Ivory Coast, there is not only /ɓ/, but /d/ as well. Furthermore, he states: "...nous considérons que l'ébrié ne possède aucune consonne nasale phonologique, et que [m], [n] et [ɲ] sont les allophones respectifs de /ɓ/, /d/ et /y/ [before nasalized vowels]" [p. 25]. Let us now propose the following voiced oral stops in Proto-Kwa:

(41) b d g
 ɓ d

Some Proto-Kwa roots with *d are: *di 'to eat', *de 'to look at', *dɛ 'blood' (cf. Proto-Bantu *dia 'to eat', Proto-Bamiléké *dég 'to look at', and the common Bamiléké root /dɛm/ 'blood'). The form for 'to eat' is /d̥i/ in Edo and /di/ in the Gnawu dialect of Gwari. The form for 'blood' is [ɛ̃jɛ̃] in Yoruba. Now let us say that in many languages Proto-Kwa *ɓN is realized as [m] and *dN is realized as [n]. In Ebrié, where *CNV has become [CṼ], we find that *ɓNV is realized as [mṼ] and *dNV is realized as [nṼ]. In Ebrié it is possible to get /b/ and /d/ followed by nasalized vowels, just as it was in the proto language. However, while the proto language had constraints on nasals following the two implosive consonants, Kwa languages that lack these sounds have realigned these constraints. Dialects of Akan treated by Schachter and Fromkin, for instance, once having merged *ɓ and *b, and *d and *d, now do not permit nasalized vowels after any voiced oral consonant, as schematized in (42):

- (42) /ɓV/ → [ɓV] > [bV]
 /bV/ → [bV]
 /ɓ̃V/ → [m̃V] > [m̃V]
 /b̃V/ → [b̃V]

(The phonemic forms /ɓ̃V/ and /b̃V/ derive of course from *ɓNV and *bNV, and ultimately from Proto-Kwa *ɓVNV and *bVNV, respectively, according to the argument advanced above.) In these dialects of Akan, [b] and [m] are now in complementary distribution after *ɓ and *b have merged: [b] is found before oral vowels and [m] before nasalized vowels. In Nupe, the situation is different, as we see schematized in (43):

- (43) /ɓV/ → [ɓV] > [bV]
 /bV/ → [bV]
 /ɓ̃V/ → [m̃V]
 /b̃V/ → [b̃V]

The difference between Akan and Nupe, then, is that Nupe has merged *ɓ and *b only before oral vowels, keeping their respective reflexes [m] and [b] distinct before nasalized vowels. Thus, what was formerly analyzed as /ɓV/ in Nupe, must now be analyzed as /m̃V/, as argued above.

As for Proto-Kwa *ɗ and *d, Schachter and Fromkin's dialects of Akan merged them in a parallel fashion to *ɓ and *b, as we see in (44):

- (44) /ɗV/ → [ɗV] > [dV]
 /dV/ → [dV]
 /ɗ̃V/ → [ñV] > [ñV]
 /d̃V/ → [d̃V]

(Recall that /ɗ̃V/ and /d̃V/ derive from *ɗNV and *dNV, respectively and ultimately from Proto-Kwa *ɗVNV and *dVNV.) However, in Nupe it is [ɿ] (and not [d]) that is in complementary distribution with [n], as we stated above. (In Akan, /d/ is also realized as [r] intervocalically before oral vowels.) In fact, Nupe is representative of a number of Kwa languages that changed *ɗ into [ɿ]. In (40) we saw that Yoruba *ɓ becomes [w]; Yoruba *ɗ becomes [ɿ]. Since sonorants cannot be implosive (cf.

Greenberg [1970]), [+implosive] segments will always be redundantly [-sonorant]. What has happened in Yoruba (and partially in Nupe) is that the redundant feature specifications have been reversed: [+implosive, -sonorant] segments have become [-implosive, +sonorant]. Because of these feature neutralizations, one frequently finds implosives developing into sonorants, as reported in a number of cases by Greenberg [1970]. We have already said that Ebrié (Akan) and Edo have /d/. The one Niger-Kaduna language that has instances of [d] occurring on the surface is Gnawu Gwari, where [dí] means 'to eat'. However, there is considerable evidence that the whole sub-branch once had /d/. In Gwari Kuta, /g/ is realized as [j̥] before front vowels. However, there is a palatal stop [j] whose synchronic source is analyzed in (45):

- (45) /li/ → [j̥i]
 /le/ → [j̥e]
 /la/ → [la]
 /lu/ → [lu]
 /lo/ → [lo]

In Gwari there are processes of labialization and palatalization that apply to particular sets of consonants before labial and palatal vowels, respectively. Thus, /ofé/ 'dawn' is obligatorily pronounced [of̥é], where the palatal off-glide is particularly pronounced. This process of palatalization partially explains the first two forms in (45), but why should we get [j̥i] and [j̥e] instead of [l̥i] and [l̥e]? In other words, why are these forms [-cont]? We can explain why palatal stops are found in these positions, if we accept the hypothesis that Proto-Niger-Kaduna (and Proto-Kwa in fact) had *d, which much later became both [j̥] and [l] in Gwari. Thus, the historical derivations of three appropriate morphemes are given in (46):

- (46) *di 'to eat' → d̥i → [j̥i]
 *de 'to look at' → d̥e → [j̥e]
 *d̥ɛ 'blood' → d̥ɛ → j̥ɛ → [j̥à]

(The last step in the derivation of 'blood' represents a rule that merges * ϵ and * ζ with * a , a rule that is discussed with reference to Nupe in Hyman [1970a].) Thus, while * d becomes [j^y] before front vowels, in other environments it becomes [l], e.g. * $dá$ 'to take' --> [$lá$]. Thus we conclude that Proto-Kwa had both * β and * d and that these consonants, when followed by /N/ were pronounced [m] and [n], respectively.

Now that we have established * β and * d for Proto-Kwa, we can present one of the strongest arguments in favor of *CNV as an intermediate source of $C\tilde{V}$. We have said that it is impossible to produce an implosive sonorant. In addition, an implosive / m / or / n / is apparently a phonetic impossibility because what is involved in the production of an implosive is the rarefaction of the air pressure inside the mouth by a downward movement of the whole glottis (Mona Lindau [personal communication]). This rarefaction or lowering of the air pressure would be impossible if the nasal passage were coupled to the oral passage. Furthermore, a nasally released implosive would be phonetically impossible because since the air pressure is lower within the mouth, it is not possible for air to be released through the nose. Instead, air rushes into the mouth after the implosive has been released. This phonetic impossibility explains why no Kwa language has been observed with phonetic sequences such as [$\beta\tilde{V}$] and [$d\tilde{V}$], which are possible, phonetically. Since we are assuming that Proto-Kwa *CVNV becomes *CNV by syncope of the first vowel, if C is an implosive and if CN is normally to be realized as a nasally released consonant, then sequences of β NV and d NV which arise from Proto-Kwa * β VNV and * d VNV must automatically be modified, for they are unpronounceable -- or at least extremely 'inefficient' (Peter Ladefoged [personal communication]). We might propose the appropriate derivations in (47):

(47) * β VNV > β NV > β mV > mmV > [$m\tilde{V}$]
 * d VNV > d NV > d nV > nnV > [$n\tilde{V}$]

Since [β mV] and [d nV] are phonetic impossibilities, we have an explanation as to why [β] and [d] do not occur before nasalized vowels in Ebrié, but only before oral vowels. Namely, nasalized vowels derive historically

from preceding nasally released consonants. If we say that Proto-Kwa *CVNV becomes *CVN, then we have no explanation as to why *bVN and *dVN should become [mṼ] and [nṼ], respectively, since [bṼ] and [dṼ] are phonetically possible. Of course, in Akan, Grebo and elsewhere, what was initially a modification of phonetically impossible combinations has been extended, since [b] and [d] are also not found before nasalized vowels (see (42) and (44)).

Thus, to summarize, I assume that most -- if not all -- Kwa languages developed nasalized vowels as in the derivation in (48):

(48) (a) (b) (c) (d)
 PK *CVNV > CNV > CNṼ > C̃Ṽ

In Proto-Kwa in stage (a), bisyllabic stems are set up where the second syllable begins with a nasal consonant. In stage (b) the vowel of the first syllable has been syncopeated, leaving an intermediate CNV stage. In stage (c), the remaining vowel has become nasalized, and in stage (d) the nasal (i.e. nasal release) has been lost. While this derivation may seem somewhat less natural than the one given earlier in (8), there are unmistakable instances of vowel syncope of the type posited here in many Kwa languages. First, there are the numerous instances of alternation between CVLV and CLV, as illustrated in (49) from Gã (cf. Truteneau [1971]):

(49) [ka|a] : [k|a] 'to nail'

A number of cases are also reported by Heine [1968] in his study of Togoremnant languages:

(50) PTR *bòlè > Likpe blè 'to hit'
 PTR *kálà > Likpe klà 'to count'

On the other hand, some Togoremnant languages appear to have lost the final syllable:

(51) PTR *bòlè > Balemi bò 'to hit'
 PTR *kálà > Akpafu- kâ 'to count'
 Lolobi

however, refrain from setting up underlying nasalized vowels in Gwari. Instead, underlying /CNV/ is realized either as [CNV], [CÑ] or [C̃V], depending on the nature of the consonant and the vowel. Recall that this post-consonantal nasal is an archiphoneme, e.g. /òkNá/ 'monkey' is realized as [òkṅǎ] and /òsNí/ 'breath' is realized as [òsǐ].

A more difficult question is how to represent voiced consonants that are always nasal before nasalized vowels. For instance, it is recalled that [m] and [n] are in complementary distribution with [b] and [d], respectively, in Ebrié: the former are found before nasalized vowels, the latter before oral vowels. If we represent [m̃] and [ñ] as /b̃V/ and /d̃V/, respectively, then Ebrié will have no underlying nasal consonants, as suggested by Dumestre [1970]. In Akuapem, Asante and Fante there would also be no /m/ and /n/, since [m] and [n] are, at least in initial position, in complementary distribution with [b] and [d]. Thus, in these Akan dialects, [m̃] and [ñ] can be represented as /b̃V/ and /d̃V/, respectively, as proposed by Schachter and Fromkin [1968]. Note, however, that Victoria Fromkin has informed me [personal communication] that in the revised version of A Phonology of Akan, she will probably set up underlying nasal consonants only in syllable final position. These dialects are exceptional in Kwa in that they permit final nasal consonants, a problem that cannot be explained by any existing hypothesis.¹⁶ In Gwari there would

¹⁶The problem is that if *CVNV becomes *CNV and then [C̃V], then where does a word like [ɛnám] 'meat' come from? (c.f. Proto-Bamiléké *ñám). There are several possible explanations, but I don't have evidence for any of them. First, it is possible that at the time *CVNV became *CNV, these words were of the structure *CVN, i.e. they lacked a final vowel and therefore couldn't syncopate. Second, it is possible that *CVNV became *CNV only if the two vowels were identical (cf. Truteneau [1971] for Gã), and that these morphemes had non-identical final vowels. Third, it is possible that syncope could occur only if the first vowel was of a certain nature (e.g. Kay Williamson has suggested to me that this vowel was always a high vowel). Those instances of *CVNV which did not become *CNV later became CVN (and still later perhaps [C̃V] outside of Akan). Fourth, the syncopation process could have been determined in part by the nature of the first or second consonant. For example, Grebo pVnV and kVnV have the respective alternants p̃V and k̃V in rapid speech, but †VnV cannot be pronounced †t̃V (Gordon Innes [personal communication]). Thus, those cases of *CVNV which did not become *CNV because of the nature of the consonant later became CVN.

vowel *a becomes nasalized before a nasal consonant and in stage (d) that nasal consonant drops. We now have the forms from Nyangbo-Tafi. In stage (e) the nasalized vowel denasalizes and we have the form from Avatime. Finally, in stage (f) the [g] spirantizes to [ɣ] and we have the form from Kposo. Thus, in (53) and (54) we observe that we must recognize intermediate *CNV and *CVN for different Togo-Remnant languages. This reveals first that nasalized vowels can possibly derive from two different processes in Kwa languages. But this also suggests that nasalized vowels may have a more recent origin in Togo-Remnant than elsewhere in Kwa, since motivated proto forms with nasal consonants can be reconstructed. As a final illustration of vowel syncope, notice the forms in (55) from the Kente dialect of Kpàn (Jukunoid), reported by Shimizu [1970]:

(55)	a-tkún	'ear'	à-fkèn	'leg'
	à-bgù	'arm'	i-bgú	'dog'

Since these syllable initial consonant clusters are of a highly marked nature, we tend to want to reconstruct a proto vowel between them. In fact, the forms in the left hand column correspond directly to the Proto-Bantu reconstructions *ku-tu¹⁵ 'ear' and *boko 'arm'.

3. Synchronic and diachronic implications

In the first section of this paper I presented evidence for a *CNV stage in the development of nasalized vowels in Kwa. In the second section I established the diachronic processes operative on *bN and *dN. Let us now briefly consider the synchronic representation of nasals and nasalization in Kwa. It should be clear from the earlier sections that Yoruba, Nupe, Akan and possibly Ewe are best viewed as having an underlying contrast between nasalized and oral vowels. While I am not ignoring the arguments made for /CVN/ in Ewe by Stahlke [1971a,b], I hardly find them sufficient justification for positing abstract forms that do not conform to the morpheme structure conditions of the language. One might,

¹⁵ku- is the noun class marker of class 15 in Bantu. Since many Niger-Congo languages exhibit noun class suffixes, it is possible to hypothesize a form such as tu-ku 'ear' to explain the reversed order of [t] and [k] in (55).

Vennemann [1972b]. This, then, raises the second objection that might be raised against the solutions suggested in the previous paragraph. Namely, by recognizing forms such as Nupe /|ĩV/ which is realized as [nĩV], individual morphemes will contain underlying segments that are never heard on the surface, since there are no alternations between [|] and [n] in Nupe. (There is a limited alternation between [|] and [n] in Yoruba, which is discussed by Stahlke [forthcoming].) How can a Nupe internalize underlying forms with /|ĩV/ if he never hears [|] followed by a nasalized vowel? Kiparsky would allow such a representation if the rule converting /|/ to [n] were a 'low-level phonetic rule'. Vennemann would disallow /|ĩV/ because of the lack of alternation. (He argues, for instance, that the unaspirated [p] in spĩn is a third phonological unit distinct from the aspirated [p^h] in pĩn and the voiced [b] in bĩn, since the [p] in spĩn never alternates with [p^h] or [b].) Thus, Vennemann's position can be restated in the following way: no underlying segment can be set up in a morpheme that is unpronounceable in that position, unless there is a surface realization of that morpheme where the underlying segment is heard phonetically. Thus, Nupe will have to have /nĩV/ in Vennemann's system. If we return to Ebrié we see that Vennemann would recognize [mĩV] and [nĩV] as /mĩV/ and /nĩV/, respectively, and not as /βĩV/ and /dĩV/, since there are no alternations. What this does in effect is create 'phonemes in complementary distribution'¹⁸: /β/ and /d/ would occur only before oral vowels and /m/ and /n/ only before nasalized vowels. Stahlke [forthcoming] reaches a similar solution for Yoruba, where /|/ is recognized before oral vowels and /n/ before nasalized vowels (with a minor rule that changes /n/ in certain morphemes to [|]). Presumably, these cases of complementary distribution will have to be signaled in the lexicon by morpheme structure conditions (which Vennemann calls 'rules'). This, then, leads into the third objection to the more abstract solutions. Namely, since the rules that change oral consonants to nasal consonants

¹⁸While in the standard theory (and all preceding theories) 'phonemes in complementary distribution' would be disallowed, Vennemann's theory of natural generative grammar "forces such an analysis" [personal communication].

also be no /m/ or /n/, but rather a homorganic /N/ which would follow initial consonants.¹⁷ In this analysis, the phonetic occurrences of [m] and [n] would be derived from underlying /δN/ and /lN/, respectively. In closely related Nupe, however, we have underlying /m/, because of contrasts such [bã] 'to break' and [mã] 'to give birth'. Finally, neither Nupe nor Yoruba would be said to have /n/, since phonetic [nṼ] would be viewed as the realization of /lṼ/.

While all of these analyses would have been accepted with no principled objections in classical phonemics and in the standard version of generative phonology (as exemplified by Chomsky and Halle [1968]), some phonologists have voiced certain reservations they have as to these solutions. One reservation centers around the pronounceability of underlying forms. This argument has both a weak and a strong form. In the weak form, it is argued that underlying forms must be pronounceable at least in some human language. Chomsky and Halle [1968] have, for example, been criticized (cf. Kiparsky [1968]) for setting up an 'epsilon glide', the pronunciation of which is uncertain. Thus, as has been brought to my attention by Victoria Fromkin [personal communication], one might object to an analysis that represents Gwari [mV] as /δNV/ on the basis that implosives cannot be nasally released (cf. the discussion in section 2). While /δNV/ neatly represents a structural fact about Gwari, it is hard to imagine any native speaker internalizing an unpronounceable underlying form. This underlying form would therefore be ruled out by a weak condition on pronounceability, which most phonologists would probably now acknowledge. A Strong Pronounceability Condition would state that no underlying form can be set up in a language that is not pronounceable by speakers of that language. As just stated, probably no phonologist would accept the strong form of the condition. However, the Strong Pronounceability Condition in conjunction with the Alternation Condition (Kiparsky [1968]) accurately represents the view of phonology presented by

¹⁷This same archiphoneme /N/ is present as a prefix of certain nouns, e.g. [mpyékwo] 'sun' and [ntnú] 'five', which are underlyingly /Npyékó/ and /Ntnú/.

morpheme structure condition that states that /l/ occurs before oral vowels and /n/ before nasalized vowels. The situation is even more clear in Ebríé. Since [β] and [d] do not occur before nasalized vowels, it should not be surprising to find foreign-sounding [βĩ] and [dĩ] being modified as [mĩ] and [nĩ], respectively. However, we should never expect an Ebríé speaker to adapt [mi] and [ni] as [βi] and [di]. Rather, these too would be adapted, I would claim, as [mĩ] and [nĩ]. We might try to salvage the concrete solutions by incorporating notions of 'natural' vs. 'unnatural' assimilation processes (cf. Schachter [1969]). However, at the moment there appears to be at least as much reason to believe that [l] and [n] are one underlying segment in Yoruba, as there is to believe otherwise.¹⁹

While it is therefore possible to describe some Kwa languages as lacking underlying nasal consonants, the remaining problem is a diachronic one: did Proto-Kwa then have no /m/ and /n/? Or, if Fromkin's proposed revisions are correct, did Proto-Kwa have /m/ and /n/ only in morpheme final position? We are no doubt tempted to say that Proto-Kwa did in fact have /m/ and /n/ and that these merged with *βN and *dN, respectively. ([mã] and [nã] would then have to represent a three-way merger in Akuapem, Asante and Fante between the intermediate reconstructions *βNa, *bNa and *ma, on the one hand, and *dNa, *dNa and *na on the other.) I know of no evidence for this merger, though I should like to mention that I am struck by the anomalous nature of Ewe, which permits nasalization in a much wider context than other Kwa languages (e.g. all vowels can occur nasalized and nasalized vowels occur after all consonants: [aɔ] 'hand' vs. [aɔ̃] 'sleep'; cf. Westermann [1954]). It would be very

¹⁹Notice that the same problem of where to capture complementary distribution characterizes other assimilatory processes. Thus, in a language which has [či] where we would expect [ki], and no alternations, we have to decide whether to have a rule converting /k/ to [č] before /i/, or whether to represent the two as phonemes in complementary distribution in the lexicon. Once again, the directionality argument favors the abstract solution. While one might expect a foreign [ki] to come into the language as [či], one would be less inclined to expect a foreign [ču] to come into the language as [ku]. Instead, one expects [ču] to come into the language as [či] (cf. Hyman [1970b]). This criterion merits further exploration.

before nasalized vowels cannot be shown to follow any other phonological rule, why not incorporate the complementary distributions into the lexicon? In other words, since these rules that convert /β/ to [m], /d/ to [n], etc., can always be the first rule in the phonological component, what evidence is there that these do in fact exist as rules? (This does not apply to the nasalization of [r], [y] and [w] in Yoruba, since this rule must follow other phonological rules in the language; cf. Stahlke [forthcoming].) We can pass a ruling by which nasal consonants are always forced into the lexicon, but this decision would have strong theoretical implications, which cannot be dismissed. The crucial difference between the two approaches is one of directionality. In Nupe, either we say that [n] is derived from /l/, or that /l/ and /n/ are phonemes in complementary distribution (i.e. with no directionality). It seems to me that if the principles I proposed (Hyman [1970b]) to explain foreign sound adaptation are correct, then the two solutions make very different predictions. While I was in Nigeria I frequently asked Yoruba speakers (who have [l] and [n] in complementary distribution) to repeat the nonsense word [eĩ], which they invariably repeated as [eĩ̃]. In the abstract solution we can claim that the rule that converts /l/ to [n] before nasalized vowels is responsible for the [n] in the repeated form. No Yoruba ever repeated [eĩ̃] or [edĩ̃], which are also possible. The concrete solution explains the [n] in the repeated form by means of the morpheme structure condition that identifies, so to speak, /l/ with /n/. However, while both solutions can explain the Yoruba speaker's inability to repeat [l] before a nasalized vowel, only the abstract solution can explain the reverse case. Namely, when Yoruba speakers are asked to repeat forms with [ni], they repeat these forms with [nĩ] and not with [li]. The directionality of the rule converting /l/ to [n] before nasalized vowels is again responsible for the change in the repeated form. The Yoruba speakers hear the derived segment [n] and assume that [n] was derived in an appropriate environment, i.e. before a nasalized vowel. Thus, they make the [i] of [ni] nasalized, so that the rule can apply (cf. Hyman [1970b]). In the concrete solution there is no explicit reason why Yorubas should perceive [ni] as [nĩ] rather than as [li]. Both are predicted by the

nasalized vowels either. A number of investigators have suggested privately to me that the absence of [ẽ] and [õ] might be due to a merger of these vowels with [ĩ] and [ũ] or perhaps with [ẽ̃] and [õ̃] (if present). While nasalized vowels have a tendency to merge, the picture presented in (56) provides a structural explanation which is specific to Kwa. Such an explanation is, I think, what is required. Of course, we still have to explain why some Kwa languages have the full repertory of nasalized vowels.

4. Conclusion

I should like to conclude this paper with the obvious remark that a proper understanding of nasalization in Kwa may not only add to our understanding of nasalization in individual Kwa languages and of nasalization as a general linguistic phenomenon, but also may some day prove to be a valid criterion for determining what is and what is not Kwa. We are far from that day, however, since some Kwa languages (e.g. Idoma, Ikom) do not have nasalized vowels (perhaps at one time they did), and since some non-Kwa languages exhibit certain traits in common with those languages we have been considering (e.g. Bariba, a Gur language, where nasalized /ĩ/, /ẽ/, /ã/, /ũ/ and /õ/ are found in contrast with their non-nasalized counterparts, but only oral /e/ and /o/ are found; see Welmers [1952], also Welmers [1950a,b] for comparable data from two Senufo languages of the Gur group). But, then, it may simply be that our present classifications are wrong. On the other hand, it may turn out that high and low vowel nasalization is an areal feature. While I have presented evidence for an intermediate *CNV stage in Kwa, I think it may still be possible that a part of Kwa developed nasalized vowels from an intermediate *CVN stage. I should at least like to leave open this possibility.

strange if the proto language did not permit /m/ and /n/ in initial position, since we know, for instance, that /m/ and /n/ are necessary for Proto-Bantu.

Still the greatest unsolved problem is: why do so many Kwa languages disallow [ẽ] and [õ]? The fact that we often do not find [mẽ] and [nẽ], [mõ] and [nõ] also supports our decision to regard these as derived segments. (Cf. Yen [1968], where a similar situation is described in some Chinese dialects, but where the presence of all nasalized vowels after nasal consonants leads to a different type of solution.) While Igbo dialects that have nasalized vowels permit all vowels to be nasalized, Welmers and Welmers [1968] report only two words that have [ne], *n'né/ñné* 'mother' and *únèrè* 'banana', while there are no instances of words with [no]. At this point, let me present a very speculative account for the absence of [ẽ] and [õ] in many Kwa languages. I have argued that [Cṽ] derives from Proto-Kwa *CVNV with an intermediate *CNV stage. It has occurred to me that the second vowel probably was historically a suffix -- either a noun class suffix or a verb suffix. Given the likelihood that this was the case, if we postulate that suffixes were limited to the three vowels *-i, *-u and *-a, then we have an answer, as shown in (56):

(56)	(a)	(b)	(c)	(d)
	*CVN-i	> CNi	> CNĩ	> Cĩ
	*CVN-u	> CNu	> CNũ	> Cũ
	*CVN-a	> CNa	> CNã	> Cã

In stage (a), Proto-Kwa *CVN- roots are posited which always carry a suffix, either -i, -u, or -a. In stage (b) the first vowel is syn-copated, leaving intermediate *CNi, *CNu and *CNa. In stage (c) the preceding nasal (or nasal release) nasalizes the vowel, and in stage (d) the nasal is lost. Thus, the reason why we do not find [Cẽ] and [Cõ] in many Kwa languages is that there were no words in Proto-Kwa of the structure *CVN-e and *CVN-o. I offer no evidence for this explanation other than the observation that some Benue-Congo languages restrict suffixes to those three vowels (e.g. Jukunoid; cf. Shimizu [1971]). Notice that there is no mention of [ẽ] or [õ]. Many Kwa languages do not have these

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BANTU LEXICAL CLASSES AND SEMANTIC UNIVERSALS

(With some remarks on how not to write phonological rules)

Frank Heny
Department of Linguistics
University of Massachusetts, Amherst

1. Introduction

This paper¹ has three related yet partially independent aims. In the first place I want to argue for a particular analysis of Shona adjectives, showing that at a rather deep syntactic level they are closely related to nouns. Secondly, I want to show that this analysis tends to vindicate the hypothesis of a syntactically and semantically defined level quite close to Chomsky's [1965] deep structure. Thirdly, I hope that the paper may serve as a kind of prolegomenon to a theory of lexical classes -- an important yet almost totally neglected aspect of the theory of natural language. In developing the argument for the analysis of adjectives, which is the central part of the paper, I shall deal primarily with some problems in the concord system. It will be necessary to demonstrate that a phonological solution is inappropriate although apparently possible within current theory. Some general restrictions are proposed on the use of morphological features or syntactic brackets in phonological rules, and it is argued briefly that the lexicon must probably include some of the rules which are now treated as phonological -- i.e. some of the P-rules.

In many Bantu languages, including Shona, there is a small, closed class of lexical items which have generally been called adjectives. There appear to be less than forty in Shona (Fortune [1955: 152-156]). Most can be glossed by English adjectives, with which they also share a good number of syntactic characteristics. As in English, adjectives in Shona can be used either predicatively (e.g. 'The sky is blue') or

¹This is a greatly expanded and modified version of a paper first read at the summer 1968 meeting of the Linguistic Society of America. I should like to thank Barbara Partee for extensive discussion of the earliest versions, and Earl Stevick for helpful comments. Talmy Givón, Erhard Voeltz, Tom Maxwell, Tom Peterson, and Richard Demers have made helpful comments on an intermediate version. None of them agree with everything I say here.

