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EDITORIAL STATEMENT

With the publication of the first issue of a new journal, the question will no doubt arise: "Why another journal?" This journal has been established to meet the needs of Africanists and Linguists of two kinds: On one hand, those whose primary interest is not the presentation of data about African languages, but rather, the implications of the grammatical structure of various languages of Africa for linguistic theory; on the other hand, those who are involved in investigating the claims of a universal linguistic theory and applying them to the grammatical analysis of African languages. In evaluating contributions for this journal, we shall not expect adherence to any particular theory of language, but shall only require that each article be of potential theoretical interest.

The journal will not, at least initially, be bound to a publication date. We envision publishing up to four issues a year, but shall publish only when in our judgment sufficient material meeting our criteria has been submitted. The format has been chosen deliberately for the purpose of expediting the speedy communication of work currently in progress, rather than work which was in progress a year or two before.

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Both in syntax and phonology one of the chief concerns in the process of linguistic analysis is the justification of grammars. If this problem is somewhat more in focus in phonology, it is perhaps because in phonology we are able to more closely approximate a workable solution and indeed argue the merits of alternate proposals to a set of linguistic data, whereas we consider ourselves lucky in syntax if we are able to reach any workable hypothesis at all. Thus it is the case that although no one overlooks the need to justify syntactic analyses, it is within the domain of phonology that questions of this sort have been most deeply discussed and developed.

1. The Need for Empirical Justification

One form of argument used to justify phonological descriptions relies on the so-called 'simplicity' criterion. Two analyses are discussed and one is rejected on the basis that in some well-defined (or not so well-defined) way it is less simple than the more acceptable solution. Only feature counting has been explicitly incorporated into the evaluation metric. Since this often leads to counter-intuitive results or has been unable to provide unique
adequate solutions, it is not infrequent that we find phonologists justifying their solutions on the basis of a number of varying forms of support: the number of underlying segments, pattern considerations, the number of phonological rules, historical evidence, or the so-called 'naturalness' of various points at issue, this last argument often falling under 'markedness theory' (yet to be developed). Thus, to consider a specific example, in a language such as Igbo, which exhibits a general CVCV pattern structure, one might quibble over whether verb roots (which are otherwise typically CV) such as kwé 'believe', kwa 'tell' and mwa 'die' are best analyzed as /CwV/, as in Standard Igbo Orthography, or as /CWV/, where in both cases C is limited to the velar series, /k/, /g/ and /ŋ/. By recognizing rounded velars (/C/) as phonological units we are able to maintain the otherwise exceptionless (ignoring syllabic nasals which possibly have a NV source) CV structure of Igbo. Similarly, in this solution we do not have to account for what would be a strange distributional restriction on /w/ (only after velars), since we take care of this in our underlying segments. However, a solution recognizing /Cw/ requires fewer underlying segments, as it more thoroughly utilizes the independently justified /w/ phoneme. How, if not by mere

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2 The choice of one of these solutions over another may seem trivial. However this choice can have great cognitive significance. If I were to pronounce kwé as ké, would a native speaker tell me that I pronounced a sound wrong (the first solution) or that I left a sound out (the second solution). Since my informants have been greatly influenced by Standard Igbo Orthography (as well as by English) such experimentation was infeasible.
assertion, are we to know which of these criteria is more critical in the construction of a phonology? The problem is that we have no way to interrelate various possible complications in a phonological component. What we need to do is further design our decision-making evaluation metric in such a way as to reflect what is really happening in human language. I strongly believe we should turn our attention toward developing a set of criteria that in a more direct, perhaps more experimental, way can be used to verify the psychological reality of a given proposal. Thus Kiparsky (1968) states: 'what we really need is a window on the form of linguistic competence that is not obscured by factors like performance ...' (p. 174). He then concludes: "In linguistic change we have precisely such a window."

It is through the work of Kiparsky and others that justification for many of the notational conventions of generative phonology has been obtained. Linguistic change is one of the possible considerations open to the phonologist desiring psychological verification.

I am assuming a certain interpretation of the notion 'explanation' (or, if you will, 'explanatory adequacy'). To state that a certain solution is superior to another on the basis of simplicity can be explanatory, if and only if the simplicity metric itself has been empirically justified. As an illustration, the failure of Halle's principle of feature counting to define natural classes has led to markedness theory, which (at least in its current state) fails in just this sense to be explanatory. Let us take an example in French from Schane (1968b, see also 1968a).
Schane discloses two sources for [ã] in French. One derives this low back nasalized vowel from /An/ (capitalized vowels are [+tense]), as well as from underlying /ɛn/. These two sources are seen in the alternations (Schane's examples):

[peizã] 'male peasant'       [peizan] 'female peasant'
[žär] 'genus, kind'          [ženerik] 'generic'

In the discussion of these phenomena Schane is concerned about the non-uniqueness of phonological representations (what Lightner has termed 'lexical overlap'). In this regard he states that we do not know whether to derive [vâdr] 'to sell' from /vAndr/ or /vɛndr/. His concern is not unrelated to the problem of justification and explanation. A phonology that is explanatory (descriptively adequate) will permit only one solution per problem, and in so far as we have indeterminate cases, our phonological metatheory has not been amply well defined. To remedy this problem of non-uniqueness, Schane invokes the concept of 'markedness'. He proposes that in cases of non-unique phonological representation we choose the underlying segment that is 'least marked'. So, in accordance with the current theory of markedness which hypothesizes /A/ as less marked than /ɛ/, we recognize the underlying form /vAndr/, despite its orthography vendre and its historical derivation.

Schane's example provides us with a solution, however with its reliance on markedness it is explanatory only to the extent that the particular markedness convention which he uses is itself explanatory. Even within this framework, the proposed theory which Schane
uses does not solve all similar problems. In the same article, for example, Schane talks of a closely related problem: phonetic [ε] is derivable from both /IN/ and /EN/ as seen from the examples:

\[
\begin{align*}
\text{[div}\text{ê]} & \quad \text{'divine' (m.)} \\
\text{[fê]} & \quad \text{'end'} \\
\text{[sərê]} & \quad \text{'serene' (m.)}
\end{align*}
\]

\[
\begin{align*}
\text{[divin]} & \quad \text{'divine' (f.)} \\
\text{[finîr]} & \quad \text{'to finish'} \\
\text{[sərên]} & \quad \text{'serene' (f.)}
\end{align*}
\]

cf. [serenite]

\[
\begin{align*}
\text{[plê]} & \quad \text{'full' (m.)} \\
\text{[plenîn]} & \quad \text{'full' (f.)}
\end{align*}
\]

cf. [plenitüd]

Given these facts, how are we to decide what should be the underlying representation of scinder [sêde] 'to divide'? Having recourse to marking conventions, as they now stand, the underlying representation is unquestionably /sIInde/, since /I/ is less marked than /E/. A problem arises however when we try to account for certain dialects of French where the distinction between [ɛ] and [ã] has been lost. Thus we find:

\[
\begin{align*}
\text{'Standard French'} & \\
\text{[ã]} & \quad \text{'one' (m.)} \\
\text{[ûn]} & \quad \text{'one' (f.)} \\
\text{[brõ]} & \quad \text{'brown' (m.)} \\
\text{[brûn]} & \quad \text{'brown' (f.)}
\end{align*}
\]

\[
\begin{align*}
\text{'Parisian Dialects'} & \\
\text{[ê]} & \quad \text{'one' (m.)} \\
\text{[ûn]} & \quad \text{'one' (f.)} \\
\text{[brê]} & \quad \text{'brown' (m.)} \\
\text{[brûn]} & \quad \text{'brown' (f.)}
\end{align*}
\]

\[3\text{[û]} \text{is used to represent IPA [y], i.e. a high, front rounded vowel.}\]
In these latter dialects there is then no phonetic distinction between [brɛ] (spelled brun) 'brown' (m.) and [brɛ] (spelled brin) 'blade of grass'. As soon as we introduce this third possible source of [ɛ] our reliance on markedness falters. Chomsky and Halle state (1968) that there is no reason to designate /i/ as more or less marked than /u/, and since [ɛ] now is to be derived from /U/ (the normal source of [ʊ], see Schane, 1968a) as well as /I/, we have no principled way to arrive at a unique solution.

The conclusion is that no matter how nice one's analysis turns out to be, unless there is some empirical justification the possibility still remains that the analysis is a mere formalism without 'psychological reality'. From the Igbo and French examples it is clear that we must look for a 'window' which will help us determine those constraints in the metatheory permitting just the correct solutions. I would like to suggest that borrowing provides one such window. The remainder of this paper will be devoted to determining to just what extent 'foreign sound adaptation' can be utilized to justify phonological grammars. A specific case where Nupe, a Kwa language of Central Nigeria, borrowed from neighboring Yoruba and Hausa will exemplify the discussion to follow.

__________

Although a more concrete phonology might recognize /ʊ/ and therefore scinder would be uniquely marked as /sɪnde/, the possibility for non-uniqueness is still inherent in the Chomsky and Halle marking conventions.
2. Past Approaches

This paper attempts to view the phenomena of borrowing and of foreign sound perception in its broader sense in the light of generative phonology. Both of these processes will be treated as one. In my dealing with the borrowing phenomenon, I shall be interested only in those cases where the foreign material has been made to conform with the phonological properties of the interpreting language. Since I shall therefore be ignoring cases of what has been traditionally termed 'phonological import' (i.e. cases where the borrowing language has, in violation of its native phonology, adopted new sounds or sequences (see especially Haugen (1950)), we can view 'borrowing' as 'institutionalized foreign sound adaptation'. Similarly, I shall ignore cases where a particularly talented speaker of the interpreting language accurately perceives and reproduces foreign sounds in the process of foreign language acquisition. I shall be interested only in those cases where the forms resulting from both forms of contact (borrowing and foreign language learning) are possible lexical items in the first language. Those lexical items which would require the feature [+foreign], for example, will not be considered. The term 'lexicalization' (which I owe to Kalon Kelley) will be used to refer to how these borrowed forms will be represented in the lexicon.

One of the chief motivations for this study is derived from the following idealized possibility: if we have a theory of borrowing (encompassing the perception of foreign sounds in other
contact situations), then by analyzing the occurring borrowed forms and/or running the necessary tests on foreign sound perception, various aspects of the internalized phonology can be determined. This possibility rests on the proposition that the phonological properties of a language largely determine both the phonological shape and the phonetic realization of a lexicalized loan-word. Not all theorists have accepted this conception of borrowing, as we shall see. The question that I shall be foremost concerned with is: if a foreign word is totally assimilated, what determines its lexicalized shape?

The tacitly (or not so tacitly) assumed explanation that we find in the pre-structuralist literature, and the one we encounter in much of the structuralist literature as well, is generally designated as 'phonetic approximation'. The form this argument usually takes is that speakers of a language, in hearing a foreign sound, replaces that sound with the most closely related phonetic (or perhaps phonemic) unit in its inventory. Thus Hermann Paul writes:

> Um eine fremde Sprache exakt sprechen zu lernen, ist eine Einübung ganz neuer Bewegungsgefühle erforderlich. So lange diese nicht vorgenommen ist, wird der Sprechende immer mit denselben Bewegungsgefühlen operieren, mit denen er seine Muttersprache hervorbringt. Er wird daher in der Regel statt der fremden Laute die nächstverwandten seiner Muttersprache einsetzen und, wo er den Versuch macht Laute, die in derselben nicht vorkommen, zu erzeugen, wird er zunächst fehlgreifen. (p. 394)

According to this interpretation speakers of a language $L_1$ replace the sounds of a second language $L_2$ with those sounds closest to them in $L_1$. In this analysis, then, the nativization of foreign sounds
could and should be explained in terms of **physical phonetics**. The manner of nativization should be reflected in (and predictable from) the distinctive features and scalar values that make up the phonetic quality of the individual segments. A contrastive analysis of the occurring phones of L₁ and L₂ should then suffice in such a 'theory' to explain how (and demonstrate why) the phones of L₁ will be realized by speakers of L₂, and the phones of L₂ will be realized by speakers of L₁.

That this explanation is at the very least **inadequate** is seen from the following observations: a Frenchman attempting to render the English sound [θ] will typically realize his efforts as [s]; correspondingly, he will render English [ð] as [z]. This makes sense, according to the argument of phonetic approximation, since [s] is the closest sound French has to [θ], just as [z] in French most closely approximates English [ð]. In terms of phonetic features, the English sounds are [-strident], whereas the French counterparts (substitutes) are [+strident]. Presumably (accepting for these purposes the Chomsky-Halle feature system, 1968) these sounds will agree in all other phonetic feature specifications.⁵ This constitutes, then, a physical phonetic explanation of the assimilation of sounds from one language (English) into another (French).

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⁵It is true that phonetically there are further differences between [s] and [θ] in that the scalar values of certain similar features will differ, e.g. [s] is 'less anterior' than [θ].
However, as soon as we look at the way in which another language L₂ interprets the sounds of L₁, we run into theoretical difficulties. Speakers of Serbo-Croatian, for instance, will tend to realize [θ] as [t] (and not [s]), just as they substitute [d] (not [z]) for [ð]. Once again we can look at these facts as advocates of the theory of phonetic approximation. The English sounds in question differ from their Serbo-Croatian counterparts only in that the former are [+cont], while the latter are [−cont]. We conclude from this that the speakers of Serbo-Croatian replace [θ] and [ð] by those segments closest to them in their language—or do they?

The problem with this approach is that these phenomena cannot be explained in purely phonetic terms. If they could be, then we would expect that French be like Serbo-Croatian and substitute [t] and [d] for the English sounds; or that Serbo-Croatian be like French and substitute [s] and [z] for the English non-stridents, since both languages bring equivalent segments to the borrowing task. The only possible chance of salvaging such a theory of phonetic approximation is to claim that [θ] is 'equidistant' in some sense from both [s] and [t] (perhaps in that in both cases the substituted sound differs by only one phonetic feature: [strident] in the French example and [cont] in the case of Serbo-Croatian). But if this were the case then we would expect to find with respect to English [θ], equal numbers of Frenchmen substituting [t] and [s], and equal numbers of Serbo-Croatian speakers substituting [s] and [t]. This doesn't appear to be the case. Thus even if we assume (without
foundation) that [θ] is equidistant from [s] and [t], we still have to explain why one nation chose [s] and the other [t].

Instead of adhering to absolute phonetic criteria we often hear the notion 'phonetic approximation' closely tied in with the more intangible notion of Sprachgefühl. It appears more realistic to say that a language adopts that sound that is 'felt' to be closest to the prototype. Thus a Frenchman feels that English [θ] most closely resembles his own [s], while a speaker of Serbo-Croatian feels that [θ] most closely resembles his [t]. As soon as we accept this notion of Sprachgefühl we can no longer adhere to a physical phonetic interpretation of foreign sound assimilation. The unequivocal conclusion that we are led to is that foreign sound adaptation is mental in nature. The only way in which we can explain why a sound X from L₂ is realized as sound Y (and not as sound Z) in borrowing language L₁ is by having recourse to the phonological facts of L₁ and the

6 In this discussion I have ignored the possibility that [θ] and [Ø] are borrowed as such as a result of the manner in which these sounds are taught in the schools. European languages seem to present this difficulty of interference that often vitiates the otherwise automatic process of foreign sound reproduction (spelling presents still another problem of interference). Whether or not I am justified in dismissing this possibility of interference is a question that can be empirically investigated, I would think. However, I do find it significant at least that in one country (France) the teachers tell the students 'it's like our [s]', while in another (Yugoslavia), apparently, the students are told 'it's like our [t]'. If all we have is the behavior of pedagogues to go by, then there must be an explanation for their varying performances. Someone (and in turn something) has to be responsible for the observed divergences.
phonetic data of $L_1$. Differing phonological properties are then responsible (at least in part) for different nativization processes. The French and Serbo-Croatian example is far from being resolved. However, if it can be shown that there is no extra-linguistic interference (see footnote 6), then we must look into the individual phonologies (perhaps into the individual feature hierarchies?) for an explanation. But the explanation must be phonological.

This is precisely the change of emphasis that came about with the advent of structuralism (although it is by no means rare to hear one speak of phonetic approximation in cases where no other explanation presents itself). When the phoneme was introduced there was a reinterpretation of the data of borrowing. Bloomfield noted simply: 'In phonetic substitution the speakers replace the foreign sounds by the phonemes of their language' (p. 446). Foreign sounds are not reanalyzed as isolated phenomena, but instead fit into the phonological system (as opposed to the phonetic system) of the borrowing language.

That the notion of phonetic approximation was insufficient to phonemicists is evident in the statement of Haugen:

Neither the speaker himself nor the linguist who studies his behavior is always certain as to just what sound in his native tongue is most nearly related to the model. Only a complete analysis of the sound system and the sequences in which sounds appear could give us grounds for predicting
which sounds a speaker would be likely to substitute in each given case. \((p. \ 215)\)

The example given by Haugen is that the Yaqui Indians reproduce Spanish \textit{estufa} 'stove' as [eht\textipa{\textta}p\textipa{\textta}] thereby substituting [h] for [s] because the normal 'allophone' of /s/ before /t/ and /k/ is [h].\(^7\)

(He doesn't discuss the f/p discrepancy.) Thus as the work of Weinreich best illustrates (1953, 1957), the allophonic distribution of the phonemes in \(L_1\) will greatly influence the manner in which the

\[s \rightarrow \text{h/} \rightarrow \text{(c)} \rightarrow \text{(h)}\]

and furthermore that in some dialects this postvocalic [h] drops out completely. Thus to consider certain English loanwords in Panamanian Spanish:

\begin{itemize}
  \item Eng. \textit{astronaut} \rightarrow P.Sp. \textit{ahtronuta/a:tronauta}
  \item Eng. \textit{Chase-Manhattan} \rightarrow P.Sp. \textit{čehmayxát\textipa{\textta}n/če:mayxát\textipa{\textta}n}
  \item Eng. \textit{Astoria} \rightarrow P.Sp. \textit{a:toría}
\end{itemize}

Whether or not the Spanish spoken in Yaqui territory (Arizona and Northern Mexico) contains such a rule is uncertain to me, although I will assume that Haugen was aware of this possibility and that it doesn't contain such a rule. In any case, the argument still remains that a presented [st] or [sk] will turn up [ht] and [hk], respectively, in Yaqui, and the reality of the process can at least be seen in the Spanish examples above.
borrowed sounds of $L_2$ are 'phonemicized', and he makes an attempt to classify the possible types of rephonemicization (overdifferentiation, underdifferentiation, etc.). Polivanov, a Prague functionalist, sums up the phonological relevance to borrowing:

> En entendant un mot inconnu étranger ... nous tâchons d'y retrouver un complexe de nos représentations phonologiques, de le décomposer en des phonèmes propres à notre langue maternelle, et même en conformité de nos lois de groupement des phonèmes. (p. 80)

With this information available and with the Yaqui example in mind, Haugen should have been led to postulate that sounds are borrowed on the basis of phonemic approximation; that is, a language first finds the closest phoneme that encompasses the phonetic quality of the foreign sound, and then this foreign sound is appropriately phonemicized and subject to the phonological constraints of that phoneme's members. With this type of analysis of borrowing, Haugen could have more readily accounted for the Yaqui example in the following manner (instead of making it appear so exceptional): 1) the perceived [s] is an allophone of /s/ in Yaqui; 2) it is therefore phonemicized as /s/; 3) now that the Spanish [s] is Yaqui /s/ it is subject to the phonological rules of Yaqui and will be realized as [h] before /t/ and /k/, as in native words. Thus the lexicalized form of Spanish estufa is /estúpa/ with a phonetic realization of [ehtúpa]. This would account for why [h] was used, when I assume there was some other element appearing in that context that would have more closely approximated [s] phonetically.
3. A Hypothesis

In the foregoing discussion we dismissed the inadequate theory of phonetic approximation. It was shown that the analysis of borrowing can be fruitful only if the phonological properties of the borrowing language are taken into account. One of the few structuralists to fully recognize the significance of foreign sound perception, its phonological nature, and its role in demonstrating the reality of linguistic descriptions was Harris (1954), who wrote:

Clearly, certain behaviors of the speakers indicate perception along the lines of the distributional structure, for example, the fact that while people imitate nonlinguistic or foreign-language sounds, they repeat utterances of their own language (i.e. they reproduce the utterance by substituting, for the sounds they heard, the particular corresponding variants which they habitually pronounce . . . . There are also evidences of perception of sounds in terms of their morphophonemic memberships. (pp. 36-37)

The next question to be resolved is whether taxonomic phonemics can provide us with all of the phonological information necessary to account for lexicalization. I shall now present in the remaining sections evidence from Nupe to support my contention that it is only through the apparatus provided by generative phonology that the facts of lexicalization can be truly accounted for.

In the preceding section we rejected the impoverished theory of phonetic approximation in favor of what we termed 'phonemic approximation'. Since others working within the framework of generative phonology (esp. Halle, 1962; Chomsky, 1964; Postal, 1968) have shown the inadequacies of phonemic analysis it is not surprising to find that where the phonological processes of a language escape a
general explanation within the phonemic approach, the facts of lexicalization are also not readily explained. Let us consider a sample case. In Nupe the distribution of stridents is virtually unmanageable by phonemic theory. A rule of strident palatalization derives the appropriate 'allophones' before front vowels as shown in the rule (SR):

\[
\begin{align*}
1. & \quad \left[ \begin{array}{c}
s \\
\hat{z} \\
\hat{t}s \\
d \hat{z}
\end{array} \right] \rightarrow \left[ \begin{array}{c}
s \\
\hat{c} \\
\hat{c}
\end{array} \right] / \{i, e\} \\
\end{align*}
\]

That is, phonemic /sI/ 'to buy' is realized as [sI] (actually, it is further palatalized by a more general palatalization rule (PR) to become [sYI], though I shall ignore this detail when it is not relevant to the discussion; see footnote 9). The remaining three stridents act accordingly. As expected we obtain the dental series before /u/ and /o/. The problem is that before /a/ we obtain both the dental series and the palatal series as seen in the examples:

\[
\begin{align*}
2. & \quad [\text{c\text{\text{\'a}}} ] 'to begin' \\
& \quad [\text{ts\text{\text{\'a}}} ] 'to choose'
\end{align*}
\]

9Actually [cY\text{\text{\text{\text{'}}}a}] would be more accurate phonetically and is crucial for phonological reasons. Whenever the predictable labialization or palatalization from LR/PR (see 25) is not crucial to the example, the unassimilated consonant will be given.

Three discrete level tones are recognized for Nupe: /å/ 'high', /\text{\text{\text{\text{'}}}a}/ 'mid' and /â/ 'low'. These are realized identically in the surface phonetics, except for the rising tone [\text{\text{\text{\text{'}}}a}] to be dealt with below. Falling tones [å] also occur. On the other hand, the Hausa 'high' and 'low' tones are realized differently phonetically (in a complex system of terrace level tonemetics) and this accounts for many of the discrepancies between the Hausa and Nupe tones in borrowing. In the cited Hausa and Yoruba forms, the phonological tones are given.
Since we have contrastive pairs such as the above, we are forced within the phonemic approach to recognize eight phonemes: /s/, /z/, /ts/, /dz/, /h/, /ž/, /c/, and /ʃ/. This position is speciously supported by the process of reduplication which is represented by the rule (RED):

\[
3. \quad \text{RED} + C_1 \begin{bmatrix}
+\text{high} \\
+\text{round} \\
+\text{back} \\
\text{MID}
\end{bmatrix} / \quad C_1 \begin{bmatrix}
+\text{round} \\
+\text{round}
\end{bmatrix}
\]

where \( C_1 = C_1 \)

That is, the reduplicated vowel is either /i/ or /u/, depending on the roundness of the stem vowel and the reduplicated syllable receives MID tone. This rule is summarized by the following reduplicated forms:

4. /gǐ/ 'to eat' \( \rightarrow \) [gǐgǐ] 'eating'
   /gē/ 'to be good' \( \rightarrow \) [gǐgē] 'being good'
   /gū/ 'to puncture' \( \rightarrow \) [gūgū] 'puncturing'
   /gə/ 'to receive' \( \rightarrow \) [gūgə] 'receiving'

By this rule the normal reduplicated form for a verb of the structure /Ca/ would therefore be [CīCā]. The question is: what happens in the case of the above stridents? Is the reduplicated form of /tsə/ 'to choose' going to be [tsītsə] or [čītsə]? It turns out that the former is the case. Since we derive [čiCā] 'beginning' from /čə/ 'to begin' we find [ts] and [č] contrasting also before /i/. For this reason, according to the phonemicist's approach, we have another
argument for recognizing an underlying dental series and an under­
lying palatal series of stridents. Similar to the example just given
we find that /sá/ 'to cut' reduplicates as [sisá]. Since /sí/ re-
duplicates as [šiši], both /s/ and /š/ must be posited in a phonemic
inventory.

Turning now to the problem of lexicalization, how should we expect the sequence [si] to be assimilated into Nupe? We have
just recognized above (assuming the phonemic analysis just proposed)
both a phoneme /s/ and a phoneme /š/. On the basis of phonemic ap-
proximation (and phonetic approximation as well) we would predict
that a foreign sequence [si] will be analyzed as [si] in Nupe. This
does not however turn out to be so. The normal (apparently excep-
tionless) nativized version of foreign [si] is [ši] (or, once again,
more accurately: [šíší]). Thus we observe the manner in which Yoruba
'sixpence' (which Yoruba borrowed from the English word 'six') comes
into Nupe:

5. Yoruba sisí + Nupe šíší

A Nupe who speaks Yoruba (or any other appropriate language) with a
Nupe accent will reproduce the [si] sequences of that language as
[ši] and the [se] sequences as [še]. Yet the sequence [si] appears
In Nupe as in the form [sísá] 'cutting'. Thus the theory of phonemic approximation is equally invalid.\textsuperscript{10}

In the references cited above, the autonomous phoneme was shown to be a highly questionable unit. In these writings it is dismissed in favor of a more abstract 'morphophoneme' or 'systematic phoneme' which by means of phonological rules is mapped into the phonetic forms of the language. Is it then to be expected that lexicalization takes place on the level of 'systematic phonemic approximation' or by some other related process? At this point I would like to propose, as a natural tendency, the following hypothesis:

6. FOREIGN SOUNDS ARE PERCEIVED IN TERMS OF UNDERLYING FORMS.

As such, they are subject to the phonological constraints of the system—unless the foreign word is to be singled out as an exception (i.e. [+foreign]) and not subject to these constraints. (It is interesting to note that in Nupe most borrowed forms are reinterpreted as non-exceptional Nupe formatives.) Thus a candidate for 'new lexical item' 1) satisfies the MSC's of that language; and 2) has a surface phonetic manifestation that is in accord with the phonological rules of the language.

\textsuperscript{10}Some might argue that this observation is only natural because [si] occurs only in RED in Nupe. However anyone who tries to use this as a counterargument is in agreement with my position—which is: in order to tell what the lexicalized form will be, we must refer to the borrowing language's phonological properties, and not to its speakers phonetic habits. A Nupe can pronounce [si], but only under certain phonological conditions. A phonetic or phonemic analysis fails to perceive this.
Thus if we take a second look at the strident situation in Nupe as proposed in Hyman (1970, forthcoming), all cases of palatal stridents + [a] (e.g. [ĉà]) are reanalyzed as dental stridents + /ɛ/ (e.g. /tsɛ/). That is, we propose an abstract entity /ɛ/ that is however realized phonetically as [a] after it has allowed /s/, for example, to palatalize (by means of SR) to [ʃ], and then further palatalize (by means of PR) to [ʃ̪]. Similarly, /tsɛ/ 'to choose' is realized as [ĉɔ] (or [ĉ̪ɔ] in more detailed phonetics), and so forth. By recognizing /ɛ/ (and there are other arguments) we are able to account for all palatal stridents as derived from the underlying dental series. Reduplication also represents no problem for generative phonology, since in order to obtain the form [tsîtsâ] 'choosing' or the form [sîsâ] 'cutting' we have only to order the strident rule (SR) before RED. Reduplication will then create new sequences of dental strident + [i], but the strident rule will no longer be operative. The complete derivations for 'beginning' and 'choosing' will therefore look something like:

7. /tsɛ/ → ĉɛ → ĉîcɛ → ĉ̪ic̪ɛ → [ĉ̪ic̪a]
   SR    RED    PR    ɛ+a

/tsà/ → tsà → tsîtsà → [ts̪itsà]
   SR    RED    PR

It is only by recognizing a deeper level than the autonomous phonemic level and by conceptualizing the phonological component as a system of rules relating abstract underlying forms to
surface phonetic realizations that borrowing can be coherently handled. Thus, to return to our example (of which there are many more), in the case of Yoruba [sisi] we hypothesize that the Nupes interpret this foreign word as an underlying form—that is, as /sisi/, and then all of the phonological rules are applicable. In other words, a word or formative when borrowed becomes part of the lexicon with a phonological representation which is subject to the morpheme structure conditions and then all of the phonological rules. These new words then consist of phonological strings which are composed of underlying phonological segments already in the language, and not new phonological segments or segments which may be closer to the phonetic output in all cases. (Note how important it is for lexicalization that these two levels, the systematic phonemic and the systematic phonetic, be expressed in the same terms.) Since Yoruba 'sixpence' is 'inserted' into the **lexicon** (i.e. is lexicalized) at the point where the morpheme structure conditions are in effect and the phonological rules are about to apply, /sisi/ is 'created' early enough to undergo the strident rule. Any other theory would fail to account for this fact. For it is only by recognizing a set of ordered rules that this analysis is possible.

Having demonstrated 1) the phonological nature of foreign sound adaptation; and 2) the necessity of recognizing an independent level of abstract phonological representations and an ordered set of P-rules relating these abstractions to their concrete phonetic realizations, we can now demonstrate the relevance of lexicalization to
the justification of the phonological systems we construct. The 'psychological reality' of the properties postulated in a given phonology is demonstrated in two ways in lexicalization: first, certain morpheme structure conditions and phonological rules are shown to be productive in the process; second, certain rules are shown to interfere with the exact rendering of foreign material. We shall consider both kinds of evidence in the following discussion.

4. Rule Productivity

Although the concept of rule productivity has been in the literature for quite some time, it has not been adequately treated with respect to the borrowing situation. If we return to Haugen's Yaqui example, where the Spanish word estufa was lexicalized with a phonetic realization [ehtúpa], we find that the reason for this s/h discrepancy is the presence of a rule in Yaqui of the form:

\[ s \rightarrow h / \text{t} \mid k \]

whereby underlying /s/ is realized as phonetic [h] before /t/ and /k/. Thus the reality of this rule is attested to by the shape of incoming loan-words. An equivalent verification of the reality of a rule can often be obtained by an analysis of what constitutes a 'foreign accent'. As we see in 9,

\[ 9. \text{French [møsyø]} \rightarrow \text{American [møøø]} \]
\[ \text{Spanish [grasyas]} \rightarrow \text{American [graʃøs]} \]

American English speakers, unless they are instructed or are perceptive, will have a tendency to reproduce French [møsyø] as [møøø] and Spanish [grasyas] as [graʃøs] because there is a rule in American
English that realizes sequences of /s/ + /y/ as [ș]. Thus we say [ışuw] and not *[iṣuyuw] and for many Americans the phrase 'I miss you' is realized as [aymışuw].

Every morpheme structure condition and phonological rule that I have found necessary to postulate in my work on Nupe, a Kwa language of Central Nigeria, can readily be shown to be productive through borrowed forms. Thus, if we look at 10,

10. MSC: A Nupe morpheme is typically (V)CV.CV we find that because of the strict CVCV nature of the Nupe morpheme, the language must somehow deal with the numerous CC clusters in the Hausa words it has borrowed. Epenthetic vowels are created to break up the unacceptable consonant clusters. These facts are represented in 11,

11. \( \emptyset + i /C__C \)
   \( \emptyset + u /C__+[+labial] \)
   \( \emptyset + a /C__+[h] \)

and exemplified in 12,

12. Hausa gâskî:yá: + Nupe gàšîkîyă 'truth'
    Hausa fûskâ + Nupe fûshîkà 'face'
    Hausa kârkô: + Nupe kàšîkô 'to last'
    Hausa kâskô: + Nupe kàšîkô 'shallow pot'
    Hausa mûlki + Nupe múlíkî 'authority'

---

11. This formula ignores syllabic nasals, which possibly have a NV source (and are not too frequent). The initial vowel prefix, when occurring, is obligatorily /e/ before monosyllabic CV roots; otherwise it can also be /a/.
An epenthetic /i/ breaks up two consonants, unless the second is a labial consonant, in which case /u/ occurs. Also, if the second consonant is /h/, the epenthetic vowel is normally /a/. The fact that we find epenthetic vowels being created in the lexicalized forms can only be explained by the reality of the morpheme structure condition of 10. That is, it cannot be explained at the phonetic level for the following reasons.

First, if the process is phonetic in nature (i.e. if we assume that the Hausa words are lexicalized with consonant clusters and a P-rule inserts epenthetic vowels) then there is no explanation why we obtain [u] before labial consonants and [a] before /h/.

Sequences of [i] followed by [p], [b], [m] and [h] are seen in the following reduplicated forms:

13. /p'yâ/ 'to dodge' → [pîp'yâ] 'dodging'
/bâ/ 'to be sour' → [bîbâ] 'being sour'
/mî/ 'to mould' → [mîmî] 'moulding'
/hâ/ 'to be hanging' → [hîhâ] 'being hanging'

12 Many of these and other words have Arabic equivalents. This is because Hausa (but not Nupe) borrowed these very words directly from Arabic. The choice of vowels and tones demonstrates that these words had to be borrowed from Hausa.
If we attempted to explain the observed epenthetic vowels by reference to the phonetic form of occurring Nupe words, we would overlook the generalization that on the systematic phonemic level there are no sequences of /i/ followed by /p/, /b/, /m/, /w/ or /h/. Instead, two MSC's enumerate the possible sequences in Nupe:

\[
\begin{align*}
14. & \ a) \ [+\text{high}] \ (h) \ [+\text{labial}] & b) \ V \ h \ a \\
    & \downarrow \quad \quad \quad \downarrow \\
    & \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad 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The i-insertion must also precede a tone rule (see Isaac George, this volume) which I represent informally as:

15. \(\text{[HIGH TONE]} \rightarrow \text{[RIISING TONE]/[LOW TONE][+voice]} \)
\(\text{v} \quad \text{C}\)

Thus, to illustrate, we find the following:

16. \(/\text{èdè}/ \) 'cloth' \(\rightarrow \) \([\text{èdè}]\)
\(/\text{kùlè}/ \) 'bell' \(\rightarrow \) \([\text{kùlè}]\)

**BUT:** \(/\text{èkò}/ \) 'road' \(\rightarrow \) \([\text{èkò}]\)

In the form for 'onion' [àlùbāsà] from Hausa àlbāsà we note that the high tone of Hausa has been transformed, in accordance with the tone rule just presented, into a rising tone. Other examples are numerous:

17. Hausa ànu:yà \(\rightarrow\) Nupe ànüyä 'determination'
   Hausa dàbá:rà \(\rightarrow\) Nupe dàbärä 'skill'
   Hausa dìlå:Ìì \(\rightarrow\) Nupe dìlåli 'agent, broker'
   Hausa tālå:tà \(\rightarrow\) Nupe tālātā 'Tuesday'
   Hausa mûrâ:di \(\rightarrow\) Nupe mûrädî 'desire'

Given, then, the productivity of this tone rule on new forms coming into the language, let us take a second look at the word for 'blessing':

18. Hausa àlbärkà \(\rightarrow\) Nupe àlùbärìkà

Notice from the examples in 12 that the tone of the syllable created by epenthesis is a copy of the phonological tone (with few exceptions) of the preceding syllable. If it is the case that epenthesis is introduced by a P-rule, then the newly created syllable should copy
the phonetic tone of the preceding syllable and not the phonological tone, as here is the case. Given the suggestion that the borrowed forms have been lexicalized in keeping with the MSC's of Nupe, the phonetic tone realizations can be easily explained. The underlying form for 'blessing' is /alèbùríkà/ and the tone rule changes the first high tone to a rising tone. In order to account for the tone on the newly created epenthetic vowel, we must postulate that tone is assigned prior to this tone rule. Thus we have one more rule that must follow epenthesisation.

We have thus seen through borrowing the productivity of three morpheme structure conditions (represented in 10 and 14.a, b) and the tone rule represented in 15. It is important to bear in mind, however, that although I make constant reference to attested borrowed forms, all of the processes illustrated are still productive and are observable in situations where Nupes speak a foreign language with a 'Nupe accent'. Thus it is not the case that a handful of borrowed words suffice in themselves to motivate the claims made in this paper, but rather these borrowed cases should be seen as an institutionalized reflex of a more general on-going process, that of perceiving and reproducing foreign sounds and sequences. In other words, both the borrowed words which have been lexicalized and have become part of the Nupe language, and the way Nupes 'repeat' non-Nupe words provide verification of the reality of both the morpheme structure conditions and the phonological rules in a grammar.
As a final illustration of the reality of phonological rules, let us recapitulate the argument put forth in Hyman (forthcoming, 1970). In that discussion /ɔ/ and /ɛ/ were justified on a number of grounds, despite the fact that neither occurs phonetically in the language. After /ɔ/ has labialized the consonant that precedes it, in accordance with the general labialization rule (LR) of Nupe, and after /ɛ/ has palatalized the preceding consonant in accordance with SR and PR (the latter of which collapses with LR to form a general assimilation rule, LR/PR, see 26), /ɔ/ and /ɛ/ merge with /a/ as they surface as [a], by the 'absolute neutralization' (AN) rule:

19. [+low] \[\rightarrow [\text{+back}] \]

Thus, to consider three verbs whose underlying vowels contrast, but whose surface vowels are realized identically, we see the following derivations:

20. /tsɔ/ → ts\[\breve{w}ɔ\] → [ts\[\breve{w}a\]] 'to watch'
/tsɛ/ → čɛ → č\[\breve{v}ɛ\] → [č\[\breve{v}a\]] 'to begin'
/tsa/ → [tsa] 'to choose'

SR LR/PR AN

It is because of the absolute neutralization rule (AN), according to my claim, that when Nupes speak Yoruba (which has [ɔ] and [ɛ]), with a Nupe accent, they replace [Co] with [C\[\breve{w}a\]] and [Cɛ] with [C\[\breve{v}a\]]. It is thus as a result of this process that numerous consistent loan-words can be cited in their lexicalized form:
21. Yoruba kèkè + Nupe k'ak'ā 'bicycle'
   Yoruba ègbè + Nupe ègb'ā (Yoruba town)
   Yoruba tżrē + Nupe t'ar'ā 'to give a gift'
   Yoruba kōbɔ + Nupe k'āb'ā 'penny'

Thus, according to this argument, not only are SR, PR and LR productive in lexicalization, but so is AN.

5. Rule Interference

In the Haugen example, the American English example and the Nupe examples in 5, 12, 17 and 21, we found that the phonetic shape of the foreign sound was identical to the distinctive feature content of the underlying form in the borrowing language. Thus in 5 Yoruba phonetic [sisi] is identical to Nupe underlying /sisiphoneological rules of the interpreting language. An important question one might raise is: what happens if the borrowed sound is identical not to an underlying segment in the borrowing language, but to a derived one? In 22,

22. Hausa álwă:ši + Nupe álùwăši 'boasting'
    Hausa fū:ši + Nupe fūši 'anger'
    Hausa múnă:fúnci + Nupe mánàfúnci 'hypocrisy'
    Hausa mágà:jí + Nupe mágà:jí 'heir'

remembering from 1 that these palatals are derived from dentals, we see that when these segments occur where they occur phonetically in Nupe, they are realized identically, and we can assume, are lexicalized with the appropriate underlying representations, seen in 23:
23. /alùwāsi/ 'boasting'
   /fūsī/ 'anger'
   /mânāfītsī/ 'hypocrisy'
   /mágàdžī/ 'heir'

Consider, however, the examples in 24.

24. Hausa šù:gàbá + Nupe šìgàbà 'leader'
    Hausa Jùmmà?à + Nupe Jìmà 'Friday'

where the segments [s] and [ʃ] occur in Hausa in environments where they wouldn't be found in Nupe. Since the forms of 25

25. *sùgàbà *dzùmà

are possible Nupe words, one must ask why the consonant remained as in Hausa with the vowel altered, rather than the vowel remaining with the consonant altered, as in 25. It must mean that the palatalization of the initial sound has caused the Nupe speaker to perceive the vowel [u] as [i], the corresponding front vowel that would make palatalization possible. Nupe possesses two assimilation rules. The first, SR, was presented in 1. The second is a more general assimilation rule, taking the form:

26. [+cons]  \[\text{+high round}\] / \[\text{round back}\]

Thus this rule (LR/PR) expresses the following information:

27. /gì/  \[g'ì\] 'to eat'
    /gë/  \[g'ë\] 'to be good'
Similar to the manner in which Hausa 'leader' comes into Nupe is the treatment of the exceptional Nupe word [gʷəgi] 'fifteen'. Since this isolated word must be marked as an exception to the phonological rules of Nupe, it is equivalent to a foreign word that would have to be marked [+foreign], as say, the native Hausa pronunciation of 'leader' with initial [šu] would be, were it to come into Nupe as such. Neither exception is tolerated in Nupe. The exceptional word for 'fifteen' derives from a compound consisting of [gʷəwō] 'ten' plus another morpheme ending in [egi], which for some reason we cannot recover. Note that this morpheme also has an alternate in free variation:

28. [gʷəgĩ] → [gʷəgĩ]

We would thus represent the regularized variant as /gōgi/ and the labialization would be automatically obtained from LR. Just as Hausa šù:gåbá is not in keeping with SR (and PR), the exceptional Nupe word for 'fifteen' is an exception to LR. In both cases we find that the vowel changes to agree with the preceding non-vowel. The
exceptional form \([g'\text{\textasciitilde}g'i]\) is not regularized as \(*[g'\text{\textasciitilde}g'i]\). Instead it is the labialization that apparently causes the \([e]\) to be perceived as \([o]\). Corresponding to the data of 'leader' and 'fifteen', then, if a Nupe were to say the Hausa word \(\text{\`a}k'\text{\textasciitilde}i:y\`a\) 'goat' with a Nupe accent (or, equivalently, borrow and lexicalize it), one can predict that it would come out as underlying /\text{\`a}k\`u\text{\textasciitilde}y\`a/ with a phonetic realization of \([\text{\`a}k\`u\text{\textasciitilde}y\`a]\). Thus the labialization of the preceding consonant causes the following \([i]\) to be realized as \([u]\), just as the palatalization in the case of 'leader' caused the \([u]\) to be realized as \([i]\). Just as we do not encounter the form \(*[s\text{\textasciitilde}g\text{\textasciitilde}b\text{\textasciitilde}a]\), we should not expect to find \(*[\text{\`a}k\`i:y\`a]. In both cases the vowel changes to agree with the preceding labialized or palatalized consonant, and not vice-versa.

The question immediately poses itself: if the correct form of the palatalization and labialization rule is as stated above in 26, where the consonants are assimilated to the vowels, then why is it that in borrowing and in 'Nupe accents' vowels assimilate to consonants? That is, why do we obtain just the reverse of the process that we postulate? Should the assimilation rules be stated differently, or is there some simple way of accounting for this discrepancy?

Before answering this question, let us consider the question of glides in Nupe, as part of a general process of assimilation in the language. We find the following near-complementary distribution:
29. yi  wu
   ye  wo

\[
\begin{array}{c}
hz/ \rightarrow \text{ya} \rightarrow \text{wa} < \\
\end{array}
\]

We do not obtain any of the following:

30. *yi  *yu
    *we  *yo

It appears from these data that in [-low] vowels an archisegment /G/ can be used to represent lexical entries. Thus,

31. /ēG If/ \rightarrow [ēyI] 'sun'
    /ēGē/ \rightarrow [ēyē] 'eye'
    /ēGù/ \rightarrow [ēwù] 'perfume'
    /ēGó/ \rightarrow [ēwó] 'money'

In each case the glide would be spelled out according to the rule:

32. \[
\begin{array}{c}
[\text{-voc}] \rightarrow [\text{round}] \\
[\text{-cons}] \rightarrow [\text{back}] \\
[\text{low}] \\
\end{array}
\]

We would still, however, need to posit /w/ and /y/ to account for: [ēwā] 'snake' and [ēyā] 'canoe', which of course constitute a minimal pair. In order to extend this glide-spelling rule to cover [+low] vowels, we recognize the following phonological sequences:

33. yi  wu
   ye  wo
   ye  wo

Since [h] is obtained only before [a] we are able to complete the system by the addition of /ha/. Thus /h/ can be assumed to be the
only underlying glide and [w] and [y] are derived in the appropriate environments by the glide-spelling (GS) rule as in 34:

34. \[ h \rightarrow [\text{\textalpha round}] / [\text{\textalpha back}] \]

This rule may ultimately be collapsed with LR/PR (cf. 26).

From 34 we observe that /hɔ/ underlies [wa] and /hɛ/ underlies [ya]. The arguments for these underlying forms are similar to those presented in my justification of /Cɔ/ and /Cɛ/ in 'How Concrete is Phonology?' First, with reference to the process of reduplication outlined in 3 and 4, we note that the reduplicated form of /wá/ 'to want' is [wuwa] 'wanting' and not *[wivá], as expected. If the underlying form is /hɔ/ and not /wá/, as just assumed, then we can easily explain the appearance of [u] in reduplication where we would expect [i]:

35. /hɔ/ \rightarrow wɔ \rightarrow wūwɔ \rightarrow [wuwa]

GS RED AN

Unless we recognize this underlying form, we will have to postulate a corrective rule to apply after RED, of the form:

36. i \rightarrow u / w

This rule would be unnecessarily redundant and unexplanatory, since it is as a result of the MSC's that no occurrences of [wi] (or [we]) ever occur in the language (two exceptions are noted below).

The second argument is one of borrowing and lexicalization. The glide-spelling rule is productive in this process in exactly the same sense as the other rules we have dealt with. Thus (though such
borrowed words are few) we find:

37. Hausa ƙallahi → Nupe wɔlai 'by God'

    Hausa ḥujja → Nupe wujua 'excuse'

In 'by God', [h] has become [y] before [i], and in 'excuse' [h] has become [w] before [u]. The glide-spelling rule is probably also responsible for 38.

38. Hausa mala:qika → Nupe mala:yika 'angel'

where we find glottal stop replaced by [y] before [i]. Although [?] is phonetically closest to [h], we obtain the form for 'angel' as entered above. (Sequences of [hi] do exist in Nupe as noted above.)

In a related process, as a result of the non-occurrence of initial vowels except /e/ (and more rarely /a/), we observe:

39. Hausa iri → Nupe yiri 'kind, species'

    Hausa i:kọ → Nupe yikọ 'power'

    Hausa ƙigiyà → Nupe yigiyà 'skein of thread'

Again, it is [y] that is obtained before [i].

One fact about the glide-spelling rule, as written, is that before /a/ we do not obtain [w] or [y]. Instead, in this position we find [h] exclusively. The non-occurrence of [w] and [y] before /a/ is apparently responsible for the obtained lexicalized form in:

40. Hausa na:dam → Nupe nəhäm 'yes' (in reply to a summons)

40 represents a recorded pronunciation (Banfield, 1914) of the Hausa word with a Nupe accent. Although /h/ and /a/ frequently conspire together (compare epenthesis in 12 above), when two /a/’s occur
together as in the above example, the glottal stop is often ignored. Thus the actual lexicalized form of Hausa [næʔam] among most speakers of Nupe, as well as other similar examples, is seen in 41:

41. Hausa næʔam → Nupe nã 'yes' (in reply to a summons)
Hausa báʔà → Nupe bâ 'defamation'
Hausa jàmáʔà → Nupe jàmá/jêmá 'crowd'

As a final example, Hausa contains two diphthongs which are represented as /ai/ and /au/. Some attested borrowed words are:

42. Hausa sai → Nupe sàyi 'until'
Hausa rai → Nupe ráyi 'life'
Hausa kái → Nupe káyi (exclamation of surprise)
cf. Yoruba nài → Nupe náyi 'ninepence'
Hausa bàutà: → Nupe bàwùtã 'slavery'

Thus at the morpheme structure level a glide /h/ is inserted to break up Hausa [ai] and [au]. The glide-spelling rule then derives [y] before [i] and [w] before [u].

There is one slight problem that we must keep in mind in dealing with these Hausa diphthongs: namely, that in many dialects of Hausa (apparently some from which other such words were borrowed into Nupe) they have become simple monophthongs, ai → e, au → o. Thus we note the following pattern:

Hausa sàràútã → Nupe sàròtã 'kingdom'
Hausa sàlá:mù àlàikù → Nupe sàlámù àlèkù 'greetings'
Hausa lámá → Nupe lèmá 'rank'
Hausa jàlá:láini → Nupe jìlìlènì 'book on Mohammedan law'
permitted in bisyllabic words, cf. Hausa *alla* + Nupe *ällö* and \[ ah\] will be realized as \[ aya \] or \[ eya \]. While I have not been able to test this out experimentally except on one subject (with positive results), and since such sequences are rare—if not nonexistent—in the languages from which Nupe has borrowed, we await empirical justification of these claims. It is clear, however, that such sequences would behave differently from \[ aha \], which comes into the language as such, or which simply becomes \[ a \], as in:

43. Hausa lâhầdî + Nupe lâdè 'Sunday'

From the above examples we see that the glide-spelling rule is productive in such cases. The question we are now faced with is: what about those cases where the GV sequence is itself borrowed? As in the case of derived assimilated consonants (see 22 and 23), if the GV sequence is a permissible one in Nupe, the Hausa word is lexicalized with an identical surface glide realization:

44. Hausa wûrī: + Nupe wûrî 'an open space'

Hausa wûyâ: + Nupe wûyâ 'difficulty'

Hausa mäsô:yî: + Nupe mäsôyî 'friend'

Hausa hár: + Nupe hârî 'until'

But when sequences such as \[ wi \], \[ we \], \[ yu \] and \[ yo \] occur, are they lexicalized with the glide assimilating to the vowel (as would be predicted from the glide-spelling rule), or with the vowel assimilating to the glide? In order to deal with this possibility, it is not necessary to deal with foreign words coming into Nupe. There are two irregular pronouns in Nupe that are exceptions to the general
restrictions on the distribution of [w] and [y]. These are: [wi̯] 'him' and [wɛ'] 'you'. Note however that they have 'regular' variants in free distribution: [wɨ̯] 'him' and [wɔ́] 'you'. The irregular forms of these two pronouns arose, most likely, from idiosyncratic historical developments operative on old forms such as *uNi 'him' and *uCe 'you'. Three processes are involved. In the form for 'him', the nasal consonant causes the subsequent vowel to become nasalized (a general rule of Nupe phonology). It (and the C in 'you') then drop and we are left with intermediate forms *ui and *ue. The final step is for /u/ to become [v] and hence to break the general phonetic distribution of glides. The regularized forms represent still a more recent change, which can perhaps be expected to thoroughly wipe out the older forms.

The importance of the foregoing is that LR/PR (26) and GS (34) would seem to predict that the vowel determines the preceding non-vowel, and not vice-versa. We would otherwise expect that the normalizing effect of the Systemzwang should be:

45. wi̯' + *yɨ̯'
wɛ' + *yɛ'

g'egi̯' + *g'egi
šugābá' + *šugābā

I have thus far been unable to discover a significant number of borrowed words violating the permissible Nupe GV sequences. One reason for this is that Hausa (with few exceptions) observes the same
pattern. One such borrowing does occur from Yoruba:

46. Yoruba ǎk̀wé + Nupe ǎkʷawù 'clerk'

Although the expected form is *[ǎkʷawō]* there are two possible sources of this discrepancy. The first is that the final vowel in the Yoruba word is often perceived as [i]. And second, there could have been contamination from the Hausa form (also borrowed from Yoruba): ǎkâ:wù:. However, we do not get forms such as *[ǎkʷaye]* or *[ǎkʷayí]*. All of these data then support the following general principle:

47. FOREIGN SEGMENTS EQUIVALENT TO NATIVE SEGMENTS DERIVED BY RULE ARE LEXICALIZED AS THE CORRESPONDING NATIVE UNDERLYING FORMS.

Then the phonological rules are applicative. By this process Hausa wúríː is lexicalized as /hûrī/ and then the [w] is recreated so-to-speak in the phonetic [wûrî]. In the Hausa word ñù: gàbá, however, [s] is a derived segment in Nupe. Since we have hypothesized that foreign sounds are perceived as underlying forms, a Nupe's natural tendency is to 'recreate' the underlying form that would have given us the derived [s]. The Nupe speaker perceives [s]. He 'reasons' that it must have satisfied the structural description of SR (see 1). But clearly the Hausa word violates this rule, since the incoming [s] would have then been derived in the context /___u/. In order to remedy this impulse toward positing underlying /s/ when [s] is heard, the [u] of 'leader' is modified to [ι] so that SR can appropriately apply to the then newly entered underlying representation: /sìgàbá/.

We therefore need a second part to the above principle:
48. WHEN A FOREIGN SEGMENT APPEARS IN AN ENVIRONMENT IN WHICH THE EQUIVALENT NATIVE DERIVED SEGMENT DOES NOT APPEAR, THEN THE FORM OF THE INCOMING FOREIGN WORD IS MODIFIED SO THAT THE STRUCTURAL DESCRIPTION OF THAT RULE IS MET AND THE SEGMENT IN QUESTION IS THEN DERIVED IN THE APPROPRIATE ENVIRONMENT.

Thus, for Nupe at least, given a rule of the form,

49. A → B / ___ C

if [BD] is borrowed, where [D] does not equal [C], then [D] is modified to [C] so that the structural description of this rule is met and [B] can be appropriately derived. Returning to the form for 'clerk' (see 46), then, [w] is recognized as a derived segment obtained through the glide-spelling rule. One can only suggest that the tendency of the Nupe speaker is to posit underlying /h/ wherever he hears [w]. But the relevant part of the glide-spelling rule that derives [w] says:

50. h → [+round] / ___ [+round]
    [+back]  [+back]

The [e] of Yoruba akọwé does not however permit us to represent this phonetic form as underlying /akọhè/, because by means of another part of the glide-spelling rule, which says,

51. h → [-round] / ___ [-round]
    [-back]  [-back]

the derived surface form would be *[akọwè]. In order to obtain [w] from underlying /h/ it is necessary to modify the environment in the incoming word so that it correctly satisfies the structural description of the glide-spelling rule. The final vowel is thereby altered. Thus the rule in question is shown by its interference to be real.
These principles have more general application in the language than is evident from the discussion thus far. For example, consider the related phenomena to be presented. The vowel systems of Hausa and Nupe are:

HAUSA

\[
\begin{array}{ccc}
\text{i:} & \text{i} & \text{u} \\
\text{ai} & \text{e:} & \text{o} \\
\text{a} & \\
\text{a:}
\end{array}
\]

NUPE

\[
\begin{array}{ccc}
\tilde{\text{i}} & \tilde{\text{u}} & \text{u} \\
\text{e} & \text{o} \\
\tilde{\text{a}} & \\
\text{a} \\
(a:)
\end{array}
\]

Short /a/ in Hausa is realized as [æ]. Thus its feature specifications will be phonetically:

\[
52. \begin{bmatrix}
-\text{low} \\
-\text{round} \\
+\text{back} \\
-\text{nasal}
\end{bmatrix}
\]

Similarly, Nupe nasalized /\tilde{a}/ is realized as [\text{\text{ê}}]. Its feature specifications will be:
53. | -low | -round | +back | +nasal |

Now note the 'normal' way (with few exceptions) for Hausa /a/ ([ə])
to be realized in Nupe:

54. Hausa dāgā  + Nupe dāgā  'from'
Hausa zārāfī:  + Nupe zārāfī 'wealth'
Hausa gādō:   + Nupe gādō   'bed'
Hausa gāfākā + Nupe gāfākā 'school bag'
Hausa ḥāfō:   + Nupe ƙafō    'horn'
Hausa kārkō:  + Nupe ƙālikō 'to last'
Hausa kābārī: + Nupe ƙābārī 'grave'

The most common way for Hausa [ə] to come into Nupe is thus as a
nasalized schwa [ɜ] (/ã/). Compare, however, the following:

55. Hausa wādārī:  + Nupe wōdārī   'length of cotton'
Hausa wāllā:hi  + Nupe wōlāyi    'by God'
Hausa wārkī:    + Nupe wōrikī    'loin-cloth'
Hausa wāsālī:   + Nupe wōsālī    'vowels in Arabic
script'
Hausa wāsikà:   + Nupe wōsikà    'letter'
Hausa wātākī:là + Nupe wōtakilà 'perhaps'
Hausa ālkā:wālī: + Nupe ălikawolì 'promise'
Hausa ămā:wālī: + Nupe ămawolì 'part of turban'
Hausa yābò:     + Nupe yèbò      'thankfulness'
Sequences of Hausa [wɔ] come into Nupe as [wo], despite the fact that there are numerous words of the shape [wɔ] in Nupe, as seen in:

56. [ewɔ] 'pregnancy'
[ewɔ] 'falsehood'
[ewɔ] 'lake'

A similar situation is observed in the case of labialized or palatalized consonants followed by schwa in Hausa:

57. Hausa kʷɔdáyì: + Nupe k'oːdárɪ 'covet' (/kodári/)
Hausa mák'abčí: + Nupe mák'óči 'neighbor' (/mákoçi/)
Hausa jámáʔa + Nupe jěn 'crowd'
Hausa jánábbà: + Nupe jénábá 'cleansing'
Hausa jàká: + Nupe jikà 'bag'
Hausa šágálí: + Nupe šegálí 'business affair'
Hausa jálá:láini + Nupe jilálëni 'book on Mohammedan law'
Hausa áljánnà + Nupe álìjënà 'Paradise'

Despite the fact that there are corresponding Nupe morphemes of the structure /CS/ and /CE/ we do not obtain in borrowed words their respective phonetic realizations [Cwɔ] and [Cyɔ]. The labialization or palatalization of the preceding consonant has blocked the otherwise productive assimilation of Hausa [ə] as Nupe [œ], just as the glide-spelling of [w] and [y] had influenced the perception of [ə] in 55. Why should this be?

14 In these three forms [i] is obtained from the Hausa environment /CV/ as a result of the de-emphasis of vowels in this position in Hausa.
The answer to this problem has to do with WHY we should obtain a nasalized schwa in 55 in the first place. As is seen in 58

58. \( \varepsilon \)

there are FOUR possibilities open for the nativization of foreign schwa in Nupe, each of which differs from schwa by one distinctive feature. Although nasalized schwa is obtained, most linguists I have asked felt that the 'closest' vowel to schwa among these four is \([a]\). Given the other examples and the principle cited in 48, we can explain the unexpected nasalized schwa. We obtain the nasalized schwa because of the presence of a rule of the form in 59

59. \( a + \varepsilon / [+nasal] \)

which raises underlying nasalized \( \tilde{a} / \) to \([\tilde{\varepsilon}]\). Looking at this rule as I have just represented it makes it clear that it is of the form in 49. A schwa is derived only in the environment of simultaneous

\[15\] This rule will ultimately collapse with the absolute neutralization rule (AN) in 19:

\[
\begin{bmatrix}
+\text{low} \\
<+\text{nasal}> \\
V
\end{bmatrix}
+ 
\begin{bmatrix}
+\text{back} \\
-\text{round} \\
<\text{-low}> \\
V
\end{bmatrix}
\]
nasalization. Therefore, when this derived vowel quality is heard from Hausa without the simultaneous nasalization, it is nasalized so that the structural description of the rule 59 is met and the schwa quality can be appropriately derived.

The reason why this process breaks down in the presence of glides, labialized or palatalized consonants is that since foreign sounds are treated in terms of underlying forms, the order of the rules affects their phonetic output. We have seen that the rule raising nasalized /a/ to a nasalized schwa is responsible for Hausa schwa coming in as nasalized schwa. However, the glide-spelling rule, labialization rule and palatalization rules all PRECEDE the nasal raising rule. Thus, when Hausa [wɔ] reaches the glide-spelling rule, by principle 48, the vowel must be changed to [+round] so that the glide-spelling rule appropriately derives the [w]. Therefore the schwa becomes [+round] or phonetically [o]. Since this has occurred, the schwa never gets far enough into the derivations to become nasalized. The examples in 54 come out nasalized for the sole reason that no rules in the phonology interfere with non-labialized and non-palatalized consonants. Therefore the effect of the low-level nasal raising rule is felt.

6. **Summary and Conclusion**

In this paper a phonological view of borrowing was supported and it was thus shown that in many respects the manner in which words are borrowed and lexicalized, or equivalently the way
people speak with foreign accents, provides justification for the conditions and rules we propose in a grammar. Three principles were proposed to account for the data of Nupe. Many of the suggestions as to how these processes occur, that is, how foreign items are perceived by speakers, are conjecture. Certain regularities were presented and the hypothesis made would appear to account for what actually occurs. The fact is that these are not random occurrences and until evidence is brought forth to show that these explanations are not plausible, they appear not only to account for the data, but to explain the data as well.

Several questions and problems remain, however. One is that we have no idea how universal these principles may turn out to be. Another is that many languages are for one reason or another prone to borrowing words as exceptions, and do not fully nativize them.

The role of borrowing in the justification of phonological grammars is much less in doubt: one of the criteria that should be considered as part of the metatheory is how foreign words are borrowed. Given this criterion, the transformations that occur between the source-word and the lexicalized-word substantiate the proposed morpheme structure conditions and phonological rules. In other words, the reality of these aspects of the phonology is attested to in just this way.
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THE DERIVATION OF IGBO VERB BASES

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O. The form of Igbo used in this study may be called "Compromise Igbo". In general, though naturally with some areal and individual differences, it reflects "Central" Igbo as spoken by those whose home dialects do not have aspirated consonants or nasalization. As such, it is an extremely widespread medium of inter-dialectal communication, and is the basis for written Igbo. Except for the added indication of tone here, the transcription is closely similar to the usual Igbo orthography. /'/' indicates a non-low tone; /'/' indicates low tone; /'/' indicates a "down-step" with the following syllable.

1.0. Inflectional affixes in the Igbo verbal system include a relatively few prefixes, suffixes, and morphemes of tone replacement. These affixes occur with a verb base, which may consist of one to three, or occasionally four or five, syllables. Representative inflectional affixes are illustrated in the following sub-sections.

1.1. Infinitive prefix; the allomorphs /i'/-/ and /i'-/ are conditioned by a pervasive pattern of vowel harmony:

<table>
<thead>
<tr>
<th>Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>i'zú</td>
<td>'to buy'</td>
</tr>
<tr>
<td>i'sí</td>
<td>'to cook'</td>
</tr>
<tr>
<td>i'méčí</td>
<td>'to close'</td>
</tr>
</tbody>
</table>
1.2. Verbal noun prefix; the allomorphs /a-/ and /e-/ are conditioned by vowel harmony; the tone of the prefix is conditioned by the tone of the verb base. The verbal noun is used in incomplete and future constructions; these are incomplete utterances, omitting an obligatory object:

\[\text{\textquoteleft he is buying\textquoteright} \]
\[\text{\textquoteleft he is cooking\textquoteright} \]
\[\text{\textquoteleft he will close\textquoteright} \]

1.3. Vowel suffix used in several constructions; the choice of the vowel is conditioned by the preceding vowel. With some monosyllabic bases and certain types of bi- and polysyllabic bases, this suffix has a zero allomorph; with some monosyllabic bases, an allomorph consisting of /r/ plus the last vowel of the base occurs. The tone of the suffix is non-low:

\[\text{\textquoteleft let\textquoteright}s buy\textquoteright} \]
\[\text{\textquoteleft let\textquoteright}s cook\textquoteright} \]
\[\text{\textquoteleft let\textquoteright}s close\textquoteright} \]

1.4. Compleitive suffix /-lá/, occurring only after the vowel suffix just described:

\[\text{\textquoteleft he has bought\textquoteright} \]
\[\text{\textquoteleft he has cooked\textquoteright} \]
\[\text{\textquoteleft he has closed\textquoteright} \]

1.5. Prefixed downstep, occurring in the compleitive construction as illustrated in the preceding section.

1.6. Low tone replacing stem tone, in the stative con-
struction. The stem itself may have low tone, in which case the low tone replacive has a zero effect. The stative is used only with a relatively few monosyllabic bases, which in general do not occur in the factative construction described below:

1.1. Low tone replacing stem tone, plus a suffix consisting of /r/ plus the preceding vowel, with low tone, marking the factative construction. The factative, roughly, refers to the past for verbs indicating action, but to the present for verbs describing a situation:

- ákwa’ 'it is cloth'
- n'èbè à 'it is here'
- àkpà 'he has a bag'

1.2. 'bù 'be identified as':
- ëgù àkwa’ 'it is cloth'
- dì n'èbé à 'it is here'
- åkpà 'he has a bag'

1.7. Low tone replacing stem tone, plus a suffix consisting of /r/ plus the preceding vowel, with low tone, marking the factative construction. The factative, roughly, refers to the past for verbs indicating action, but to the present for verbs describing a situation:

- zùrù 'he bought'
- siri 'he cooked'
- mèciri 'he closed'
- ìwàre 'he has'

2.0. Two and only two morphemes may occur in a verb form after the vowel suffix or the completive suffix (1.3, 4). The status of these appears to be different from that of the inflectional affixes described above, and yet they do not appear to belong to the verb base.

2.1. The first of these morphemes is /-kwá/, indicating an action in addition to an action previously mentioned. Although this morpheme may occur freely with probably any verb, it differs from the verbal inflectional affixes in that it may
also occur, usually in apocopated sentences, after nominals, with the meaning 'also'.

2.2. The second of these morphemes consists of /r/ plus the preceding vowel, with non-low tone. It indicates that the action is applied to or performed for an indirect object, which is normally animate. This morpheme differs from the inflectional affixes described above in that its occurrence is restricted to verbs indicating action, and it requires the use of an indirect object. This morpheme is not the same as the factative suffix (1.6); it may occur with the factative suffix, with certain morphophonemic alternations. The additive /-kwá/ and the applicative /-rú/ may both be used in one form, in that order. These two morphemes are here illustrated with the completive construction:

\[ \text{'zúálákwá ákwà} \quad \text{'he has also bought cloth'} \]
\[ \text{'zúálará 'ú ákwà} \quad \text{'he has bought cloth for me'} \]
\[ \text{'zúálákwárá 'ú ákwà} \quad \text{'he has also bought cloth for me'} \]

2.3. These two morphemes may also occur at the end of forms which have no suffix, including the infinitive. The fact that they occur after certain inflectional suffixes, however, suggests that they do not belong to the verb base; if they were interpreted as part of the verb base, it would be necessary to describe some inflectional affixes as appearing between component parts of the base. To these two morphemes, the label "verbal extensions", borrowed from Bantu grammarians, may conveniently be
applied. To be sure, in Bantu, unlike Igbo, verbal extensions do constitute part of the verb base. A striking similarity, on the other hand, is found in the usage and even the form of the Igbo and Bantu applicative extensions.

3.0. A verb base may now be defined, for Igbo, as that part of the infinitive which follows the infinitive prefix, excluding the additive and applicative extensions. Such verb bases may consist of one or more syllables. In bases of more than one syllable, the first is itself a verb root, which with very few exceptions occurs independently as a monosyllabic verb base. The few exceptions display no system; they appear to be merely a few sporadic cases of bound roots, appearing only in combination with other morphemes to form bases. It is the syllable or syllables after the first in a verb base which concern us.

Ida C. Ward's *An Introduction to the Ibo Language* was published in 1936. Miss Ward's field of specialization was phonetics. However, as she herself explicitly states, the study of tone inevitably led her farther into the field of grammar than she had anticipated. In her discussion of two-syllable verb bases (she cites a few three-syllable bases, but makes no statements about them), she distinguishes between what she calls "compound verbs" and "verbs with meaning suffixes". A "compound verb" is a base consisting of two verb roots, each of which occurs independently as a monosyllabic verb base. A "meaning suffix" is a morpheme which appears in second position in a two-
syllable verb base, but which does not occur independently as a monosyllabic verb base, yet which adds something to the meaning of the preceding root. She recognizes the possibility that what she calls "meaning suffixes" may be bound verb roots, or at least may originally have been verb roots; and she observes, rightly, that the distinction between the two formations is irrelevant to the grammar of Igbo in so far as she treats it. However, Miss Ward's remarkable intuition in matters of language analysis makes the question of the validity of her "meaning suffixes" as a separate class of morphemes well worth pursuing.

3.1. Some examples of two-syllable verb bases in which each syllable is attested as an independent verb root are given here. The tones of the resultant combinations may not be obvious in all cases, but they follow statable rules which are irrelevant to this discussion.

-ğá 'go', -fè 'cross, pass over': -ğafè 'go across'
-byá 'come', -fè (as above): -byáfè 'come across'
-kwà 'push', -cì 'be stopped up': -kwàcì 'push shut'
-mé 'do, make', -cì (as above): -mécì 'close, shut'
-mé 'do, make', -ghé 'be open': -méghé 'open'
-tí 'hit, beat', -wá 'split open': -tíwá 'shatter'
-wè 'take, pick up', -pù 'exit': -wépù 'take out'
-kwọ 'scoop up', -pù (as above): -kwọpù 'scoop out'
-wụ 'pour', -nyé 'give': -wụnyé 'pour in, on'
-tụ 'throw', -fù 'get lost': -tụfù 'throw away'
3.2. Examples of two-syllable verb bases in which the second syllable is not attested as an independent verb root, but is one of Ward's "meaning suffixes", are:

With /-tá/, indicating action performed in the direction of the subject or speaker, or in his interest:

-źū 'buy': -źūtá 'buy and bring, buy for oneself'
-wè 'take, pick up': -wètā 'bring'
-mù 'study': -mûtā 'learn, master'
-dō 'pull': -dōtā 'attract, be attractive to'
-ţwē 'obtain, get': -ţwētā 'receive'

With /-cá/, indicating action performed to completion or to the exhaustion of the object:

-ří 'eat': -řícā 'eat all of, eat up'
-hú 'see': -húcā 'get a good look at, inspect'
-gû 'count, read': -gûcā 'read all of, finish reading'

With /-sû/, indicating action performed up to a stopping point or to temporary completion:

-ří 'eat': -řísû 'finish eating'
-kwû 'stand': -kwíssû 'stop'

With /-cí/ (not the independent root meaning 'be stopped up'), indicating action performed as a replacement of another action:

-źū 'buy': -źûcî 'buy as a replacement'
-nû 'be at, sit': -nûcî 'take the place of'
-lû 'marry': -lûcî 'remarry (e.g., as a widower)'
With /-hyè/, indicating action done in a wrong way or by mistake:

- gà 'go': - gàhyè 'go the wrong way' (obj. 'road')
- kwú 'speak': - kwúhyè 'speak disrespectfully of; (with object 'mouth') make a slip of the tongue'

With /-wá/, indicating action taken up or initiated (more than merely begun):

- gà 'go': - gàwá 'get going'
- gù 'count, read': - gùwá 'get at reading'

3.3. In some three-syllable bases, the second and third syllables are not readily analyzable as separate morphemes, but are bound to each other; further, these combinations do not appear as independent verb bases, and thus belong with Ward's "meaning suffixes". Examples are:

With /-gídé/, indicating continuation of an action:

- nò 'be at, sit': - nògídè 'stay'
- rú 'work': - rúgídé 'keep on working'

With /-ghárí/, indicating action performed at random, aimlessly, or in other than a straight line:

- gà 'go': - gàghárí 'walk around, stroll'
- lé 'look': - léghárí 'look around, turn one's head'

3.4. In other three-syllable bases, the second syllable, as in two-syllable bases, may be either an independent root or a bound morpheme. However, the third syllable is only very
rarely an independent verb root. Bound morphemes of the type discussed in 3.2 above are common in this position. Only a few independent roots may occur in third position; only /-gå/ 'go' indicating action away from the speaker or subject, and /-fè/ 'pass by' indicating action past a place, have been recorded, though it would not be surprising to find also /-pù/ 'exit' indicating action out of a place. Significantly, these form a semantic group with the bound morpheme /-tå/ indicating action toward the speaker or subject. Examples of three-syllable bases of this type are:

- wè 'take, pick up', - då 'fall', with /-tå/:
  - wédåtå 'bring down'
- wè 'take, pick up', - pù 'exit', with /-tå/:
  - wépùtå 'bring out'
- mé 'do, make', with /-kå/ indicating action done together, and /-tå/:
  - mékåtå 'do together, bring together'
- ké 'tie', - ci 'be stopped up', with /-så/:
  - kécìså 'tie up, fasten up completely'
- då 'fall', - så 'spread', with /-så/:
  - dàsåså 'fall apart and scatter all around'

3.5. The same patterns apply to bases of more than three syllables: the first syllable must be an independent verb root, the second (or second and third; see 3.3 above) may be either an independent root or a bound morpheme; any syllable thereafter must be a bound morpheme or one of the very few directional
verb roots mentioned above in final position.

4.0. Igbo verb bases may thus be composed of morphemes of two definably different types in terms of distribution. Independent monosyllabic roots may occur alone to constitute verb bases. They may also occur in either first or second position in a longer verb base. With only a few exceptions, they may not occur after the second position, and those which do must be in final position. On the other hand, certain bound morphemes, Ward's "meaning suffixes", may not occur in first position in a base of two or more syllables; they may occur in any position after the first.

4.1. The bound morphemes in question, which occur as parts of verb bases, may be given a label more formal than "meaning suffixes"; namely "base formatives". Most base formatives, like verb roots, are monosyllabic, but a handful of bisyllabic morphemes are included in this class. Some thirty such base formatives have been identified in Igbo. Semantically, they indicate motion or direction of various sorts, completion, inception, and comparable modifications of the action indicated by the preceding independent root or roots. No claim is made that every morpheme involved in Igbo verb bases has been unambiguously identified, but it is clear that a morpheme class of "base formatives" can be recognized as distinct from verb roots.

4.2. Since base formatives do function as part of the verb base, and since there is a sizable number of them, it might
appear more attractive to compare these, rather than the two morphemes discussed in 2.0-3 above, with verbal extensions in Bantu. However, Igbo base formatives and Bantu verbal extensions have little if anything in common in specific semantic reference. The typical references of Bantu extensions -- passive, causative, reciprocal, stative, and others -- are not found at all among the Igbo base formatives.

4.3. The morphotactics of Igbo base formatives in bases containing more than one has not been investigated. However, it is clear that there are certain restrictions on their co-occurrence and order. What has been accomplished is to define the task of a fuller statement of Igbo verb morphology in terms of four morpheme classes: roots, base formatives, inflectional affixes, and extensions. This is particularly significant in that a verb morphology of this type has not been reported for any other West African language, though it probably appears in the languages most closely related to Igbo, which have often been called dialects of Igbo.
Serious Verbs

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Introduction

This paper consists of a series of connected notes and comments on a very perplexing type of surface structure found in many of the languages of West Africa. In the first part of the paper I will present a number of examples of the phenomenon mentioned in the title. The second part will examine the notions causative and inchoative and their function in the two languages being discussed. The third part will be devoted to a few speculations as to what the preceding sections may mean. All of the data for this paper are taken from two somewhat remotely related members of the Kwa subgroup of Niger-Kordofanian: Yoruba, spoken in southwestern Nigeria, and Yanye, spoken in Ogoja Province in southeastern Nigeria. ¹

I. A Survey of Serial Verb Constructions

A common phenomenon in many West African languages is the use of a series of verbs, all having the same structure subject. In some cases the resultant meaning would be expressed in English by a

¹ A few special symbols will be used, for typographical reasons. e and o are respectively front and back lax mid vowels. ʒ is a palato-alveolar sibilant. ˘, ̆, and ̅ are respectively high, low, and mid tones. Normally mid tone will be marked by the absence of any tone mark. A tone mark not appearing over a segment will belong to the preceding segment and does not entail any lengthening of that preceding segment.
single verb, as with the Yoruba example:

(1) mo mú 'iwé vá ílé
    I took book came house
    I brought a book home.

In other cases the meaning would be equivalent to a benefactive or some kind of adverbial notion in English, as in

(2) mo ti àdá gé igi ná
    I took machete cut tree the
    I cut the tree with a machete.

(3) mo bá q mú 'iwé wá
    I for you took book came
    I brought a book on your behalf.

The range of syntactic and semantic phenomena which these languages account for with serialization is even broader than this. In the two languages which I have singled out for study in this paper, Yoruba and Yatyê, we will find serialization used to express what in English are considered instrumental and manner adverbials, datives, benefactives, locatives, causatives, inchoatives, comparatives, and auxiliaries.

Apparent instances of instrumental adverbs are (2) and (4)

(4) Ami awá ɔkìtì adyu ìtsì (Yatyê)
    I took machete cut tree
    I cut the tree with a machete.

A Yoruba manner adverbial looks and behaves much like an instrumental, as in (5).
(5) Mo *fi ṣẹgbọn* ge igi
   I took cleverness *cut* tree
   I cut the tree cleverly.

There does seem to be an order constraint, however, requiring that when both an instrumental and a manner adverbial occur in one sentence, the manner adverb comes first.

(6) Mo *fi ṣẹgbọn* *fi àdá* ge igi
   I took cleverness *took* machete *cut* tree
   I cleverly cut the tree with a machete.

   The expression of directional and some non-directional locative adverbs require verbs with appropriate locative semantic content.

(7) `Ekó ni mo gbé ge igi
    Lagos TOPIC I *live-in* do work
    I work in Lagos.

(8) Mo mú gbogbo àwọn ọmọdè lo ṣẹ *Ekó*
    I took all PLURAL children went Lagos
    I took all the children to Lagos.

(9) Ìyì malùyù ìku ni ọtywi ayó òkrọ
    PLURAL inhabitants of Utyu gathered in meeting ground *did* work
    The people of Utyu worked in the meeting ground.

(10) Ìwọlù àva ínyahẹ awa ọtywi
    child *took* book went home
    The child took the book home.
Yoruba exhibits a very clear contrast between datives and benefactives, using distinct verbs.

(11) mo bá àbúrò mi mú ́iwé wá
I on-behalf-of younger brother my took book come
I brought a book for my younger brother.

This benefactive contrasts with a dative.

(12) mo mú ́iwé wá fún ẹ
I took book came gave you
I brought you a book.

Both can occur in one sentence.

(13) mo bá àbúrò mi mú ́iwé wá fún ẹ
I brought you a book for my younger brother.

In Yatyè the situation is more like in English, where the two have, at least in surface structure, merged, so that (14) is ambiguous.

(14) àmì awá ìnyahwọ ibí akà àwọ
I took book came for you
I brought you a book.

(or I brought a book on your behalf.)

The comparative construction in Yoruba involves two verbs: jù 'surpass', and lọ 'go'. That there is nothing morphologically comparable to the English superlative in Yoruba will be seen to be related to the use of these verbs. The surface structure of the comparative is

(15) NP V NP [jù NP lọ]_s
Examples of this structure are

(16)  Ayq  ní  qgbọn  jù  mí  lq
    Ayq  ṣe  cleverness  surpass  me  go
    Ayq  is  cleverer  than  I  am.

(17)  Ayq  lè  sá  eré  ju  gboogbo  àwọn  ará-ọkùnrin-rè  lq
    Ayq  ṣe-able  run  race  surpass  all  PLURAL  classmates  his  go
    Ayq  can  run  faster  than  any  of  his  classmates.

jù,  a  low  tone  verb,  behaves  like  all  low  tone  verbs  in  changing  to
mid  by  a  very  early  phonological  rule  if  its  object  is  a  noun,  rather
than  a  pronoun,  as  the  examples  show.  The  NP  following  jù  can  be  a
sentence,  as  in  (18)  and  (19).

(18)  Ayq  ní  qgbọn  jù  kpé  kí  ó  dára  fun  un  lq
    Ayq  ṣe  cleverness  surpass  that₁  that₂  it  is-good  for
    him  go
    Ayq  is  cleverer  than  is  good  for  him.

(19)  Ayq  ní  qgbọn  jù  bí  mo  ti  rò  lq
    Ayq  ṣe  cleverness  surpass  how  I  PERFECT  think  go
    Ayq  is  cleverer  than  I  had  thought.

In  both  sentences  the  constituent  between  jù  and  lq  is  a  sentence  and
is  dominated  by  an  NP,  as  the  tonal  behavior  of  jù  indicates.  The
difference  between  a  comparative  and  a  superlative  depends  on  the
presence  of  a  NP  object  after  jù.  (17),  for  example,  could  be  para-
phrased  by  (20).
(20) Ayọ lè sá érè jù lọ ní inú gbogbo àwọn ará ọkùnrin-rẹ

Ayọ can run race surpass go among all PLURAL classmates his

Ayọ can run the fastest of all his classmates.

The first part of (20), as far as jù lọ, would mean 'Ayọ can run very fast' or 'Ayọ can run fastest', depending on contextual factors.

Auxiliaries too are treated as verbs in series in some languages. This is clearest in Yatye, although there is some evidence for it in Yoruba too. In Yatye there is a class of verbs which can be used either as auxiliaries or as main verbs. Although there seems to be a semantic relation between their meanings as auxiliaries and as main verbs, within the current theory it may be difficult, if not impossible, to characterize this relation adequately.

(21) (i) [-Aux] Verbs [+Aux] [-Aux]

abá future
ahyè continuous squat, lie
aga habitual wander
ibu repetitive return

(ii) òdíde ahýè íbi ịtywi òdíde ahýè ọmẹ

man CONT come home man squat there

The man is coming home. The man squatted there.

(iii) òdíde aga íbi ịtywi òdíde aga ọmẹ

man HABIT come home man wander there

The man usually comes home. The man wandered there.

(iv) òdíde ibu íbi ịtywi òdíde ibu ọmẹ

man REPET come home man return there

The man came home again. The man returned there.
The man is going to come home.

The causative and inchoative constructions are also clearest in Yatyé, where the following facts are in evidence.

(22) (i) ɪtywɛndɛ adà
    pot broken
    The pot is broken. (Stative)

(ii) ɪtywɛndɛ abà ada²
    pot ACTIVE broken
    The pot broke. (Inchoative)

(iii) yetà abà ɪtywɛndɛ adà
    stone ACTIVE pot broken
    The stone broke the pot. (Causative)

(v) ivyi abà yetà adà ɪtywɛndɛ
    child ACTIVE stone broken pot
    The child broke the pot with a stone. (Causative Instrumental)

(23) (i) ḍtsi aple
    tree tear out
    The tree was uprooted. (Stative)

²In previous papers I used the term CAUSATIVE for what I am calling ACTIVE in this paper. The term ACTIVE seems to subsume both CAUSATIVE and INCHOATIVE, at least in the sense in which Lakoff (1965) used them.
(ii) òtsi abà aplè

tree ACTIVE tear out

The tree got uprooted/toppled. (Inchoative)

(iii) medìde abà òtsi aplè

men ACTIVE tree tear out

The men uprooted the tree. (Causative)

(iv) ahuhwò abà òtsi aplè

wind ACTIVE tree tear out

The wind uprooted the tree. (Causative)

(v) medìde abà yahwà aplè òtsi

men ACTIVE axes tear out tree

The men tore out the tree with axes. (Causative, Instrumental)

(24) (i) utsì ikù

doors close

The door is shut. (Stative)

(ii) utsì abà ikù

doors ACTIVE close

The door shut. (Inchoative)

(iii) ìwà utsì ikù

child ACTIVE doors close

The child shut the door. (Causative)

(iv) òtsì abà utsì ikù

sticks ACTIVE doors close

The stick shut the door. (Causative)
The child shut the door with a stick. (Causative Instrumental)

There are a large number of verbs which have paradigms like (22)-(24), a few of which are given in the Appendix. There has been some doubt expressed as to whether aba is actually a verb. The evidence seems to indicate that it is. It is inflected for mood and tense, as in (25), where (24.iii) is given in the Perfect, Imperfect, and Imperative.

(25) (i) ́iwí aba útsi ikù
   The child shut the door.

(ii) ́iwí ābà útsì ́ikù
   The child shuts the door.

(iii) bà útsì kù
   Shut the door.

Perfect tense is marked by a mid tone on the prefix of the verb, Imperfect by a low-high sequence, and the Imperative mood by the absence of a prefix. Also aba can undergo Agent-Nominalization, as in (26).

(26) (i) obà útsì kù
   one who closes doors, a door-closer

(ii) obà ́itywèndê dà
   one who breaks pots

(iii) obà ́otsì plè
   one who fells trees
II. Causative and Inchoative

The way Yatyë handles statives, inchoatives, and causatives suggests that the latter two are the same phenomenon and that Lakoff's distinction between them (1965) is redundant. The important contrast seems to be between stative and active, with the inchoative/causative contrast being a matter of the number of NP's involved and the relation between them. For example, (27.i) is stative, but (ii-iv) are all non-stative and all have inchoatives in them. The causatives (iii and iv) are distinguished by the presence of a subject and an object. (27.v) suggests that instrumentals may be a further extension of causatives.3

(27) (i) The sky was red.
(ii) The sky reddened.
(iii) The sunset reddened the sky.
(iv) The artist reddened the sky.
(v) The artist reddened the sky with a sunset.

This suggestion is borne out by an examination of sentences like those in (22)-(24).

The sentence (24.iii) can be paraphrased by (28).

3 Much non-transformational work, particularly the tagmemic school, talks about 'degrees of transitivity', using the terms 'intransitive', 'transitive', 'ditransitive', etc. A ditransitive, in a tagmemic framework, is a structure including both an indirect and a direct object. The present treatment suggests that if there is a useful notion of this sort it is to be defined in terms of embedded actives, rather than such things as datives and benefactives.
Furthermore, (24.i) is ambiguous in a way in which (24.iii-v) are not. (24.i) can be interpreted as stative or active, its active interpretation being identical to the unambiguous (24.ii). Although (28) is an acceptable paraphrase of (24.iii), (24.iii) is not ambiguous. (24.iv) and (24.v) have paraphrases similar to (28), i.e., respectively:

(29) òtsi abà utsì abà ikù
The stick shut the door.

(30) ìwyi abà òtsi abà ikù utsì
The child shut the door with a stick.

The potential further paraphrase of (30), that is (31), does not seem to be fully acceptable, but informants recognize the structure and usually call it baby-talk. It is immediately noticeable that (31) continues the pattern of (29), adding an abà so that there is one ACTIVE per actant in a non-stative sentence:

(31) ìwyi abà òtsi abà utsì abà ikù
The child shut the door with a stick.

For these reasons we may suggest (32) and (33) as underlying structures for (24.iv-v), this counting for the facts of (28)-(30).
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(32)  
[Diagram showing the syntactic structure of a sentence with nodes labeled with words like 'child', 'ACTIVE', 'door', 'shut', 'ACTIVE', etc.]

(33)  
[Diagram showing another syntactic structure with similar labels and words]
A transformation similar to McCawley's predicate raising will raise iku into $S_2$ of (33) and $S_1$ of (32). Precisely where it will be attached is not clear, but because of the subsequent incorporation of abà, it seems better to consider abà iku a verb and to Chomsky-adjoin iku to abà, so that the lowest $S$'s of (32) and (33) become

(34)

```
    S
   /\  \
 NP  VP
   /\  /\  \
 utsi iku abà
```

Abà then copies the feature [+ACTIVE] onto iku and is deleted, resulting in the ambiguity which was observed in (24.i). (24.iii-v) are not similarly ambiguous because a stative embedded as an object complement to abà is apparently not a well-formed deep structure.

The underlying trees we have arrived at are strikingly like those of Lakoff (1965) with the difference that Lakoff's [+CAUSATIVE] and [+INCHOATIVE] pro-verbs are found to be the same verb, ACTIVE. Compare Lakoff's tree (35) to (32).
In all of Lakoff's causative examples the lowest $S$ contains a stative verb. This is embedded as the subject complement of an inchoative pro-verb, the inchoative sentence in turn being embedded in a causative as an object complement. If we begin with a large class of stative verbs, such as those given in Appendix I for Yatyq, we can then derive an inchoative by embedding the stative in a non-stative or ACTIVE as its subject complement. We can further derive a causative by embedding this structure in another ACTIVE as its object complement. The notions causative and inchoative can be treated as derived notions and do not have to be included in the base. This, of course, is precisely the case for Yatyq, and as (33) shows an instrumental, and perhaps some manner adverbs (see (5) and (6)) can be regarded as embedded causatives. Abâ looks very much like a pro-verb which has an overt surface representation as an embedding verb.
The sort of paraphrase we get with abà is odd in that the sentence does not contain a number of verbs, each of which has a distinct meaning and can be used as the only verb in the surface structure representation of a sentence. That is, the English paraphrase of (35) can be, among others, those found in (36).

(36) John shut the door.

(37) (i) John caused the door to shut.

(ii) John made the door close.

(iii) John pushed the door shut.

(24.i) can be paraphrased by (38).

(38) 'wyi awá utsi ikù

child took door shut

The child shut the door.

This, in turn, can be paraphrased on the pattern of (29)-(32).

(39) (i) 'wyi awá utsi abà ikù

(ii) 'wyi abà utsi awá ikù

(iii) 'wyi abà utsi abà ikù

(iv) 'wyi abà utsi awà abà ikù

(v) 'wyi abà utsi abà awá ikù

(vi) 'wyi abà utsi abà awà abà ikù

However the relation between awá 'take' and ikù 'shut' is to be represented, its behavior with abà is familiar, and the predicate raising and incorporation used above with ikù can be used here also.

Awá 'take' and abà 'ACTIVE' have rather different properties, but what is important here is the fact that awá utsi in (39.i) is a
constituent, while aba utsì is not. Thus the former can be nominalized and clefted, whereas the latter cannot. (40), therefore, is grammatical, but (41) is not.

(40) utsì òwówà nì ìwyì avá utsì ikù ìmì
door taking TOPIC child took door shut
The child took the door and shut it.

(41) *utsì òbóbà nì ìwyì abà utsì ikù ìmì
door ACTIVE TOPIC child ACTIVE door shut

In Yoruba, the verb fi 'take' appears to behave very much like the YatYì avá 'take'. Both are used to express instrumentals.

(42) (i) ọmọ'fi i gi ti ìlekùn
child took stick shut door
The child shut the door with a stick.

(ii) ìwyì avá ọtsì ikù utsì
child took stick shut door
The child shut the door with a stick.

With both verbs, the verb and its following noun form a constituent which can be nominalized and topicalized.

(43) (i) rífi i gi ni ọmọ'fi i gi ti ìlekùn
taking stick TOPIC child took stick shut door

(ii) ọtsì òwówà nì ìwyì avá ọtsì ikù utsì
stick taking TOPIC child took stick shut door

Fi is not normally used with inchoatives, but in some types of embeddings it is found as an inchoative. The sentences (44.1) and (45.1) are ambiguous between stative and active. As (44.11) and (45.11)
show, this ambiguity cannot be eliminated by using fi as abà is used in Yatyë. The sentences with fi inserted are ungrammatical. This is not surprising, since fi is not an embedding verb, as is clear from (43.i). That fi does at least have an ACTIVE feature, in Lakoff's terms an inchoative, is clear from (46), where it makes the difference between a stative and an active. In (47) fi is obligatory in structures which semantically entail the notion of coming into a state.

(44) (1) omi' kùn igo
   water fill bottle
   The bottle is full of water.
   (or The water filled the bottle.)

(ii) *omi' fi kùn igo
   water fill bottle
   The water filled the bottle.

(45) (1) igò' fò
   bottle broke
   The bottle is broken.
   (or The bottle broke.)

(ii) *igò' fi fò
   bottle broke
   The bottle broke.

(46) (1) nì ìgbà tì ó jè qì'lá
   when he was a bigshot

(ii) nì ìgbà tì ó fi jè qì'lá
   when he was acting-like a bigshot
Thus it is possible that *fi*, like *avá* in (39), is embedded under an ACTIVE; but that, unlike *avá*, with *fi* raising and incorporation are obligatory.

III. Properties of Serial Verbs

It is fairly evident that *abá* in *Yatyg* is a complementizing verb, but sources for other types of serial construction are not so clear. We will not go into the problem of the underlying representations for auxiliaries, but sentences like (48)-(50) present a different sort of problem. Verbs such as *gbá* 'receive', *fi* 'take', *bá* 'benefit', and *mú* 'pick up, take' are not the type which one normally treats as taking sentential complements. There are at least two other ways of deriving such structures as we have in (48)-(50): they may result from underlying conjoined structures, or they may be underlying or derived case markers. We will first consider conjunction as a source.

The sentences of (48)-(50) must be distinguished both syntactically and semantically from coordinate structures.

(48) *ájá gba eegun ha ẹnu*  
(Yoruba)  
dog received bone wedged mouth  
The dog took the bone in his mouth.
(49) ọmọ ná ń ṣi ādá gẹ iṣi ńjẹ́ (Yoruba)
child the took machete cut tree tall

The child cut a tall tree with a machete.

(50) mo ń kọ ẹ mú ńwé wá ilé (Yoruba)
I for you took book came home

I brought a book home for you. (Benefactive)

Semantically it would be possible to continue a coordinate structure like (51) with (52):

(51) mo mú ńwé, mo si wá ilé
I took book, I and came home

I picked up a book and came home.

(52) ụgbọ́n mo gbàgbé láti mú wá pélú
but I forgot to take came with

but I forgot to bring it along.

However, to continue (50) with (52) in the same way would render it nonsensical. Syntactically it would be impossible to derive (48)-(50) from coordinate sentence structure for a number of reasons. First, they cannot result from conjunction reduction, simply because if conjunction reduction occurs at all in Yoruba, it is restricted to deleting identical VP's, as in (53).

(53) Adé ń ńjẹ́, ẹmi ń ńjẹ́ ńjẹ́
Adé ńti ẹmi ńjẹ́ ńjẹ́
Ade ate food, I and ate food ⇒ Ade and I ate food
Ade ate and I ate.

There is, for example, a general constraint in Yoruba and typologically similar languages against the deletion of identical verbs in
coordinate structures. Thus, because Yoruba does not have a gapping rule, (54) is ungrammatical:

(54) *Adé mū ṣēnu, Oyè omi, Dokun sì qti

Ade drank wine, Oye water, Dokun and gin.

We saw above that the meaning of (50) is quite distinct from that of (51). That their underlying structures are also distinct is shown by the fact that conjunction reduction on (51), deleting mo, produces not (52), but an ungrammatical (55).

(55) *mo mū ṣē ṣi wá ilé

I took book and came house

Finally, if (48) derives from coordinate structure, it should be impossible to move either eegun 'bone' or ṣēnu 'mouth' out of its original conjunct. However, both sentences in (56) are grammatical.

(56) (i) eegun wọ ni ajá gbà ha ṣēnu
Which bone did the dog take in his mouth?

(ii) ṣē ṣēnu ni ajá gbà eegun ha
Was it his mouth that the dog took the bone in?

Moving either ṣē 'book' or ilé 'house' out of its conjunct in (51), on the other hand, results in ungrammatical sentences.

(57) (i) *ṣē ni mo mū, mo sì wá ilé
*It was a book I took and I came home.

(ii) *ilé ni mo mū ṣē, mo sì wá
*It was home that I took a book and I came.

The same facts apply to (49) also. This argument, of course, depends on at least two of so far unmentioned factors which together may be
sufficient to vitiate it. The first of these is the question of whether the VP's in series are still in conjoined structure at the point where the NP movement applies. At present I have no way of making certain of this. The second factor has to do with NP movement in general. Neither Yatyê nor Yoruba show any evidence of Psych-movement, WH-movement, Passive, Tough-movement, or other such transformations which have the effect of moving one NP over another. We will return to this point briefly below.

A second distinguishing feature of serialization is the tense agreement noted on page 67. All verbs in a series must agree as to tense and, as (25.iii) illustrates, as to mood also. This is clearest in Yatyê, where the perfect is indicated by a mid tone on the prefixes of all verbs within one series, and the imperfect by a low-high tone sequence, the high being absent on auxiliaries.

(58) (i) ḣwyi ābā awā inyahwé ḣibi
   child FUTURE take book come
   The child was going to bring a book.

(ii) ḣwyi ābá ḣwā inyahwé ḣibi
   child FUTURE take book come
   The child is going to bring a book.

Lack of tense agreement results in an ungrammatical sentence. That this may be true in Yoruba also is indicated by a suppletion involving the verb wā 'come'. Wā does not occur with the continuous particle ń, but must be replaced by bọ 'come'. The following paradigm results.
(59) (i) mo wá láti Òkò
    I came from Lagos.
(ii) *mò N wá láti Òkò
    I am coming from Lagos.
(iii) *mo bò láti Òkò
    I came from Lagos.
(iv) mò N bò láti Òkò
    I am coming from Lagos.

The second verb of (60) has to be marked for tense agreement, as comparison with (59) indicates.

(60) (i) mò N mú ìwé bọ̀.
    I am bringing a book.
(ii) *mò N mú ìwé wá.
    I am bringing a book.

A third condition on verbs in series is that they must all agree as to auxiliaries, negation, interrogative, and mood. Mood agreement is shown in (25), at least for YatyɁ. This is not quite so obvious in Yoruba. The auxiliaries in Yoruba and YatyɁ both occur before all other verbs in surface structure. For YatyɁ this is illustrated by the examples in (21). For an auxiliary to occur elsewhere produces an ungrammatical sentence. There is an apparent case of a different auxiliary element occurring after the initial verb in surface structure in Yoruba in sentences like (61).
(61) mo lqq máa mú ′iwé vá.
I went-to 'FUTURE' take book come
I went to fetch a book.

This, however, is a case of a sentence embedded as a purpose adverb in which Equi-NP-Deletion has removed the embedded subject. This is shown by the vowel length on the main verb lq 'go' and the optionality of láti 'in order to' before máa 'FUTURE', which is in complementary distribution with the vowel length.

(62) mo lq láti máa mú ′iwé vá.
I went to fetch a book.

These facts are true of Yoruba complement structures in general, for example,

(63) (i) mo féj (máa) mú ′iwé vá.
I want-to 'FUTURE' take book come.

(ii) mo fé láti (máa) mú ′iwé vá.
I want to 'FUTURE' take book come.

Yatyé does not have Equi-NP-Deletion in complement structures, so this sort of apparent exception does not occur.

If negation were permitted to occur on more than one verb in series, and if it were not the case that all verbs in series agree as to negation, then one would expect this to show up when a verb phrase is topicalized, as in (43.ii). The negation of (44.ii), the untopicalized equivalent of (45.ii), is
Both sentences of (65), however, are ungrammatical. *Ya* 'NEG' must be on the whole series.

(65)  (i) *òwówá òtsi ya nì `ìwi awá òtsi ikù utsì.`

(ii) *ìkúkù utsì ya nì `ìwi awá òtsi ikù utsì.`

This, of course, is related to the fact that *ya* 'NEG' is the last element in the surface structure of a sentence. Because of this, the sentences of (66), in which a NEG occurs after the first verb phrase, are also ungrammatical.

(66)  (i) *ìwi awá òtsi ya ikù utsì.

(ii) *ìwí awá òtsí ya ikù utsí ya.

All of these points suggest that the serial constructions of the type discussed in this section are not derived from underlying conjoined structures. This leaves our other alternative: that at least some verbs in series, especially those denoting the so-called 'oblique' cases, are in fact overt case markers.

Treating verbs in series as case markers results in several problems. First of all we get the paraphrases in (67).

(67)  (i) Oye’ mú `ìwé wá rùn mí.

Oye took book came for me

(ii) Oye’ mú `ìwé wá bùn mí.

Oye took book came presented me
(iii) Oye took book *came* gave me

In all three sentences, the last underlined word is a verb meaning something like 'give'. The particular verb used depends on the circumstances surrounding the giving, but in all three the 'case marking' is done not on the noun, but in the semantic content of the verb. There is no way of predicting exactly which one of a class of verbs marked as Instrumental or Dative or some other case is going to mark that case in a given sentence, and so we do not really have a unique determination of case marking.

A second problem is that the verbs involved must also be marked for tense. To show this I will give an example from Yoruba similar to one which we discussed earlier. The evidence in Yatýç is much more straight-forward, and the reader can refer back to (25) above, where he will notice the prefixes of all verbs agree for tense. The relevant Yoruba examples are (68) and (69).

(68) (i) mo *vá* láti Òkó ní àná.
I *came* from Lagos yesterday.

(ii) mo N bò láti Òkó ní isinsin èyí.
I am *coming* from Lagos right now.

(iii) *mo N vá láti Òkó ní isinsin èyí.
I am *coming* from Lagos right now.

(69) (i) mo mú àbúrò mí vá láti Òkó ní àná.
I brought my younger brother from Lagos yesterday.
(ii) mò ń mú àbúrò mi bọ̀ láti ìkò ní ́isíní́n èyí.

I am bringing my younger brother from Lagos right now.

(iii) *mò ń mú àbúrò mi wá láti ìkò ní ́isíní́n èyí.

I am bringing my younger brother from Lagos right now.

The verb used in (68) and (69) to mark the locative is wá 'come'.

This is only one of a number of verbs which could have been used, the choice again being determined by the context, but wá has one idiosyncrasy which is crucial here. If wá is used in a continuous tense, even if the continuous particle is several verbs earlier in the sentence, wá must be replaced by its suppletive bọ̀ 'come', and failure to apply this rule results in ungrammatical sentences like (68.iii) and (69.iii). We have, then, a choice of 'case marker' conditioned by the tense of the sentence, an improbably situation. A third problem is that, as we saw above, certain so-called case markers are ambiguous as to which case they represent, and the choice depends on the semantic content of the following noun. Examples of this are the Yoruba sentences with fí 'take' in (70) and the Yatọ́ sentences with ń́bá 'ACTIVE' in (71):

(70) (i) mo fí àdá gé igi.

I took matchete cut wood.

I cut wood with a machete.

(ii) mo fí àgbára gé igi.

I took strength cut wood.

I cut wood energetically.
The fi of (70.i) is instrumental and the fi of (70.ii) is a manner adverb, not a case at all. Similarly:

(71) (i) àmi abà òkìtì adyú òtsi.
I ACTIVE machete cut wood.
I cut wood with a machete.

(ii) àmi abà òtsi awa yírú.
I ACTIVE firewood went market.
I took firewood to market.

In (71.i) òkìtì is instrumental and in a case grammar abà would have to mark it as such. In (71.ii), on the other hand, òtsi is the direct object of the sentence. Therefore the specification of which case a 'case marker' marks is a function of the meaning of the noun to which the 'case marker' assigns case. This is obviously circular.

One of the basic motives behind case grammar is the need to specify relations between nouns and the verb of the sentence. This presupposes that a problem exists here, that is, that there must be the possibility of a single verb relating three or more actants. Two actants can, of course, be differentiated by formal Subject-of and Object-of relations, but more than two require some additional marking. The case base generates a string consisting of a modality, a verb, and a series of nouns, each marked for case. An early transformation is responsible for forming the subject and object, a process requiring the movement of NP. Such a movement transformation causes no problems in English, where NP-movement transformations seem to grow on trees, but, as we observed earlier, these languages with
serial constructions do not seem to have NP-movement transformations, with the possible exceptions of topicalization and Y-movement, neither of which seems to be subject to the sort of crossover and NP movement constraints that Ross (1967) and Postal (1968) have shown to control how other types of NP-movement can operate. In a language which otherwise lacks NP-movement before shallow structure, it seems very odd to begin the transformational derivation of sentences with mass migrations of NP.

One final observation on the problems involved in treating verbs in series as case markers is the fact that this would demand that abà 'ACTIVE' and its immediately following noun be a constituent. They are, in fact, not a constituent. Abà embeds a sentential complement, and the noun immediately after abà is not its object, but is rather the subject of the complement sentence. Evidence of this is alluded to in example (26), where abà and its complement are nominalized. If it could take a noun as object then it should be possible to nominalize abà and the following noun. This is not possible.

There is one other possibility that would be worth examining in our search for a source for serial verbs, and that is the complex lexical item. The sorts of phenomena which we have been calling serialization act in some ways like complex lexical items and yet are clearly composed of independent lexical items. A NP within a serial string can take a relative clause, for example, and it is possible to pronominalize into and out of serial strings. Neither of these is possible with complex lexical items, as Postal (1969) and Morgan (1968)
have shown. Furthermore, it is possible, as we saw on page seven, to
nominalize a section of a serial string which looks very much like a
verb phrase. Also, a noun can be moved out of a serial string by
Topicalization or Y-movement. Thus we do have evidence for at least
the following bracketings.

\[(72) \text{\`ivy}i_{NP} \text{awá} \text{otsi}_{VP} \text{ikù} \text{utsi}_{VP} S\]

child took stick shut door
The child shut the door with a stick.

\[(73) \text{\`owó}w\text{nts}_{VP} \text{Na} \text{\`ivy}i_{NP} \text{awá} \text{otsi}_{VP} \text{ikù} \text{utsi}_{VP} S\]

taking stick TOPIC child took stick shut door
It was by taking a stick that the child shut the door.

The fact that the two VP's together can be nominalized, as in (26),
suggests also the following bracketing.

\[(74) \text{\`ivy}i_{NP} \text{awá} \text{otsi} \text{ikù} \text{utsi}_{VP} S\]
The resulting surface structure phrase marker, however, is not obvi-
ously derived from underlying conjunction, since the results of the
discussion on this earlier apply equally to Yaty\v{e}. It must then be
derived from some other source, unless we are to believe that the base
generates structures like (75):

\[(75)\]

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The resulting surface structure phrase marker, however, is not obvi-
ously derived from underlying conjunction, since the results of the
discussion on this earlier apply equally to Yaty\v{e}. It must then be
derived from some other source, unless we are to believe that the base
generates structures like (75):

\[(75)\]
Another restriction on serial strings is that verb phrase complementation cannot be string-internal, that is, it must occur after the entire serial string. Although it is not impossible that this results from an obligatory extraposition transformation, this possibility seems unlikely because of the absence of other NP-movement transformations. In any case, the fact remains that sentential complements are not found within serial strings. Therefore (76) below is a grammatical sentence in Yoruba, but (77) is not:

(76) mo sq ̀fún ə kpé ̀Adísà kò níi ̀lọ̀ ilú.
I said gave you that Adisa would not go to town.

I told you that Adisa would not go to town.

(77) *mo sq kpé ̀Adísà kò níi ̀lọ̀ ilú ̀fún ə.
I said that Adisa would not go to town give you.

I said that Adisa would not go to town to you.

Notice that (77) does have a correct reading if ̀fún ə is considered internal to the complement, meaning 'I said that Adisa would not go to town for you.' Semantically, and on the basis of what is known about complements in English, this is not surprising, but we are still left with the verb ̀fún to account for. I have at this point no defensible explanation for these structures. And the problem does not stop here. Why the surface structure of (72) and (74), as given in (75), should seem to contradict our intuition that ̀utsi is the direct object of the sentence and that ̀otsi is part of an instrumental adverb is very puzzling; as is the fact that we do apparently have the
correct relations in the surface structure of (76) and of (77) in its correct reading, as (78) and (79), respectively, show:

(78)

(79)

Although it is possible as we suggested above that (78) results from extraposition, the independent evidence for this transformation in Yoruba is very slim. But even if it does, that would mean that the complement is not actually the direct object of the sentence, but the surface structure only makes it look that way. In either case, serialization presents us with a structure that behaves in some ways like a complex lexical item and in other ways like a structure containing a number of independent lexical items. But it evidently is not what one would normally consider a complex lexical item.

Needless to say, this paper has left a score of unanswered questions, the most important of which concerns the source of verbs
in series. Ross (1967:170) mentions a set of sentences which appear to be immune to the coordinate structure constraint. These are

(80) (4.107) a. She’s gone and ruined her dress now.
   b. I’ve got to try and find that screw.
   c. Aunt Hattie wants you to be nice and kiss your granny.

(80.b) and (80.c) puzzle me at least as much as they puzzled Ross.
(80.a), on the other hand, seems to bear some relation to the phenomena discussed in Part Two, and in a more general way to the whole problem of serialization. Additional examples like (80.a) are the inchoative sentences of (81),

(81) (i) The bottle took and broke.
   (ii) The bottle upped and broke.
   (iii) The bottle went and broke.

and their causative counterparts

(82) (i) John took and broke the bottle.
   (ii) John upped and broke the bottle.
   (iii) John went and broke the bottle.

These sentences are paraphrases of the more standard form using only the verb broke, in much the same way that the sentences of (28)-(30) are paraphrases of those in (24). The sentences of (81) and (82) have properties which seem quite similar to those cited in Yatyğ also. For example, the verbs took, upped, and broke can occur only in non-stative, or, in the terminology of Part Two, ACTIVE sentences. The sentences of (83), then, are not surprisingly ungrammatical.
(83) (i) *The bottle is taken and broken.
(ii) *The bottle is upped and broken.
(iii) *The bottle is gone and broken.

A further parallel is the fact that they must take the same auxiliary and must both be either negative or affirmative, as in (84).

(84) (i) *The bottle took and didn't break.
*The bottle upped and might break.
*The bottle went and will break.
*The bottle went and has broken.
(ii) The bottle didn't take and break.
The bottle might up and break.
The bottle will go and break.
(iii) *The bottle has taken and broken.
The bottle has gone and broken.
The bottle has upped and broken.

but

(iv) The bottle has took and broken!

Except for the puzzling asymmetry of (84,iii), these facts show themselves to be strikingly similar to what we found in Yatyé. It may be that these represent the failure of a plugging-in rule, in R. Lakoff's (1969) terms, to apply, leaving a pro-verb to be spelled out in surface structure. The verbs take, up, and go serve no semantic function other than to redundantly mark the sentence as active. The ultimate solution to both this and the serialization problem may turn out to be very closely related, if not identical.
IV. Some Broader Implications of Serialization

In the earlier years of research into transformational grammar a great deal was written on the formal notion of simplicity as an evaluatory measure. More recently this topic has with some justification received less attention and the thrust of research has been turned more to the related topic of constraints on transformations and on derivations. The feeling has been rather that before we can talk meaningfully about simplicity metrics we need to know much more about just what sort of devices we will need to account for the phenomena of natural languages. It is therefore with considerable trepidation that I venture into the question of what is meant by simplicity in linguistic descriptions.

I will begin with the statement that the goal of our science is to be able to present for any given sentence of any given language a fully 'factored-out' representation of the meaning of that sentence and to be able to justify, in some meaningful sense, all formal devices and primitive notions used in such a description. It stands to reason that in some languages we may require certain devices which will not be required in other languages. A case in point is the NP-movement transformation. As was noted in earlier parts of this paper Yoruba and Yatyq appear to have little, if any, NP-movement. There are, to be sure, movement transformations of other types, including Topicalization and Y-movement, and, more importantly for these languages, clitic placement. However, these movement transformations are distinct from NP-movement rules in one crucial way: they are not
subject to the same complex constraints, such as the Crossover Constraint, the Complex NP Constraint, the Coordinate Structure Constraint, and so on.

The function of these 'global derivational constraints', as Lakoff calls them (1969), is to prevent the underlying structure of a sentence from being destroyed beyond the point of recoverability. That is, NP-movement transformations are an extremely powerful type of rule, and any grammar which allows them must also block those movements which would be particularly destructive to the underlying structure. The statement of such constraints may involve reference to rules and to various not necessarily adjacent stages in the derivation, and it therefore is a costly affair, but the added complexity they bring to the grammar is not due to the fact that there are global constraints operating, but to the fact that the grammar of that particular language permits NP-movement transformations in the first place. It should not, therefore, come as a surprise that there are languages without NP-movement rules, and therefore languages that do not need some of these global constraints. In terms of a universal base, Yoruba, Yatyg and typologically similar languages do not seem to have such transformations and therefore in some sense the grammars of these languages can be considered 'less marked' than the grammars of languages having NP-movement rules and therefore needing global derivational constraints on these rules.

In as complex a device as a grammar of a natural language, it is unlikely that simplification in an area such as NP-movement
would be without its parallels in other areas of the grammar. Such a parallel simplification might involve the serialization phenomena we have been discussing. If, in fact, the goal of the underlying representation of a sentence is to give a factored-out representation of the meaning of that sentence, then one would also expect that lexical incorporation rules would be needed in languages such as English. These could be similar to what McCawley (1968) suggested for the derivation of kill, or they could be similar to such processes as Gruber (1967) developed. Whatever they are like, it should not be surprising to find languages in which such highly constrained processes are needed to a more limited degree than they are, say, in English. This may be why we find both serialization and the absence of NP-movement transformations in the same languages. There is apparently an overall tendency toward economy in a grammar and some languages may well have more nearly 'optimal' grammars than others. It may also be possible that processes as costly and complex as NP-movement in English may be found in languages other than English, and not in English at all.

Whatever the validity of the preceding speculations, we apparently have some important questions before us. Why, for example, do we find a strongly limited verb inventory in the lexicon, a type of syntactic structure in which groups of verbs get in concert to form more complex meanings, such as 'go-take-come' for 'fetch' or 'take-give' for the three argument verb 'give', and the absence of NP-movement all in the same languages? Here is a ripe field for the
sometime vacuous discipline of linguistic typology. Linguistic typology should be able to tell us what the implications of specific linguistic phenomena are for the structure of particular languages and should enable us to predict much more accurately the sorts of phenomena we can expect to find in particular languages.
The following is a sample listing of verbs which are inherently stative in Yatye. Each can become non-stative when embedded as subject complement of abà 'ACTIVE', and that complex can then be embedded as object complement of a higher abà to produce a causative. Each verb is given with its stative, inchoative, and causative meanings.

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<thead>
<tr>
<th>Item</th>
<th>Stative</th>
<th>Inchoative</th>
<th>Causative</th>
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<tr>
<td>aplè</td>
<td>uprooted</td>
<td>get uprooted</td>
<td>uproot</td>
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<td>ihù</td>
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<td>ablè</td>
<td>glued to</td>
<td>get stuck to</td>
<td>glue to</td>
</tr>
</tbody>
</table>
REFERENCES

Because serialization is not a generally known phenomenon, I have included a number of important articles on the topic in this bibliography, even though they are not cited in the text.


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NUPE TONOLOGY

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A. Introduction

Any linguistic description of the Nupe language must posit the existence of contrastive tone. This is immediately evident from examples (1) through (3). An acute accent (') represents a high tone, a grave accent (``) represents a low tone, mid tone is left unmarked. (All vowels bear some tone.)

1. u lọ kata
   he entered house
   He entered the house.

2. u lo dzukọ
   he went market
   He went to the market.

3. u lọ bise
   he untied chicken
   He untied the chicken.

Nadel (1964), in his discussion of the Nupe language, by ignoring tone, is forced to treat three phonetically distinct forms as homonyms, when he states that eba has three different meanings. But

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1I am greatly indebted to Professor Victoria Fromkin, who spent much of her time giving me assistance in writing this paper. I am also grateful to Larry Hyman for his insightful comments and criticisms.
ebà 'ground' or 'place', eba 'male organ', and ebá 'husband' are as different to Nupe speakers as are bit, pit, and fit to speakers of English. Nadel's omission of such obvious tonal contrasts is strange for one as knowledgeable about the Nupe language and culture as he is. However, when one views the complicated morphotonological alternations and tonal assimilations in Nupe (as discussed below) it is not surprising that a non-linguist decided to ignore tone altogether.

Smith (1967) on the other hand, in his 'Phonology of Nupe', postulates five lexical tones (tonemes), and abandoned a possible sixth tone on the grounds that 'it is more economical to postulate a ninth vowel phoneme rather than a sixth toneme' (p. 168). His tonal description is very accurate phonetically, but due to his theoretical framework at that time, he was unable to find the generalizations which we seek in a descriptively adequate phonology. He concludes by saying that 'further analysis will yield greater complexity and so no further generalization will be ventured here' (p. 168).

This paper attempts to present some further generalizations, based on the fact that the surface complexities can be accounted for with a set of ordered phonological rules and a necessary 'mixing of levels'.

B. The Rising Tone

The five distinctive pitches or tones postulated by Smith include three level pitches, High ('). Mid (unmarked), and Low ("), and two kinetic or contour pitches of tones, namely, Rising ("), and Falling ("'). The minimal quintuple which exemplify these contrasts are:
4. bà 'to be sour'
5. ba 'to cut'
6. bà 'to pray'
7. bǎ 'negative emphatic particle'
8. bả 'defamation' (from Hausa ba'ā)

Given the three contrasting level tones in examples (1) through (3) above and the contrasting tones of edu in examples (9) through (13) below, it seems fairly certain that one must posit at least three phonemic tones.

9. musa wā edú
   moses caught edu (edu is a species of fish)

10. ̀èdù zá
    Niger flooded
    The Niger flooded.

11. musa dzò èdu
    moses planted edu (edu is a wild species of yam)

12. edu ̀yá nānkó dànà
    thigh of cow this is
    This is a thigh of a cow.

13. musa wā edù
    moses caught deer
    Moses caught a deer.

2Smith has ̀edù for this form. I think this is an error. The correct form is edù.
In sentences (9) through (13) there are five different nouns with the same segmental form, contrasted only by tone. These nouns conform to the general phonological shape of many Nupe nouns, namely, a CV stem preceded by a nominal prefix [e]. In the above examples the vowel of the stem is shown to be High (edú 'fish'), or Mid (èdu 'yam') or Low (edu 'deer'). The prefixes, however, are limited to Mid or Low tones.  

Furthermore, we find the following sequences of tones in the examples above produced as (14) through (18) below:

14. edú 'yam' Low-Mid
15. èdù 'the Niger' Low-Low
16. edú 'fish' Mid-High
17. edu 'thigh' Mid-Mid
18. edù 'deer' Mid-Low

The only gap in the possible tone sequences (given the restriction of Mid and Low prefix tones) is a Low-High tonal sequence. Further examination will reveal, however, that this gap exists only when the

3Certain words have an initial high tone [â] as in the following:

(a) ádvâni 'seventy'
(b) ámînci 'faithfulness'
(c) ázârûfa 'silver'
(d) ázikí 'riches'

Most of these seem to be borrowings. Note that they do not have a CV stem.
consonant of the stem is a voiced consonant. Thus examples (19) through (22) include nouns with a low tone prefix, followed by a high tone stem vowel:

19. ̀ëtú èwu cigbá
    parasite kills tree
    A parasite kills trees.

20. u gí èkó
    he ate shea-butter nut
    He ate a shea-butter nut.

21. kata năná de èkpá
    house this has length
    This house is long.

22. èfú má
    honey sweet
    Honey is sweet.

It should also be noted that among the forms cited by Smith to illustrate the validity of the phonemic status of the Rising tone are the nouns [èdè] 'cloth' and [èdũ] 'taxes'. These rising tones occur both in isolation and in sentences as in examples (23) and (24).

23. èdè gá múló
    cloth that expensive
    That cloth was expensive.

24. musa ta èdũ
    moses paid taxes
Even in a strictly autonomous phonemic description it is possible to suggest that the rising tone is an 'allotone' of the High tone, occurring in the environment after a Low tone followed by a Voiced Consonant. Using three distinctive Features of tone to specify the phonetic tones above, they may be distinguished as follows:

<table>
<thead>
<tr>
<th>Features</th>
<th>High Tone</th>
<th>Low Tone</th>
<th>Mid Tone</th>
<th>Rising Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>H(igh)</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>L(ow)</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>G(lide)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

The rule predicting the Rising Glide may then be stated as in (I).

I. [+H] → [+G] / [+L] [+Cons. ] [+Ved ]

At this point we can see that only two tonal features need be specified in the lexicon—[+High] and [+Low] since [G] is predictable by rule. Examples (25) through (30) illustrate the applicability of Rule (I).

<table>
<thead>
<tr>
<th>Underlying form</th>
<th>Phonetic form (by I)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. ègbá</td>
<td>[ègbã]</td>
<td>'a border on a garment'</td>
</tr>
<tr>
<td>26. èbè</td>
<td>[èbẽ]</td>
<td>'pumpkin'</td>
</tr>
<tr>
<td>27. èbú</td>
<td>[èbũ]</td>
<td>'cross'</td>
</tr>
<tr>
<td>28. ègò</td>
<td>[ègõã]</td>
<td>'name of a town'</td>
</tr>
<tr>
<td>29. èdzá</td>
<td>[èdzã]</td>
<td>'sash'</td>
</tr>
<tr>
<td>30. èlé</td>
<td>[èlẽ]</td>
<td>'past'</td>
</tr>
</tbody>
</table>
As is evident from these examples, the Rising Tone does not occur on the initial vowel. The lexical entries of nouns which phonetically show a Low tone prefix followed by a Rising tone on the stem vowel are therefore represented with a phonological low tone followed by a High tone as shown in (25) through (30).

The existence of such a tone glide is not unique to Nupe, but can be found in a number of Kwa languages. Courtenay (1968) suggests such a rule for Yoruba:

\[
H \rightarrow LH \text{ Glide} / L \quad \text{(page 51)}
\]

The Yoruba version of the rule is a more general one, lacking the voicing constraint which Nupe imposes on the intervening consonant.

Rule (I), however, still does not seem to handle the Rising Tone in example (31).

31. musa si dě

Moses bought cloth

Moses bought some cloth.

In this example the Rising Tone follows a Mid Tone, which appears to contradict the prediction of Rule (I).

\[\text{In Nupe certain words have a Rising Tone on the initial syllable, as in [lō: zū] 'evening'. Note, however, that the initial syllable is a CV and not a vowel. Moreover, the Rising Tone is quite distinct from the one that is obtained through the application of Rule (I), for the one in case rises higher than the Rising Tone we have discussed above. The type of rising that is found in this word is typical of low tone nouns when they are the first element in a compound. Thus we recognize a high tone 'associative' tone and the underlying form } /l̃ō' zū/. \text{ Examples of this type do not, therefore, constitute counter examples, to the claim made above.} \]
In a taxonomic phonemic analysis, with unordered rules, and where only the phonetic string is considered as data, one would have to consider the Rising Tone as a phonemic tone. Compare, however, example (31) with (32):

32. musa si ëdé

Moses bought some cloth.

Both (31) and (32) are acceptable alternants of the given sentence. The deletion of the prefix vowel is a very common phenomenon in Nupe, and as we shall see, vowel deletion is a still more general process.

The first thing that comes to mind is to propose that Rule (I) be ordered prior to the Vowel Deletion Rule so as to obtain a derivation that follows:

\[
\text{by Rule (I)} \quad \text{by Vowel Deletion Rule.}
\]

But as we shall see later the presence (or absence) of the segment features does not affect the application of Rule (I) because the tone of deleted segments are not themselves deleted in other cases.

Other occurrences of the phonetically Rising Tone are found in verb stems of the form \( [+Vd] V \).

---

5 The phonetic string in the given derivation is not the final tonal phonetic realization. The tone of \( /si/ \) is actually a glide which starts on Mid tone pitch and glides to a low tone. This can be specified as \([-H, -L, +G]\) and will be symbolized by a grave accent following the vowel (e.g. \( [̃si'] \)). This is discussed in section C.
Examples (33) through (40) show that in certain constructions these verbs have a simple High Tone, whereas in others they occur with a Rising Tone.

33. etsú ʰi nākâ
   rat ate meat
   A rat ate the meat.
34. musa lá nākâ
   Moses took meat
   Moses took the meat.
35. u ba
   it sour
   It is sour.
36. etsú ʰi nākâ
   rat will eat meat
   A rat will eat the meat.
37. musa ʰi lá nākâ
   Moses carrying meat
   Moses is carrying the meat.

---

6 The actual phonetic forms of examples (36), (38), and (39) are:
36. [etswâ: ʰi nākâ]
38. [wâ: bâ]
39. [etsû: ʰi]

The vowel contractions and the Falling Tone will be discussed below.
38. wú à bă
   it will sour
   It will be sour.

39. etsú d u gi
    rat has it eaten
    A rat has eaten it.

40. u lá èdu bè
    he took yam come
    He brought the yam.

The High Tone/Rising Tone alternations of these verb stems can be predicted from the form of the verb whether it occurs with or without one of the low tone particles (e.g., the continuous marker /è/ or the future morpheme /â/). Thus examples (33) through (35) represent a high tone occurring in the absence of these particles, whereas in (36) through (38) the Rising Tone is obtained because of the presence of a preceding Low Tone particle. In many cases, however, the particle /è/ is deleted in the surface forms. In complex constructions (those which are termed serialization by Stahlke in this volume) such as examples (39) and (40) above, we obtain the Rising Tone because the /â/ is present at the appropriate point in the derivation. The segment features get deleted on the surface, the tone does not.7

7Thus we observe from these examples, (39) and (40), that the continuous form of the verb is required in such constructions despite the fact that they are semantically past. It is not surprising to find that a construction should dictate the form in which the verb is to occur. Thus in what we might term 'consecutive construction' marked by a sort of conjunction [či] 'and to', the past form is required as in musa à lá èdu či bè (Moses will take yam and to come) 'Moses will bring the yam', where the verb [bè] is future in meaning.
When a vowel in a verb stem is phonologically High, and the verb stem begins with a [-Voiced] consonant, one does not find this alternation, since rule (I) does not apply, as in examples (41) through (43).

41. gbìgbi tí
owl hooted
An owl hooted.

42. gbìgbi ètí
owl hooting
An owl is hooting.

43. gbìgbi á tí
owl has hooted
An owl has hooted.

The following derivation further demonstrates the applicability of Rule (I):

/musa bê/       /gbìgbi tí/
Rule (I)  - - - -  - - - - 

/musa èbê/       /gbìgbi ètí/
Rule (I)  musa èbê  - - - - 

---

8 The final phonetic forms of examples (42) and (43) are:

42. [gbìgbé : tí] (= sign for raised Low Tone)
43. [gbìgbyâ: tí]
Without postulating the pre-verbal Low Tone in the complex constructions, there is no way to explain the alternation of the tones on the verb stems which have voiced consonants initially, and one would be forced to represent such formatives with two lexical entries. The present solution permits one underlying phonological form for each verb stem, and at the same time shows that there is no phonological Rising Tone, since the general rule which predicts the Rising Tone also explains the alternations of the verb stems.

One can therefore conclude that Smith's Rising Toneme is the phonetic realization of a general rule in Nupe which predicts that a high tone will become a glide following a low tone and a voiced consonant.

C. The Falling Tone

The fifth tonemic tone suggested by Smith is a falling glide. Examples of words which could be used to support this conclusion are:

44. cìzi 'cheese'
45. bâ 'defamation' (from Hausa ba'a)
46. mànj 'teacher'
47. jàmà 'people'
48. jímà 'Friday'
49. àmà 'but'
50. dê 'outside'
51. sàlâ   a kind of drum
52. kâŋ    'a farm'

One can also add four of the personal pronouns to the list:

(these have a tonal contour [\~])

53. mî     'I' or 'me'
54. wê      'you' (singular)
55. yê      'you' (plural)
56. yi      'we'

Obviously, example (44) is a borrowing from English. Examples (45) through (49) also appear to be recent borrowings from Hausa. One might suggest that these few items be marked [+Foreign] or [+Exception] and ignore the problem of the Falling Tone. That suggestion, however, is unsatisfactory since we do find the Falling Tone in utterances, alternating with other tones. It is possible that if such Falling Glide can be predicted, some light will be shed on these few items.

Before we consider some examples of utterances in which the Falling Tone occurs, let us clarify the Rising Tone part of the pronouns in (53)-(56). In these forms we recognize a low tone prefix /ê/. Thus /êmî/ becomes [êmî] by Rule (I). Similarly, we obtain the same glide on the other pronouns. This postulation is justified by some historical evidence. [êmî] still occurs in the dialect of Kpada. In Pategi and Bida dialects, where the prefix is obligatorily deleted, the presence of a Rising Tone is assumed to be sufficient justification
for the positing of a preceding low tone. We can now treat the remaining part of the contour as part of the Falling Tone.

Examples (57) through (59) show the occurrence of the Falling Tone in utterances.

57. etsū: gi from /etsū a u gi/
   rat has it eaten
   A rat has eaten it.

58. ebe: ti from /ebe ëti/
   monkey howling
   A monkey is howling.

59. musè: gi from /musa ègi/
   Moses is eating.

From these examples we can note that first, the Falling Tone occurs on lengthened vowels, second, that certain vowels appearing in the underlying strings (or which would occur in slow deliberate articulation, or in isolation of the individual formatives) have been deleted, and third, that the Falling Tone may be a glide starting from a high tone or a mid tone. Example (57) shows a falling glide from high to mid, and (58) and (59) show a falling glide from mid to low. (A glide from high to low is also possible.) There are many examples where no glides occur in similar tonal environments where there is no immediate succession of vowels and when there has been no vowel deletion or contraction as in example (60).
60. musa si vátà

Moses bought vátà (vátà = a shallow calabash used for carrying loads)

Moses bought a calabash.

Thus we do not get:

60'. *musa si' vátà

Two more examples are needed before we make a generalization.

61. ŭ: há: fi o from /á u há èfi bo/

have it hang up LOC.

Hang it up.

62. musâ: dê kû from /musa á èdé kû/

Moses had cloth sold

Moses sold the cloth.

The above examples illustrate that vowel deletion or contraction is involved in Falling glide phenomena. The general deletion rule deletes a vowel preceding an immediately following vowel. However, a nominal prefix may be deleted in object position by the same rule—Vowel Deletion Rule (VDR). Thus VDR must be ordered so that if the nominal prefix is not deleted the preceding vowel is also not deleted. This would rule out the otherwise possibly occurring surface realization of example (63).

63. *ŭ hē: fi o

Since the tone of the deleted segment affects the final phonetic output, it is necessary to retain the tone while deleting the segmental features of the unit. Such a unit may be specified as [+T, -Seg ],
or symbolized as $\emptyset$. VDR may now be stated (with further constraints on the position in which the noun occurs; for example, some nouns in subject position do not permit this deletion):

\[
\text{II. VDR (Optional)}
\]

\[
V \rightarrow [+T -\text{Seg.}] / \begin{cases} [\text{Nom. Pref.}] \\ \text{V} \\ [-\text{Nom. Pref.}] \end{cases}
\]

This rule is to be read as follows: if a noun prefix occurs it can be optionally deleted. If, however, it is not deleted, part (b) cannot apply to delete the vowel immediately preceding it. If two vowels occur in succession, where the second is not a noun prefix, the first vowel can be optionally deleted by (b). The application of this rule is shown in the following derivation:

\[
/\hat{\text{u}} \text{ ha } \hat{\text{e}} \text{ fi bo}/
\]

VDR (a) \[
\hat{\text{u}} \text{ ha } \hat{\text{e}} \text{ fi } \emptyset \text{ o}
\]

(b) \[
\emptyset \text{ u ha } \hat{\text{e}} \text{ fi } \emptyset \text{ o}
\]

(The rule which deletes $[b]$ of the underlying /bo/ does not concern us here.)

We can now state the Falling Glide Rule (FGR) as the following:

\[
\text{III.} [V_{\alpha T}] \rightarrow [+G] / [\text{\text{-Seg}}]
\]

This states that the tone on a vowel will become a glide just in case it is preceded or followed by a different tone. It is necessary that the VDR precede this Glide Rule so that the glide will occur on the segmental vowel. Applying this rule to the output of the VDR in the
above example we get the following derivation:

By VDR   \( \emptyset \ u \ h\ddot{a} \ \emptyset \ f\ddot{i} \ o \)

By FGR   \( \emptyset \ \ddot{u} \ h\ddot{a} \ \emptyset \ddot{f} \ddot{i} \ o \)

A later P-rule will lengthen a V in the environment of a unit specified as \([+T, -Seg.]\). This rule may be stated as Vowel Lengthening Rule (VLR)

\[
\text{IV. (VLR) } V \rightarrow V: \left[ T \right. \left. \text{Seg} \right]
\]

The units which are \([-Seg \] \) will be deleted, deriving the final phonetic output of the above derivation as:

By VLR  \( \emptyset \ \ddot{u}: \ h\ddot{a}: \ \ddot{f} \ddot{i}: \ o \)

and finally,

\( \ddot{u}: \ h\ddot{a}: \ \ddot{f} \ddot{i}: \ o \).

Intuitively one would like to combine the Rising Glide Rule with the Falling Glide Rule. However, the RGR occurs only when a high tone occurs after a low tone, and only when a voiced consonant precedes the high tone. These two rules may be conflated as a general glide rule (GR).

V. GR.

\[
T \rightarrow [+G] / \left\{ [-\text{Tone}] \left[ +\text{Low} \right] \right\} \left[ +\text{Vcd} \right] / \left\{ \right. \left[ -\text{Tone} \right] \left[ +\text{Hi} \right] \right\}
\]

It seems quite obvious that such a rule must be stated to predict the Falling Glide when it occurs in sentences. Otherwise different phonological shapes of the same roots must be given in the lexicon. Can such a rule provide an explanation for the falling tones which occur in the few formatives given in examples (44) through (56)?
As already stated, a number of these forms cited are direct borrowings from Hausa. [bâ:] is the Nupe form for the Hausa bâ'â. The tones on the Hausa form is High-Low. In Nupe the glottal stop is lost, and the Falling Tone on the lengthened vowel is predicted by the rules given above. Thus we have the following:

/bââ/
by VDR bōâ
by GR bōâ
by VLR bōa:
and finally,

[bâ:].

[kâŋ] is a shortened form of [kámi] which is 'farm'. There is an optional rule in Nupe which permits the deletion of [i] after [m] if followed by a word boundary. This is represented in VI.

VI. i + ø / m__#

Some provision must be made to transfer syllabicity to the derived final [m] to become [ŋ]. Another rule would convert [m] to [ŋ] if in final position. Thus an alternative realization of

64. /lá yà èmì/

take give me

give it to me.

is

([lá yà èmì])

64'. [lá yà ŋ].
This reflects the regularity of the monosyllabic stems. Since sonorants can bear tone, there is a rule which spreads the tone of a deleted vowel onto a preceding sonorant. This can be stated as Tone Spreading Rule (TSR).

VII. TSR. [+Son] → [aT] / [aT]

This rule applies prior to the GR, and must precede the [i] deletion rule. Thus we get:

Underlying form  kámi
By TSR          kámi
By [i]-Deletion kám
By GR           kám

and finally,

káŋ

[mān] is similar to [kāŋ], since it is the shortened form of [mállámi] from Hausa mállámi ('teacher'). But this form is an exception in that not only is the final vowel deleted after the nasal, but the second syllable is also deleted. Since it is an exception, no general rule can be written for the deletion of -lá-. Given the shortened form, however, the tonal Falling Glide rule applies.

[dē] also requires some explanation. In the dialect of Kpada, instead of [dē:] of the Pategi and Bida dialects, we get [dēŋ] (both forms mean 'outside'). If the phonological representation for all dialects is /dēŋ/, one must mark this as an exceptional item (which indeed it is) in Bida and Pategi. Then there will be a rule
which deletes the final [n]. One can also represent this form as 
/ðeθ/, in these dialects.

The four pronouns would also be represented as /əmi/, etc. An alternative would be to represent the final /i/ with features 
[+T, +L] with no segment features represented.

It may be argued that such lexical representation violates the naturalness condition and as such is untenable. But since it is necessary to include the Falling Glide Rule in any case, and since this rule predicts the correct phonetic forms of this small closed class of formatives, any other solution would require that we miss real generalizations which predict the occurrence of the Falling Glide.

D. The Sixth Tone

As stated above, Smith postulated a possible sixth tone, which he then chose to represent as an additional vowel phoneme. This tone is a sort of level tone, and in pitch, it is between a mid and low tones. Example (65) illustrates this.

65. u da٦ mi (represents the tone in question)

He went home.

The underlying form for (65) is

65'. /u da٦ əmi/

/ə/ is deleted by the VDR since it is a nominal prefix. Regularly in Nupe, all low tones are raised when they interact with neighboring tones. Thus /da/ becomes [də:] (the vowel lengthening is obtained by
the VLR). /dà/ occurs at the end of utterances as [dà]. This is illustrated in (66).

66. /u dà zà dà/ u də: zə də
   he walked walk He actually walked.

This mysterious 'sixth tone' is then the result of a simple low tone phonetic raising rule which can occur at the end of the P-rules.

It should also be noted that in rapid speech when the long vowel is often reduced the Falling Glide tones can merge with the raised low tone, and the result is that phonetically they may be indistinguishable. What is important, however, is that all the glides, both Rising and Falling, and the Raised Low Tone are predictable by rule, given only three phonological tones.⁹

In summary, the rules which are necessary to predict the non-phonological tones of Nupe are given below:

---

⁹The following words occur in Smith's analysis:

(a) /lʊkʊntata/ 'arm pit'
(b) /sesègi/ 'swollen glands in the arm pit'
(c) /susuзи/ 'waxbill'
(d) /tamu/ 'tinder'

In Pategi dialect (a) is phonetically [lʊkʊntata]. If we recognize a low tone prefix, we can predict the Rising Tone. The Falling Tone also can be predicted by our rules. The remaining forms (b)-(d) seem to be ideophones. As such they do not undergo regular phonological rules.
1. Vowel Deletion Rule
2. Tone Spreading Rule
3. [i]-Erasure Rule
4. Glide Rule
5. Vowel Lengthening Rule
6. [−Seg ] Deletion Rule
7. Low Tone Raising Rule
REFERENCES


