

Problems of Palatalisation in Akan

Lawrence A. Boadi

University of Ghana, Legon.

Mensah has proposed that palatalisation in Akan results from the articulatory force of certain consonants. This paper refutes this view by providing evidence that palatalisation occurs in the environment of non-low front vowels. Because of a front/low vowel alternation rule, palatalisation also occurs in back vowel environments. Its occurrence in certain words in the environment of /a/ leads to postulating two underlying vowels /a/ and /æ/, and thus two 5-vowel harmony sets.

Mensah a proposé que la palatisation en akan provient de la force articulatoire associée à certaines consonnes. Cet article réfute ce point de vue en démontrant que la palatisation paraît en contexte de voyelles +antérieur et -bas. Par une règle d'alternation entre voyelles +antérieur et +bas la palatisation paraît aussi en contexte de voyelles postérieures. L'apparence de la palatisation avec /a/ amène à poser deux voyelles sous-jacentes: /a/ et /æ/, et par conséquent un système d'harmonie vocalique composé de deux séries de cinq voyelles.

0. INTRODUCTION

This paper¹ raises issues about the nature of palatality and palatalisation as phonetic processes in Akan and other languages. I was prompted to write it by Mensah (1977) on the same topic. The central argument of Mensah's paper is that palatalisation does not arise as a result of the presence of a front vowel in the linguistic environment as widely accepted, but as a result of articulatory force which accompanies the production of certain consonants. Mensah bases his argument on data selected mainly from Akan but he also uses material from Latin and French as well.

We take a different position in the central portions of this paper where we provide evidence in support of the more traditional view that palatalisation occurs in the environment of non-back vowels. That is, a non-low front vowel is the unmarked environment for induced (predictable) palatalisation. The available evidence would seem to suggest that if a language had processes of palatalisation induced by a linguistic environment other than a front non-low vowel, then these processes are also induced by a front non-low vowel. As background to the presentation of our view, we discuss the phonetic nature of palatalisation in general in the first part of the paper. We then proceed to argue for the more traditional view.

We define palatalisation as either (i) a synchronic or diachronic consonantal shift towards the palatal region; or (ii) the simultaneous raising of the front of the tongue towards the hard

palate during the formation of a major stricture in the production of a non-palatal consonant. Both types (i) and (ii) have to do with place of articulation or properties of localisation in Trubetzkoy's scheme of oppositions. But the one belongs to the basic series - labial, dorsal etc. and the other the secondary series. During the formation of a stricture for the production of a consonant, say a stop, the blade of the tongue can be brought into close contact with a large area of the hard palate near its forward slope and in the pre-palatal region (Heffner, 149:133). The resulting stop is said to be palatalised in accordance with (i) above. In the case of the labials and dentals, there is no adjustment of the stricture during the contact between the blade or front of the tongue and the hard palate, according to Heffner. The major and minor articulations are superimposed one on the other. This is the second type of palatalisation referred to above and is exemplified by the following in the Fante dialect of Akan:

1. [pj̥ir] 'struggle'
- [bir] 'blacken'
- [fj̥ew] 'beautiful'
- [mj̥in] 'swallow'

The situation is somewhat different and complex for velar stops as pointed out by Heffner. The primary stricture for the velar *k*, *g*, is first advanced to the medio-palatal area and then extended to the prepalatal, forming a long occlusion. During the release of the palatalised stop, 'the opening begins at the normal point of release for the stop' (1949:133), followed by a quick 'peeling off' of the pre-palatal occlusion. This results in a fricative glide. In Akan a similar process occurs in very few contexts but the occlusion does not extend to the pre-palatal. Furthermore, there is no audible fricative or glide; or, if there is, it must be very short. Examples include the ideophones *ken!* *kim!* and some affixes e.g. *ke* in *keka* 'bite' as well as a class of morphs with specified phonological structure including *keṭe* 'mat', *keṣi* 'big', *keṭereṃa* 'tongue'. This process is one manifestation of the first type of palatalisation described above.

The release of the medio-palatal or palatal may be so slow as to be followed by the homorganic fricative (medio-palatal or palatal) resulting in a medio-palatal or palatal affricate [cç] or [ʃz]. This is a second, statistically more important, variation of the first type of palatalisation referred to above e.g. [cçim], [ʃzi] etc. It is so frequent and regular that this is what most writers refer to as velar palatalisation. The two types of palatalisation, then, are both exemplified in Akan. The first type results from a shift from the primary stricture. In the second type, the major point of articulation remains outside the palatal area, while the secondary stricture is superimposed giving the articulation a front-vowel colouring.

For purposes of description, we divide the Akan dialects into Groups A and B. Group A dialects are represented by Akuapem and Fante and B by Akyem, Asante and Kwahu.

1. PALATALISATION IN AKAN

It is customary, for purposes of describing palatalisation in Akan, to divide the consonants into two: back and non-back (Christaller, 1881; Schachter and Fromkin, 1968). It is also useful to divide the back consonants into stop /k, g/ and non-stop /w, h/ since they do not undergo identical processes. For example, although all the underlying back consonants can shift towards the palatal area when certain phonological rules apply, only the former can affricate because they are stops. Finally, we should distinguish between the simple velars /k, g, h/ and their labialised counterparts /k^w, g^w, h^w/. As will be shown, the last two of the labialised velars occur before the vowel /a/ in the Akuapem and Fante dialects only. In other dialects they have a palatal component before /a/. (But see Sect.3 for a reinterpretation of /a/.)

Akan has surface phonetic forms like [ku, ko, gu, wu, hu] but normally not [ki, hi, gi, wi] etc. With very minor exceptions the initial plosives occurring before front vowels become palatal affricates. For simplicity we will assume that the rule that accounts for this change has two parts. The first shifts the consonant to the palatal or medio-palatal:

[illegible]

This rule produces (a) intermediate forms like [cím] 'twist', [jí] 'receive'; (b) surface forms for ideophones like [cén], [cím]; (c) surface forms of items like [cètɛ] 'mat', [cèsɪ] 'big' belonging to a class of morphs whose morph-initial /k/ does not affricate; and (d) certain prefixes, including the reduplicating affix.

The second part of the rule changes (medio)-palatal plosives to affricates. This part of the rule does not operate on (b), (c) and (d) above, which are already surface forms after the application of 2(i):

$$2.(ii) \quad c, j \rightarrow c\epsilon, j_z$$

This rule turns fronted velars in forms like *[cím] and *[jí] to [ccím] 'twist' and [jzím] 'receive'. Table 1 illustrates the application of the two rules on the three classes of morphemes.

Table 1

Underlying Form	kika	kum	kɛtɛ	kim	kim	gi
Palatalisation	cika	...	cɛtɛ	cim	cim	ji
Affrication	...	...	...	...	cɛim	jzi
Final output	cika Redup. of ka 'bite'	k ^w um 'kill'	cɛtɛ 'mat'	cīm ideo- phone	cɛīm 'twist'	jzi 're- ceive'

The back non-stops /w/ and /h/ are palatalised in similar environments but they are not affricated for obvious phonetic reasons. Thus, underlying /wi/ and /hɛ/ become [qi] and [ɛɛ].

The view taken here, then, is that the rule of palatalisation applies without exception throughout the language to /k, g, w, h/ in the environment of non-low front vowels. The ideophones and prefixes containing these consonants as well as items like *kɛtɛ* are no exception to the palatalisation rule, although velars in these items do not undergo the rule of affrication. When the labialised velar counterparts /k^w, g^w/ are followed by front non-low vowels they, too, undergo the palatalisation rule and, as pointed out, the rule of affrication applies subsequently.

2. THE TREATMENT OF PALATALISATION IN GENERAL & IN AKAN

Whether as a shift in articulation to the palatal region or as a secondary articulation, palatalisation has been treated in the literature as an assimilatory process induced by a non-low front vowel. This is the position taken by Christaller (1881), Welmers (1946), Schachter and Fromkin (1968). But, as has been pointed out by Mensah, one finds surface phonetic sequences like [cɛ^wo], [cɛa] etc. in Akan and many other languages in which palatalisation is induced rather than contrastive. If it is insisted that all cases of induced palatalisation be accounted for by the presence of a front non-low vowel, such cases of palatalisation cannot be explained.

Mainly because of cases like the occurrence of palatal consonants in the environment of [a] (and possibly back vowels) in Akan and other languages, Mensah rejects the view that palatalised consonants are the result of front non-low vowels. He quotes the following as exceptions to the rule of palatalisation in Akan:

- (i) Reduplicated morph-initial velar consonants do not palatalise e.g. *kika* not *kyika* (but see below).
- (ii) A morph-initial consonant is not palatalised if it is followed by a syllable introduced by a voiceless alveolar e.g. *kɛsi*, *kɛtɛ*, not *kyɛsi*, *kyɛtɛ*. (This restriction goes as far back as Christaller (1881) who, however, does not state it in terms of palatality. It is quoted by Schachter and Fromkin.)

Rejecting distribution as a criterion, Mensah proposes to attribute palatalisation in Akan and in all languages to physiological processes.

...we believe that palatalisation is mainly conditioned by the articulatory force operating on a syllable at a particular time. (1977:72)

By force of articulation is meant 'the actual energy dispensed by the muscles of the organs...' and this is to be distinguished from energy from respiratory force produced by the pulmonary organs. The amount of energy dispensed, it is explained, is in direct proportion to the duration of the sound. Mensah claims that Fante [a] is one of the longest vowels, certainly longer than [i]. And since [a] requires relatively great muscular energy it easily induces palatalisation of the consonant in the neighbourhood. It is this phonetic property of [a] that accounts for the occurrence of palatals before the vowel.

Mensah argues that the change from velar to palatal in the stop series is the result of advancing of the tongue-root initiated by reinforcement of the articulatory organs but the change from palatal to alveolar involves a reduction in energy. Some of the physiological evidence referred to by Mensah receives confirmation by instrumental studies of vowels. For example, Bush (1964) points out that physiologically "the Compact vowels [æ] and [a] are characterised by greater incisor separation than are the Diffuse vowels [i] and [u]. The amount of incisor separation has a high correlation with the amount of phonetic power in the vowel" (p. 52). Bush reports that Fairbanks, House and Stevens have assigned to these four vowels the following relative positions in a descending order of vowel intensity: [æ, a u, i]. The crucial question is whether the intense phonetic force associated with compact vowels explains the evolution or initiation of palatalisation. Put slightly differently, do palatal consonants develop, and does palatalisation take place, only or even preponderantly, in the environment of the compact vowels [a] and [æ]? If Mensah's hypothesis is correct, then the following velar-vowel sequences (which occur in many languages) will represent a descending order of importance and generality in the evolution of palatality and palatalisation: [kæ, ka, ku, ki]. But this is not the scale one finds in the majority of languages including Akan. Although induced palatal consonants occur in the immediate neighbourhood of the compact vowels [æ] and [a], their occurrence here is less frequent than in the environment of the non-low front ones. And no one would seriously claim that underlying /k/ in /ku/ is more likely to palatalise than underlying /k/ in /ki/; yet the production of [ku] requires more intense phonetic power than [ki], according to instrumental evidence.

Mensah makes the additional point that the movement of consonants from velar to palatal in the stop series is the result of advancing of the tongue root initiated by the reinforcement of the articulatory organs. It is commonly known that tongue-root advance is accompanied by a widening of the pharynx. As pointed

out by a number of instrumental phoneticians (Halle: 1959), the pharynx is widened during the production of front vowels, too, especially [i], [e]; and this explains why no transitional effects are observed when a palatal sound is adjacent to a front vowel (pp. 150, 152).

The physiological evidence, then, would seem to support the view that the production of front vowels and movement of velar consonants to the palatal area have a phonetic/physiological property in common; namely, the widening of the pharynx. This may explain why palatalisation or fronting of velar consonants is often induced in the environment of front vowels.

I think that the physiological facts of tongue-root advance and the velar-to-palatal movement discussed by Mensah should be linked with the widening of the pharynx and its relation to front vowels. One must give due weight to instrumental evidence that there are no observable transitional effects between a palatal sound and an adjacent front vowel. I do not think it is enough merely to link velar-to-palatal movement with articulatory force. There are other factors; and, indeed, as I have explained, articulatory force alone does not explain why [k] in [ki] palatalises more easily and statistically more frequently than [k] in [ku].

Mensah's hypothesis, then, does not explain the facts of palatalisation. The evidence he adduces does not support the conclusion that force gives rise to palatalisation in Akan. Neither does it explain why there is often a movement of velar consonants towards the palatal region or why a secondary stricture is sometimes formed in the palatal area. It may well be that neither of these processes is induced by non-low front vowels, but we should be interested in knowing why in a large number of cases palatalised consonants co-occur with non-low front vowels.

3. AN ALTERNATIVE INTERPRETATION

No one would deny the importance and relevance of physiological evidence in interpreting phonology. After all, phonological systems are ultimately realised by bodily movements. But it should be borne in mind that the abstract phonological units in a system respond to restrictions within the system itself as well as to higher-level ones outside phonology; in particular, to syntactic and semantic restrictions. An account of palatalisation in Akan should take into consideration co-occurrence restriction in the vowel system (vowel harmony); recognise a distinction between two subclasses of stop consonants (plosive and affricate). It should also take cognisance of syntactic restrictions imposed on phonological processes.

It is also important to bear in mind that Akan has sister languages and these languages have velar stop consonants which have undergone various phonological changes. It would be useful to bring knowledge of the development of velars in related languages to bear upon an attempt to explain the evolution of palatals in Akan. One should not ignore the historical dimension. Another dimension of history derives from the set of extant

written documents on Akan; in particular, the phonetic transcriptions made by Koelle in the nineteenth century and Christaller's comments on the pronunciation of Akan around the same period. Above all, one should not lose sight of the fact that certain phonological processes and underlying representations may be obscured by other historical and synchronic processes. Taking all these into account, including the physiological, we may come closer to explaining the source of palatals more satisfactorily.

3.1 PALATALISATION DUE TO ENVIRONMENT OF NON-LOW FRONT VOWEL OR GLIDE.

I think that the position taken by Christaller, Welmers, Schachter and Fromkin on Akan palatalisation is essentially correct. Most cases of palatalisation are triggered by an underlying non-low front vowel or glide.

I do not find it necessary to accept the rules of exception first formalised by Schachter and Fromkin and quoted by Mensah as part of the grammar of Akan. These relate to reduplicated morphs and lexical items like *kɛsɪ* 'big'; *kɛtɛ* 'mat'. It is necessary to get the phonetic facts straight. **kyika*, and **kyesi*, with initial palatal affricates, do not occur, and in place of the affricates, simple plosives occur. But this is different from saying that the initial plosive is not palatalised or fronted in these environments. In my pronunciation and that of many Akan speakers I have investigated, the reduplicated forms of [ka] and [kan] are [cika] and [cɪŋkan] and not [kika] and [kɪŋkan] as transcribed by Mensah. The initial plosive consonants are palatal or at least medio-palatal, not velar. Similarly the pronunciation of *kɛtɛ*, *kɛsɪ* are [cɛtɛ] and [cɛsɪ] with an initial (medio)-palatal consonant. This would be true of the ideophones, too, not mentioned by Mensah or Schachter and Fromkin. What would be correct to say is that these initial plosive consonants have not undergone affrication after the initial palatalisation. The non-labialised back consonants /k g h w/ all become palatalised or advanced in the environment of non-low front vowels. The stops may affricate after palatalisation provided that they do not occur in any of the three environments mentioned above.

If we accept these facts, it follows that there are no non-low front-vowel environments in Akan where the back consonants do not palatalise in the manner described at the beginning of this paper. It is also a fact that the conditioning factor in Akan palatalisation is the presence of a surface non-low front vowel except in two cases:

- (i) before the vowel /a/
- (ii) before back vowels like u, ʊ, o, ɔ, in surface phonetic form.

Examples of (i) include the following in Group B dialects: *gya* [jza] 'leave', *dwa* [jzʷá] 'split'; *dware* [jzʷari] 'bathe'.

Examples of (ii) include the following in all Akan dialects. *dwuma* [jzʷumá] 'duty', *dwo* [jzʷú] 'cool'. It is in the handling

of such items that Mensah's criticisms of the traditional view of palatalisation become relevant. How does one explain palatalisation and affrication of [jz^wa], [jz^wumá] etc. in the absence of a non-low front vowel?

At the risk of sounding otiose one should repeat here that some relations in a phonological structure are often "obscured" as a result of historical processes or the order in which phonological rules apply. I think that at least some of the apparent exceptions to the rule of palatalisation referred to above can be explained if one bears this point in mind. (Bloomfield 1922:377ff).

3.2 PALATALISATION OF CONSONANTS IN BACK-VOWEL ENVIRONMENTS

There is an important phonological rule in all the dialects of Akan and West Volta-Comoe by which front and back vowels alternate. It is not always easy to state the conditions under which this rule operates. Examples include:

3.	okúsie	okisie	'rat'
	an ^w jú ^m íre	an ^w jímíre	'evening'
	kosujá	kesujá	'egg'
	túmì	tímì	'power'
	bótùmí	bétìmi	'will be able'

The alternation occurs within and across dialects. The vowel-alteration rule operates to remove the original environment which triggered palatalisation, substituting for the original front vowel, a back vowel. The effect is the juxtaposition of a palatal(ised) consonant and a back-vowel. Examples include: [ńcɛ^wúm] 'scabies'; [cɛ^wùm] 'completely'; [cɛ^woobóì] 'a war cry'. The respective alternants, with front vowels, are;

4.	ńcɛɔ ^w ím	(underlying form: nkɔ ^w ím)
	cɛ ^w ím	" " ku ^w ím)
	cɛ ^w eebóì	" " kueebèi)

As can be seen all these latter, apparently problematic, items have a non-low front vowel in their underlying representation as well as in one of their alternant surface forms. Palatalisation, labialisation and affrication apply to produce forms like [cɛ^wím] and [cɛ^weeboi]. As already pointed out, the conditions under which vowel-alteration operates are not clear. However, Christaller points out that after a palatal affricate has been formed the front vowel is backed if it is followed by [m] or [w]. [w] may itself disappear after backing of the vowel. In his Dictionary, Christaller cites similar forms containing palatal consonants with front and back alternating vowels.

3.3 PALATALISATION OF CONSONANTS IN THE ENVIRONMENT OF /a/

The next group of problematic cases of palatalisation are all sequences of a palatal affricate and an /a/- type vowel.

The difference between 7a and 7b in terms of production is that in the former A₁ triggers a velar-to-palatal movement and exerts an upward and forward pull on the body of the tongue. Although the vowels in positions A₁ and A₂ are phonologically distinct and have different physiological correlates the auditory differences between them seem to have been neutralised in some dialects of Akan (Ladefoged:1964,37). In prefix position, however, the difference is heard, as the items of 8 show:

- | | | |
|-----|-----------------------|-------------------|
| 8a. | e + k ^w a | 'it polishes' |
| b. | ã + k ^w a | 'it has polished' |
| c. | æ + cɔ ^w æ | 'it has cut' |

[æ] is distinct from both [e] and [a].

Stewart suggests that tongue-root advance which accompanies the production of [æ] has the effect of pushing 'the highest part of the tongue not only higher but also at least further forward' (1971, 202). A similar observation has been made by Pike:

'It would seem that if one were to move the tongue root forward for purposes of phonetic contrast, the tongue blade would be likely to go forward at least a little bit at the same time (1967, 136).'

The palatalisation which occurs in the environment of [æ] is the result of the forward movement of the tongue blade.

3.4 A TEN-VOWEL SYSTEM

Our explanation for the occurrence of palatals before the low vowel [æ] requires that we recognise a contrast between [a] and [æ] and, consequently, a symmetrical vowel-harmony system of five tongue-root advanced and five retracted vowels. Although the contrast between the two vowels in root morphs has almost vanished from most Group A dialects (of Akuapem and Fante) one finds here and there evidence of contrast. We give here two pairs of near-minimal contrasts taken from the Akuapem dialect.

- | | | |
|-----|-----------------------|-------------------------|
| 9. | g ^w amaŋ | 'conspiscence' |
| | ʃz ^w æmina | 'Dwamena' (proper name) |
| 10. | g ^w aɪ | 'disjoin' |
| | ʃz ^w æɪ | 'haughty, arrogant' |

In 9 and 10 the velar and palatal occur before [a] and [æ] respectively. If, as we and others have argued, the palatals and velars are conditioned variants, the only way to explain the alternation is to recognise two underlying low vowels, /a/ and /æ/, conditioning the choice of velars and palatals respectively.

3.5 THE PALATAL GLIDE: KOELLE, CHRISTALLER AND SCHACHTER AND FROMKIN

Christaller points out in his Dictionary that the palatal affricates evolved historically from velar plosives in the environment of front vowels. He illustrates the point with several examples and in almost all these the triggering front vowel occurs in present-day surface structure. However, Christaller has very little to say about the evolution of palatal

affricates in the environment of [a] in surface phonetic form. But he points out that such items as present-day **ogya** 'fire' had either /i/ or a palatal glide between the consonant and final vowel in the nineteenth century. Schachter and Fromkin use this fact to justify their postulation of the i-insertion rule which introduces i into morphs with a surface sequence of a palatal affricate and [æ]. Mensah, on the other hand, not only rejects this interpretation of the facts but goes as far as to suggest that Christaller's transcription of the data may have been wrong. Christaller was probably far too thorough and keen an observer of speech to commit an error of this kind. Three decades before the publication of the Dictionary, Koelle had published his *Polyglotta Africana* in which he included data from the Asante-Twi dialect of Akan. Like Christaller, Koelle transcribes present-day **ogya** 'fire' as [ogia]. Both heard a high front vowel or something approaching it in the transition from the velar to the vowel [æ]. Koelle's data include transcriptions of similar items. We reproduce below some of them, with the corresponding Group B forms and our proposed underlying representation. We assume from the data and interpretation from the previous section that both /a/ and /æ/ are underlying vowels.

11. Koelle	Present-day Akan	Proposed Under- lying Form
bogia 'blood'	bójzæ	bogæ
agia 'father'	æjzæ	ægæ
ogia 'fire'	ojzæ	ogæ
ohigia 'lion'	oɕijzæ	ohigæ
egwiasi/eguiasi 'market'	ejz ^w æ(si)	eguæ(si)
gwiari/guiasi 'bathe'	jz ^w æri	guæri

The non-low front vowel /i/ which occurs before /a/ and after /u/ in the last two items selected from Koelle is reflexed in a similar environment in most present-day dialects. Compare the utterances of 12 and 13 below:

- | | | |
|------|---------------------------|----------------------|
| 12a. | mīk ^w ú | 'I kill' |
| b. | mīg ^w ú | 'I let fall' |
| c. | mīh ^w ú | 'I see' |
| 13a. | mīc ^w újānūmāá | '(If) I kill a bird' |
| b. | mīj ^w újà | 'If I let fall' |
| c. | mīh ^w újà | 'If I see it' |

The palatal glide inserted between [u] and [a] in the utterances affects the quality of the [u], making it more fronted and more palatal. This palatal quality spreads leftwards to influence the morph-initial consonant. Thus the [k g] in [k^wu] [g^wu] become fronted [c^wū] and [j^wū] in the environment of the automatically inserted glide [j]. These facts and the data from Koelle help provide a clue to an interpretation of the labilised-palatal consonants which occur in the environment of a following [a]. The palatal glide discussed above does not appear in the underlying representation, being predictable by a rule. Its presence, however, reinforces palatalisation of the velars in certain phonetic environments.

Table 2

Underlying	<u>guæ</u>	<u>kua</u>	<u>kui=a</u>	<u>suæ</u>	<u>sũĩ=a</u>	<u>hũæ</u>
Form:						
Labialisation:	g ^w uæ	k ^w ua	k ^w ui=a	s ^w uæ	s ^w ũĩ=a	h ^w ũæ
Pal.Glide Ins:			k ^w ui=ja		s ^w ũĩ=ja	
Palatalisation:	j ^w ũæ		c ^w ui=ja	s ^w jæ	s ^w jũĩ=ja	c ^w uæ
Affrication:	j ^{zw} ũæ		cc ^w ui=ja			
U-Deletion:	j ^{zw} æ	k ^w a	cc ^w i=ja	s ^w jæ	s ^w jĩ=ja	c ^w æ
Final Phonetic	j ^{zw} æ	k ^w a	cc ^w ijja	s ^w jæ	s ^w jĩjã	c ^w æ
Output:						
	'market'	'polish'	'dog'	'be small'	'learn'	'scent'

3.6 DERIVATION OF MORPHS WITH INITIAL PALATALS AND FINAL LOW VOWELS

Table 2 illustrates the derivation of palatals in the context of the low vowels /a/ and /æ/. In this section we make a few observations on some of the items on the Table.

The phonetic form [cc^wijja] 'dog' is derived from the underlying form **kui=a** (where "=" represents syllable boundary). Palatalisation with subsequent affrication is induced by /i/ occurring on the left of the boundary and in the same syllable as the consonant. This is after labialisation has applied. The source of [j] in the phonetic output has already been explained. Although this palatal glide sometimes triggers palatalisation it plays no role in this context being superseded by /i/ in the same syllable as the consonant.

Underlying /kuæ/ and /guæ/ behave differently in this respect. Fronting and subsequent affrication are initiated by the vowel /æ/ occurring in the same syllable as the morph-initial consonant.

Syllable boundary obviously plays a role in determining whether or not affrication should take place after palatalisation. The word **Twi** (the name of a dialect of Akan) is /kúi=i/ in the underlying phonology and undergoes the same process as /kui=an/ discussed above. The non-low front vowel /i/ occurs in the same syllable as the morph-initial consonant and thus induces palatalisation and affrication in it after the rule of labialisation has applied.

Now, let us consider further the role of syllable boundary using the following as an illustration:

14a.	ækuja	'Akua'	underlying:	æ=ku=ba
b.	akũĩ	'fighting place'	"	a=kũ=ĩ
c.	økũ	'hernia'	"	ɔ=kũ=ĩ
d.	kũ	'notch'	"	kũ=

The last syllable of (a) changes to [wa] and then [a] (by regular rules which we need not discuss here) resulting in [æ=ku=a]. The correct environment is thus created for j-insertion after which [æ=ku=ja] results. All four items contain the palatal /i/ or /j/, but i/j is separated from the high vowel /u/ by a syllable boundary. Hence, although palatalisation and fronting of the velar consonant and back vowel can take place, the former cannot affricate. In slower speech, palatalisation and fronting do not occur at all. Corresponding to the underlying representations above, are the following two sets of surface forms representing slow and relatively fast speech respectively:

15.	<u>Slow speech</u>	<u>Fast speech</u>
a.	ak ^w ũjĩ 'fighting place'	ac ^w ũjĩ
b.	ɔk ^w ũjĩ 'hernia'	oc ^w ũjĩ
c.	æk ^w uja 'Akua'	æk ^w úja
d.	k ^w ũjĩ 'to notch'	c ^w ũjĩ

4. CONCLUSION

It should be clear from the evidence given that velar palatalisation is induced by the presence at some level of a phonetic feature which has the property of pulling a back consonant to the palatal area. The feature may reside in

(a) a front non-low vowel like [i ɪ e ɐ]
or

(b) the vowel [æ], whose [low] feature specification is compensated for by its ability to simultaneously raise and front the body and blade of the tongue. The traditional view of palatalisation is that it is assimilatory; and one does not need to go outside this to explain the process specially for Akan. It requires an environment which technically fronts (i.e. pull in the direction of the front of the tongue) and raises. Simultaneous raising and fronting are some of the phonetic properties of the Akan low [æ] and the other non-back vowels.

NOTES

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