Studies in African Linguistics
Volume 24, Number 1, 1995

ASPECTS OF AVATIME PHONOLOGY*

Russell G. Schuh
UCLA

Avatime is one of 14 Central-Togo languages (formerly known as "Togo Remnant Languages") spoken in the Volta Region of Ghana and contiguous areas of Togo. The most striking typological feature of these languages compared to their closest Kwa relatives is the fact that they have active noun class systems. The present paper is a description of Avatime phonology, with emphasis on certain features which have been poorly described and/or are of general linguistic interest. Within the consonant system, Avatime has bilabial fricatives and a full series of labiovelar obstruents, including fricatives. Consonants with following glides are considered to be segment sequences rather than consonants with secondary articulations. The vowel system has nine vowels with [ATR] harmony. Continguous vowels undergo a variety of coalescence processes, which differ depending on morphological context and the specific vowels involved. Modern Avatime requires an analysis with four contrasting level tones. However, many instances of two of these tones (the highest level and the lower mid level) are derived through still active processes. One feature of the tone system not previously described is the presence of glottal stop following a syllable bearing non-low tone when that syllable falls at a phonological phrase boundary.

* This paper derives from about a month of fieldwork I did on Avatime, partly in conjunction with Ian Maddieson, in November and December 1994. Travel to Ghana for Maddieson and myself was made possible by a University of Ghana/UCLA faculty exchange program funded by the United States Information Agency through UCLA's James S. Coleman Center for African Studies. The field work consisted of 2-3 weeks on the University of Ghana campus at Legon and a five day trip to Amedzofe. At Legon, we worked with Chris Kwami Bubuama, a 28 year-old native of Amedzofe who had completed his O-level examinations and who is employed at the University's Balme Library. In Amedzofe we worked with a number of speakers, but the primary informants were Christian "Sony" Dedume, a 40 year old teacher at the Amedzofe Government Secondary School, and Martin K. Aboni, who is 22 years old and has recently completed his O-level examinations at Vane, the area headquarters. I am grateful to Okusie Akyem Foli V, Chief of Amedzofe, for facilitating our field work in his community and to Christian Dedume, Martin Aboni, Wilson Adinyira, and Joseph Mawuena for their help in Amedzofe. Special thanks go to Andy Ring of the Ghana Institute for Literacy and Bible Translation (GILBT) for making the trip to Amdedzofe possible, profitable, and enjoyable. Thanks also to Robert Botne, who commented on a draft of this paper. And most especially, thanks to Chris Bubuama for his indefatigibility, patience, insight, and advice.

1. Background

Avatime is one of 14 languages referred to as "Central-Togo" languages in Kropp Dakubu and Ford [1988]. These languages were first recognized as a group by Struck [1912], who referred to them by the term "Togorestsprachen" (rendered in English as "Togo Remnant Languages"). Most of the "Central-Togo" languages are spoken in the Volta region of Ghana, though several, including the largest, Kposo, are spoken in Togo, and one, Basila, is spoken in Benin. Avatime is spoken north of Ho in seven towns, the largest of which is Amedzofe (*À̀mèdzɔ̀fē*). The language is called *Sɪ̀yà* or *Sɪ̀yàsɛ̀̃* by its speakers, who refer to themselves as *Kèdāɳ̄mà* (m.sing. *Kèdɔ̄nē*, f. sing. *Kèdēdzē*). "Avatime" is the Ewe appellation, but I retain it here since it is the term most widely used in the literature and also in Ghana to refer to the people and their language. According to Kropp Dakubu and Ford [1988:121],[1] Avatime had about 11,600 speakers in the late 1980's. Avatime, along with Nyangbo-Tafi and Logba, are the southernmost Central-Togo languages, separated from the primary Central-Togo speaking area by Ewe. Ewe is the lingua franca and language used in primary education for the area. The effects of Ewe contact on Avatime (and other Central-Togo languages) will arise at several points in the discussion below.

What has struck researchers about the Central-Togo languages from the earliest times is the fact that they have active noun class systems utilizing prefixes and concord much like the Bantu languages. This is in contrast to the languages which appear to be their closest linguistic relatives, where lexical noun class and concord systems are entirely absent. Greenberg [1966] listed the Central-Togo languages together with Ewe, Akan, Gã, and a number of other languages as the "b" subgroup of his "Kwa" group. Though a fairly close linguistic affiliation of the Central-Togo languages with geographically nearby "Kwa" languages has long been recognized, dating from Struck [1912], the Central-Togo languages have generally been considered to comprise an independent subgroup. Heine [1968], using a number of lexical, morphological, and lexicostatic diagnostics, proposed a two-way division within the group, which he referred to as the the "NA" and "KA" branches, based on the reconstructed root that the respective languages use for 'meat'. Avatime is a member of Heine's KA branch.[2] More recently, Stewart (as reported in Kropp Dakubu and Ford [1988:122]) has proposed that Heine's NA branch is to be

---

[1] Kropp Dakubu and Ford [1988] base their demographic information on Heine [1968] and Ring [1981] and the internal Central-Togo linguistic classification on Heine [1968]. They present a succinct and useful summary of the historical, social, and linguistic situation of the Central-Togo languages. Here, I repeat only that information relating particularly to Avatime. Heine [1968:78-93] outlines all the literature on the Central-Togo languages over the hundred years 1867-1967.

[2] Though Avatime is classified within the KA branch, the Avatime root for 'meat', *kɪ̄-dzā*, is not cognate with the reconstructed root for this branch. The cognate item shows up in *ɔ̄-gā* 'animal' [Heine 1968:221].

grouped with the Volta-Comoe languages (the subgroup of Kwa which includes Akan) whereas Heine's KA branch is to be grouped with separate Ewe-Fon subgroup of Kwa. If this hypothesis proves plausible, the Central-Togo languages do not represent a genetic unit at all, despite the striking typological characteristic which they share.

The earliest descriptive works on Avatime are a grammatical sketch in Funke [1909] and a German-Avatime wordlist in Funke [1910]. The most extensive single work on Avatime, and also the most detailed and reliable, is Ford [1971a]. Although Ford focuses on syntax, he includes an extensive discussion of the tone system and of both nominal and verbal morphology. Other significant published work includes a fairly large wordlist in Kropp [1967], a presentation of nominal class and concord morphology in Ford [1971b], a 27 page sketch of Avatime and Lolobi (Siwu) phonology, morphology, and syntax by Ford in Kropp Dakubu and Ford [1988], and phonological, morphological, and lexical information in Heine [1968]. Schuh [1995] presents details of the noun class system and concord in attributive noun modifiers.

2. Consonants and Syllable Structure

2.1. Consonant inventory and remarks on individual segments

Table 1. Avatime consonants

	Bilabial	Labio-dental	Dental	Alveo-palatal	Velar	Labiovelar
Stops	p, b		t, d		k, g	kp, gb
Fricatives	(ʃ), v	f, v	s, z		x, ɣ	xw, ɣw
Affricates			ts, dz			
Nasals	m		n	ny	ŋ	ŋw
Liquid(s)			l [l/r]			
Semivowels	w			y		

2.1.1. ʃ: The voiceless bilabial fricative appears only in Ewe loanwords, e.g., *àʃùlā* 'the ocean' (< Ewe *ʃù* + *lá*; 'sea-the'), *séʃɔ̀ʃoɛ̀* 'flower' (< Ewe *séʃòʃò*).

2.1.2. x, ɣ, xw, ɣw: The sounds listed as velar fricatives have only light local noise at the velum, if there is any local noise at all. Perceptually, they are more often than not realized as [h, ɦi, h^w, ɦi^w], respectively.

2.1.3. ts, dz: All published sources which comment on consonants note a distinction between dental and alveopalatal affricates: Funke [1909:291] gives *ts, dz* vs. *tsy, dzy*; Kropp [1967:2] says, "In Avatime [*c* and *j*] contrast with *ts, dz*";

Heine [1968:105] gives *ts, dz* vs. *c, ɟ*; Ford [1971a:17] gives *ts, dz* vs. *t͡ɕ, d͡ʑ*. However, Ian Maddieson and I were unable to find any cases of contrast between affricates at different places of articulation. There was a difference, perhaps generational, between individual speakers as to whether they used dental [ts, dz] or alveopalatal [č, ǰ]. Maddieson made a number of recordings with groups of speakers repeating the same word one after the other, and speakers sitting next to each other and repeating the same word varied as to whether they used dental or alveopalatal pronunciation of affricates. Chris Bubuama, the main informant for this study, consistently used the alveopalatal pronunciation for all affricates. However, I will use *ts, dz* to represent these sounds since these are the symbols used in the widely known orthography for Ewe, which does not have the dental/ alveoplalatal distinction but which does tend to use an alveopalatal pronunciation, at least in Ghanaian dialects.[3]

2.1.4. [l/r]: The liquid sounds are in complementary distribution, [r] appearing as the second consonant in clusters with dentals and alveopalatals, [l] elsewhere, e.g., *à-srā-nà* 'laziness', *ɔ̀-nyrɔ̄-mɛ̀* 'farm', but *ɔ̄-pli-ɛ̄* 'louse', *ɔ̀-kl̩̄-lɔ̀* 'foot', *l̩̄-vlɛ̂-lɛ̀* 'morning'.

2.1.5. q̣: Heine [1968:105] and Ford [1971a:17] list *q̣* among the Avatime consonant phonemes. Ford notes that *q̣*, along with *ƒ*, is "found almost exclusively in loan words". Neither Maddieson nor I found any words containing *q̣*, though it may well occur in Ewe loanwords.

2.1.6. [ʔ]: Heine [1968], alone among all previous writers on Avatime, includes glottal stop (which he writes /'/) among Avatime consonants. As evidence for the phonological distinctiveness of /'/, he cites the following examples of apparent minimal pairs (p. 97, orthography as in Heine): *olé'/olé* 'Hals/eins', *tɔ́'/tɔ́* 'etwas/ kochen'. It turns out, however, that presence or absence of final [ʔ] is conditioned by tone (see §4.2). The items here *without* glottal stop terminating a non-low syllable (a number and a verb) are exceptional and raise questions of tone analysis which go beyond the scope of this paper. Heine [1968:106] remarks, "/'/ hat die

---

[3] Related to the issue of affricate contrast is Funke's [1909:291] remark, "In manchen Fällen klingen [*t* und *d*] wie *ts* und *dz*, werden aber von diesen Lauten genau unterschieden, so vor *u* und *i*." This observation continues to hold true, and occasionally, I mistranscribed *t* in particular as *ts*. Heine [1968:106] states, "Im Dialekt von Amedzofe is die Opposition der Konsonanten /t/ und /ts/ vor den zungenhöchsten vokalen /i/ und /u/ aufgehoben, es kommt nur /ts/ vor. Desgleichen ist die Opposition der stimmhaften Entsprechungen /d/ und /dz/ in diesen Umgebungen neurtralisiert." It seems to be Funke rather than Heine who has the correct picture here. Although my data do not contain enough examples of the relevant consonants before high vowels to argue one way or the other, Ford's [1971a:246-256] appendix of 383 verb roots has many examples of both *t* and *ts* before high vowels, e.g., *ti* 'get dry' vs. *tsi* 'grow up/old'.

Allophone [ʔ] im Wortauslaut, und [h] in allen anderen Umgebungen." It is not clear what Heine means by "[h]" in his distributional statement, since Avatime has no /h/ phoneme. As noted above, /x/ is often perceptually [h], but if this is what Heine intends, then [ʔ] is no more in complementary distribution with [h] than with any other consonant, since, aside from syllables terminated by the tonally conditioned [ʔ], which appears only before pause, Avatime allows only open syllables (see §2.2).

2.1.7. Labiovelars: In addition to the labiovelar stops *kp*, *gb*, the "labiovelar" column in Table 1 includes *xw*, *ɣw*, and *ŋw*. Heine [1968] and Ford [1971a] have implicitly assumed this labiovelar categorization by listing these consonants in the same column as *kp*, *gb* (neither lists *ŋw* as a segmental unit, nor does Heine list *ɣw*). Kropp Dakubu and Ford [1988:127] write the fricatives as *xɸ* and *ɣβ*, implying actual occlusion at both lips and velum, but Maddieson [1995] shows that not only is this implausible on physiological grounds, but also that videotaped data from a number of speakers show that there is no occlusion at the lips for these sounds. Even though the fricatives (and nasal) are not labiovelars from a strictly articulatory point of view, a number of factors justify grouping the labialized velars phonologically with the labiovelar stops. First, among the velars, labial occlusion and labial rounding are in complementary distribution depending on manner of articulation: the two stops have only total occlusion, i.e., there are no labialized velar stops [kʷ] or [gʷ],[4] whereas the fricatives and nasal have only labial rounding. Second, the consonants in the labiovelar column can appear as the first member of a consonant cluster:[5] *ɔ̀-kplɔ̄-nɔ̀* 'table', *ɔ̀-gblāgɛ̄* 'snake', *ká-ɣwl̃tsà̃* 'chameleon', *sɪ̄-ŋwlɛ̀-sɛ̀̃* 'mucous'. If the labiovelar consonants, including those with labial rounding, were viewed as sequences rather than units, clusters such as those illustrated here would consist of three consonants, a combination which is otherwise impossible in Avatime.

2.1.8. Labialized and palatalized consonants: Ford [1971a:17] says, "Most consonants occur in both rounded and unrounded forms." However, aside from the labialized velars, which I have argued in the previous paragraph to be labiovelar phonological units, my data and Ford's appendix of 383 verb roots show lexical examples of only *mw* and *fw*, e.g., *ɔ̀mwɪ̣̄* 'goat', *fwɛ̃* 'breathe'. Ford's and my

---

[4] I found two loanwords, *àkwlɛ̄* 'canoe' (also cited in Ford [1971a:17] as *àkwlɛ̄* 'boat') and *kùkwí* 'pepper' (cf. Ewe *kùklúí*), which contain labialized *k*'s. Strictly speaking, introduction of labialized velar stops into the Avatime phonological inventory makes the phonological categorization of labialized velar fricatives ambiguous, but within the native vocabulary, the labialized velar fricatives clearly pattern with the labiovelar stops.

[5] I have found no examples of *xw* in a cluster and only one example of *x*, viz. *xlã̄* 'wind, coil'. The voiceless velar fricatives, both plain and labialized, are relatively infrequent, so this is probably an accidental gap.

data also include examples of labiodental and dental consonants with a following palatal glide,[6] e.g., *fyo* 'drink soup', *vya* 'implant seeds', *kụ̀vyà* 'palm oil', *tya* 'choose', *ādyāmèdzē* 'deer(?)', *ḹsyānè* 'horn', *zyɔ* 'lean', *lya* 'harden'. There is a notable absence in these data of velars, labiovelars, and bilabials followed by either front or back glides. In over 1000 items of nominal and verbal vocabulary in Ford's and my data, I have found only the two loanwords with *k* + *w* cited in fn. 4, one example of *ŋw* + *y* (*ŋwya* 'throw' from Ford [1971a:247]), and no examples of bilabial + *y* or *w* other than *mw* (which is fairly common). Such apparent systematic gaps aside, it seems necessary to recognize lexical (underived) cases of C*w* and C*y* in Avatime.

There are three plausible analyses for C*w* and C*y*: (1) they are phonological units with secondary articulations of labialization and palatalization, respectively; (2) they are sequences of consonant + glide, exactly as their orthographic representation suggests; (3) they are CV sequences where the V has undergone glide formation as part of a general process affecting vowels, e.g., *ōbī* 'child' + *ē* 'the' → [ōbyē] 'the child' (see §3.4). Setting aside the single loanward *àkwlē* 'boat' cited in fn. 4, C*w* and C*y* seem never to participate with other consonants in clusters. Analyses (2) and (3) share the claim that C*w*/*y* are sequences rather than units, and thus, either analysis explains why C*w*/*y* do not cluster with another consonant. Viewing C*w*/*y* as a sequence also fits with Avatime phontactics in a natural way by expanding the class of complex syllable onsets from just C*l* to the more general class $CC_{[+sonorant, -nasal]}$. Although many postconsonantal glides can be derived from non-low vowels, as in the example 'the child' cited just above, there is no justification, at least in contemporary Avatime, for deriving the glides from vowels in words such as *fwɛ̄* or *fyo*. In this paper I will use the following convention to distinguish apparently underlying glides from glides derived from vowels:

> CONVENTION FOR REPRESENTATION OF POSTCONSONANTAL GLIDES:
>
> (1) *Underlying glides* will be represented as *w* or *y*, as in the examples in the preceding paragraphs.
>
> (2) *Glides derived from underlying non-low vowels* will be represented as the underlying vowels but will bear no tone marking. Tone will be marked on the following vowel, e.g., *ɔ́nɔ̀* 'person' + *ɛ̄* = *ɔ́nɔɛ̄* 'the person', *ōbiɛ̄* 'the child'.

This convention for representing glides may have importance beyond distinguishing the underlying sources for glides, viz. it is possible that the original vowel distinctions are maintained even when the vowels change to glides. Only

---

[6] The nasal *ny* is written in accordance with the standard pattern of orthography for Ghanaian languages. Though written as a consonant sequence, it is unquestionably a unitary (alveo)palatal segment. It can, for example, appear as the first consonant in a cluster, e.g., *nyrɔ* 'sink, submerge, drown'.

instrumental studies will provide a definitive answer, but I observed one aspect of glide formation that suggests the distinction is preserved. Were the vowel distinctions neutralized, the four back vowels *u*, *ụ*, *o*, *ɔ* should all be reduced to [w], for which any phonetic variation could be predicted by environment (as opposed to features of the source vowel). The same would hold for the parallel front vowels with respect to the glide [y]. However, I found that usually, if not always, I heard the [+ATR] vowel *u* as the front rounded glide [ɥ] whereas I did not hear any of the other back round vowels as fronted in this way. During elicitation, I was not consistent in marking this fronting because it was clearly subphonemic, but in looking through my notes, I find dozens of cases (counting multiple tokens of the same word) where I did mark it for underlying *u*, but no cases where I marked it for the other back vowels. Compare the following examples (Table 2). These are all nouns plus a definite suffix. I have put a hyphen before the suffix, but the final CV-V is pronounced as a single syllable. I mark the fronting of *u* with an umlaut.

Table 2. Fronting of glided [+ATR] high back V but not other glided back V's

u	*ụ*	*o*	*ɔ*
óbü-ɛ̄ 'bee'	*ɔ̄bụ-ɛ̄* 'god'	*ōkpo-ɛ̄* 'corpse'	*ɔ́nɔ-ɛ̄* 'person'
kībü-è 'thorn'	*kī̩fụ-è* 'fire'	(no ex. this class)	*kī̩gɔ-è* 'occiput'
kétsü-à 'forehead'	(no ex. this class)	(no ex. this class)	*kāgɔ-à* 'dove'
kùtsü-ō 'foreheads'	*kụ̀mụ-ɔ̀* 'oil'	(*o*, *ɔ* are elided by the -O suffix)	

2.2. Syllable structure. Including C*w*/*y* as sequences, the possible syllable types in Avatime are V, CV, CGV (G= "glide"), C*l*V (where "l" = [l] or [r], distributed as noted in §2.1.4), and n̩ (syllabic nasal), e.g., *à-plī̩-là* 'clouds' (V-ClV-CV), *kpāī̩* 'much, many' (CV-n̩). In In CG and C*l* clusters, the C cannot be of the same type as the following sonorant, i.e., there are no GG clusters and no *rl* or *lr* clusters. Syllabic nasals appear only word final in ideophones. Syllables of the shape V occur only word initial. Moreover, it is not possible to have two syllabic vowels in sequence. When two vowels come in contact, one of three processes takes place: (i) a glottal stop separates the vowels, e.g., *mɛ̄* 'my' + *ɔ̀kplɔ̄nɔ̀* 'table' → *mɛ̄ 'ɔ̀kplɔ̄nɔ̀*; (ii) one of the vowels is elided, e.g., *mɛ̄* 'my' + *ɔ̄ka* 'father' → *mɔ̄kà*; (iii) the first vowel is reduced to a glide—cf. [ōbyē] 'the child' cited above. I return to processes affecting contiguous vowels in §3.4. All consonants other than /n/ and /l/ itself can be the C of a C*l* cluster:[7] *ple* 'unload', *ble* 'untie', *fli* 'split', *lī-vlɛ̀-lɛ̀* 'morning', *mlɔ* 'swallow', *trɛ* 'go', *dra* 'open', *sra* 'smear', *zrɔ* 'to smooth', *tsrɛ* 'change', *dzro* 'dilute', *nyrɔ* 'submerge', *lī-klà-nɛ̀* 'stone', *glu* 'sow (rice)', *xlã*

[7] I have found no examples of *vl* or *xwl*. I assume that these are accidental gaps.

'wind, coil', *ɣla* 'vomit', *ŋle* 'shine', *ɔ-kplɔ̄-nɔ̀* 'table', *gbla* 'incite', *kà-ɣwlîts-ā̀* 'chameleon', *sɪ̣̄-ŋwlè-sɛ̀̄* 'mucous', *wlo* 'bathe', *yrɔ* 'wither'.

3. Vowels

3.1. Vowel inventory and vowel hamony. Avatime has a nine-vowel system, with the vowels divided into two groups, differentiated by a feature generally called "Advanced Tongue Root" (ATR) in West African languages. All 9 vowels may also have distinctively nasalized variants (see §3.3 for discussion). The oral vowel system is as follows:

Table 3. Avatime vowels

	Front		Central	Back	
	[+ATR]	[-ATR]	[-ATR]	[+ATR]	[-ATR]
High	i	ɪ̣		u	ʊ̣
Mid	e	ɛ		o	ɔ
Low			a		

The vowels participate in a cross-height vowel harmony system whereby roots and associated affixes contain only vowels which match for the feature [ATR]. This is easiest to illustrate with affixes whose vowels vary depending on the [ATR] feature of the root to which they are attached:

i/ɪ̣: *lī-gbō-lè/lɪ̣̄-gɔ̀-lɛ̀̄* 'chair'/'year'; *bī-bū-wè/bɪ̣̀-gʊ̣̄-wè* 'thorns'/'wars'; *sī-sē-sè/ sɪ̣̄-tā-sè* 'clay'/'saliva'

e/ɛ: (see suffix examples just above; *ɛ* does not appear in any prefixes); *é tē yɛ̄/ á mɔ̄ yɛ̄* 'he knows him'/'he sees him'

u/ʊ̣: *kù-bē/kʊ̀-mwè* 'tear'/'salt'; *kù-tsō/kʊ̀-pɔ̄* 'monkeys'/'antelopes'

o/ɔ: *ō-dzē/ɔ́-dzē* 'wife'/'woman'; *ò-lō-lò/ɔ̀-sɔ̄-lɔ̀* 'crocodile'/'elephant grass'; *wɔ̀ pè/wɔ̀ gà* 'you are tired'/'you walked'; *é tē wō/á mɔ̄ wɔ̄* 'he knows you'/'he sees you'

e/a: *kē-tsō/kā-pɔ̄* 'monkey'/'antelope'; *ē-gbō-là/ā-gɔ̀-lā̀* 'chairs'/'years'; *mè sē/mà yɔ̄* 'I ran'/'I stood up'

In the last row, *e* and *a* are paired as vowel alternants in prefixes. This pairing is not based on a [±ATR] differentiation. It is possible that Avatime at one time had paired low vowels *ɜ/a* (a contrast that does exist in some West African languages) and that *ɜ* fell together with *e*. However, there is not now any phonetic contrast between the *e* paired with *ɛ* and that paired with *a*. The following distributional facts are worth noting:

(1) Prefixes have only the *e/a* alternation, suffixes only the *e/ɛ* alternation.

(2) Suffixes with an *a* are invariable, even in environments where suffixes with other vowels do show alternation.[8] Relevant examples are the *-la* suffix paired with the nominal *e-/a-* prefix (cf. 'chairs'/'years' illustrating *e/a* above), the *-ba* or *-wa* suffix paired with the *be-/ba-* nominal prefix (*bē-dzē-wà/bá-dzē-wà* 'wives'/'women'), the *-a* suffix paired with the nominal *ke-/ka-* prefix (*kè-zi-ā̀/ká-dzi-á* 'bowl'/'hawk'), and the 3rd person plural object pronoun (*é tè wā̀/á mɔ̀wā̀* 'he knows them'/'he sees them').

(3) The *e/ɛ* alternation is limited to suffixes which are paired with prefixes having vowels other than *e/a* and suffixes not paired with prefixes. Relevant examples are suffixes paired with the prefixes *li-/li-*, *ki-/ki-*, *bi-/bi-*, and *si-/si-* (cf. examples illustrating *i/i* above), the suffix *-e/-ɛ* associated with the "Class 1" prefix *o-/ɔ-* (see 'wife'/'woman' illustrating *o/ɔ* above), and the 1st and 3rd person singular object pronouns (*é tē mē/á mɔ̄ mɛ̄* 'he knows me'/'he sees me', *é tē yē/á mɔ̄ yɛ̄* 'he knows him'/'he sees him').

These distributional facts have obvious implications for which affixes should be reconstructed with front mid vowels vs. low vowels. In modern Avatime, however, these facts and the patterns of vowel harmony in general are frozen as a feature which cannot be accounted for in phonetic terms and probably not even in purely phonological terms. Presumably vowels within native Avatime roots would harmonize, but in practice this is difficult to illustrate because nearly all undecomposable native Avatime roots are monosyllabic, and even those not obviously decomposable could be frozen compounds comprising roots with different harmony features. Loanwords retain their original vowels, even where they are disharmonic, e.g., *mángò* 'mango' and the name of the town *Àmèdzɔ̀fé*, both from Ewe, have mixed vowels with respect to the [ATR] feature. Compounds comprising only native Avatime roots may likewise be disharmonic, e.g., *ɔ̀sàyōlɔ̀* 'place for weaving' < *-sà-* 'cloth' + *yō* 'weave'; *kèdɔ̄nɛ̄* 'Avatime man', composed of the [+ATR] root *ked-* "Avatime" and the [-ATR] root *ɔ́nɔ̀* 'person' (cf. *kèdōbiē* 'Avatime child', where both roots happen to be [+ATR]). Even some Avatime derivational processes give rise to disharmonic words. Thus, the *-lɔ* suffix seen on *ɔ̀sàyōlɔ̀* 'place for weaving', which is part of a locative noun dervational process, always has a [-ATR] vowel even though its associated prefix *o-/ɔ-* harmonizes with the first root of the derived form, e.g., *ɔ̀sēlɔ̀* 'place for running' < *sē* 'run'—cf.

---

[8] The fact that *a* in such suffixes can have a [+ATR] host suggests that *a* is a "neutral" vowel for the feature [ATR]. However, in prefixes, *a* only cooccurs with [-ATR] hosts, and when *a* is the vowel of a root, it always conditions [-ATR] harmony in affixes. I therefore consider *a* to be a [-ATR] vowel, and view the "invariable-*a*" suffixes as being a case of tolerated disharmony. The [ATR] feature is ultimately a *phonetic* property, of course, so it should be possible to bring instrumental data to bear on the [ATR] nature of *a*.

òsēlò 'tree', an underived word which obeys vowel harmony and which differs from 'place for running' only in the vowel of the suffix.

3.2. The [±ATR] contrast in [+high] vowels. Among previous writers, only Funke [1909:288-289] recognizes a nine-vowel system. Everyone else analyzes Avatime as having seven contrasting vowels, *i, e, ɛ, a, ɔ, o, u,* i.e., a system with no [±ATR] contrast among either the high or low vowels. Kropp [1967:3] says, "In Avatime there are many words with apparently free alternation between *i* and *e*, *u* and *o*. Funke [1909] writes these as two further vowels, but I doubt that this is necessary." Heine [1968:105] lists seven vowels for Avatime, noting (p. 106), "Funke erwähnt zwei weitere Vokale *ė* und *ů* ..., die nicht nachgewiesen wurden." Among recent writers, Ford [1971a:16] comes closest to recognizing a more elaborate vowel system. He says, "There are seven oral surface vowels [i, e, ɛ, a, ɔ, o, u] .... Ford [1970][9] recognizes the following ten underlying qualities: [i,ɪ e,ɛ ɜ,a o,ɔ u,ω], being pairs of vowels differing on the basis of the feature tongue-root advancing." Though Ford [1971a] has little more to say specifically about the vowel system, it is clear from his transcriptions that he considers the "tongue-root advancing" feature to be phonetically neutralized for high and low vowels. Even Funke [1909], though recognizing nine phonetically distinct vowels, seems equivocal about the status of a contrast within pairs of front and back high vowels. Aside from the sections where he explicitly discusses the vowel system (pp. 288-291), he does not mark the distinction for high vowels, nor does he mark it in Funke [1910].

Funke's [1909] analysis provides an interesting counterpoint to Ford's [1971a] account. As noted, Ford set up an underlying contrast between pairs of vowels which he claimed to be phonetically neutralized for high and low vowels. Funke, on the other hand, seems to have believed that there was no underlying contrast between the vowels in any of the pairs *i/i̱, e/ɛ, u/u̱, o/ɔ*. Rather, the right-hand vowel of each pair is the phonetic result of a coalescence of the left-hand vowel with *a*. His analysis can be illustrated using his statements and examples for *u̱* (which he writes *ů*). For each of the vowels *i̱, ɛ, u̱, ɔ*, he makes a statement such as, "[*ů*] ist aus *ua* entstanden" (p. 288); he illustrates this with examples such as *kůsa* 'Kleid' = *ku-asa*, *kudẽ* 'Weg' = *ku-edẽ* (p. 291).

Funke's illustrations of /V + *a*/ all show the vowel of a noun prefix coalescing with a putative underlying vocalic prefix on a noun stem. Not only is there no evidence for such vocalic prefixes at any level, synchronically or historically,[10] but

[9] The bibliography of Ford [1971a] lists Ford [1970], "On vowels and vowel-harmony in Avatime," unpublished mimeo. I was unable to locate this paper in the Linguistics Department library at the University of Ghana, and apparently it was never published.

[10] Funke's thinking was influenced by Ewe, which he probably knew quite well. He seems to have believed that Avatime has added its noun class prefixes to word stems that looked like Ewe nouns, most of which have a canonical VCV structure. In Funke [1909:290] he says, "Da das

continued on next page ...

in assuming that the [-ATR] vowels derive from /V + *a*/, he would have to claim that *every* [-ATR] vowel, including those internal to roots, results from a similar derivation, clearly a *reductio ad absurdum*. Although Funke's analysis cannot be accepted, he did recognize a contrast which later writers have denied but which does exist in modern Avatime, both phonetically and phonologically. What is the evidence for this contrast?

The most important evidence for the constrast is the fact that *i*/*i̱* and *u*/*u̱* are four phonetically distinct sounds. Funke [1909:288] said of this distinction, "*ė* ... liegt in der Mitte zwischen *e* und *i*. Gewöhnlich hört man nur ein enges etwas nach *i* hinüberklingendes *e*. ... *ů* is ein weites, offenes *u*. In rascher Aussprache klingt es stark nach *o* hinüber." Of course, modern Avatime could have neutralized a [±ATR] distinction for high vowels that existed at the time when Funke wrote, but in fact it has not. The vowel distinctions in question are perceptually distinct in minimal and near minimal pairs such as the following:

Table 4. Pairs distinguished (in part) by [ATR] specification for high vowels

[+ATR]		[-ATR]	
sīnīsè	'mushroom'	*sı̀mı̱sè*	'excrement'
ɲ̄nīnè	'soups'	*ɲ̣nyı̱̄nè*	'firewoods'
ɲ̄bìlɛ̀	'wound'	*ɲ̣bɲ̣lɛ̀*	'snail'
kūvùvù	'catching'	*kū̱vù̱vù̱*	'newness'
ɲ̄mùnɛ̀	'lake'	*ɲ̣mū̱nè*	'unprocessed rice'
kībū	'thorn'	*kı̱fū̱*	'fire'
kīkù	'yam'	*kı̀gū̱*	'war'

The claimed perceptual distinctions here are confirmed by instrumental data. Maddieson [1995] shows that for a data set comprising single repetitions by a group of 12 speakers (8 male, 4 female) and multiple repetitions by a single male speaker, the F1 frequencies of the [-ATR] vowels are significantly higher than for the corresponding [+ATR] vowels. Moreover, the [-ATR] high vowels have significantly lower F1 frequencies than the [+ATR] mid vowels, belying a merger of these vowels implied in the quote from Kropp [1967] in the first paragraph of this section. F2 frequencies also differ, the [-ATR] high front and back vowels having lower and higher frequencies respectively than their [+ATR] counterparts, but again remaining distinct from the [+ATR] mid vowels.

Präfix aus Konsonant und Vokal oder nur aus einem Vokal besteht, so kollidiert bei der Anfügung an ein Substantiv sein Vokal mit dem vokalischen Anlaut des Substantivs, das (wie im Ewe) in seiner ursprünglichen Form nur aus einer Silbe, und zwar Konsonant + Vokal mit einem tieftonigen Vokal (*a*, *e*, *o*) als Anschlag oder Anlaut, besteht."

The transcription practices of previous researchers demonstrate that they, too, must have been hearing the distinctions here, though they did not use the [±ATR] label. Funke, quoted above, noted the phonetic similarity between the [-ATR] high vowels and the [+ATR] mid vowels, but in most of his work he wrote *i* for both his "*i*" and "*ė*" and *u* for both his "*u*" and "*ů*". Kropp noted what she considered to be "free alternation" between vowels in the pairs *i/e* and *u/o*. However, it is not the case in her transcription practice that this "free alternation" takes place in all lexical items. Rather, it is strongly skewed toward those which have [-ATR] harmony. This can be illustrated, as in Table 5, from Kropp's [1967] list in the following way: For most nouns, Kropp gives both the singular and the plural forms. In many singular/plural class pairs, the singular class prefix has a high vowel whereas the corresponding plural has a mid or low vowel, or vice versa. Kropp and other writers are relatively consistent in noting [±ATR] distinctions among mid and low vowels.

Table 5. Kropp's [1967] transcription of [-ATR] high vowels

Prefix pair	as written, Kropp [1967]	# of cases	example word
li-/e- [+ATR]	*li-/e-*	17	*li-ne/e-* 'tooth'; Funke *line-ne/e-*
	le-/e-	Ø	
l̩i-/a- [-ATR]	*li-/a-*	18	*li-nyɔ/a-* 'nose'; Funke *linyɔ-ne/a-*
	le-/a-	11	*le-gba/a-* 'life'; Funke *ligbã*
o-/i- [+ATR]	*o-/i-*	17	*o-le/i-* 'neck, voice'; Funke *ole-lo/i-*
	o-/e-	2	*o-pi/e-* 'tail'; Funke *opi-no/i-* *o-tsri/e-* 'okra'; Funke *otsre-no/i-*
ɔ-/l̩i- [-ATR]	*ɔ-/i-*	18	*ɔ-na/i-* 'heart'; Funke *ɔna-nɔ/i-*
	ɔ-/e-	11	*ɔ-kele/e-* 'leg'; Funke *ɔkli-lo/i-*
ku-/be- [+ATR]	*ku-/be-*	3	*ku-de/be-* 'road'; Funke *kudẽ/be-*
	ko-/be-	Ø	
kụ-/ba- [-ATR]	*ku-/ba-*	9	*ku-ka/ba-* 'fence'; Funke *kuka/ba-*
	ko-/ba-	3	*ko-nya/ba-* 'bow'; Funke *kunỹ-a/ba-*
ke-/ku-[+ATR]	*ke-/ku-*	7	*ke-zi/ku-* 'plate, bowl'; Funke *kezi-a/ku-*
	ke-/ko-	Ø	
ka-/kụ- [-ATR]	*ka-/ku-*	9	*ka-gɔ̃/ku-* 'bush fowl'; Funke *kagɔ̃/ku-*
	ka-/ko-	5	*ka-wala-mɛ/ko-* 'palm'; Funke *kawlamɛ/ku-*

For the majority of words in Kropp's list, we can thus determine whether a root is [+ATR] or [-ATR] from the plural (or singular) prefix containing the mid or low

vowel. For example, the *li-/lị-* singular class is paired with the *e-/a-* plural class, where the left-hand variant is [+ATR] and the right is [-ATR], e.g., *lɪ̄gbōlè/ēgbōlà* 'chair' with the [+ATR] vowel /o/ in the root vs. *lɪ̣̄vōlè/āvōlà* 'mud' with the [-ATR] vowel /ɔ/ in the root. I counted all examples of the relevant class pairs in Kropp [1967] where she provided both singular and plural forms. Table 5 above summarizes the results. The fourth column compares Kropp's transcriptions with those in Funke [1910]. I have written Funke's e̲ and o̲ as ɛ and ɔ, respectively, and I have omitted tone marking from both sources since neither source has a consistently applied tone marking system, and tone is not relevant to the point at hand in any case. I have given just the prefix for the plural. Funke's citations usually have a definite marking suffix as well as a prefix whereas Kropp's citations have no suffixes.

These figures for Kropp [1967] can be summarized as follows:

Total high vowel prefixes written as **high** vowels in [+ATR] words:	44/46	(96%)
Total high vowel prefixes written as **mid** vowels in [+ATR] words:	2/46	(4%)
Total high vowel prefixes written as **high** vowels in [-ATR] words:	54/84	(64%)
Total high vowel prefixes written as **mid** vowels in [-ATR] words:	30/84	(36%)

I made a similar count for the Avatime items which Heine [1968:212-257] cites in his comparative wordlist, with the results summarized below:[11]

Total high vowel prefixes written as **high** vowels in [+ATR] words:	18/18	(100%)
Total high vowel prefixes written as **mid** vowels in [+ATR] words:	0/18	(0%)
Total high vowel prefixes written as **high** vowels in [-ATR] words:	17/25	(68%)
Total high vowel prefixes written as **mid** vowels in [-ATR] words:	8/25	(32%)

These figures show that both Kropp and Heine transcribed about 1/3 of the prefixes with high vowels as mid vowels when they were attached to [-ATR] roots, but in [+ATR] roots Kropp transcribed only 2 out of 46 high vowels as mid and Heine none.[12] In contrast to Kropp's and Heine's practice, Funke [1909, 1910] and Ford [1971a] transcribe only *i* and *u* in the relevant prefixes. These differences in transcriptions for the various writers and the fact that the Kropp's and Heine's variation between high and mid vowels occurs almost exclusively with [-ATR] roots has only one explanation, viz. high vowels in [-ATR] words differ in some way from those in [+ATR] words.

---

[11] In his comparative wordlist, Heine [1968] sometimes used citations from other sources, esp. Funke [1910], where he lacked the relevant item in his own materials. I have counted only those items which Heine did not attribute to some other source.

[12] The smaller absolute number of [+ATR] roots as compared to [-ATR] roots holds across the entire Avatime lexicon. In my list of 315 underived nouns, 146 (46%) are [-ATR], 101 (32%) are [+ATR], and 68 (22%) are disharmonic. The latter are all loanwords.

Casali [1994] discusses the reduction of 9 vowel systems to 7 vowel systems in Niger-Congo languages, generally by neutralizing the [±ATR] distinction in the high vowels. He further lists several examples of languages which were originally described as having 7 vowel systems but which turned out to have 9 vowel systems, a list to which Avatime could be added. Casali's explanation for why 9 vowel systems would reduce to 7 vowel systems is auditory rather than articulatory, as has been proposed in most discussions of this subject. He says, "Acoustic studies have revealed that in a number [of languages with Cross Height Vowel Harmony systems], the first and second formant values of [ɪ] and [ʊ] compare very closely with those of [e] and [o] ... A natural outcome of this sort of acoustic overlap might be that at some point, children learning such a language would fail to detect the contrast between the two pairs and consequently merge them in the grammar they construct "(p. 9). This auditory, rather than articulatory explanation for historical vowel mergers would account for why researchers have not been consistent in hearing and transcribing vowel distinctions in Avatime and the languages which Casali lists. Although English and German, the native languages of the researchers on Avatime, have an *articulatory* distinction of at least four vowel heights among non-low vowels, the primary difference between the [+ATR] and [-ATR] vowels is not height, but rather is an *auditory quality* distinction, generally accounted for as an effect of advancing or retracting the tongue root (but see Fulop, Kari and Ladefoged [1995], who question the universality of the [ATR] gesture as the basis for West African vowel harmony systems).

Because the auditory properties based on [ATR] do not correspond in a direct way to the tongue height distinctions of European languages, it is not surprising that European researchers have also shown some inconsistency in transcribing Avatime *mid* vowels. Kropp [1967] sometimes transcribes the [+ATR] front mid vowel *e* as *i*, e.g., 'okra' in Table 5 (cf. Heine *o-tsre'*), *o-ni/be-* 'mother' (Funke *one/be-*, cf. Heine *o-ne*), *ke-dzi/ku-* 'rat' (Funke *kedzẽ/ku-*). (A casual perusal of Kropp's list has not revealed parallel examples of *u* written for *o*.) Though not as pervasive as variation in high vowel transcriptions, there are also examples where writers have transcribed [+ATR] mid vowels in place of [-ATR] mid vowels or vice versa, e.g., Funke *lible* 'snail' (root should be *-blɛ* as can be seen by the [-ATR] plural prefix in *a-ble* [sic]), Kropp *kɛ-tu* 'forehead' (should be *ke-tu*—there are no prefixes containing *ɛ*), Heine *ɛ-nyi'* 'names' (should be *e-nyi*). Significantly, none of the writers who show variation in their vowel transcriptions were aware of (or at least did not describe) a vowel harmony system for Avatime. Like these writers, I had difficulty in consistently distinguishing the [±ATR] vowel pairs, but often a "disharmonic" transcription on my part would lead me to recheck items and, on rehearing, to detect what, for me, were subtle quality differences.[13]

[13] I have had the same perceptual problem with mid vowels in Ewe and Wolof, both of which have seven vowel systems and at least vestigial [ATR] vowel harmony. I might note that I also have the corresponding production problem. In working on Ewe and Wolof, both of which I have

continued on next page ...

This comment leads to the final piece of evidence that the [±ATR] distinction between high vowels is alive and well in modern Avatime, viz. native speaker intuition. What I described as "subtle quality differences" were categorical for Chris Bubuama, the speaker with whom I worked most. In my first few field work sessions, before I was atuned to the sounds of Avatime and before I had worked out the system of noun class affixes, I made such transcriptions as *lēxwàlɛ̄* 'bone' instead of *lɪ̰xwàlɛ̀*, *kèklēẅɪ̰* 'toe' instead of *kɪ̰klɪ̰wɪ̰*. Chris Bubuama showed considerable interest in Ian Maddieson's and my work on his language and watched as we transcribed his utterances. In examples such as those just mentioned (and several times later as field work progressed), he corrected my incorrect *e*'s to *i*'s. He is literate in Ewe and is therefore familiar with symbols particular to Ewe orthography. For example, he knew the orthographic distinctions between *o*/ɔ and *e*/ɛ, and it was he who pointed out to me that the *-lɔ* suffix on locative nouns, mentioned in the last paragraph of §3.1, is invariable when he saw that I was more or less mechanically transcribing it as *-lo* or *-lɔ* depending on the [ATR] value of the stem vowel. The segment inventory of Ewe and Avatime are quite similar except that Ewe has a 7 vowel system. Chris was thus unfamiliar with any special symbol for [-ATR] high vowels, but he was insistent that the vowels in question be written with a high vowel symbol rather than a mid.

3.3. Phonologically distinctive nasalization. Avatime has a phonological distinction between nasalized vowels and their non-nasalized counterparts. This distinction is disappearing, a process which has probably been going on for some time. Funke's [1910] vocabulary contains examples of the following nasalized vowels:

ã: *zã* 'be ripe', *liklã-ne* 'stone'
ɛ̃: *klɛ̃* 'shine', *kedzɛ̃* 'rat', *kudɛ̃* (pl. *bedɛ̃-ma*) 'road'
ɛ̃: *sɛ̃* 'leave, go out', *livɛ̃* (pl. *avɛ̃*)[14] 'guilt'
ɔ̃: *mɔ̃* 'see', *kutɔ́̃* 'urine'
ĩ: *tsyitsyĩ* 'red'
ũ: *vũ* 'catch', *ligũ-ne* (*egũ-na*) 'palm kernel', *livũ-ne* (*evũ-na*) 'nest'
ṵ̃: *kukũ* (pl. *bakũ*) 'spear', *lisṵ̀* (pl. *asṵ̀*) 'worm', *kigṵ́-ie* 'war'[15]

---

tried to use at least minimally as spoken languages, and during field work on Avatime, I have never been able produce a "convincing" distinction between the pairs of mid vowels. This is almost surely a result of my attempting to use a vowel height distinction based on English vowels in place of a quite different articulatory gesture.

[14] Funke writes *ɛ̃* rather than *ɛ̃* in this and a number of other examples. However, the plural prefix *a-* rather than *e-* shows that the root is conditioning [-ATR] vowel harmony.

[15] Funke [1910] does not mark the distinction between [+ATR] and [-ATR] high vowels. In the words for 'spear' and 'worm', the plural prefixes *ba-* and *a-* rather than *be-* and *e-* show that the roots are [-ATR] and must therefore contain *ṵ̃* rather than *ũ*. The word for 'war' does not

continued on next page ...

In Funke [1910], nasalized *ã* is by far the most frequently occurring nasalized vowel; *ĩ/ɪ̃* and *ẽ* are the least frequent (most apparent examples of *ẽ* in Funke's list can be shown to be *ɛ̃*—see fn. 14). I could find no examples of *õ* in Funke's list, and the word for 'red' was the only unequivocal example I found of *ĩ* or *ɪ̃*. Other examples of nasalized high front vowels raise questions. For example, Funke gives *sìmĩ-sɛ* 'Kot', with a nasalized vowel, but *simí-sɛ* 'Exkrement', clearly the same word, but without nasalization marked on the vowel. Similarly, he gives *ɔ́nɔ' kpikpĩ* 'Neger' ("person black"), with a nasalized vowel on the adjective, but *kpikpi* 'black', with no nasalization marked. In the first pair of examples, the preceding nasal consonant probably plays a role. Indeed, in modern Avatime there is some perseverative nasalization on vowels following nasal consonants,[16] though in the majority of words containing nasal consonants, Funke does not mark nasalization on vowels following the nasals. There is no *phonetic* explanation, such as a contiguous nasal consonant, for why Funke heard nasalization in *ɔ́nɔ' kpikpĩ* vs. *kpikpi*.

The foregoing remarks suggest that even at the time Funke was working, early in this century, phonologically distinctive vowel nasalization was not a phonetically prominent feature of the vowel system. For recent generations of speakers, it seems to have nearly disappeared. Ian Maddieson and I, working both together and independently with Avatime speakers, found only three words in the nominal vocabulary with unconditioned nasalization, and the roots of these words are all borrowings from Ewe: *lãklẽ* 'leopard' (< Ewe *lãkle*), *ɔ̀-kwẽ̃* 'soap' (< Ewe *kɔ̃e*) and *sɪ̀-gẽ̃-sɛ̀* 'Gã language' (< Ewe g*ɛ̃́*). I did find a few verbs with nasalized vowels, including the two in Table 6 which show near minimal contrast with words which lack nasalization. Nasalization must therefore still play at least a marginal phonological role. Citations are the verbal nouns, which are in the KU class; the first pair bears the definite suffix -O.

Table 6. Pairs contrasting nasalized and non-nasalized vowels

Nasalized		**Non-nasalized**	
kūtsítsĩ̀ɔ̃̀	'be red'	*kʊ̄tsɪ́tsɪɔ̀*	'cut off'
kʊ̄zázã̀	'be ripe, be fair-skinned'	*kʊ̄zāzà*	'pass'

provide morphological evidence for its [-ATR] status, but Ian Maddieson and I used this word extensively in our work in checking [ATR] in high vowels.

16 Definite suffixes for several classes have alternate forms, one with a non-nasal consonant, one with a nasal, e.g., *lɪ̄-xwà-lɛ̀/ā-xwà-lã̀* 'bone/bones' vs. *lɪ̄-mwā-nɛ̀/ā-mwā-nà* 'breast/breasts'. This alternation was originally conditioned by whether or not the preceding vowel was nasalized, whether through distinctive nasalization or perseverative nasalization from a preceding nasal consonant. See Schuh [1995] for further discussion.

Funke [1910] shows nasalization on both nasalized words here; Ford [1971a: 69, 251] shows it on 'be ripe' but not on 'be red'. I have two recorded tokens of the latter. In one, the nasalization is all but inaudible, and in both tokens, I hear it as clearly emerging only on the *-o* suffix. Ford [1971a], in his appendix of 383 verbs, marks only 9 verbs as having nasalized vowels. Of these 9, 2 have the vowel *ɛ*, and the other 7 have *a*, corresponding to the distribution already evident in Funke's material, which showed unconditioned nasalization to be most common among non-high, [-ATR] vowels. Many of the verbs which Funke marks with nasalized vowels do not have nasalized vowels in Ford's list, e.g., Funke *kɛ̃*, Ford *ke* 'be sated, have enough to eat'; Funke *tsɛ́̃*, Ford *tsi*[17] 'peel'; Funke *klɛ̃*, Ford *kle* 'shine'. Note the vowel differences in the first two, where nasalization apparently conditioned a lowering effect, which Funke transcribed as a phonological vowel feature.

In short, distinctive nasalization remains as part of Avatime vowel phonology, but it seems to be playing a less prominent role than in earlier times and is difficult to document for the full vowel inventory.

3.4. Processes affecting juxtaposed vowels. Vowels frequently come together across morpheme boundaries. Avatime does not allow consecutive vowels to form separate syllable peaks. This is avoided using one of three strategies: (i) both vowels remain as syllable peaks with a glottal stop initiating the second syllable, e.g., *Yàwò ʼɔ̄gɛ̄* 'Yawo's animal'; (ii) one of the two vowels is elided, e.g., */mɛ̄ + ɔ̄kà/ → mɔ̄kà* 'my father'; (iii) high or mid vowels followed by unlike vowels change to the corresponding glide to form a C + glide syllable onset, e.g., */kèzī + a/ → [kèzyà]* 'the basket', */kāgɔ̄ + a/ → [kāgwà]* 'the bushfowl'. Avatime does not exploit a fourth possibility, viz. vowel coalescence resulting in a monophthong different from either of the source vowels (*/a + i/ → [e]*, etc.).

The choice of strategy depends in part on the type of phrase boundary separating the vowels, in part on the specific construction, and in part on the vowels themselves. I have not looked systematically at the possible phrase types where vowels could abut, nor have I systematically checked acceptability of the various strategies in particular environments depending on factors such as speech tempo, stylistic level, etc. The following observations therefore point in research directions to be further explored.

Strategy (i) is possible only when a word boundary separates the two vowels, i.e., the strategy of inserting a glottal stop is not possible at the level of a clitic or affix boundary. The number of environments where vowels could come together across word boundaries is large. If, however, strategy (i) comes into play at fairly

---

[17] This root actually contains the [-ATR] high front vowel, i.e., *tsi̱*. This is evident in the vowel harmony pattern of clitics, e.g., *mà tsī* 'I peeled' rather than *mè...* as would be the case with a [+ATR] root.

low level syntactic phrasal boundaries, one can assume that vowels coming together across higher level boundaries would likewise be subject to strategy (i) rather than strategies (ii) or (iii), which clearly show tighter phonological phrasing. I found strategy (i) to apply in at least the following environments:

Possessor + possessed: *Yàwò 'ɔ̄gɛ̄* 'Yawo's animal', *blɔ́ 'ɔ̄gɛ̄* 'our animal'
Preposition + complement: *ní 'ɔ̀kplɔ̄nɔ̀-và* 'on the table' ("at table-topside")
Verb + object:[18] *ɛ̄ vù 'ɔ̄gɛ̄* 'he caught the animal'
Subject + verbal agreement clitic: *ɔ̀kplɔ̄nɔ̀ 'è kɛ̄mè* 'the table is big'

These examples and all others that I have checked are from elicited data. I have not investigated examples of rapid or casual speech to see whether it would be possible to apply strategies (ii) or (iii) in these environments. However, I have many examples of all the types above, and in some cases I asked speakers to repeat utterances in a rapid relaxed manner. With the exception of possessive pronoun + possessed object (about which more below), I found only strategy (i) to apply. I therefore believe that it is safe to say that even if some sort of vowel elision or coalescence is an option in environments such as these, it is not nearly as pervasive as it is in a language such as Yoruba.

At clitic boundaries, the choice between strategies (ii) and (iii) depends on the interaction of several factors, including the specific vowels, the position of the vowel (V_1 or V_2), the specific morphemes, and stylistic factors. Some environments show variation. One environment where variation does not appear to exist is the construction Noun + Definite Suffix. Several noun classes have definite suffixes which are only a vowel, and when this vowel is suffixed to a noun, the vowel contact phenomena are invariable. This morphological context shows a skewing which exists in all other contexts involving only clitic boundaries, viz. only the low and mid vowels occur in V_2 position. Table 7 outlines the relevant data. It turns out that in Avatime, there are almost no vocalic affixes which begin in a high vowel and which could follow another vowel. The only exception that I know of is the plural noun class prefix I- (see Table 8b for an example).

[18] The illustration here is of Verb + Object Noun. In many languages, Verb + Object Pronoun constitutes a lower level phrasal boundary than Verb + Noun and hence would be a candidate for strategy (ii) or (iii). However, all object pronouns/clitics in Avatime begin in consonants and thus never involve juxtaposed vowels.

Table 7. Vowel contact processes between noun final vowels and definite suffixes

Noun class	Final V	Suffix	Result	Example			
KA-	a	a	a	kāwā + a	→	*kāwà*	'the axe'
	O		wa	kāgɔ̄ + a	→	*kāgɔà*	'the bushfowl'
	E		a	kēlédē + a	→	*kēlédà*	'the nape'
	U		wa	kētsū + a	→	*kētsuà*	'the forehead'
	I		ya	kèzī + a	→	*kèziā*	'the bowl'
KU-, KÙ-	a	O	a (KU-)	kụ̀sà + O	→	*kụ̀sā*	'the cloth'
			O (KÙ-)	kụ̀wā + O	→	*kụ̀wɔ̀*	'the axe'
	O		O	kū̩nɔ̄ + O	→	*kū̩nɔ̀*	'the flour'
	E		O	kūdè + O	→	*kūdò*	'the road'
	U		wO	kùmū̩ + O	→	*kùmụ̀ɔ̀*	'the oil'
	I		yO	kùdròwī + O	→	*kùdròwiò*	'the dogs'
O-, KI-	a	Ē, E	Ē	ɔ̄lā + Ē	→	*ɔ̄lē*	'the metal'
				kɪ̀dzā + E	→	*kɪ̀dzè*	'the rat'
	O		wE	ɔ̄nụ̀vɔ̀ + Ē	→	*ɔ̄nụ̀vɔ̀ɛ̀*	'the child'
				kɪ̀gɔ̄ + E	→	*kɪ̀gɔè*	'the occiput'
	E		E	ōvè + E	→	*ōvē*	'the mouse'
				kɪ́dē + E	→	*kɪ́dē*	'the mortar'
	U		wE	ɔ̄zū̩ + Ē	→	*ɔ̄zụ̄ē*	'the fly'
				kìkù + E	→	*kìkuɛ̀*	'the yam'
	I		yE	ōbī + Ē	→	*ōbiē*	'the baby'
				kínībī + E	→	*kínībiè*	'the eye'

With that limitation on environments in mind, the following generalizations emerge for V + Definite Suffix:

(1) $V_i + V_i \rightarrow V_i$, where front/back and height features are the same for each V_i. (See below for discussion of [ATR] specifications of contiguous vowels.)

(2) *Fate of V_2*: Retained, except for the singular KU- class, where *-a* + O → *a*.

(3) *Fate of V_1*:

(a) High vowels are always retained in the form of a glide.

(b) *a* is elided by both E and O except for the case noted in (2).

(c) O is retained in the form of a glide.

(d) E is elided by both *a* and O.

A second environment where strategy (ii) is applied in an invariant way is Possessive Pronoun + Kin Term. Below is a full paradigm for the noun *ɔ̄kà* 'father'. The accompanying paradigm of pronouns makes it clear which vowel is elided.

Table 8a. Vowel elision with possessive pronouns

	Possessed Noun		Independent Pronouns	
	Singular	Plural	Singular	Plural
1	*mɔ̄kà*	*blɔ̄kà*	*mɛ̄*	*blɔ̀*
2	*wɔ̄kà*	*mlɔ̄kà*	*wɔ̄*	*mlɔ̀*
3	*yɛ̄kà*	*bākà*	*yɛ̄*	*bà*

These are the only accepted pronunciations for these possessive constructions, i.e., **mɛ̄ 'ɔ̄kà* (application of strategy (i)) and **myɔ̄kà* (application of strategy (iii)) are both unacceptable. This is the only complete possessive paradigm I collected for kin terms. Funke's [1909:303] paradigms show the same pattern of vowel elisions. Funke [1909:303-304] gives further relevant examples. First, he notes that with plural kin terms, the *b-* of the *be-/ba-* prefix is elided, such that the vowel of the pronoun comes in contact with the *vowel* of the prefix. He also gives examples of three non-kin terms from classes with vocalic prefixes.[19] Below are Funke's full paradigms. I have omitted his tone marking and replaced his *e̲* and *o̲* with *ɛ* and *ɔ*, respectively.

Table 8b. Possessive paradigms from Funke [1909]

	bakaba 'fathers'	*one* 'mother'	*beneba* 'mothers'	*agba* 'houses'	*ɔnyɔ* 'time'	*inyɔ* 'times'
1S	*makaba*	*mone*	*mɛneba*	*magba*	*mɔnyɔ*	*mɛnyɔ*
2S	*wɔakaba*	*wone*	*wɔeneba*	*wagba*	*wɔnyɔ*	*wɔnyɔ*
3S	*yeakaba*	*yene*	*yɛneba*	*yagba*	*yɔnyɔ*	*yɛnyɔ*
1P	*blakaba*	*blone*	*blɔeneba*	*blagba*	*blɔnyɔ*	*blɔnyɔ*
2P	*mlakaba*	*mlone*	*mlɔeneba*	*mlagba*	*mlɔnyɔ*	*mlɔnyɔ*
3P	*bakaba*	*bane*	*beneba*	*bagba*	*banyɔ*	*bɛnyɔ*

I cannot verify Funke's forms from my own data, and some of his forms do raise questions. For example, the [+ATR] vowel of 3rd sg. *ye* for 'his fathers', 'his mother' is suspect since the possessive pronouns (actually the independent pro-

[19] In my own field work, I also found vowel elision to be a possibility for non-kin terms, e.g., *mɛ̀ɔ̄gɛ̄* = *mɔ̄gɛ̄* 'my animal', but I collected no full paradigms.

nouns) normally have invariant [-ATR] vowels (cf. *yɛ* in 'his mothers', even where the root is [+ATR]). In the same way, 3rd plural *be/bɛ* ('their mothers'/'their times') seem aberrant since invariable *ba* would be expected in every case. Nonetheless, certain generalizations emerge, some of which jibe with those for definite suffixes, some of which do not:

(1) $V_i + V_i \rightarrow V_i$, where front/back and height features are the same for each V_i.

(2) *Fate of V_2*:

  (a) Non-high vowels are retained, except for (i) any vowel after *a* and (ii) O after 3rd sg. *yɛ* in kin terms.

  (b) The high vowel *i* is elided. As noted above, this situation, where an I- class noun follows a possessive pronoun, is the only case I know of where a high vowel can be V_2 across a clitic boundary.

(3) *Fate of V_1*:

  (a) *a* as V_1 elides any following vowel.

  (b) O is retained in the form of a glide except in non-kin terms before *a*.

  (c) E is elided by following O and *a*, except for 3rd sg. *yɛ* before O in kin terms, where O is elided, and *yɛ* before *a* in kin terms, where E is retained as a glide.

The next environment to be considered is N + postposition where the postposition has the shape -VCV. Avatime expresses most locative relational concepts like 'in', 'on', 'under', etc. with postpositional clitics. Most of these clitics have the structure -CV, e.g., *kpòsiɛ̀-mɛ̀* 'in the bowl', *kpòsiɛ̀-sʉ̀* 'beside the bowl'. One postpositional clitic, *-ēsē* 'under', has the shape VCV and, hence, creates an environment for vowel contact processes. With this postposition, the final vowel of the noun, regardless of its frontness and height, nearly always elides the *-e-* of the postposition—from a list of 21 nouns that I elicited with the postposition, 11 nouns ended in a vowel other than *e/ɛ*, and in only one case was the vowel of the postposition retained (as a glide), viz. *ɔ̀tɔ̀sɨ̀lɔ̄sē* 'under the mat'.[20] Below are examples of each of the possible vowel combinations with this postposition.

[20] I did not check to see whether *ɔ̀tɔ̀sɨ̀lɔ̄sɛ̄*, with elision of *-e-*, was possible, though I am reasonably confident that it would be. As seen in Table 9, the [+ATR] vowel *o* elides *e*. [ATR] specification never seems to be a factor in choice of vowel contact strategies.

Table 9. Vowel elision with the postposition *-èsè* 'under'

e	*ɛ*	*i/ị*	*u/ụ*	*o*	*a*
kìkuē 'the yam' *kìkuēsē* 'under the yam'	(See discussion below.)	*kpòsī* 'a bowl' *kpòsīsē* 'under the bowl'	*òɣū* 'a car' *òɣūsē* 'under a car'	*òɣūlò* 'the car' *òɣūlōsē* 'under the car'	*sị̄wā* 'grass' *sị̄wāsē* 'under grass'

The second column in Table 9 raises the issue of what happens under strategy (ii) when the vowels in contact differ only in [ATR] specification—in this case, where the noun ends in the [-ATR] vowel *ɛ*, which is in contact with the [+ATR] *-e-* of the postposition. The predominance of data suggests that it is the [ATR] specification of the *second* vowel which prevails, even where that vowel is the one elided by vowels differing in features other than [ATR]. In the paradigm I collected for the postposition *-ēsē*, the following examples emerged: *kị́dēsē* 'under the mortar' (*kídè*), *bị́dāwēsē* 'under the mortars' (*bị́dāwè*), *sị̄wāsèsè* 'under the grass' (*sị̄wāsè*), *sị̄yàsēsē* 'under the hair' (*sị̄yàsè*). The paradigm for 'mother' in Table 8b also shows this pattern for [ATR], e.g., *wɔ + one → wone* 'your mother'. The pattern for [ATR] assignment parallels the pattern for tone assignment when two syllables bearing different tones are reduced to a single syllable by strategy (ii) or (iii)—cf. examples here and further discussion in §4. However, a few examples in the available data show the opposite [ATR] assignment. Thus, in the postposition paradigm I collected I found the following: *bị́dēsē* 'under yams' (*bídè*), *bìkùwēsē* 'under slingshots' (*bìkùwè*[21]). Likewise, the phrases *mɛ/yɛ + -eneba → mɛ/yɛneba* 'my/his mothers' from Funke in Table 8b show the [-ATR] vowel to predominate. In short, although the preponderance of available examples show a pattern $V_{[\alpha ATR]} + V_{[-\alpha ATR]} \rightarrow V_{[-\alpha ATR]}$, the issue requires further investigation.

The final class of cases involving strategies (ii) and (iii) are the indefinite *-Vtɔ̄* and the proximal demonstrative *-Vyà*.[22] The "V" in these nominal modifiers varies depending on the class of the noun to which they are appended.

---

21 This is the plural of the word *kìkuè* 'rubber', which is a [+ATR] root. The expected plural definite suffix would thus be *-we*, not *-wɛ*. It is possible that I have mistranscribed the vowel both in the citation form and the form with the postposition, but the noun alone is repeated several times on the tape, and in the postposition constructions, differences in the vowels are easy to hear, inasmuch as they are in adjacent syllables.

22 Both Funke [1909:308] and Ford [1971a:24-25] report the indefinite, but both describe it as a separate word with a full prefix which can be reduced to -V-, e.g., "*kídɔ' kitɔ*, kurz *kidɔ́tɔ* ein Ding" (Funke, p. 308). The only forms Chris Bubuama ever volunteered were the -VCV forms reported here, and Ford's description suggests that his forms with full prefixes are abstract underlying forms which surface as in Table 10. Neither Funke nor Ford give a full paradigm for all noun classes. Funke does not list any forms that resemble the demonstratives here—his only demonstrative examples (p. 308) list a form *etsyia*, which takes a full nominal prefix. Ford

continued on next page ...

Table 10. Vowels with indefinite and proximal demonstrative suffixes

Class & suf. vowel	Both vowels retained	[V_1] elided	[V_2] elided
BA-, *a*	*bēveătɔ̄* 'mice'	*bādz[ɛ]átɔ̄* 'women'	(no examples)
BÀ-, *a*	*bàḷiáyà* 'th. palm trees'	*bèd[e]ǎyà* 'th. roads'	*bèdè[a]tɔ̄* 'roads'
KA-, *a*	*kèziáyà* 'th. bowl'	(no examples)	*kèzī[a]tɔ̄* 'a bowl'
A-, *a*	*égliàtɔ̄* 'some walls'	*ègl[i]ǎyà* 'th. walls'	(no examples)
KU-, O	*kūḷiɔ́tɔ̄* 'a palm tree'	*kūd[e]ǒyà* 'th. road'	*kūdě[ɔ]tɔ̄* 'a road'
KÙ-, O	*kùzióyà* 'th. bowls'	*kṵ̀w[a]ǒyà* 'th. axes'	*kùzī[ɔ]tɔ̄* 'bowls'
KI-, E	*kị̀gụéyà* 'th. war'	(no examples)	*kīku[ɔ]tɔ̄*
BI-, E	*bīkuéyà* 'th. yams'	(no examples)	*bị̄gú[ɛ]tɔ̄* 'wars'
LI-, E	*lḭ̄ḷiéyà* 'th. palm nut'	*lḭ̄b[a]ěyà* 'th. hoe'	(no examples)
(L)Ì-[23], E	*lĭpoéyà* 'th. doors'	(no examples)	*lĭpó[ɛ]tɔ̄* 'doors'
SI-, E	*sìmị́éyà* 'th. excrement'	*sḭ̄w[a]étɔ̀* 'grass'	*sḭ̄wá[ɛ]yà* 'th. grass'
O-, E	(no examples)	*ìɣ[a]ěyà*[24] 'th. knife'	*ɔ̄gá[ɛ]tɔ̄* 'an animal'
Ò-, E(?)[25]	*ŏpoéyà* 'th. door'	(no examples)	*ŏpó[e]tɔ̄* 'a door'

Not included in the table are cases where the stem final vowel of the noun is the same as the vowel of the suffix. As in other vowel hiatus environments, the resultant vowel is a vowel with the same front/back and height features as the source vowels, e.g., *ābătɔ̄* 'hoes', *ḳídétɔ̄* 'a mortar', *ɔ̄vĕtɔ̄* 'a mouse'. For [+ATR] roots, as in the case of 'a mouse', I have usually transcribed a [+ATR] result vowel. This would seem to contradict the generalization discussed above under Table 9. It may be that I have mistranscribed some of these vowels, or it may be the case that it is actually the [+ATR] V_1 which elides V_2, the more common direction for elision.

Although the data in Table 10 suggest a chaotic situation, examination of details reveals that certain combinations of vowel position are strong predictors of result vowels. In assembling data on indefinite and demonstrative suffixes, I elicited a total of 78 tokens. A numerical tabulation of the possibilities in the respective columns of the table immediately shows strong tendencies:

[1971a] does not discuss demonstratives, and Ford [1971b] lists only a set of prefixes said to be used on demonstratives, but no full demonstrative forms nor noun phrases with demonstratives.

23 All sources on Avatime give an Ì- plural class pairing with the Ò- singular class. Chris Bubuama accepted the Ì- prefix and sometimes volunteered it, but his normal prefix for this class was LÌ-. The vowel of the indefinite and demonstrative suffixes is E in either case.

24 The word *ìɣā* 'knife' does not have a prefix. All prefixless nouns in Avatime belong to the O-singular and BA- plural classes in terms of their agreement patterns.

25 The example in the first column is the only example from my data where the vowel of the suffix shows up. The vowel E seems questionable as the class vowel for these suffixes. In all other classes, the class vowel of the indefinite and demonstrative suffixes is the same as the vowel in the definite suffixes (see Table 7).

$V_1 = V_2$	20
Both V's remain, $V_1 \rightarrow$ glide	23
Elision of V_2	26
Elision of V_1	9
TOTAL	78

These figures show, first, that there is an overwhelming preference to preserve V_1, whether or not V_2 is elided. The specific vowel combinations where V_1 is elided reveal further skewing:

a + E → E	3	(cf. a + E → a, 6 cases)
E + a → a	4	(cf. E + a → E, Ø cases)
a + O → O	Ø	(cf. a + O → a, 3 cases)
O + a → a	Ø	(the only 2 cases of O + a → Oa)
O + E → E	Ø	(cf. O + E → O, 3 cases)
E + O → O	2	(cf. E + O → E, 1 case)

These figures suggest a strength hierarchy among non-high vowels, such that *a* > O > E. Even in the face of the strong preference for V_2 to elide, all elisions in combinations E + a are resolved in favor of *a*, showing *a* > E (there are two cases where no elision takes place, with E retained as a glide). In E + O, 2 out of 3 cases of are resolved in favor of O, showing O > E (there are no cases where E is retained as a glide). Although there are no cases of O + *a* being resolved in favor of *a*, there are also no cases of *a* being elided in this configuration, and moreover, in *a* + O, *a* always prevails, showing *a* > O. The one "aberrant" figure is the three cases of E prevailing in *a* + E, where the "weaker" vowel prevails in the "weaker" environment. I have no account for this other than to note that throughout this discussion, we are speaking of *tendencies*, and even here the tendency for *a* to dominate E is evident in the fact that *a* prevails over E in twice as many cases of *a* + E as E prevails over *a*. This apparent hierarchy of strength jibes with the observations for nouns + definite suffix (Table 7), where we find that E is elided before both *a* and O, and that in one case, O in V_2 position is elided in favor of *a*, even though elsewhere V_2 is retained with definite suffixes.

The high vowels do not appear as V_2 with indefinite and demonstrative suffixes, so it is not possible to compare symmetric $V_1 + V_2$ cases. In the data sample, there were 2 cases of -I + E → I and no cases of -I + O → I. There were 4 cases of -U + E → U; I had no examples of -U followed by the other non-high vowels. The single case of high V_1 eliding was I + a → a. However, in most combinations of high vowel + non-high vowel, both vowels were retained, with the high vowel becoming a glide. Thus, compared to mid vowels, there is a tendency toward gliding high vowels in preference to elision.

	V_1 = E	V_1 = O	V_1 = I	V_1 = U
V_1 or V_2 elided	7	3	7	4
V_1 glided	2	4	9	7

As with non-high vowels, the behavior of high vowels jibes with the data for noun + definite suffix (Table 7), where high vowels are always retained as glides.

We have examined four environments where contiguous vowels reduce to one syllable nucleus, either through elision of one of the vowels or by changing V_1 to a glide, which then becomes part of a complex syllable onset. The strategy chosen in any individual cases depends on a combination of the specific morphemes, the types of morpheme junctures, the positions of the respective vowels, and the qualities of the vowels. We can summarize with the following observations:

(1) **Specific morphemes:** Specific morphemes may dictate application of strategies which run counter to otherwise more general principles. We have seen two cases: (i) the definite suffix -O of the KU- singular class, which is elided by a preceding *a*, even though all other definite suffix vowels are retained, including the -O of the KÙ- plural class; (ii) the 3rd singular possessive pronoun *yɛ̄*, which retains the front vowel when prefixed to kin terms, even though the same vowel of the 1st singular *mɛ̄* follows the more general process of being elided in this environment.

(2) **Vowels with identical front/back and height features:** Regardless of morphological environment, V_i + V_i → V_i, where front/back and height features are the same for each V_i. Other possibilities, e.g., conversion of V_1 to a glide or a long result vowel,[26] never occur in Avatime. When like vowels are contracted in this way, there is an apparent tendency to retain the [ATR] specification of V_2.

(3) **Elision of V1 or V_2 as a function of type of morphological juncture:** When the elision option is chosen, the four environments examined show clear differences in preference for eliding V_1 or V_2. For the definite suffixes and nouns following possessive pronouns, the preferred option is to elide V_1; for the postposition and the indefinite and demonstrative suffixes, the preferred option is to elide V_2. There are good reasons for this. The *definite suffixes* all consist of a vowel alone. Were that vowel elided, morpheme identity would thus be lost, aside from possible tonal cues. In the *possessive constructions*, V_2 is the stem initial vowel of the noun, i.e., its class prefix. Again, important

[26] Vowels can be lengthened in Avatime for stylistic purposes. In an early field work session when I was eliciting noun + demonstrative constructions, I was given forms such as *lɪ̄gbo̱e̱eyà* 'this chair', with a lengthened intial vowel in the suffix. This vowel clearly has not been lengthened through vowel elision because the final stem vowel of the noun is also present.

information would be obscured by elision of this vowel, whereas the possessive pronouns all remain distinct from one another solely on the basis of their consonants. Elision of their vowels results in no information loss. On the other hand, in both the case of the *postposition* and the *indefinite and demonstrative determiners*, the intial vowels of these affixes (= V_2) are not necessary to retain morpheme identity—in the case of the indefinites and demonstratives, the vowels are even predictable based on the class of the noun to which they are affixed.

(4) **Vowel strength hierarchy among non-high vowels:** When both V_1 and V_2 are non-high vowels, there is a tendency for the affected vowel to be elided rather than to be converted to a glide (with *a*, glide formation is not even an option). Both in constructions with definite suffixes, where V_1 is more frequently elided than V_2, and in constructions with with indefinite and demonstrative determiners, where V_2 is more frequently elided than V_1, there is a dominance hierarchy *a* > O > E.

(5) **Glide formation with high vowels:** When V_1 is a high vowel, the strong preference is for the vowel to become a glide rather than to elide. This is categorially the case with the definite suffixes. The set of environments in Avatime where V_2 can be a high vowel are so limited that it is not possible to state any generalizations about high vowels in this position. There are a number of possible reasons why high vowels as V_1 should be particularly prone to gliding. One is that high vowels are articulatorily closer to glides than are non-high vowels, and glide formation thus involves only desyllabification with little further articulatory adjustment. Another, not unrelated hypothesis is that greater phonetic, and probably phonological distance between high vowels and non-high vowels than between non-high vowels as a set impedes the mechanism of elision, whatever that may actually be.

4. Tone

Avatime tone alone could occupy a monograph length work. Ford [1971a] devotes nearly 80 pages to what is really just a sketch of the system meant as background for his syntactic study. The system is one of many subtle, yet consistent distinctions, which I was often able to differentiate only through repeated listening to tonal pairs and instrumentally-aided comparisons. I must acknowledge my indebtedness to Ford's groundbreaking work. His analysis, using the linear segmental framework current at the time, would be formulated in different terms today, and my observations of the Avatime facts do not jibe with his in all details, but without having had his careful study available as I worked on Avatime, I suspect that I would still be scratching my head, mystified at the apparent tonal vagaries of this language.

4.1. Tone levels. Funke [1909:289] and Heine [1968:105] both state that Avatime has three tone levels, plus rising and falling contours. Likewise, Kropp [1967:3] says, "It seems probable that [Avatime, Lefana, and Akpafu] all have at least three phonemic tones," but as Kropp remarks, "No analysis has been made of the tone systems of these languages, by myself or anyone else to my knowledge." The only real analysis of the Avatime tone system is in Ford [1971a:Part I], with aspects of that analysis repeated in Kropp Dakubu and Ford [1988:128ff.].

Ford [1971a:20] says, "In any utterance, no more than four distinct levels of tone are used ... ." He labels the tones with the numbers 1-4, with tone 1 being the lowest. He also recognizes a rising tone, which seems always to be a combination of tones 1 + 4 conflated onto a single syllable (see §4.4). He does not mention a falling tone, and in my data, falling tone is unusual outside a few borrowed items with falling tone, such as *àyêmè* 'heaven', and cases where a falling glide seems to be a transition from a higher to a lower tone across a voiced domain, e.g., *kīkuêyà* [- ^ _] 'this yam'. My data confirm that Ford is correct in requiring up to four, but no more than four, distinct levels for a description of Avatime tone. I will therefore use his numbering 1-4 to refer to tones, and in marking tones on words, I will use the following diacritics:

Tone 1 *à*
Tone 2 *a̋*[27]
Tone 3 *ā*
Tone 4 *á*

Though the description of Avatime tone requires reference to four tone levels and at least a rising contour, tone 2 occupies a rather marginal position as an underived tone, and some instances of tone 4 are likewise derived. The description here will concentrate only on aspects of tones in the nominal system. The same general principles apply in the verbal system, but that system is tonally quite complex and would lead beyond the scope of this overview.

All native Avatime nouns (and many borrowed nominal roots as well) have a tone bearing prefix. Regarding tones of the prefixes and of underived nominal roots, Ford [1971a:21-22] points out two distributional gaps as follows: "Each prefix has certain tone possibilities ... where it will be noticed that no noun-class prefixes are found with tone 2. ... Among [nominal] roots, we find only the three tones: 1, 2, and 3." He lays out the prefix tone possiblities in a table (p. 22), from which I have adapted the data as Table 11. In the Table, note especially several minimal sets distinguished only by tone. I replace Ford's class numbering system

[27] The diacritic *a̋* looks unappealing. I am using it in part for typographical convenience, but it also has a certain iconic value, since, as we will see (§4.3), many cases of Ford's Tone 2 are actually tones 1 + 3 conflated onto one syllable, as the "˝" diacritic implies.

with a set of labels referring to classes by small capitals. The vowels in these class labels are cover symbols for the respective [+ATR] or [-ATR] vowels, the choice of which is determined by the [ATR] specification of the root. The singular and plural of a root always respect the singular and plural class pairings in the rows of the table. The exemplifying nouns in Table 11 all carry the class-sensitive definite suffix.

Table 11. Tones of noun class prefixes

Sing.	Tone	Plural	Tone	Sing. noun	Pl. noun	Meaning (sing. only)
O	4	BA	4	*ɔ́dzɛ̄*	*bádzɛ̄wà*	'woman'
	3		3	*ōzɛ̄*	*bɛ̄zɛ̄wà*	'thief'
LI	4	A	4	*l̩ívānè*	*ávānà*	'bean'
	3		3	*l̄ībīlè*	*ēbīlà*	'seed'
	1		1	*l̂ībīlè*	*èbīlà*	'tick'
KI	4	BI	4	*k̩ídè*	*bi̩dēwè*	'mortar'
	3		3	*kībuè*	*bībūwè*	'thorn'
	1		1	*kìbuɛ̀*	*bìbūwè*	'honey'
KU	4	BÀ	1	*kú̩nyɔ̀*	*bànyɔ̄wà*	'smoke'
	3		1	*kūtsɛ̄*	*bètsɛ̄wà*	'death'
	1		1	*kùbɔ̀*	*bèbōwà*	'tear'
KA	3	KÙ	1	*kāwà*	*kù̩wɔ̀*	'axe'
	1		1	*kèziɛ̀*	*kùziɔ̀*	'bowl'
Ò	1	(L)Ì[28]	1	*ɔ̀mwɛ̄nɔ̀*	*l̩ìmwɛ̄nè*	'orange'
		SI	3		*sī̩yàsɛ̀*	'hair'
			1		*sì̩yàsɛ̀*	'Avatime language'

With the exception of the Ò singular class prefix and the BÀ, KÙ, and (L)Ì plural class prefixes, all of which always bear low tone, the tone of the prefix is a non-predictable feature associated with the specific noun root. Because the tones on these prefixes must be lexically specified, they are sufficient to demonstrate that Avatime has at least three distinctive tone levels, a fact recognized by Funke [1909] and Heine [1968] prior to Ford's work. My data confirm that Ford is by and large correct in claiming that underived native Avatime roots do not bear tone 4. He says, "Loan words account for any occurrence of tone 4 [in underived roots]" (p. 23). However, it is undoubtedly the presence of three tone levels even in native Avatime words which has facilitated the borrowing of words with three contrastive tones, and there are many loan words with tone 4 syllables which are well-integrated into Avatime vocabulary, e.g., *mángoɛ̄* 'mango', *dzàté;* 'lion', *kùkwié*

[28] See fn. 23 for an explanation of the parenthesized (L).

'pepper', *kɔ̀rántiɛ̄* 'banana', *kɔ́ŋuɛ̄* 'kenke' (a type of staple food), *àsígɛ̄* 'ring', *tsàkplākpé* 'cockroach', etc. as well as proper names, e.g., *Ámà, Kɔ́kù, Kwămì* (1-4 rising tone on first syllable), etc. In addition, there are many native Avatime words with stems bearing a tone 4 where that tone may have originally been derived from tone 3 (see §4.4) but where the word is undoubtedly frozen with its current tone pattern rather than being derived "anew" each time it is used, e.g., *kīnémiè* 'tongue', *kēpléwià* 'ladle' (*mi* in 'tongue' and *wi* in 'ladle' are originally diminutive formatives < *-bi-* 'child'), *kākósà* 'chin' (*sa* is probably a root meaning 'under'), *ɔ̄gbágbɛ̄* 'wasp' (reduplicated roots often show tone 4 on the first reduplicant), etc. Finally, there is a presumably native preposition *ní* 'at, on, in', which invariably bears tone 4 (*ní kēdà* '[at] behind', *ní kùsiō* 'in the middle'). Such data further reinforce the assertion that Ford's tones 1, 3, and 4 must be recognized as being in phonological contrast with each other.

The status of Ford's tone 2 is less clear cut. To demonstrate that tones 3, 2, 1 and only those tones appear on underived roots, Ford [1971a:22-23] gives examples such as the following, rearranged and amended here to demonstrate the possible prefix + root combinations. The nouns are in their unsuffixed forms; items in brackets represent patterns where the first tone could not fall on a prefix; dashes show non-existent patterns:

Table 12. Nouns illustrating possible two-tone patterns

Descending patterns			Level patterns			Ascending patterns		
4-3	*ɔ́-dzɛ̄*	'woman'	4-4	-----		1-4	[*dzàtá*]	'lion'
4-2	[*Ámà*]	a name	3-3	*ɪ̀ɪ̄-ɪ̀ɪ̄*	'palm nut'	1-3	*kù-mū*	'oil'
4-1	*ɔ́-nɔ̀*	'person'	2-2	-----		1-2	*ɔ̀-lɛ̀*	'gecko'
3-2	*ɪ̀ɪ̄-vlɛ̀*	'morning'	1-1	*ɪ̀ɪ̀-bì*	'wound'	2-4	-----	
3-1	*kī-kù*	'yam'				2-3	-----	
2-1	-----					3-4	[*tsàkplākpá*]	'cockroach'

My data on these specific words agree with Ford's, e.g., the 4-2 pitch pattern of *Ámà* (name of a woman born on Saturday) does differ from 4-3 and 4-1, etc. Distinguishing tones 2 and 3 proves to be the greatest perceptual difficulty in Avatime tone. In fact, I do not believe that they are always distinguished in normal speech. Because this aspect of Avatime tonology proved particularly elusive, I recorded and repeatedly listened to many tokens of the putative tone 2 vs. tone 3 contrast, in some cases juxtaposing hard-to-hear contrasts by digital cutting and splicing. I found that the putative sequences 3-3 vs. 3-2 did not always contrast, sometimes both bearing a level pitch pattern, and the putative sequences 1-3 vs. 1-2 sometimes appeared to ascend over the same interval. However, the pairs of sequences differed in that it was virtually always tone 2 which merged with tone 3, not vice versa, i.e., a putative 3-3 sequence would always be pronounced with a

level pitch pattern, never [– –], and a 1-3 ascending pattern would always be heard as a greater ascent than 1-2.

With this caveat, it is clear that words like *Ámǎ, lī-vlɛ̌* 'morning' and *ɔ̀-lɛ̌* 'gecko', with tone patterns 4-2, 3-2, and 1-2, respectively, require recognition of a tone distinct from either tone 3 or tone 1. Though I have found no minimal sets contrasting words differentiated only by a syllable bearing tone 2 vs. a syllable bearing tone 3 or tone 1, there are no obvious phonological or other features of the illustrative words presented to this point which would allow us to derive tone 2 from some other underlying tone (though see §4.3 for discussion of *lī-vlɛ̌* 'morning'). In addition to substantive lexical items like those in Table 12, Avatime has other underived words and morphemes with tone 2 distinct from tones 1 or 3. The singular object pronouns bear tone 3, while the plural object pronouns bear tone 2, e.g., *ē vù mē* 'he caught me' vs. *ē vù bǎ* 'he caught them'. The first syllable of the interrogative adjective *wɔ̀li* 'which?' bears tone 2,[29] e.g., *bádzē wɔ̀lí wɔ̀ mɔ̄* '**which** women did you see?', *bēvè wɔ̀lí wɔ̀ mɔ̀?* '**which** mice did you see?'

Ford noted that tone 4 does not occur on native, underived nominal *roots*, and tone 2 does not occur on *prefixes*. Table 12 reveals that this restriction on occurrence of tone 2 is part of a broader generalization, viz. tone 2 never occurs word initial (or perhaps utterance initial if *wɔ̀li* 'which?' is taken to be a "word"). With these distributional facts in mind, an internal reconstruction of the Avatime tone system suggests that Avatime originally had only two tones (corresponding to Ford's tones 1 and 3) and that tones 2 and 4 were originally derived from tones 1 and 3 respectively by register raising processes.[30] Such processes are still active (§§4.3-4), but because of the introduction of large numbers of loanwords bearing underived tone 4 in particular, as well as some instances of underived tone 2, along with the obscuring of environments for derivation of at least some instances of tones 2 and 4 in native Avatime items, there seems to be no alternative in modern Avatime to recognizing four distinctive tone levels.

---

[29] The tone of the second syllable of *wɔ̀li* varies according to the following tonal context. According to Ford's [1971a:29-30] description, *wɔ̀li* has a class agreement prefix. For Chris Bubuama, this word is invariant for all classes. Ford's and my data do agree on the tone of the first syllable.

[30] Ford [1971a:25-27], using the segmental model for tone current at the time, distinguishes the four tones with features [high] and [raised] as follows: tone 1 [-high, -raised], tone 2 [-high, +raised], tone 3 [+high, -raised], tone 4 [+high, +raised]. He expresses his tone rules in terms of these features, but he views them as an analytic convenience rather than something "real" about Avatime tones, saying, "The features proposed have little or no intrinsic content. They are looked upon as terms which express relationships between phonological units (here, tones). The matirx [of tone features] does not represent the level of systematic phonetics—the feature complexes must be translated into scalar values or some other form of surface representation" (p. 27). If, however, my suggestion that tones 2 and 4, in origin are derived from tones 1 and 3 respectively by *register* raising processes, his analysis of features may have more reality than he gave himself credit for!

4.2. Tone and glottal stop. One feature of the tone system which no previous researchers have noted is a final glottal stop associated with phrase final tones 3 and 4.[31] Note the following distinctions. The words are transcribed as above but with final glottal stop overtly represented as '.

Table 13. Examples of final glottal stop conditioned by tone

Final glottal stop (tones 3 and 4)		No final glottal stop (tones 1 and 2)	
ē vù mē'	'he caught me'	*ē vù bà̀*	'he caught them'
óbuē' /óbū + ē/	'the bee'	*kìbuè̀* /kìbū + è/	'the thorn'
ɲ̀lē'	'necks'	*ɲ̀bìlè̀* /ɲ̀bì + lè/	'the wound'
òlē'	'thirst'	*òlēlò* /òlē + lò/	'the thirst'
kụ̀wē'	'axes'	*kụ̀wɔ̀* /kụ̀wē + ɔ̀/	'the axes'
kụ̄wā'	'medicine'	*kụ̄wà* /kụ̄wā + ò/	'the medicine'
dzàtá'	'lion'	*mángò*	'mango'
tsàkplākpá'	'cockroach'	*sàplálà*	'onion'

4.3. Derived tone 2. Most tokens of tone 2 are derived from one of two sources: (i) tones 1 + 3 conflated onto one syllable; (ii) raised tone 1. Far and away the most frequent source of situation (i) in the nominal system comprises nouns of the O class with a final tone 1 in the stem + the tone 3 definite suffix for that class, Ē. Nouns in this configuration contrast tonally with O class nouns with stem final tone 3 or 4 plus definite suffix. In the latter cases, the resultant tone is tone 3 or 4 respectively. Of interest is the fact that if the tone 2 syllable resulting from tones 1 + 3 is phrase final, it ends in a glottal stop, i.e., this prosodic feature associated with tone 3 (§4.2) is preserved even though the result tone is no longer tone 3. The plural for each noun shows the underlying tone of the root syllable because the plural definite suffix, *-wa*, does not coalesce with the preceding syllable.

Table 14. Examples of tones 1 + 3 → 2ʔ vs. 3/4 + 3 → 3/4

Conflation of tones 1 + 3			Conflation of tone 3 or 4 + 3		
ōkpoè'	*bēkpòwà*	type of parasite	*ōkpoē'*	*bēkpōwà*	'corpse'
ɔ̄nụ̀vɔè'	*bānụ̀vɔ̀wà*	'child'	*ɔ̄gàsịē'*	*bāgàsɪ̄wà*	'lizard'
àgbèlìè'	*àgbèlɪ̀wà*	'cassava'	*dzàté'*	*dzàtáwà*	'lion'
mángoè'	*mángòwà*	'mango'	*ódzē'*	*bádzēwà*	'woman'

[31] As noted in §2.1.6, Heine [1968] did hear and transcribe final glottal stops in Avatime, but he did not recognize them as being tonally conditioned, rather construing the glottal stop as a distinctive consonantal segment.

One of Ford's examples of apparently underived tone 2 in Table 12 is the word *ĩivlɛ̃̀* 'morning' (definite form, *ɪ̃̀vlɛ̃̀lɛ̀* 'the morning'). This word without the definite suffix and in phrase final position ends in glottal stop, which the discussion above suggests is a diagnostic for the presence of stem final tone 3. I had originally transcribed this word, along with a number of others in the LI class, as having tones 3-3 on the prefix + root, e.g., *ĩtōlɛ̀* 'mountain', *ɪ̃̀gbālɛ̀* 'house'. Thinking that I might have mistranscribed some of these, I rechecked the tones of all of them. The only word other than 'morning' which had a 3-2 tone pattern on the prefix + root was *ɪ̃̀klɛ̃̀nɛ̀* 'stone'. 'Morning' and 'stone' differ from all the others I checked in that these two words are the only ones where the noun root begins in a consonant cluster. I therefore propose that the roots of these words were originally **-vèlɛ̄-* and **-kàlā-*, respectively, and when the vowels were syncopated, the 1-3 original pattern conflated to tone 2. One might propose that this syncopation and tone conflation is the way these words obtain tone 2 even in modern Avatime, obviating the need to assign lexical tone 2 to them. However, there is little evidence for claiming that the syncopated vowel is underlyingly present.[32] This observation, plus the fact that there are cases of tone 2 with no obvious derivational source, suggests that tone 2 is part of Avatime tonology and should be assigned as the lexical tone of items such as those in question.

I have claimed that a second source for tone 2 is raised tone 1. All tokens of this source are definite suffixes of nouns other than the O class. Ford [1971a:24], who is the only previous writer to describe the tones of the definite suffixes, does not derive the tones from a single underlying source, but rather gives the distributional statement, "... if the tone preceding is either 2, 3, or 4, the definite suffix will bear tone 1; if the preceding tone is tone 1, then the suffix will bear tone 2." I have chosen to provide the definite suffix with underlying tone 1 which dissimilates to tone 2 following tone 1. The main motivation for this is the fact that the existence of non-derived tone 2 seems to be an innovation in Avatime, yet we can assume that the tonal properties of the definite suffix are not. We would therefore not want underlying tone 2 suffixes to be part of the morphological inventory of Avatime:

---

[32] Kropp [1967] actually transcribes the syncopated vowels, noting (p. 3), "In all [the languages included in the study], vowels in position C___*l*/*r* are usually very short." In my opinion, they are non-existent. I never heard anything more than a vowel-like transition between C_1 and C_2 in such words, and often not even that. Literate speakers, likewise, do not write vowels here.

Table 15. Definite suffixes with tone 2 or tone 1

Class	Tone 2 following tone 1		Tone 1 following tone 3	
BA	*bēvèwâ*	'mice'	*bēzēwà*	'thieves'
LI	*ɲ̀bìlɛ̂*	'wound'	*ɲ̀bīlɛ̀*	'tick'
A	*èbìlâ*	'wounds'	*èbīlà*	'ticks'
Ò	*ɔ̀ɣàlɔ̂*	'pig'	*ɔ̀ɣālɔ̀*	'group'
(L)Ì	*ɲ̀ɣàlɛ̂*	'pigs'	*ɲ̀ɣālɛ̀*	'goups'
SI	*sīpìsɛ̂*	'body hair'	*sīnīsɛ̀*	'mushroom'
KI	*kìkuɛ̂*	'rubber'	*kɪ̀gɔɛ̀*	'occiput'
BI	*bìkùwɛ̂*	'slingshots'	*bɪ̀gɔ̄wɛ̀*	'occiputs'
KU	*kʊ̀sâ*	'cloth'	*kʊ̄kà*	'fence'
BÀ	*bàsàwâ*	'cloths'	*bàkāwà*	'fences'
KA	*kèziâ*	'spoon'	*kēfūkpà*	'pot'
KÙ	*kùziɔ̂*	'spoons'	*kùfūkpò*	'pots'

For classes where the suffix forms a CV syllable, the tonal behavior is straightforward. For the classes whose prefixes have the form KV, the suffixes are just a vowel, which coalesces with the preceding vowel to form one syllable. Patterns of vowel coalescence for this case are illustrated in Table 16 (some examples repeated from Table 15). In all but one case, tones on the syllables resulting from vowel coalescence can be accounted for by a simple rule, viz. *the result syllable bears the tone of the final vowel.* The one case that cannot be accounted for by this statment is the last one, where tones 3-1 coalesce to tone 2 following tone 1. I propose that when the 3-1 underlying contour follows a tone *other than* tone 1, the tone 3 is absorbed into the preceding non-tone 1, leaving only the 1 on the final syllable, as in 'mortar', 'flour', 'hawk'. Following tone 1, the contour 3-1 in cases like 'war', 'oil', 'bowl' simplifies to tone 2. Note that this account allows us to say that either 1-3 or 3-1 on a single syllable simplify to tone 2. If the underlying final tone is 3, the final glottal stop appears phrase final; if the underlying final tone is 1, there is no glottal stop.

Table 16. Tones of definite suffixes coalesced with stem final vowels

P F-R*	Class	Example	Underlying		Evidence for underlying	
4/3 1-2 → 4/3 2	KI	*kīkuề*	/kīkù + è/	'yam'	*bīkùwề*	'yams'
	KU	*kūdō*[33]	/kūdè + ò/	'road'	*bèdèwà*	'roads'
	KA	*kāsà-mè*[34]	/kāsà + à/	'waist'	*kāsà-mè*	'a waist'
4/3 3-1 → 4/3 1	KI	*ḳ́ídè*	/ḳ́idē + è/	'mortar'	*bḭ́dēwè*	'mortars'
	KU	*kūnɔ̀*	/kūnɔ̄ + ɔ̀/	'flour'	*bànɔ̄wà*	'flours'
	KA	*kādzḭà*	/kādzī + à/	'hawk'	*kādzī'*	'a hawk'
1 1-2 → 1 2	KI	*kìkuề*	/kìkù + è/	'rubber'	*bìkùwề*	'slingshots'
	KU	*kùnyà*	/kùnyà + à/	'bow'	*bànyàwà*	'bows'
	KA	*kādròwià*	/kādròwì + à/	'dog'	*kādròwì*	'a dog'
1 3-1→ 1 2	KI	*kḭ̀gụ̀*	/kḭ̀gū + è/	'war'	*bḭ̀gūwè*	'wars'
	KU	*kùmụ̀ɔ̀*	/kùmū + ɔ̀/	'oil'	*bàmūwà*	'oils'
	KA	*kèzià*	/kèzī + à/	'bowl'	*kèzī'*	'a bowl'

*P = prefix tone; F = final root tone; R = result tone of coalescence

To summarize, we can identify active processes for deriving many tokens of tone 2, including some probable lexicalized cases of originally derived tone 2. However, there are enough cases where no transparent derivational source is available that it seems necessary to recognize tone 2 as a separate phonological entity.

4.4. Derived tone 4 and rising tone. Ford [1971a] documents a number of cases of tone 4 and rising tone, which he always analyzes as 1-4. His rule system is complex and in most cases involves examples from the verbal system, which I am not discussing here. Very roughly, tone 3 → tone 4 / ___3 when certain conditions are met. Here I list a few examples of compound or derived nouns where tone 4 is apparently derived from tone 3. I stress that these examples are not drawn directly from Ford's account, and he may not have chosen to derive them this way, but they fit into the general picture.

[33] I have transcribed this and the only other two examples that I collected from the KU class with tones 3-3 rather than 3-2. This could have been a transcription error or it could be the case that the speaker neutralized tones 2 and 3 when he pronounced these words, a neutralization which sometimes takes place, as noted above.

[34] *Mɛ̄* is a postposition meaning "in". It is included in the citation form of most nouns indicating locations, e.g., *ɔ̀nyrɔ̄-mè* 'farm', as well as in words indicating an area on the body (as opposed to words indicating specific body parts).

Table 17. Examples of words with derived high tones

Example		Source	
ɲ̀klámāsēnè	'knee'	/ɔ̀-klɪ̄ + -mā + ēsē/	/leg + ? + under/
ɲ̀nyɔ́ɣūlè	'nostril'	/ɲ̀-nyɔ̄ + ɪ̄-ɣū/	/nose + hole/
ɔ̀zyánētē	'poor person'	/ɔ̀-zyā + ō-nētē/	/poverty + possessor/
ɔ̀tsátsānɔ̀	'fruit bat'	/-tsā/	(reduplication)

As noted, Ford [1971a] derives rising tone from tones 1 + 4 on one syllable. As far as I can determine, all instances of derived rising tone do have this source, though in my data, the phonetic rise usually starts at the level of the preceding tone if there is one. Thus, *ōvètɔ̄* /ōvè + étɔ̄/ 'a certain mouse' has the phonetic pitch pattern [ˉ ˇ ˉ] (see §3.4 above, esp. Table 10, for analysis of the morphology). I have found one case where a 1 + 4 rise derives from tones 1 + 3 conflated to one syllable with the 3 raised to 4 as exemplifed in Table 17, viz. *ŏpōlò* 'door', plural *ɲ̀pōlè*. The singular and plural of this word were always pronounced in this way, with a rise to tone 4 on the first (prefix) syllable. Funke [1910:32] gives *opúpolo* [tones *sic*], showing that the source of the rising tone for my informant is haplology of the first root syllable but preservation of that syllable's tone.

In §3.4, Table 10, I illustrated a second type of case where Ford derives tones 4 and 1-4 rise, viz. noun + indefinite determiner *-tɔ̄*. According to Ford's [1971a: 24-25] analysis, the indefinite has the underlying form /prefix + *-tɔ̄*/, where the prefix bears tone 4 if the host noun has a prefix with tones 3 or 4 and tone 1 if the host noun has a prefix with tone 1. The prefix of the indefinite determiner ultimately coalesces with the final vowel of the stem, with the following tonal results:

/kū̱-ɲ̀ + ɔ́-tɔ̄/	→	*kū̱ɲ̀ɔ́tɔ̄*	'a certain palm tree'
/bē-vè + á-tɔ̄/	→	*bēveătɔ̄*	'certain mice'
/è-glɪ̀ + à-tɔ̄/	→	*èglìàtɔ̄*	'certain walls'
/bà-ɲ̀ + à-tɔ̄/	→	*bàɲ̀ìàtɔ̄*[35]	'certain palm trees'

Here, according to Ford's analysis, tone 4 is not derived, but is the *underlying* tone of the prefix on the indefinite marker if the host noun has a tone 3 or 4 prefix. If this tone coalesces with tone 3 or 4 from the last syllable of the noun stem, the

[35] I give tone 2 as the result tone on the second syllable. This is the tone Ford claims to result from the coalescence of stem final tone 3 + prefixal tone 1, and this is also the result that I would have predicted from the discussion at the end of §4.3. In my own data, however, I found the pitch of this syllable always to be at least at the level of *-tɔ̄*, and sometimes slightly higher, though not as high as tone 4 would be. There is some evidence from other environments that a sequence 2 + 3 levels to 2 + 2 or 3 + 3.

result tone is 4; if it coalesces with a stem final tone 1, the result is a 1-4 rise. As an alternative analysis, I suggest that the tone on the prefix of the indefinite marker always *copies* the tone of the host noun prefix. If that is tone 3, then it is raised to tone 4 before *-tɔ̄* by the process exemplified in Table 17. The ultimate surface tones will not differ from those predicted by Ford, but this account will give a more intuitive account of the tones of the prefix of the indefinite marker by using a tone raising process known to be needed in any case.

REFERENCES

Casali, R. 1994. "On the loss of Cross-Height Vowel Harmony in Niger-Congo languages." ms., UCLA.

Ford, K. C. 1971a. "Aspects of Avatime syntax." PhD dissertation, University of Ghana.

Ford, K. C. 1971b. "Noun classes, concord and markedness in Avatime." In *Actes du 8° Congrès de la Société linguistique de l'Afrique occidentale*, pp. 141-149. Abidjan: Université d'Abidjan.

Fulop, S., E. Kari and Peter Ladefoged. 1995. "Articulatory modeling of so-called Advanced Tongue-Root vowels." Paper presented at the 26th Annual Conference on African Linguistics, UCLA, March 24-26, 1995.

Funke, E. 1909. "Versuch einer Grammatik der Avatimesprache." *Mitteilungen des Seminars für orientalische Sprachen* 12(3):287-336.

Funke, E. 1910. "Deutsch-Avatime Wörterverzeichnis." *Mitteilungen des Seminars für orientalische Sprachen* 13(3):1-38.

Greenberg, J. H. 1966. *The Languages of Africa*. Bloomington, IN: University of Indiana.

Heine, B. 1968. *Die Verbreitung und Gliederung der Togorestsprachen*. Berlin: Dietrich Reimer Verlag.

Kropp, M. E. 1967. *Lefana, Akpafu and Avatime with English Gloss*. Legon: Institute of African Studies, University of Ghana.

Kropp Dakubu, M. E. and K. C. Ford. 1988. "The Central-Togo languages." In M. E. Kropp Dakubu (ed.), *The Languages of Ghana*, pp. 119-154. London: Kegan Paul International.

Maddieson, I. 1995. "Collapsing vowel harmony and doubly-articulated fricatives: two myths about the phonology of Avatime (Siya)." Paper presented at the 26th Annual Conference on African Linguistics, UCLA, March 24-26, 1995.

Ring, A. 1981. "Ewe as a second language: a sociolinguistic survey of Ghana's Central Volta Region." *RR* 12(2/3).

Schuh, R. G. 1995. "Avatime noun classes and concord." Paper presented at the 26th Annual Conference on African Linguistics, UCLA, March 24-26, 1995.

Struck, B. 1912. "Einige Sudan-Wortstämme." *Zeitschrift für Kolonialsprachen* 2:233-253, 309-323.

Department of Linguistics
University of California
Los Angeles, CA 90024

[Received March 12, 1995;
accepted March 20, 1995]