THE TONOLOGY OF KHOEKHOE (NAMA/DAMARA)

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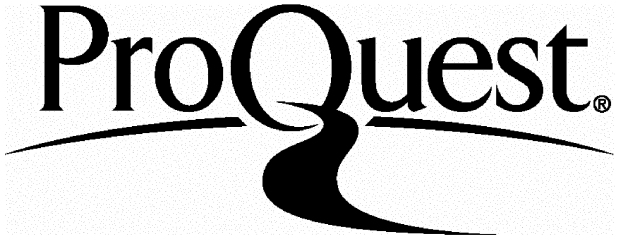

For Pastor Eliphas Eiseb

ABSTRACT

This thesis investigates the tonal system of Khoekhoegowab or Khoekhoe, a Central Khoesaan language spoken in Namibia, and formerly known as Nama/Damara. The data for the research, particularly on lexical tonology, is drawn from a lexicographic project which was instituted by the author in 1981. Observations are based on a total perusal of the near-complete database by means of computer.

Chapter 2, following on an introductory chapter, presents an instrumental analysis of the surface tone of radicals, on the grounds of which a four-tone system previously established by the author is refined and defended against other systems. Arguments are presented in favour of a register system as opposed to a contour system, *i.e.* that a tonal melody consists of a sequence of two level tonemes. In addition to the six major citation melodies and their sandhi versions, some residual melodies are identified, which are due to former depressor segments. An underlying feature system is then established, which is able to account for the existence of subsidiary melodies and some perturbational behaviour, showing that these are due to tonogenesis typologically akin to that of South-East Asian languages.

Chapter 3 deals with the formation of compound words and derivations in the realm of lexical tonology. The occurrence of the different perturbational processes is investigated, which, next to regular sandhi changes *i.a.* involve flip-flop rules as known from Chinese. Unlike the neighbouring Bantu languages, Khoekhoe uses paradigmatic displacement of melodies in cyclic application, rather than syntagmatic feature-changing rules.

Chapter 4 presents an overview of the post-lexical tonology with regard to the major syntactic structures. It is demonstrated that Khoekhoe corroborates a universal, namely that tonal domains coincide with syntactic domains that commence with a double left bracket [[in a bracketed representation of an IC structure. In Khoekhoe the leftmost constituent receives the citation melody, while subsequent constituents receive the sandhi melody.

Khoekhoe tonology has semantic as well as syntactic and derivational functions.

ACKNOWLEDGEMENTS

When I first approached Neil Smith on the possibility of studying under his guidance I did so because of his reputation as a linguist. Little did I know then how privileged I would be from a personal point of view to have him as my supervisor. What meant most to me, beside the assurance of being safely guided academically, was his tactful and unobtrusive support and encouragement. One way of relieving the anxiety was by his particularly prompt responses to my problems and draft submissions, whether it was directly during my presence in London, or by correspondence to Namibia where I had nobody to discuss linguistic issues with. For all this and his patience I thank him sincerely.

I shall remain indebted throughout my academic career to Jonathan Kaye from SOAS, who - without remuneration - spent much time on masterminding the design of a very specialized sorting programme for my *Khoekhoegowab Dictionary* Project. He provided me with the tool I had been unable to obtain for many years at home. Not only does it significantly enhance the quality and efficiency of the lexicographic work; more important, it provided me with a means of electronic data retrieval without which I would have been unable to undertake the present work at this stage. This lexicographic database and programme is unique in Khoesaan studies and should remain instrumental for future research on a wider basis.

In this connection I also acknowledge with gratitude the contribution of Lorna Gibb, who under the direction of Jonathan Kaye wrote the programme in 1989.

Without extensive financial assistance I would not have been able to read for my Ph.D at London University. I thank the following sponsors (in alphabetical order) for their substantial contributions, which hopefully can be fruitfully re-invested in Namibia: The Academy with the University of Namibia; the African Languages Association for Southern Africa; the British Council; the Human Sciences Research Council; the Norwegian Agency for Development Co-operation (NORAD); the Rössing Foundation, Namibia. I also thank the Academy, Windhoek for the funds to acquire a fundamental frequency analyzer for departmental use, and for the opportunity to use it for my research.

Least seen but vital was the support of my family, in particular my wife Irmgard. For many years she and our two children have put up with the demands made on our family life by my absorption in a new professional field and my studies.

The work in this thesis reflects almost exclusively the linguistic competence of my closest and most trusted colleague for over eleven years, Pastor Eliphas Eiseb. Although officially employed as research assistant for the *Khoekhoegowab Dictionary* Project, I consider him to be my teacher in many

ways. His dedication to the task has meant inspiration to me and allowed me glimpses into Namibian life that I would have been denied otherwise. For Pastor Eiseb the survival of the Khoekhoe language and cultural heritage is a matter of deep concern. Therefore I dedicate this work to him.

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

In the first half of this century Nama was the best-known Khoesaan language in the literature. This was due mainly to missionary activities, which dated back to 1830. From a linguistic point of view, Nama probably achieved prominence most through the phonetic study by D.M. Beach, *The Phonetics of the Hottentot Language*, which dates back to 1938. This Ph.D study was hailed as a classic from a phonetic point of view, yet until the mid seventies its results went largely unnoticed in subsequent linguistic publications on Nama. The present study in essence continues where Beach left off. With the exception of a grammar by Hagman (1977) and some articles mainly by Haacke, interest in Khoesaan languages at present focuses on all Khoesaan languages but Nama, even though Nama/Damara is officially recognized for literary purposes in Namibia and is taught as a major degree course at university level.

This language, which in the literature of today is still most generally known as Nama, was the language with the widest geographical distribution in pre-colonial Namibia. It is spoken from the southern border on the Orange river, and to some extent still by a remnant population south of the Orange river in the Richtersveld of the northern Cape Province of South Africa, to approximately the central area of Namibia by mainly the Nama. From central Namibia to the northern limits of the linguistic area the language is spoken predominantly by the Negroid Damara. In the west the

area extends up to Sesfontein, which forms the southern border of Kaokoland, a territory associated traditionally with Himba and other dialects of Herero, a Bantu language. In the central northern area the delimitation is not that clear, as the northernmost representatives of the language, the Haillom extend into areas traditionally associated with the Wambo. But the language is well represented up to the Etosha Game Reserve, which - by virtue of being a game reserve - forms a buffer separating the two traditional linguistic areas. East of Grootfontein the Damara and Haillom are neighbours to the Northern Khoesaan speaking Saan groups, mainly the Western !Xû. Further south the Damara extend up to the Waterberg in what traditionally is considered to be a Herero domain, while east of central Namibia, that is, roughly from the 22nd° latitude down the language extends into the Nharo area of Botswana.

Although the "Nama" language does have dialect variation particularly among the Damara, it is justified to speak of one common language, even though it is spoken by three ethnically diverse groups; *viz.* the "Hottentot" Nama, the Negroid Damara and the Haillom. The latter are usually considered to be "Saan", despite being a hybrid group with closer linguistic and cultural associations to the Damara.

1.1 Why "*Khoekhoe*"?

At the risk of causing some confusion in classificatory terms, this language commonly known as *Nama* in the literature will here be referred to as the *Khoekhoe* language in recognition of a public campaign by the speakers themselves. It has always been a sore point for the Damara that they were said to speak the language of the Nama, particularly when the claim is added that they had adopted the language while being in servitude with their Nama masters. Hence many Damara reject the name Nama and claim to speak Damara or *ǂNûkhoegowab* (Language of the Black people, *i.e.* Damara). As a compromise it was accepted as official policy in the late sixties to refer to the language with the dual reference Nama/Damara - immediately leading to the possibility of bias by also using Damara/Nama. After an earlier attempt had been vetoed in the late 1970s (by a prominent Nama), the Nama/Damara Subject Committee of the Ministry of Education and Culture decreed in 1990 (after independence) to promote the name *Khoekhoegowab* (Khoekhoe-language) for official purposes. The initiative was due to my long-time colleague and informant for the present research, Pastor Eliphas Eiseb. The name *Khoekhoegowab* is not an artificial creation, but a name that had gone out of use at the beginning of this century. Its existence is also confirmed in the literature, occasionally.

The concept "Khoekhoe" is, thus not used as a wider classificatory term for "Hottentot" (including *i.a.* !Gora and Xri) in this thesis, but in a narrow vernacular sense.

It is my view, that linguists should serve the people they study by respecting their sentiments and established conventions - also with regard to orthography, rather than to assume a dubious academic prerogative of innovating at will. Recent research (Haacke forthcoming) has, in fact, proved beyond doubt that the Damara cannot indeed have adopted the language from the Nama. A dialect survey has shown that those Damara dialects which are geographically little exposed to Nama, *i.e.* those of the Haiǁom in the north, the Sesfontein Damara in the north-west, and the Namidama on the periphery of the Namib desert as far south as the Brandberg, share considerable percentages of their vocabulary with the Nharo of Botswana. As Nharo and ǁGanakhoe are considered to be closest to Proto-Central Khoekhoe, it follows that the Damara dialects likewise are closer to it than the Nama dialects. For the sake of brevity I shall take one liberty, though, namely to shorten *Khoekhoegowab* to *Khoekhoe*.

Recent demographic figures are not available, as the census held after Namibia achieved independence in 1990, does not reflect ethnic composition. In view of the present total population of approximately 1,4m., the figures of the 1981 census may still be taken to be indicative percentagewise:

Damara:	76 169	7,4%
Nama:	48 539	4,7%
Total Nama/Damara:	124 708	12,1%
Total of Namibia:	1 031 927	100,0%

With 12,1% the Khoekhoe speakers form the biggest language group in Namibia after the Wambo with 49%. It can be assumed that the Damara figure is too low, as Haiom speakers may have been classified as belonging to the "Bushman" ethnic group. Likewise, many Nama would voluntarily have had themselves classified as "Rehoboth Baster", in those days.

1.2 The Idiolect Described

The idiolect described in this thesis is primarily that of a Damara by upbringing, Pastor Eliphas Eiseb. I met Pastor Eiseb as member of the Nama/Damara Subject Committee, when I accepted an appointment as Language Planner for Nama/Damara with the education authorities in 1973. In the meetings of this committee I came to respect Pastor Eiseb as the person with the most outstanding knowledge of the Khoekhoe language I have ever met. Most decisive is his enquiring mind, which gives him an intimate knowledge also of cultural aspects ranging from ethno-botany to history. But in his service first as teacher and then as minister of the church he had also acquired a wide knowledge of dialectal variation in the country, having been stationed *i.a.* in Namaland, and having introduced mission work among the Saan in Botswana. His own

idiolect belongs to the Damara of the central, Okahandja region. As such it can be considered to belong to the main stream.

In 1981 Pastor Eiseb, then minister for the parish of Otjiwarongo and acting vice-praeses of the Evangelical Lutheran Church, was granted unpaid leave until retirement and moved to Windhoek for the purpose of compiling a comprehensive Khoekhoe bilingual dictionary with me. After his clerical vocation as a devout Christian, the documentation of the lexicon of his dwindling mother tongue had been the greatest ambition in his life. This task was, for practical purposes, concluded in July, 1992, after more than eleven years, with Pastor Eiseb by now being well into his seventies. The data on the lexical tonology in chapter 3 are drawn exclusively from the electronic data base of the *Khoekhoegowab Dictionary*, which we compiled as co-authors. The data on the post-lexical tonology were verified with him for the purpose of this thesis, just before his departure to Damaraland into retirement.

Not all the data are exclusively due to Pastor Eiseb, though. As language planner it was part of my responsibility to do basic research with regard to reviewing the official orthography, before school literature could be produced. The person who introduced me to the Khoekhoe language in 1973 was my then colleague, Mr. Johannes Boois, a Nama-Dama from Rehoboth in the central region. As the tonology of Khoekhoe had implications for the orthography, I

intended to write an M.A. dissertation on Nama tonology. For this purpose I identified the six Citation melodies still valid presently, as well as their corresponding Sandhi melodies. Only after that did I get a chance to read Beach's classic analysis of 1938. As he had already largely dealt with the topic of tone, I abandoned it for a topic in syntax. For the sake of the record I included my analysis of syntactic Sandhi in the noun phrase in that thesis (see section 4.1 for a summary). I have used my analysis and the tonal marking system I established then with Mr. Boois, in various works since then (1967), including the *Khoekhoegowab Dictionary* during its compilation phase. As will be seen in section 2.2.., certain notational conventions will be revised in the course of the present research. These will also be adopted in the dictionary, once it is prepared for publication. The dictionary project and the present thesis are inextricably linked, as, on the one side the dictionary provided the lexical material for the thesis, while, on the other side, the present research was a prerequisite for the tonal marking of the compound words in the dictionary.

Yet much of the data in the thesis cannot be ascribed to one specific informant, as they emanated from ten years of practical experience as a language planner (1973-83) and another nine of teaching Khoekhoe as a university subject to mother tongue speakers. Hence I am also indebted to many of my students. Much of this material, particularly on syntactic tone, was used in study guides for lecturing purposes. But as these study notes are only disseminated in xeroxed form

university-internally, these data are not specifically acknowledged in this thesis unless also published elsewhere. In the course of that work I should also acknowledge my colleague at the university, Levi Namaseb, a Namidama from the Brandberg region. The data in the dictionary were sporadically verified with various Nama speakers from the south, as Pastor Eiseb felt the need for it. Pastor Eiseb used to remark occasionally that the Nama in general speak "higher" than the Damara. What exactly this means, remains a topic for future research. My impression is that, particularly in compound words, they do not resort to tonal inflection by way of Sandhi and Flip-flop as much as the Damara do.

1.3 The Orthography

The orthography used in this thesis is the officially recognized orthography of 1977, with one important proviso. The official orthography makes a distinction between "long" and "short" oral vowels. "Long" vowels are marked with a macron, *e.g. tūs* (rainstorm). These so-called "long" vowels are in reality two juxtaposed identical vowels, which became juxtaposed through the elision of an intervocalic bilabial or alveolar consonant; see 2.2.2 for Beach's decomposition theory. Such vowels are spelt in this thesis as two identical vowels, so as to accommodate the two tone marks, thus *tűúś*. Likewise, nasal vowels are doubled, for they originated through the elision of a nasal consonant and also must

accommodate both tones from the two syllables: *dî* (ask) > *dîì*. By analogy to the convention applied to nasal "diphthongs", the nasal is indicated only on the first of the two vowels. It is hoped that the present convention of writing double identical vowels instead of "long" vowels with macrons, will eventually also be adopted for the official orthography.

One further convention is used here for the benefit of the reader. The post-clitic person-gender-number markers, here called nominal designants, are separated from their nominal stem by means of a period sign, *e.g. khõè.b* (male person).

The clicks are indicated according to the official orthography. The four primary articulations (influxes) are the following:

ǀ (affricated) dental click
ǃ (implosive) alveolar click[1]
ǂ (implosive) palatal click
ǁ (affricated) lateral click

Each of these primary articulations is followed by one of the following secondary articulations or effluxes. They are here represented in the context of the dental influx and the low vowel a.

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[1] The phonetic description of the alveolar ǃ and the palatal ǂ are not uniform in the literature. However, this is not an issue here.

ǀa	[ǀʔa]	... followed by a glottal plosive
ǀqa	[ǀa]	... followed by an inaudible voiceless velar plosive
ǀha	[ǀ‾ha]	... followed by a delayed glottal fricative
ǀkha	[ǀxʰa~ǀkxa]	... followed by a voiceless velar fricative or affricate
ǀna	[ŋǀa]	... accompanied by voiced velar nasalization.

The tonal marking will be elaborated on as part of the discussion.

1.4 The Theoretical Framework

As this thesis is of a language-specific nature rather than theoretical, no arguments in favour of one or the other theoretical framework are offered. The autosegmental framework is implicitly accepted, although its acceptance does not appear to be compelling from a typological point of view. With the exception of tonal spreading in certain trisyllabic roots (section 2.2.3.3.3) and the defective interrogative morpheme in the from of a floating tone (section 4.3. *et seq.*), there is no pressing need to resort to the autosegmental framework, for the suprasegmental phonology and the segmental phonology of Khoekhoe is largely isomorphic with a one-to-one association of tone and syllable.

The main concern of this thesis is to provide an analysis of the Khoekhoe language in particular, but with the hope of providing typological hints that may in turn facilitate comparative work in other Khoesaan languages. Such work should not be dated by an undue commitment to theory.

2. THE TONEME SYSTEM OF KHOEKHOE

In the present chapter the ground is prepared for an analysis of compound words in chapter 3, which deals with the lexical tonology of Khoekhoe. After a brief overview of existing analyses, a system of tonemes will be established for Khoekhoe with the support of instrumental evidence. Processes of tonal perturbation are moreover identified, the occurrence of which will be investigated in the subsequent chapters.

2.1 Some Former Approaches To Nama Tonology

Only four attempts of significance have thus far been made to develop consistent systems for marking Khoekhoe tone, *viz.* by L. Schultze (1907), by D. M. Beach (1938), by W. Haacke (1976) and by R. Hagman (1977). Three of these will be briefly discussed here as a preliminary to developing a tonological system for the present purpose.

Schultze's analysis of some 600 words is supposed to be remarkably reliable (as a zoologist he provided excellent linguistic and ethnological material), but his notational system is so complicated that few have attempted to analyse it. According to Winter (1981), Beach (1938) even misinterpreted it and stated that Schultze postulated nine tonal melodies, while actually he identified six. Other than noting that

Schultze apparently was the first to recognize six melodies, his system need not concern us any further here.

2.1.1 Beach (1938)

Beach's Ph.D thesis of 1938 is hailed even today as a classic, and his system is by far the most widely quoted of the four. Beach (*op. cit.*: 125) recognizes six inherent "tones" or "tonemes", which he defines as the "relative pitch of a root". They may differ in height or direction or both, according to him. Beach takes a unitary as opposed to a register approach, for his unit of toneme assignment is the root, not the syllable. He stipulates five classes of roots. Class 1 is of no concern here as it comprises only grammatical formatives consisting of a single consonant. The other four classes contain lexical formatives, or "strong roots" in his terminology (*op. cit.*: 27):

class 2: "consisting of a monophthongic vowel, preceded or not by a consonant", *e.g. a* or *ʔa* (drink), *sâ* (rest);

class 3: "consisting of a 'vowel combination', preceded or not by a consonant", *e.g. gao* (rule);

class 4: "consisting of a vowel plus a nasal consonant", *e.g. ɬan* (know);

class 5: consisting of a "vowel plus consonant plus vowel, which combination may or may not be preceded by a consonant", *e.g.* *ʔari/ari* (dog), *koro* (five).

Any of these four classes serve as domain for his tone assignment. In current terminology, one and the same tone (pattern) is thus "mapped" onto various types of syllabic environment. Beach marks his tones (tonemes) with a single symbol that precedes the root (*op. cit.*: 131):

1. high-rising toneme	ʻX	*ʻ!khai*	(cold)
(including a less high-rising subsidiary, cf. below)			
2. mid-rising toneme	ˌX	*ˌ!nâi*	(blow)
3. low-rising toneme	ˏX	*ˏǁnae*	(sing)
4. high-falling toneme	ʻX	*ʻ!oa*	(toil)
5. mid-falling toneme	ˌX	*ˌǁoa*	(kiss)
6. low-mid level toneme	-X	*-ǁau*	(thick).

Table 1: Citation melodies according to Beach (1938)

2.1.2 Haacke (1976)

Haacke (1976), not having had access to Beach (1938) at that stage, corroborated Beach in essence by also identifying six toneme classes; but he used a different approach. It is based on the assumption that (practically) all Khoekhoe roots - *i.e.* lexical formatives - are based on a disyllabic skeleton $\mathbf{C_1VC_2V}$ (cf. also section 2.2.3.3 for trisyllabic compound roots based on this). Phonotactic constraints limit $\mathbf{C_2}$ to either

a labial plosive/fricative <u>w</u> [b/v/ß],

an alveolar trill <u>r</u>,

a labial nasal m,

or a denti-alveolar nasal n.

Internal reconstruction shows that the elision of the intervocalic oral consonants w or r results in juxtaposed oral vowels, *viz.* **CVV** (cf. a) and c) below). If the vowels are identical the result is taken to be an oral "long" vowel in the standard orthography and it is marked with a macron, *e.g.* ā (drink); cf. Beach's class 2 above. Elision of the intervocalic nasal consonants (**N**) m or n results in nasal vowels: if they are identical, in a "(long) nasal vowel", *e.g.* â [ãã]; if not, in a nasal "diphthong", *e.g. âi* [ʔãĩ].

Beach (*op. cit.*: 108-116) argues on account of kymographic measurements that length in vowels is too varied to warrant marking. In considering length in (absolute) phonetic terms rather than in phonologically distinctive ones, he misses the generalization that *all these roots are disyllabic*, including his class 2. For actually roots of that class still consist of two vowels, *viz.* [ʔáà] (drink) and [sə̀ə̋] (rest), and hence constitute two syllables *CV+CV > CV+V. A perusal of the *Visi-Pitch* presentations in this thesis will show that the upper curve, which indicates intensity, in most instances reveals two distinct syllabic pulses even on juxtaposed vowels.

A further generalization is that every Khoekhoe root commences with a consonant: those that seemingly commence with a vowel do in fact commence with a more or less distinctly

articulated glottal stop, which is not reflected in the standard orthography, *e.g.*

áò [ʔao] (throw).

Whether the glottal stop happens to be elided in rapid speech, is a minor phonetic detail and a matter of idiolect. It is, nevertheless, a phoneme, as it contrasts with other phonemes, *e.g. táò* (be ashamed) or */áò.b* (blood).

A further possibility of systematic elision is that of $\mathbf{V_2}$, but only if C_2 is a sonorant (in genuine Khoekhoe roots thus m or n; rarely r, but not w). The implication is that the second tone bearing unit (**t.b.u.**) *i.e.* syllable must remain intact to accommodate a tone of some kind.

The following examples provide diachronic evidence of this reduction process (called "decomposition theory" by Beach, who in turn acknowledges it to Heinrich Vedder. For the hitherto most exhaustive list of instantiations cf. Haacke 1988: 145-6).

a) Oral dissimilar vowels $\mathbf{CV_1CV_2} > \mathbf{CV_1V_2}$

(= Beach class 5 > 3)

ǁ*gàrè* > ǁ*gàè* (ape, mime)

b) Nasal dissimilar vowel ("nasal diphthong") $\mathbf{CV_1NV_2} > \mathbf{CV_1V_2}$

(= Beach class 5 > 3)

tòmã́.s > [tõ̀ã́s] = *tõ̀ã́.s* (wild cucumber)

c) Oral geminates ("long" vowels) $\mathbf{CV_1CV_1 > CV_1V_1}$

(= Beach class 5 > 2)

pùrű > [pùű] = *pǜ̋* (topple over *v.t.*)

d) Nasal geminates ("nasal" vowels) $\mathbf{CV_1NV_1 > CV_1V_1}$

(= Beach class 5 > 2)

mùnű > [mùű] = *mǜ̋* (view, admire)

e) Elision of V_2 **CVNV > CVN**

(= Beach class 5 > 4)

|khằná > *|khằń* (crack).

|gàmấbềsèn > *|gàm̋mềsèn* (warm o.s.),

cf. *|gấḿ* (warm)

Having shown that Khoekhoe roots are essentially disyllabic and not monosyllabic, Haacke (1976) postulated four **tonemes** (*i.e.* register tones) for descriptive purposes, *viz.*

"Double-Low" /‟/ or /1/,
"Low" /`/ or /2/,
"High" /'/ or /3/, and
"Double-High" /"/ or /4/.[2]

These tonemes combine into a pair (foot) on (disyllabic) roots to form six "**tonal profiles**" - which, for the sake of conformity, will be referred to as **(tonal) melodies** henceforth. The "basic profiles" (*i.e.* Citation forms/melodies) of Haacke amount to the "inherent tonemes" of Beach, essen-

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[2] For ease of reference numbers are used in this thesis synonymously with the diacritical marks as pitch designations. '*Double*-Low/High' may be read to mean '*extra* Low/High'. 'Double' here simply is a reference to the doubled diacritical mark.

tially. But by taking **CVCV** as the canonical skeleton of all roots, including Beach's class 2, *viz.* "C$\bar{V}$", Haacke's analysis allows a uniform treatment of all tonal patterns as well as an isomorphic relation between syllable and mora.[3]

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[3] Vossen 1986a:324 postulates for ǁAni, a Central Khoesaan language, a root structure type CV with sub-types CV: and CVV, next to CVCV and CVN. Of this CV structure he writes:

> 'Roots of the structure CV always have *a long* vowel, if it is a monophthong; otherwise the V-slot is occupied by a diphthong'.

He considers roots of the type CVN to consist of one closed syllable. This leads him to the somewhat awkward statement that

> 'the basic unit of the phonological structure of ǁAni is the mora, *which determines* the structure of the syllable. ... *Monosyllabic roots are always bimoraic*, independently of their respective structure (CV:, CVV or CVN)' (*op. cit.*: 341; my translation and italics).

It seems that ǁAni ought rather to be described in the same way as Khoekhoe, *viz.* that roots of the above type are all disyllabic and hence bimoraic. Likewise Traill (1985:35) appears to miss the same generalization for !Xóõ, a Southern Khoesaan language, by taking a composite approach:

> 'The phonetic details of the syllable structure of the segmental bases is as follows. CV: is monosyllabic with a long vowel; CViVj is also monosyllabic with two short vowels; CVCV is bisyllabic with two short vowels; CVN is monosyllabic with a short vowel'. ... 'All lexical stems ... are phonologically bimoric and constitute the domain of a single tone regardless of their syllabic structure.'

Further down (*op. cit.*: 37), he states, however, that

> 'long vowels are clearly to be interpreted as a sequence of like vowels, that is, as consisting of two morae'.

In the light of the above I suspect that Baucom (1974:5) also missed a generalization in his reconstruction of the Proto-Central Khoesaan vowel system, when he states that 'all vowels occurred both long and short, nasalized as well as oral'.

Elderkin (1989:295) is suspicious of the validity of the CV syllable as the unit of phonological patterns for South African Khoesaan on the grounds of his re-analysis of Northern Khoesaan. Instead he favours the morph. The above evidence in favour of the decomposition theory only concerns the *internal* reconstruction of Khoekhoe, of course.

For support from typologically different quarters cf. Pulleyblank (1988:300), who in Tiv treats short vowels as constituting one mora, and long vowels two.

Haacke (1976) superseded Beach by identifying "perturbed profiles" or Sandhi forms for each of the six citation melodies. (The Citation form is assumed to be the underlying form, as there occurs neutralization in the Sandhi forms; for a more detailed discussion cf. section 2.2.1 below.) The tags were merely convenient short-hands, and the tonal markings were simplified for practical (didactic) purposes to present tonemic distinctions, rather than tonetic detail. For this reason the six major melodies were presented as four level (/11/, /22/, /33/, /44/) and two rising (/12/, /34/) melodies. Some of these simplified representations will be revised below, in order to achieve greater naturalness; cf. Table 14 (p.119) for a summary.

GLOSS	**CITATION**	**SANDHI**	**MEANING**
"Double-Low (level)"	*!ɔ̀m̀(.s)*	*!ɔ̀m̀.s*	(butt, push)
"Low-Rising"	*!ɔ̀ḿ.s*	*!ɔ̀m̀.s*	(udder)
"Low (level)"	*!ɔ̀m̀(.s)*	*!ɔ̀m̀(.s)*	(force exit)
"High (level)"	*!ɔ́ḿ(.s)*	*!ɔ̀m̀(.s)*	(coagulate)
"High-Rising"	*!ɔ́ḿ.s*	*!ɔ̀m̀.s*	(pollard)
"Double-High (level)"	*!ɔ́ḿ.s*	*!ɔ́ḿ.s*	(fist)

Table 2: Citation ("Basic") and Sandhi Lexical Melodies according to Haacke (1976)

Beach and Haacke thus identify the same (main) tonal categories, *i.e.* lexical melodies, but while Beach adopts a unitary approach with the entire root being the tone bearing unit (t.b.u.) for *one contour* tone, Haacke adopts a bimoraic approach in which *two level* or "register" tonemes are paired into **melodies** constituting a foot. In Haacke's approach the mora or t.b.u. is coextensive with the syllable, not with the root.

2.1.3 Hagman (1977)

Hagman (1977:5) in his Ph.D thesis takes the same approach as Haacke (1976) with regard to phonotactic structure:

> "If the present description is compared with that of Beach, it will be found that his "contours" are nothing more but a sequence of two register tones, and that his "strong roots of class 2" with the form CV actually have the form CVV with two identical vowels each having its own register tone."

Hagman's above approach is also adopted by Winter (1981) in his comparative investigation of Common Central Khoesaan, for which he postulates eight distinctive melodies ("Tonemmuster").

Hagman (*op. cit.*: 10) differs, however, by postulating only three phonemic register tones instead of four, *viz.* High /ˊ/, middle (unmarked) and Low /ˋ/. This simplified system allows him to make the following generalization (*op. cit.*: 12):

> "... the first mora may have any of the three tonemes ..., but the second mora may only have a High or middle tone. Thus, there are six possible tone combinations in a root; letting the symbol "M" stand for "mora" we have: ḾḾ, ḾM, M̀Ḿ, MM, M̀M̀, and M̀M."

In principle, any simplification of a notational system is desirable, especially if it allows generalizations as above. It remains one of the topics of investigation of this the-

sis, however, how many surface and underlying tonemes have to be postulated for Khoekhoe.

Table 3 presents a summary of the notational systems of Beach, Haacke and Hagman for Citation forms:

BEACH (1938)	**HAACKE (1976)**	**HAGMAN (1977)**
,X low-rising	M̏M̏ Double-Low (level)	M̀M
ˌX mid-rising	M̏Ḿ Low-rising	M̀Ḿ
-X low mid-level	M̀M̀ Low (level)	MM
ˏX mid-falling	ḾḾ High (level)	ḾM
ˈX high rising	M̋Ḿ High-rising	MḾ
ˋX high falling	M̋M̋ Double-High (level)	ḾḾ

Table 3: The notational systems of Beach (1938), Haacke (1976) and Hagman (1977)

The first issue to be attended to now is whether Khoekhoe has contour or register tone.

2.2 The Tonal Type Of Khoekhoe

Two issues are at stake: firstly, the descriptive means of handling tone, *i.e.* whether as a contour or as a register tone system; and secondly, the postulation of the number of tonemes.

2.2.1. Determination of the Kind of "Toneme" in Khoekhoe

The present issue is to some extent a quantitative one, namely, what the length or domain of the tonal unit is. A mora is essentially a unit of quantity.

Beach (*op. cit.*: 124/5) defines a "tone" generally as "the relative pitch of any significant speech-element chosen as a unit", and specifies that for Hottentot this unit is the *root*. These tones (elsewhere called tonemes by him) are said to differ in "height" or "direction" or both.

Beach justifies his choice of the root as the unit of assignment *i.a.* by the fact that "both the nature and the number of inherent tones of both *monosyllabic* and *disyllabic* roots [are] identical" (*op. cit.*: 125). - It is not contested here that the root plays a role as a unit of some kind for tone assignment, but the question is whether it is the minimal unit.

Before this point is argued, graphic displays of the fundamental frequency (**F**$^{\bullet}$) curve for the respective Citation and Sandhi melodies are presented (Figures 1-12b). Corresponding patterns for CVCV and CVV roots should demonstrate that the melodies are essentially the same. This is true also for CVN roots; for reasons of space their reflexes are not displayed here. All recordings use a vertical frequency scale of 0-200 Hz and a horizontal time scale of 2 seconds per screen width, unless indicated otherwise (in chapter 4). F$^{\bullet}$, *i.e.*

"pitch" is displayed on the lower half of the screen in absolute terms (Hz), while "intensity" (in relative terms, depending on the distance of the microphone) on the upper half of the screen provides a correlate in DB that is useful for orientation. All recordings were made with the aid of an *Apple IIE* personal computer with a *Visi-Pitch* Model 6096 interface by the *Kay Elemetrics Corporation*, using a reel-to-reel tape recording as source. The voice in all cases was that of Pastor Eliphas Eiseb.

In the following graphic representations in real time the pitch trace of the utterance under investigation is framed by the cursors. Normally the cursors are set on the very first and last pitch reflection, that is, the onset and offset. If, however, there is a considerable interruption of the pitch trace at the onset or end, or if the low degree of intensity (esp. a drop) indicates some perturbation with concomitant tonal crumble, then the cursors frame only that part which is considered to be decisive for the pitch target, so as not to slant the calculation of statistics (averages, etc.). - The critic may, of course, suspect this application of personal judgement to be a possible source of manipulation.

Pitch readings for the beginning and end of the melody, *i.e.* for the respective cursor positions are reflected immediately under the frame at **L** and **R** respectively. For the benefit of the reader additional statistics are at times included underneath the figure. Values pertain to readings

between cursors. As only one set of positions can be reflected in a printout, other cursor positions have occasionally been added to the graph by hand. Figures of particular interest are underlined manually. Average pitch for a section of an utterance is preceded by a double tilde. Lettering within the graph represents phonetic script; the square brackets are omitted for the sake of convenience.

All reflexes are tested in the same frame sentences. As verbs can be converted into infinitives (*i.e.* nouns) by the addition of the feminine nominal designant (= person-gender-number marker) *.s*, all reflexes can be tested as nominals in a copulative frame sentence

____.S GÈ (It is (a) ...).

This sentence will yield the *Citation* melody of the word under investigation, as the Citation melody is *i.a.* obtained when a reflex stands sentence-initially (cf. chapter 4). The *Sandhi* form is *i.a.* obtained when a qualifier precedes the noun, *e.g.* the adjective *!gâi* (good). Sandhi forms are thus obtained with the frame sentence

!GâÌ ____.S GÈ (It is (a) good ...).

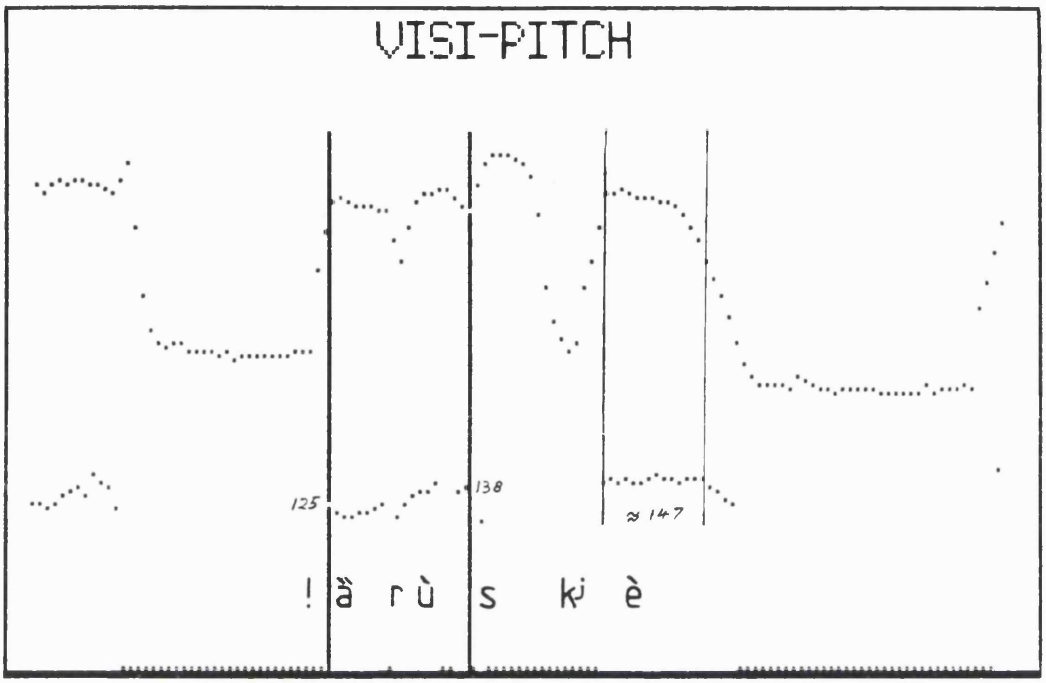
Conveniently, it is possible to test all words with the same adjective, as the tone of neighbouring words does not influence a word, tonologically. If there is a considerable interval between two successive tones then the target pitch

of the second tone often is reached only towards the end of its curve, as the beginning of the tonal domain may be subject to assimilation to the preceding tone. Such glides (portamento) amount to low-level tonetic detail, however. As a point of departure, the tonal marking represents auditory surface cues, of course. Whether such surface melodies must underlyingly be derived from other underlying tones that are subject to segmental influence, remains to be seen.

Apart from providing the context to elicit Citation and Sandhi forms of a reflex, the frame sentences furthermore have the important function of providing a point of reference with regard to the determination of a particular toneme, as the pitch of a toneme is, of course, not absolute. The sentence type marker *gè* (which marks indicative main sentences) has a **Low** tone /2/. Where *gè* stands sentence finally, its pronunciation is extended to about double the normal length before tone and intensity begin to crumble. The particular informant's typical pitch for a Low tone is around 129 Hz, but this may vary considerably. The reflex to be tested is assessed relatively to the pitch of *gè* for auditive cues, *i.e.* for tonemic assessment. For averaged onset and offset frequencies *relative* to the median *gè* the reader should compare the individual pitch tracings to the statistical abstractions in Fig. 18 on p.135. In the case of Sandhi forms a further point of reference is provided by *!gâì*, which has a **High-Low** melody ("High-High" in old notation).

The designations of Haacke 1976 (cf. Table 3, p.30) are still retained in the captions for Figures 1a-12b. The refinements that will be summarized in Table 14 (p.119) as part of the present investigation follow in brackets on a "greater than" sign >.

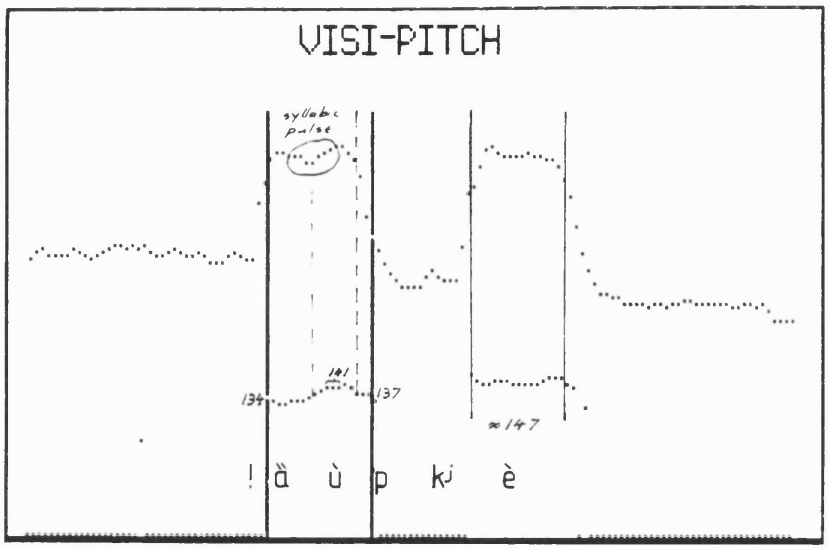
DOUBLE-LOW (LEVEL)
Citation: /11/ (> /12/)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 59.1DB 125.1HZ
CURSOR LEFT/RIGHT R 57.7DB 138.0HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	!garu.s	*ge*	
AVERAGE FO	127.8	144.6	16.8 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	58.2	58.0	0.2 DB
TIME BET. CURSORS	0.29	0.22	0.07 S
PERTURBATION	1.48	0.32	1.16 %
MAXIMUM FO	147.2	147.6	0.4 HZ
MINIMUM FO	112.7	141.5	28.8 HZ
FO RANGE	34.5	6.1	28.4 HZ
FO AT L	125.1	143.8	18.7 HZ
FO AT R	128.9	144.2	15.3 HZ
INTENSITY AT L	59.6	58.3	1.3 DB
INTENSITY AT R	57.2	48.5	8.7 DB

Figure 1a: "Double-Low" (Citation), <u>CVCV</u>:
***!gàrù* (>*!gàrù*) (be far ahead)**



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 60.1DB 133.6HZ
CURSOR LEFT/RIGHT R 45.6DB 136.7HZ

STATISTIC	COL #2	COL #1	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	ge	!gau.b	
AVERAGE F0	147.4	135.0	12.4 HZ
EXTENDED AV. F0	---	---	--- HZ
AVERAGE DB	60.5	59.9	0.6 DB
TIME BET. CURSORS	0.24	0.27	0.03 S
PERTURBATION	0.42	0.71	-.29 %
MAXIMUM F0	154.0	144.8	9.2 HZ
MINIMUM F0	142.6	125.1	17.5 HZ
F0 RANGE	11.4	19.7	8.3 HZ
F0 AT L	154.0	133.6	20.4 HZ
F0 AT R	152.6	136.7	15.9 HZ
INTENSITY AT L	55.5	60.1	-4.6 DB
INTENSITY AT R	56.3	45.6	10.7 DB

Figure 2a: "Double-Low" (Citation), <u>CVV</u>: *!gầù.b* (>*!gầù.b*) (wild dog)

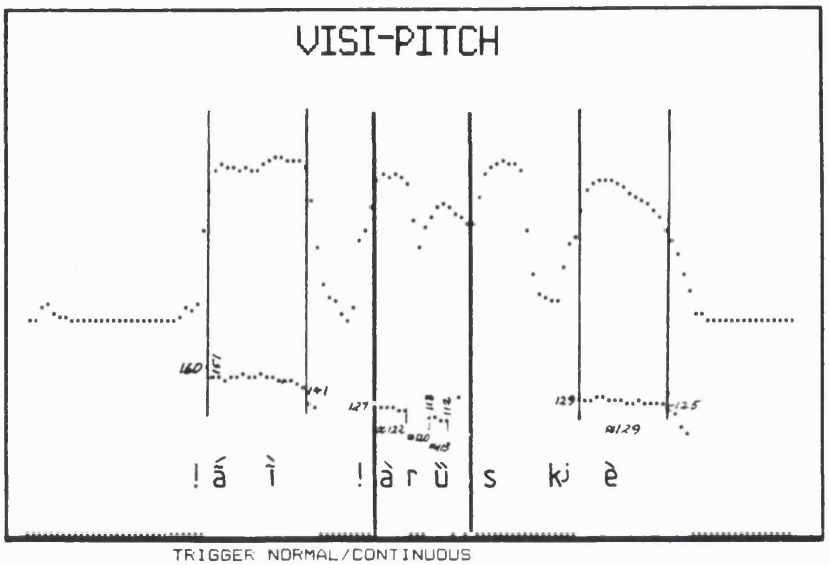
Beach (*op. cit.*: 136): "low-rising"

This melody commences with the lowest pitch of all Citation melodies, *viz.* the /1/ toneme.[4] With most speakers there occurs a slight rise from first to second toneme, some fifteen Hz with the main informant, for whom a fairly marked

[4] Cf., however the instrumental evidence presented in Fig. 18 in conjunction with the discussion of register split in section 2.3, where it is argued that the present surface toneme /1/ consists of two underlying tones differing marginally in pitch, that reflect a diachronic merger.

rise happens to be characteristic. This melody was nevertheless not transcribed as /12/ in the past, as a previous colleague who assisted with my original investigation (Johannes Boois) exhibited a less marked rise, and as the /12/ transcription was, at that stage, considered tonemically more appropriate for the Sandhi form of the Low-rising melody. This, however, will also be revised. Beach, indeed, observes that the interval is "very small" and may even be absent in roots of class 2 (with monophthongic vowel).

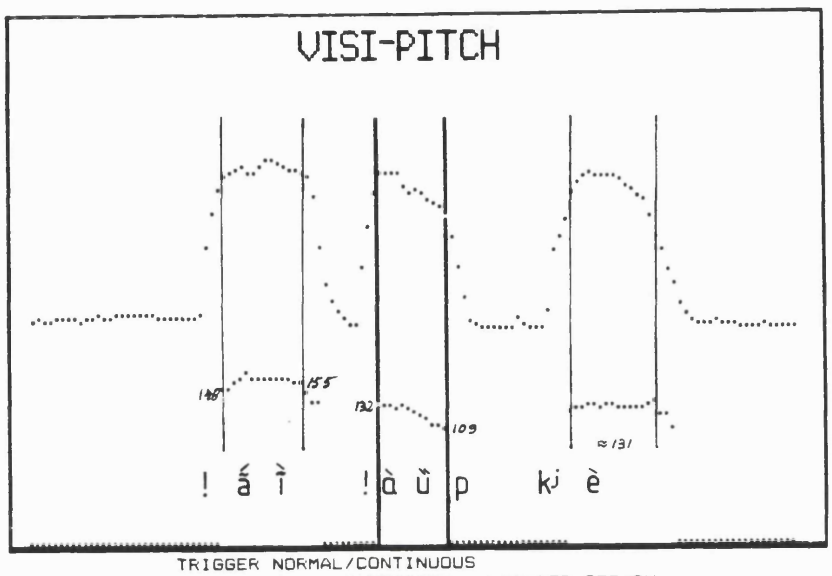
Sandhi: /21/



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 56.3DB 127.3HZ
CURSOR LEFT/RIGHT R 30.0DB ---- HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	!gâĩ	!garu.s	
AVERAGE F0	150.6		32.1 HZ
EXTENDED AV. F0	---	---	--- HZ
AVERAGE DB	59.4	51.9	7.5 DB
TIME BET. CURSORS	0.25	0.25	0.00 S
PERTURBATION	0.32	0.81	-.49 %
MAXIMUM F0	160.4	132.4	28.0 HZ
MINIMUM F0	141.3	110.7	30.6 HZ
F0 RANGE	19.1	21.7	2.6 HZ
F0 AT L	160.4	127.3	33.1 HZ
F0 AT R	141.3	0.0	141.3 HZ
INTENSITY AT L	54.6	56.3	-1.7 DB
INTENSITY AT R	59.3	30.0	29.3 DB

Figure 1b: "Double-Low" (Sandhi), <u>CVCV</u>:
- *!gàrù* (be far ahead)



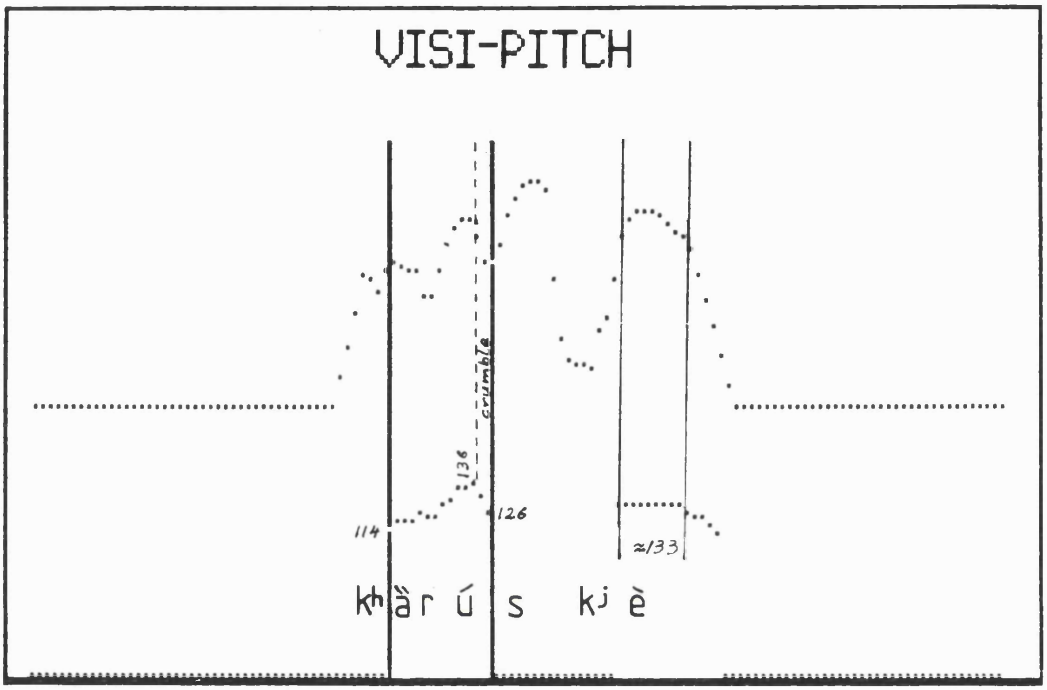
TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 59.0DB 132.4HZ
CURSOR LEFT/RIGHT R 51.0DB 108.8HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS	*!gâi*	*!gau.b*	
AVERAGE FO	157.4	124.7	32.7 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	59.9	56.0	3.9 DB
TIME BET. CURSORS	0.20	0.17	0.03 S
PERTURBATION	0.35	0.54	-.19 %
MAXIMUM FO	163.5	136.9	26.6 HZ
MINIMUM FO	148.3	108.8	39.5 HZ
FO RANGE	15.2	28.1	12.9 HZ
FO AT L	148.3	132.4	15.9 HZ
FO AT R	154.7	108.8	45.9 HZ
INTENSITY AT L	58.5	59.0	-.5 DB
INTENSITY AT R	59.1	51.0	8.1 DB

Figure 2b: "Double-Low" (Sandhi), <u>CVV</u>: - *!gàù.b* (wild dog)

The Sandhi form falls distinctly, perceptually even giving the impression that it falls below the Double-Low tone /1/. Instrumental evidence, however, shows that it clearly descends from /2/ to /1/; cf. Fig. 18 on p.135. This Sandhi form is that of the "High" melody, a fact which is due to tonogenesis, as will be discussed in section 2.3.

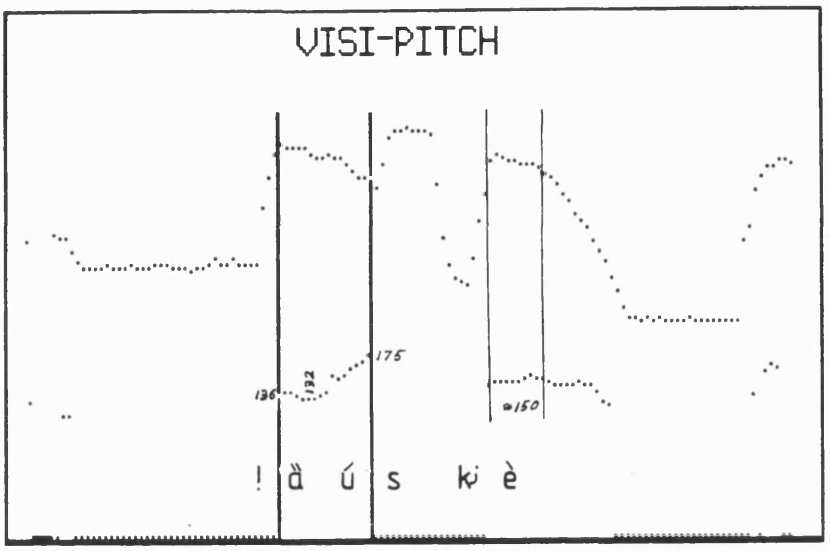
LOW-RISING
Citation: /12/ (> /13/)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 51.4DB 114.2HZ
CURSOR LEFT/RIGHT R 51.4DB 125.7HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS	*kharu.s*	*ge*	
AVERAGE FO	124.7	132.8	8.1 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	56.0	57.6	-1.6 DB
TIME BET. CURSORS	0.17	0.12	0.05 S
PERTURBATION	0.54	0.13	0.41 %
MAXIMUM FO	136.9	133.4	3.5 HZ
MINIMUM FO	108.8	132.2	23.4 HZ
FO RANGE	28.1	1.2	26.9 HZ
FO AT L	132.4	133.2	0.8 HZ
FO AT R	108.8	133.4	24.6 HZ
INTENSITY AT L	59.0	55.0	4.0 DB
INTENSITY AT R	51.0	55.5	-4.5 DB

Figure 3a: "Low-rising" (Citation), <u>CVCV</u>:
***khărú* (menstruate for first time)**



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 63.5DB 135.6HZ
CURSOR LEFT/RIGHT R 57.1DB 175.3HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE F0	145.0	150.4	5.4 HZ
EXTENDED AV. F0	---	---	--- HZ
AVERAGE DB	60.9	60.1	0.8 DB
TIME BET. CURSORS	0.24	0.14	0.10 S
PERTURBATION	1.18	0.38	0.80 %
MAXIMUM F0	179.4	154.0	25.4 HZ
MINIMUM F0	132.2	144.0	11.8 HZ
F0 RANGE	47.2	10.0	37.2 HZ
F0 AT L	143.0	144.0	1.0 HZ
F0 AT R	179.4	154.0	25.4 HZ
INTENSITY AT L	63.4	58.7	4.7 DB

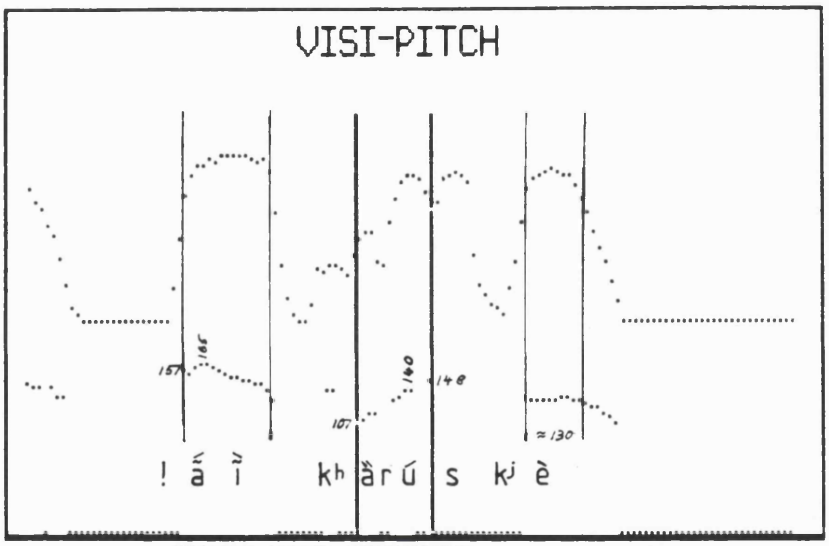
Figure 4a: "Low-rising" (Citation), <u>CVV</u>: *!gàú* (look for)

Beach (*op. cit.*: 135): "mid-rising"

This melody rises distinctly, also commencing on the lowest toneme but rising to an offset pitch higher than that of the Double-Low melody, yet lower than the High /3/ onset tone. The averaged pitch is about five Hz higher than that of the Low /2/ tone, hence this Low-rising melody will be transcribed tonemically as /13/ henceforth, while the Double-Low melody becomes /12/. For a discussion of the toneme merger,

cf. section 2.3. Typically a slight fall in pitch can be noticed after the onset of the initial syllable. In CVCV roots the comparatively higher rise is the more noticeable, it being delayed to the second syllable.

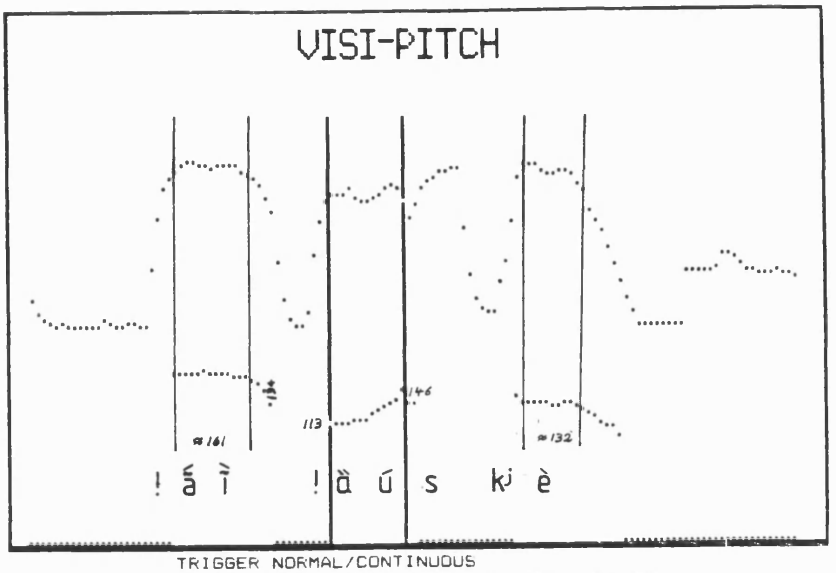
Sandhi: /12/ (> /13/)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 45.6DB 107.8HZ
CURSOR LEFT/RIGHT R 51.4DB 147.6HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	153.6	130.2	23.4 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.4	50.8	9.6 DB
TIME BET. CURSORS	0.22	0.19	0.03 S
PERTURBATION	0.32	0.71	-.39 %
MAXIMUM FO	164.6	147.6	17.0 HZ
MINIMUM FO	140.7	107.8	32.9 HZ
FO RANGE	23.9	39.8	15.9 HZ
FO AT L	157.1	107.8	49.3 HZ
FO AT R	140.7	147.6	6.9 HZ

Figure 3b: "Low-rising" (Sandhi), <u>CVCV</u>: - *khə̀rú* (menstruate for first time)



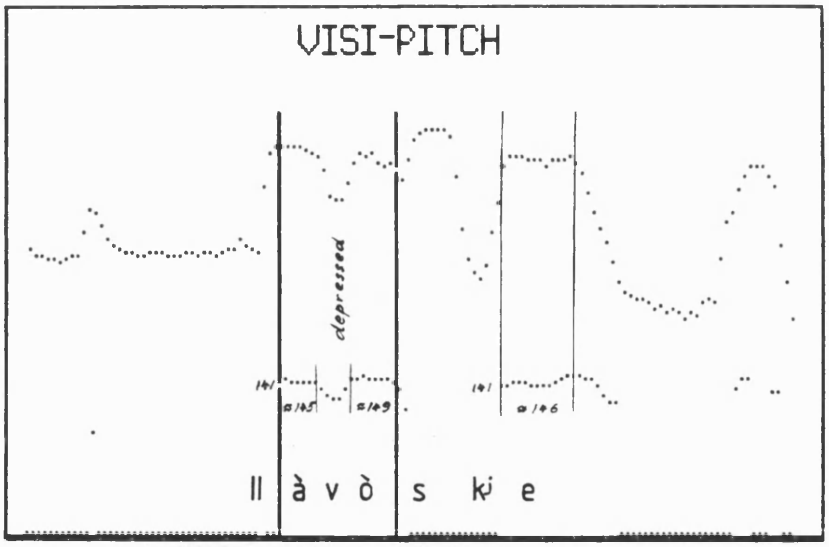
STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	160.6	123.1	37.5 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.1	54.7	5.4 DB
TIME BET. CURSORS	0.19	0.19	0.00 S
PERTURBATION	0.48	0.46	0.02 %
MAXIMUM FO	164.1	146.3	17.8 HZ
MINIMUM FO	157.1	112.7	44.4 HZ
FO RANGE	7.0	33.6	26.6 HZ
FO AT L	162.7	112.8	49.9 HZ
FO AT R	157.1	146.3	10.8 HZ
INTENSITY AT L	59.1	54.7	4.4 DB
INTENSITY AT R	58.7	53.5	5.2 DB

Figure 4b: "Low-rising" (Sandhi), <u>CVV</u>: - *!gàú* (look for)

This Sandhi form was previously analysed on the strength of perceptual judgement as rising less markedly than its Citation form, albeit hardly noticeable. Instrumental evidence (Fig. 18 on p.135) shows, however, that the averaged tonal offset has the same pitch for both the Citation and the Sandhi form. This pitch lies an average of 5-6 Hz above the Low tone. The comparatively more level melody of the Sandhi form is due to a slightly higher onset, rather, which can probably be ascribed to partial assimilation to the "High" *!gâì* in the frame sentence. Furthermore, the *gè* lowered

through gradual downdrift at the end of the test pair would raise the *relative* onset pitch of the reflex more in the Sandhi frame, as in most recordings it was uttered last. This tonetic detail is tonemically irrelevant, however. Hence, both Citation and Sandhi form will be designated as **/13/** henceforth.

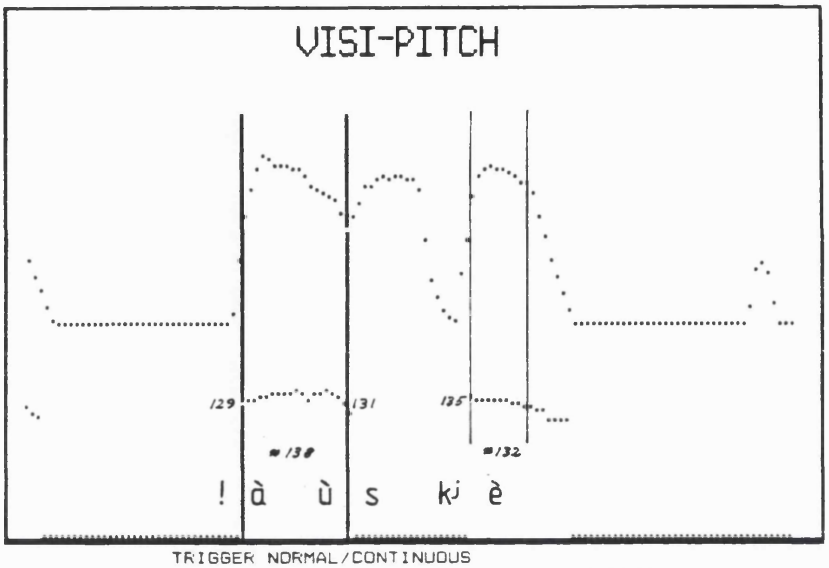
LOW (LEVEL)
Citation /22/



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 63.0DB 141.3HZ
CURSOR LEFT/RIGHT R 58.5DB 144.6HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	143.3	145.5	2.2 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	59.3	60.4	-1.1 DB
TIME BET. CURSORS	0.30	0.19	0.11 S
PERTURBATION	0.88	0.28	0.60 %
MAXIMUM FO	152.8	152.6	0.2 HZ
MINIMUM FO	126.0	141.3	15.3 HZ
FO RANGE	26.8	11.3	15.5 HZ
FO AT L	141.3	141.3	0.0 HZ
FO AT R	144.6	152.6	8.0 HZ
INTENSITY AT L	63.0	58.8	4.2 DB
INTENSITY AT R	58.5	59.8	-1.3 DB

Figure 5a: "Low-level" (Citation), <u>CVCV</u>:
ǁ*gàwò* (pile up)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 50.2DB 129.4HZ
CURSOR LEFT/RIGHT R 48.0DB 131.1HZ

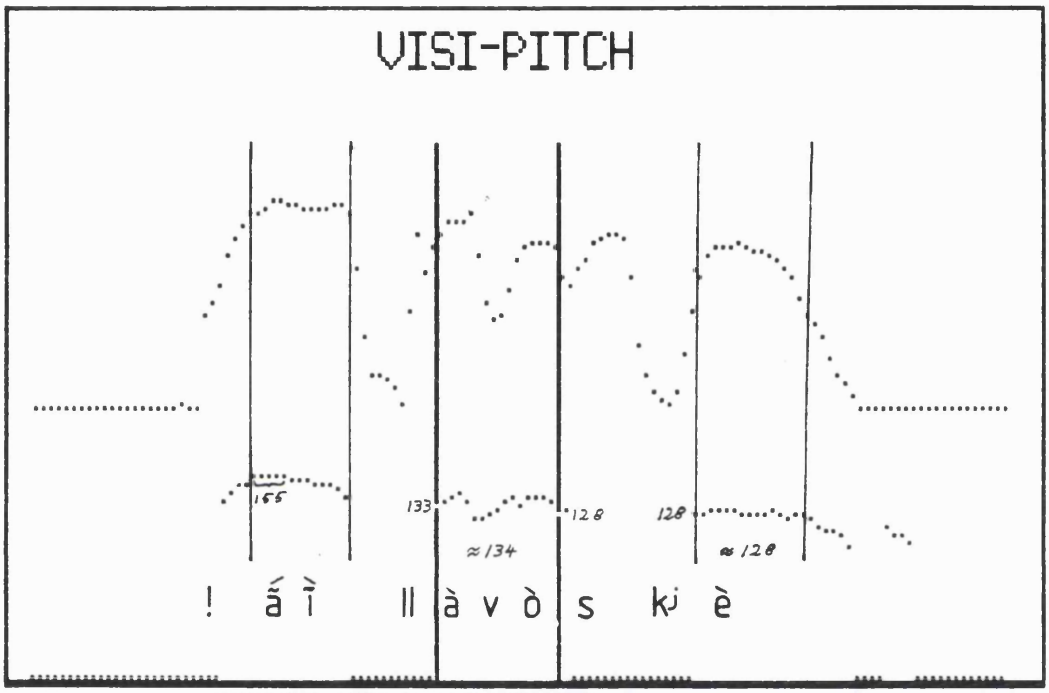
STATISTIC	COL #2	COL #1	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	ge	*!gau.s*	
AVERAGE FO	131.5	137.7	6.2 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	58.0	56.8	1.2 DB
TIME BET. CURSORS	0.14	0.27	0.13 S
PERTURBATION	0.29	0.43	-.14 %
MAXIMUM FO	135.2	141.5	6.3 HZ
MINIMUM FO	125.4	129.4	4.0 HZ
FO RANGE	9.8	12.1	2.3 HZ
FO AT L	135.2	129.4	5.8 HZ
FO AT R	125.4	131.1	5.7 HZ
INTENSITY AT L	54.1	50.2	3.9 DB
INTENSITY AT R	56.3	48.0	8.3 DB

Figure 6a: "Low-level" (Citation), <u>CVV</u>:
***!gàù* (be left over)**

Beach (*op. cit.*: 141): "low-mid level"

This melody has a characteristically level contour. It is furthermore conspicuous in that its Sandhi form remains unaltered, hence also level.

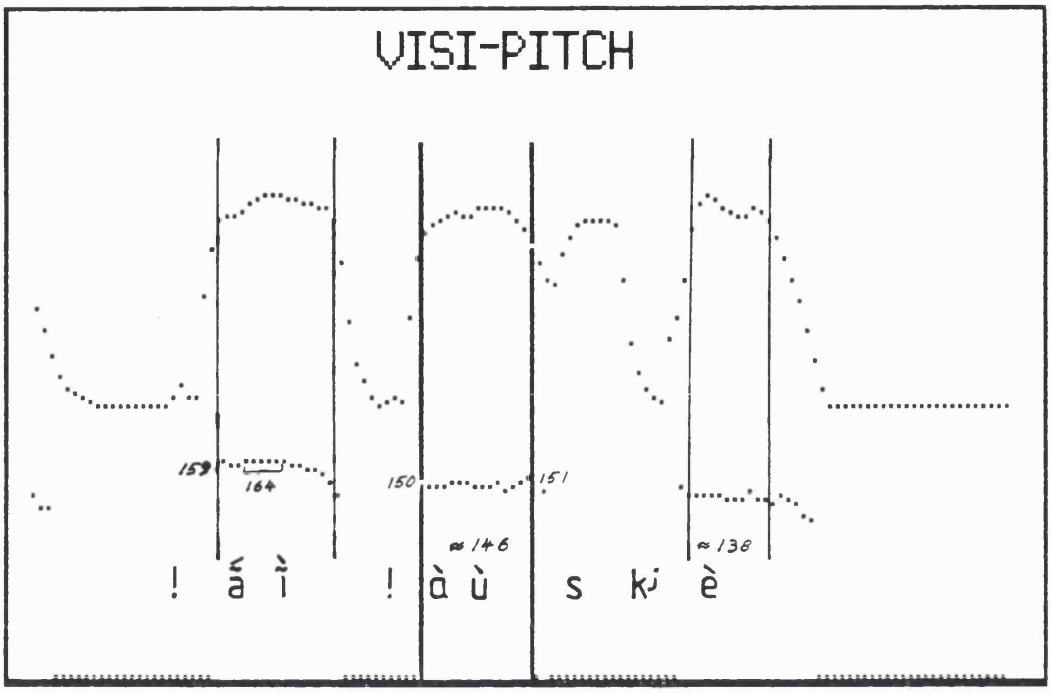
Sandhi: /22/



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 56.1DB 132.9HZ
CURSOR LEFT/RIGHT R 49.9DB 127.6HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	!gâi	ǁgawo.s	
AVERAGE FO	150.9	134.2	16.7 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	59.9	52.7	7.2 DB
TIME BET. CURSORS	0.20	0.25	0.05 S
PERTURBATION	0.34	1.06	-.72 %
MAXIMUM FO	156.6	143.2	13.4 HZ
MINIMUM FO	140.5	121.7	18.8 HZ
FO RANGE	16.1	21.5	5.4 HZ
FO AT L	150.0	132.9	17.1 HZ
FO AT R	140.5	127.6	12.9 HZ
INTENSITY AT L	59.1	56.1	3.0 DB
INTENSITY AT R	59.1	49.9	9.2 DB

Figure 5b: "Low-level" (Sandhi), <u>CVCV</u>: - ǁgàwò (pile up)

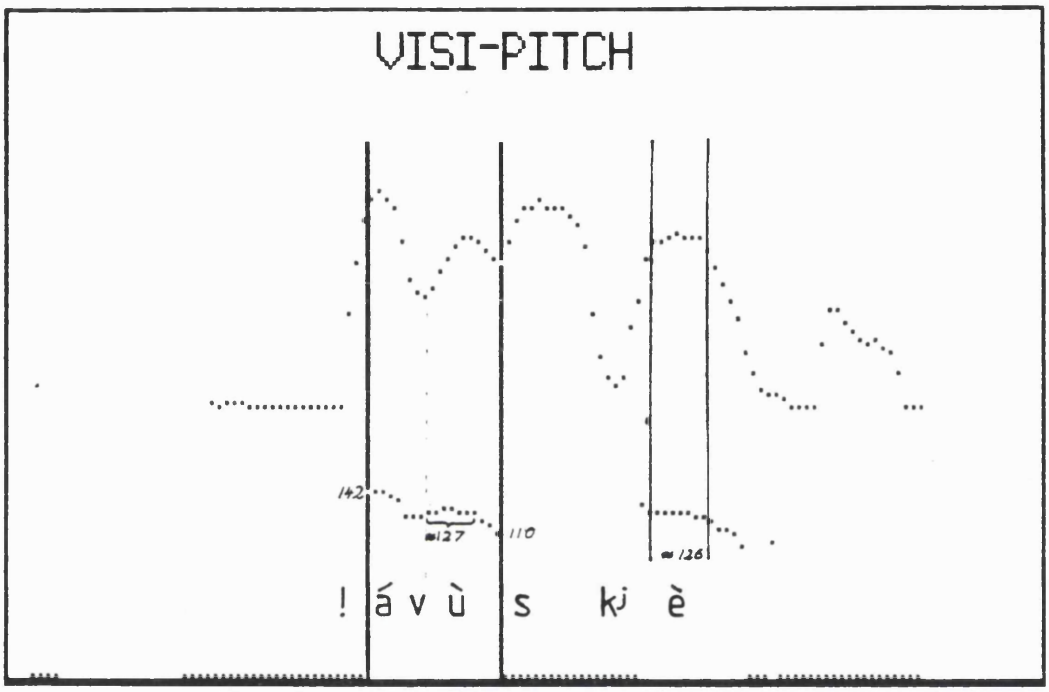


TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 55.8DB 150.0HZ
CURSOR LEFT/RIGHT R 53.8DB 150.9HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	150.8	146.1	14.7 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.1	58.3	1.8 DB
TIME BET. CURSORS	0.24	0.22	0.02 S
PERTURBATION	0.41	0.88	-.47 %
MAXIMUM FO	166.5	151.9	14.6 HZ
MINIMUM FO	148.3	139.0	9.3 HZ
FO RANGE	18.2	12.9	5.3 HZ
FO AT L	159.1	150.0	9.1 HZ
FO AT R	148.3	150.9	2.6 HZ
INTENSITY AT L	58.0	55.8	2.2 DB
INTENSITY AT R	57.7	53.8	3.9 DB

Figure 6b: "Low-level" (Sandhi), <u>CVV</u>: - *!gàù* (be left over)

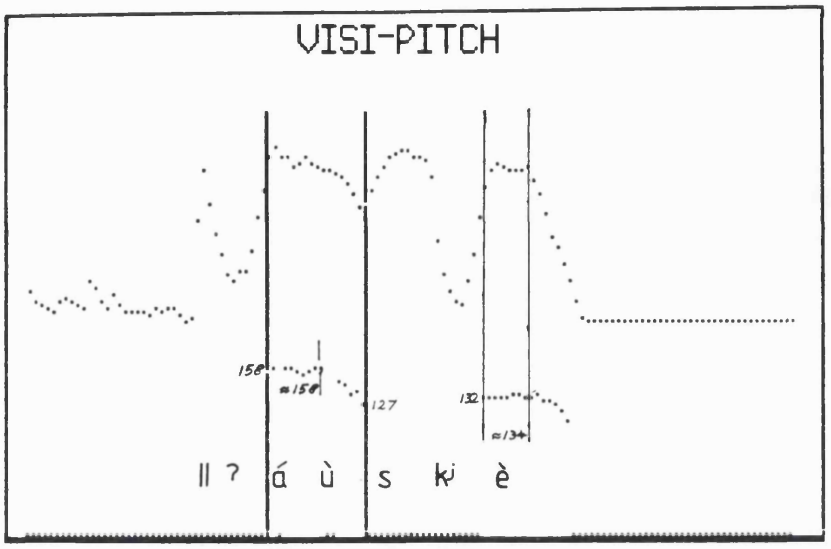
HIGH (LEVEL)
Citation /33/ (> /32/)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 61.2DB 141.9HZ
CURSOR LEFT/RIGHT R 51.6DB 109.5HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	127.8	125.6	2.2 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	53.5	55.2	-1.7 DB
TIME BET. CURSORS	0.27	0.11	0.16 S
PERTURBATION	1.17	0.40	0.77 %
MAXIMUM FO	146.1	127.8	18.3 HZ
MINIMUM FO	109.5	122.0	12.5 HZ
FO RANGE	36.6	5.8	30.8 HZ
FO AT L	141.9	127.8	14.1 HZ
FO AT R	109.5	122.0	12.5 HZ
INTENSITY AT L	61.2	54.6	6.6 DB
INTENSITY AT R	51.6	53.3	-1.7 DB

Figure 7a: "High" (Citation), CVCV:
***!gáwú* (> *!gáwù*) (teem)**



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 60.9DB 158.1HZ
CURSOR LEFT/RIGHT R 51.9DB 127.0HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE F0	150.7	133.5	17.2 HZ
EXTENDED AV. F0	---	---	--- HZ
AVERAGE DB	58.2	58.5	-.3 DB
TIME BET. CURSORS	0.25	0.11	0.14 S
PERTURBATION	2.53	0.18	2.35 %
MAXIMUM F0	167.4	135.8	31.6 HZ
MINIMUM F0	127.0	131.5	4.5 HZ
F0 RANGE	40.4	4.3	36.1 HZ
F0 AT L	158.1	132.7	25.4 HZ
F0 AT R	127.0	134.0	7.0 HZ
INTENSITY AT L	60.9	55.5	5.4 DB
INTENSITY AT R	51.9	58.8	-6.9 DB

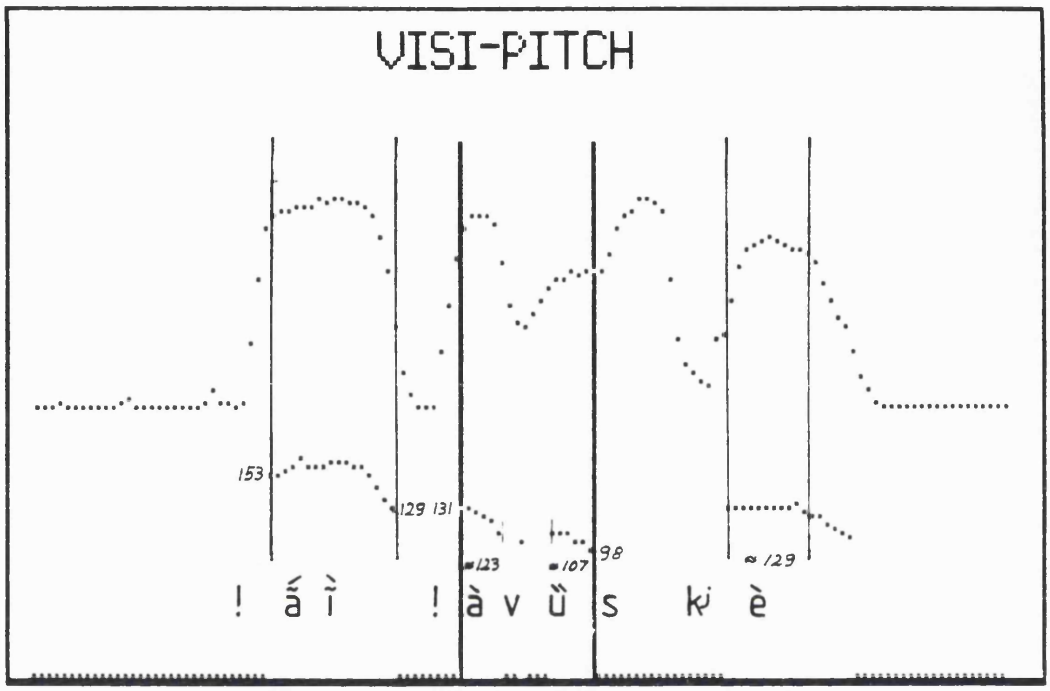
Figure 8a: "High" (Citation), <u>CVV</u>:
‖áú (> ‖áù) (useless)

Beach (*op. cit.*: 139): "mid-falling"

This melody falls an average of 27 Hz, which is a full toneme step. In roots with CVCV structure the fall is most pronounced on the second syllable, which creates the impression that - concomitant with a drop in intensity - this fall

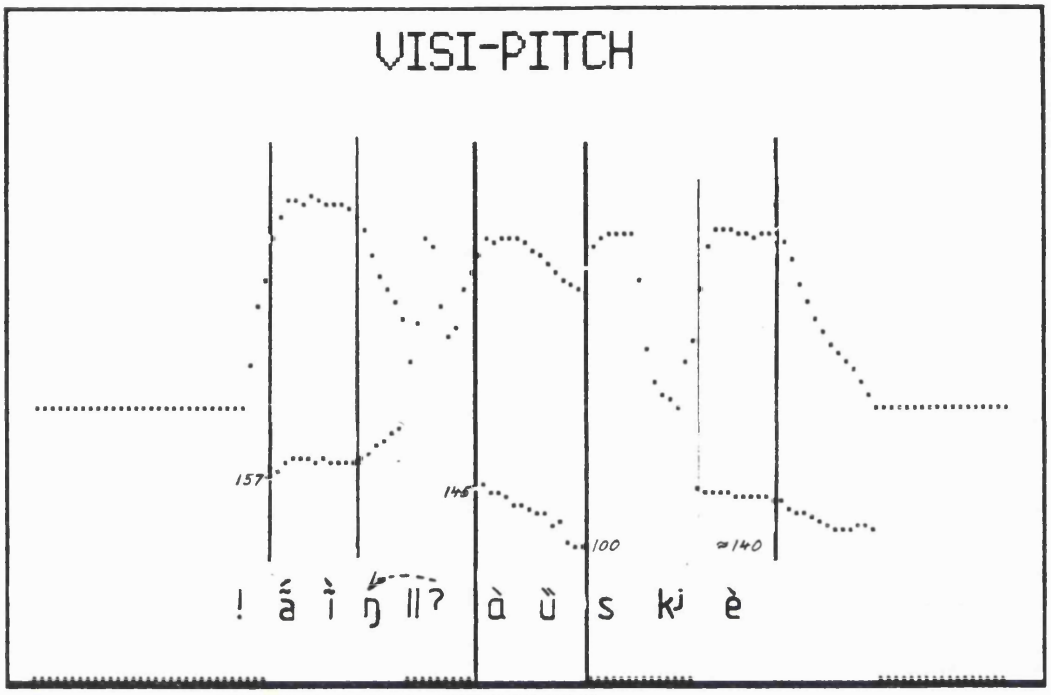
is due to tonal crumble of a */33/ melody. A tonemically more correct rendering, however, presents the melody as consisting of a High and a Low toneme, rather than of two High tonemes. The /33/ version had been used for the sake of didactic simplicity, allowing one to speak of four level and two rising melodies. It will henceforth be replaced by a **/32/** notation.

Sandhi: /21/



STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	158.0	113.6	44.4 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	58.5	50.2	8.3 DB
TIME BET. CURSORS	0.25	0.27	0.02 S
PERTURBATION	0.53	1.14	-.61 %
MAXIMUM FO	166.8	130.6	36.2 HZ
MINIMUM FO	129.1	98.2	30.9 HZ
FO RANGE	37.7	32.4	5.3 HZ
FO AT L	153.7	130.6	23.1 HZ
FO AT R	129.1	98.2	30.9 HZ
INTENSITY AT L	58.7	56.5	2.2 DB
INTENSITY AT R	42.0	50.0	-8.0 DB

Figure 7b: "High" (Sandhi), <u>CVCV</u>: - *!gàwù* (teem)

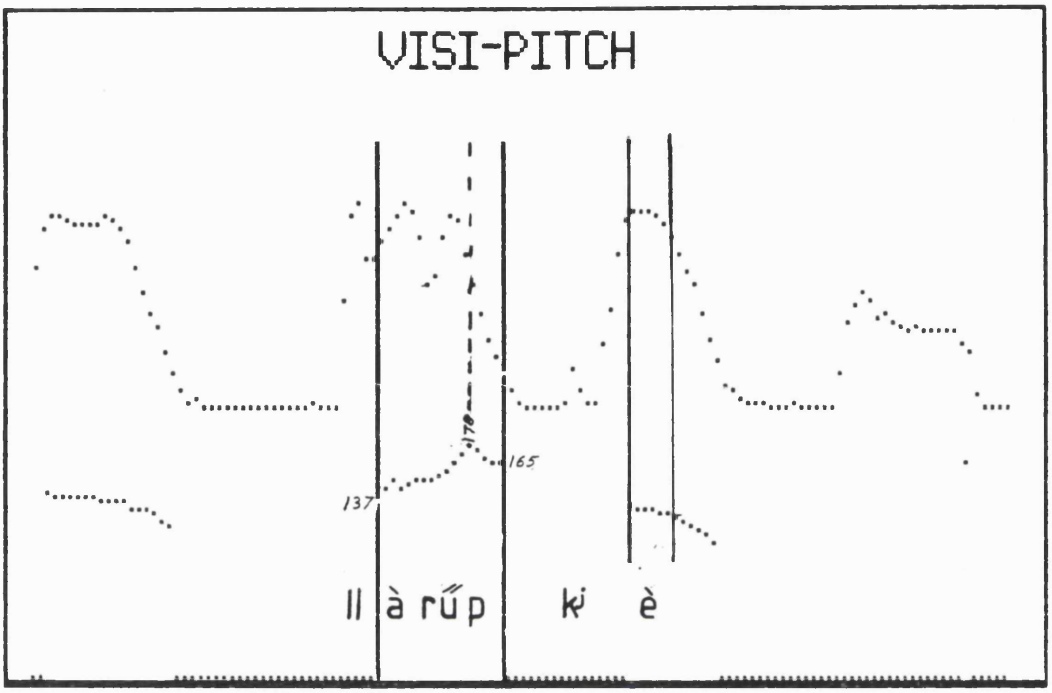


TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 53.0DB 145.7HZ
CURSOR LEFT/RIGHT R 51.1DB 100.1HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	165.8	129.7	36.1 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.1	52.4	7.7 DB
TIME BET. CURSORS	0.17	0.22	0.05 S
PERTURBATION	0.32	1.16	-.84 %
MAXIMUM FO	169.1	147.8	21.3 HZ
MINIMUM FO	156.6	100.1	56.5 HZ
FO RANGE	12.5	47.7	35.2 HZ
FO AT L	156.6	145.7	10.9 HZ
FO AT R	165.4	100.1	65.3 HZ
INTENSITY AT L	55.0	53.0	2.0 DB
INTENSITY AT R	58.5	51.1	7.4 DB

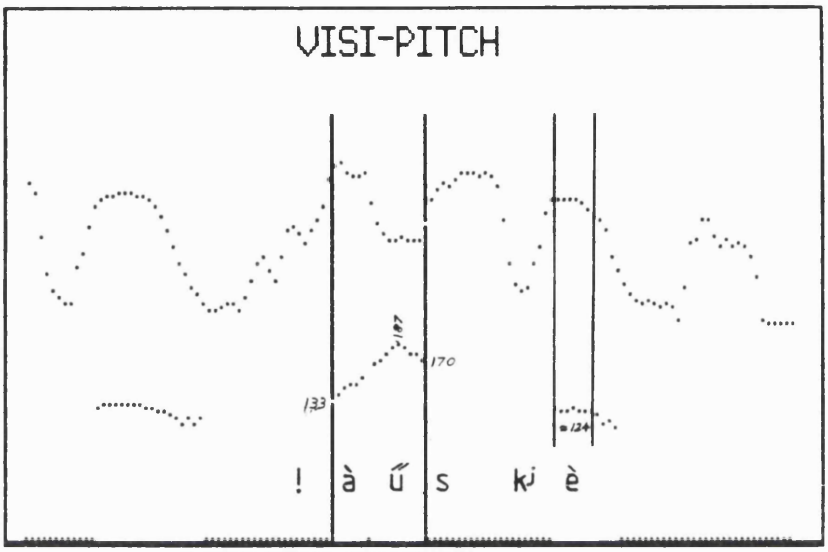
Figure 8b: "High" (Sandhi), <u>CVV</u>: - ‖àù (useless)

HIGH-RISING
Citation: /34/ (> /24/)



STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	159.1	128.0	31.1 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	51.8	57.9	-6.1 DB
TIME BET. CURSORS	0.25	0.08	0.17 S
PERTURBATION	1.03	0.19	0.84 %
MAXIMUM FO	178.4	132.4	46.0 HZ
MINIMUM FO	137.3	124.9	12.4 HZ
FO RANGE	41.1	7.5	33.6 HZ
FO AT L	137.3	132.0	5.3 HZ
FO AT R	165.4	124.9	40.5 HZ
INTENSITY AT L	54.7	59.0	-4.3 DB
INTENSITY AT R	35.0	55.2	-20.2 DB

Figure 9a: "High-rising" (Citation), <u>CVCV</u>:
ǃ*gárű́.b* (> ǃ*gàrű́.b*) (pot-hole in rock)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 59.9DB 133.2HZ
CURSOR LEFT/RIGHT R 48.9DB 170.2HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
AVERAGE FO	166.3	123.8	42.5 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	51.3	52.9	-1.6 DB
TIME BET. CURSORS	0.24	0.09	0.15 S
PERTURBATION	1.04	0.63	0.41 %
MAXIMUM FO	186.7	127.1	59.6 HZ
MINIMUM FO	133.2	122.3	10.9 HZ
FO RANGE	53.5	4.8	48.7 HZ
FO AT L	133.2	125.4	7.8 HZ
FO AT R	170.2	123.2	47.0 HZ
INTENSITY AT L	59.9	53.5	6.4 DB
INTENSITY AT R	48.9	50.5	-1.6 DB

Figure 10a: "High-rising" (Citation), <u>CVV</u>: *!gáű* (>*!gàű*) (rancid)

Beach (*op. cit.*: 132): "high-rising"

This melody was said (Haacke 1976) to rise distinctly from a High to a Double-High toneme, *i.e.* /34/. Instrumental evidence shows, however, that the first tone of the melody is Low rather than High, and that the interval consists of two

tones rather than one; cf. also below, p.75 for tonemic considerations.

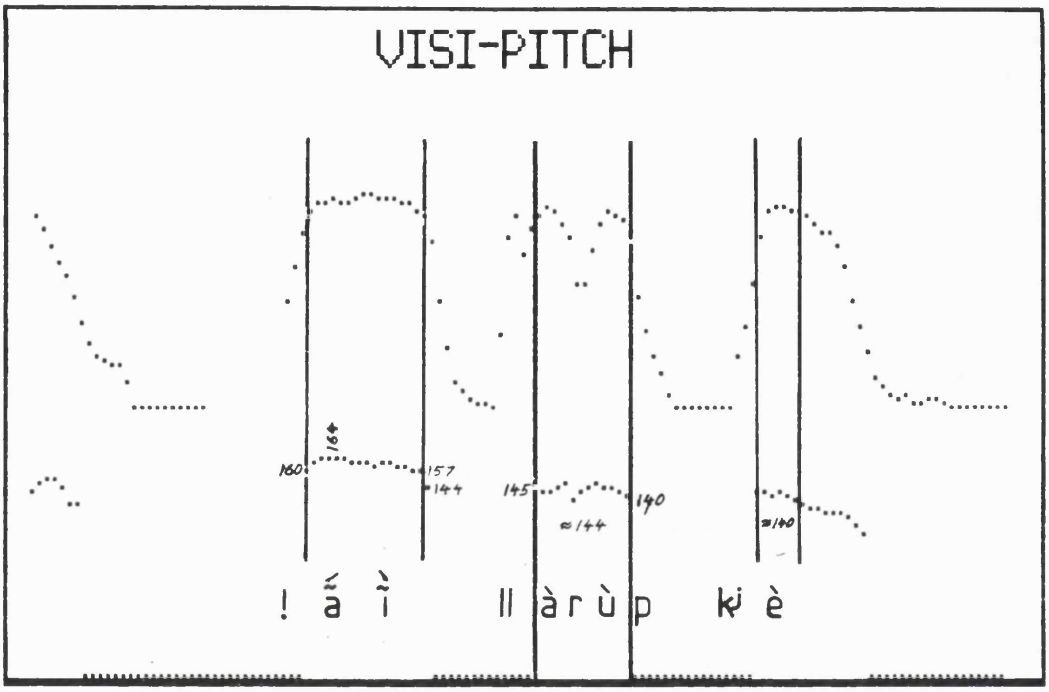
It is to Beach's credit that he detected allotonic variants: a higher rising melody with the close vowels *i* or *u* as V_2 or the nasal consonants *m* or *n* as C_2; and a less high-rising melody for all the other roots. The above illustrations depict the higher variant, but cf. Fig. 18 on p.135 for the variants. The Double-High tone /4/ on the second syllable exceeds the pitch of the onset /4/ tone of the /43/ melody considerably: in the lesser variant by an average of 55 Hz above Low, in the higher variant by an average of 73 Hz, while the onset tone of the /43/ melody averages only 43 Hz above Low.

This extreme height is considered to be a tonetic detail of no tonemic significance, as it can vary considerably according to the emphasis applied, and - more importantly - as the tonal scale is (within limits of performance) tonetically open-ended at the bottom and top extremes, as long as the Double-Low/High tones are *relatively* lower or higher than the respective Low and High tones, *i.e.* as long as they remain the lowest and highest tones within the entire tonal range.

It was noted, for instance, that the main informant normally availed himself of a pitch range not exceeding a *Visi-Pitch* scale calibrated to 200 Hz. When, however, minimal pairs

representing the /23/ and /24/ range were recorded for comparison, the /24/ roots would regularly exceed the 200 Hz limit to about 260 Hz, as the informant was intent on driving home the difference.

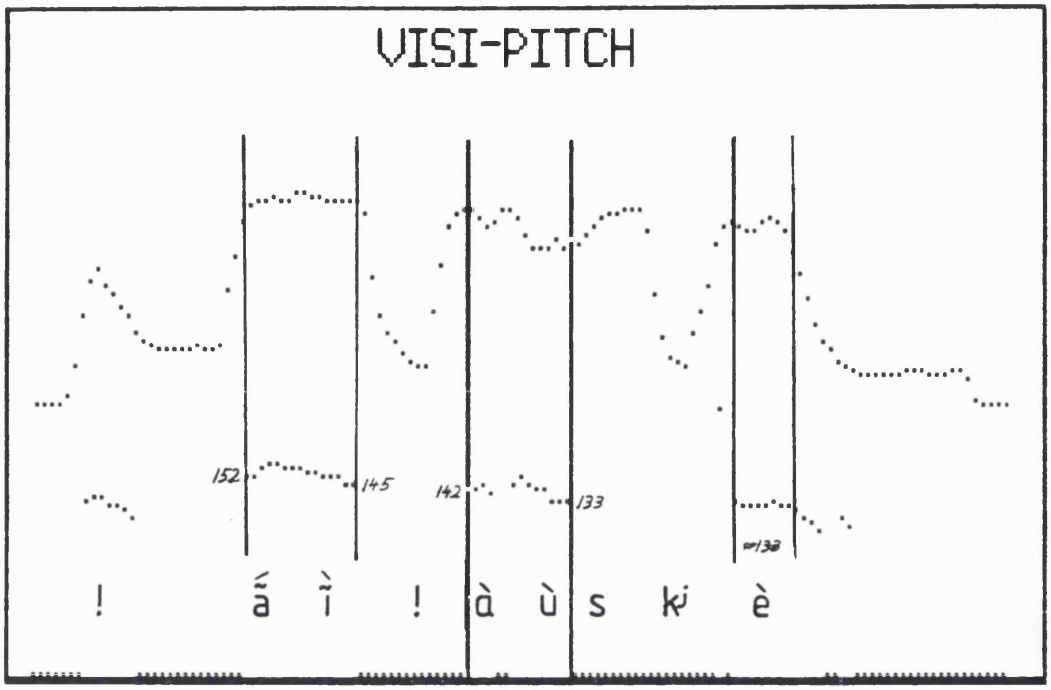
Sandhi: /22/



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 58.7DB 145.2HZ
CURSOR LEFT/RIGHT R 54.6DB 139.8HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	!gâ i	ǁgaru.b	
AVERAGE FO	163.9	143.6	20.3 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.4	55.8	4.6 DB
TIME BET. CURSORS	0.24	0.19	0.05 S
PERTURBATION	0.37	0.72	-.35 %
MAXIMUM FO	169.6	148.5	21.1 HZ
MINIMUM FO	157.1	130.8	26.3 HZ
FO RANGE	12.5	17.7	5.2 HZ
FO AT L	158.9	145.2	13.7 HZ
FO AT R	157.1	139.8	17.3 HZ
INTENSITY AT L	59.1	58.7	0.4 DB
INTENSITY AT R	58.3	54.6	3.7 DB

Figure 9b: "High-rising" (Sandhi), <u>CVCV</u>: - ǁ*gàrù.b* (pot-hole in rock)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 59.0DB 141.5HZ
CURSOR LEFT/RIGHT R 54.4DB 132.9HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS	*!gái*	*!gaus*	
AVERAGE FO	155.0	142.3	12.7 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.5	56.0	4.5 DB
TIME BET. CURSORS	0.22	0.20	0.02 S
PERTURBATION	0.54	0.94	-.40 %
MAXIMUM FO	162.7	150.7	12.0 HZ
MINIMUM FO	144.8	132.4	12.4 HZ
FO RANGE	17.9	18.3	0.4 HZ
FO AT L	151.9	141.5	10.4 HZ
FO AT R	144.8	132.9	11.9 HZ

Figure 10b: "High-rising" (Sandhi), <u>CVV</u>: - *!gàù* (rancid)

DOUBLE-HIGH
Citation: /44/ (> /43/)

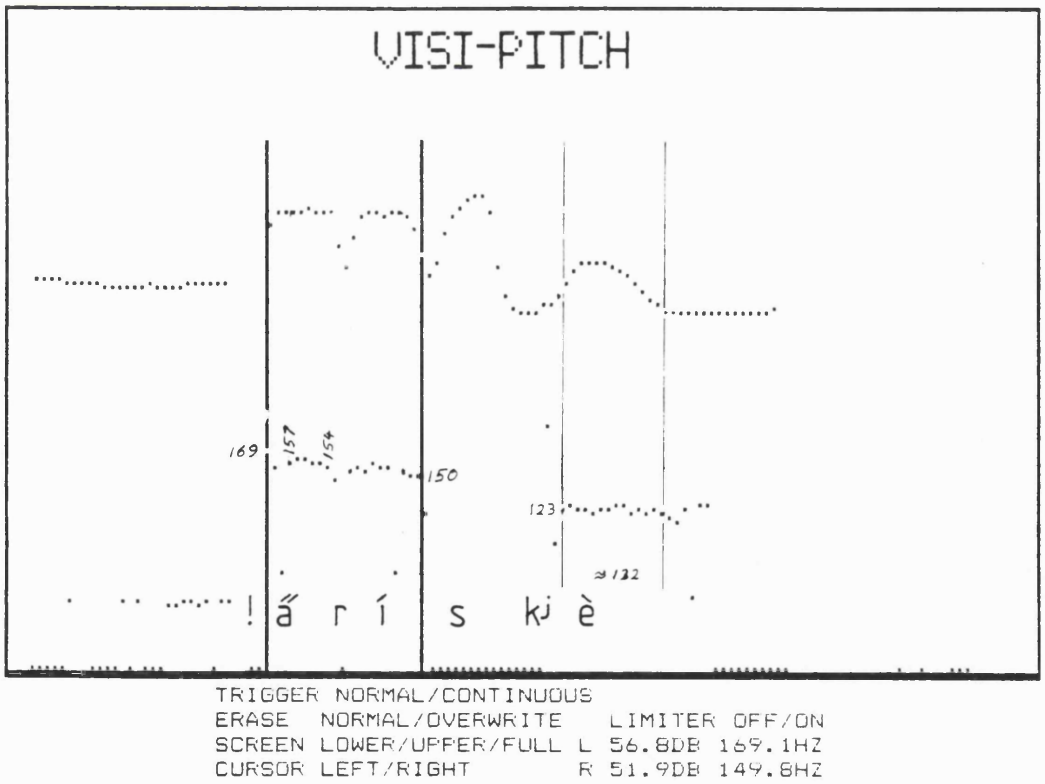


Figure 11a: "Double-High" (Citation), <u>CVCV</u>:
***!gárí* (> *!gárí* (hard)**

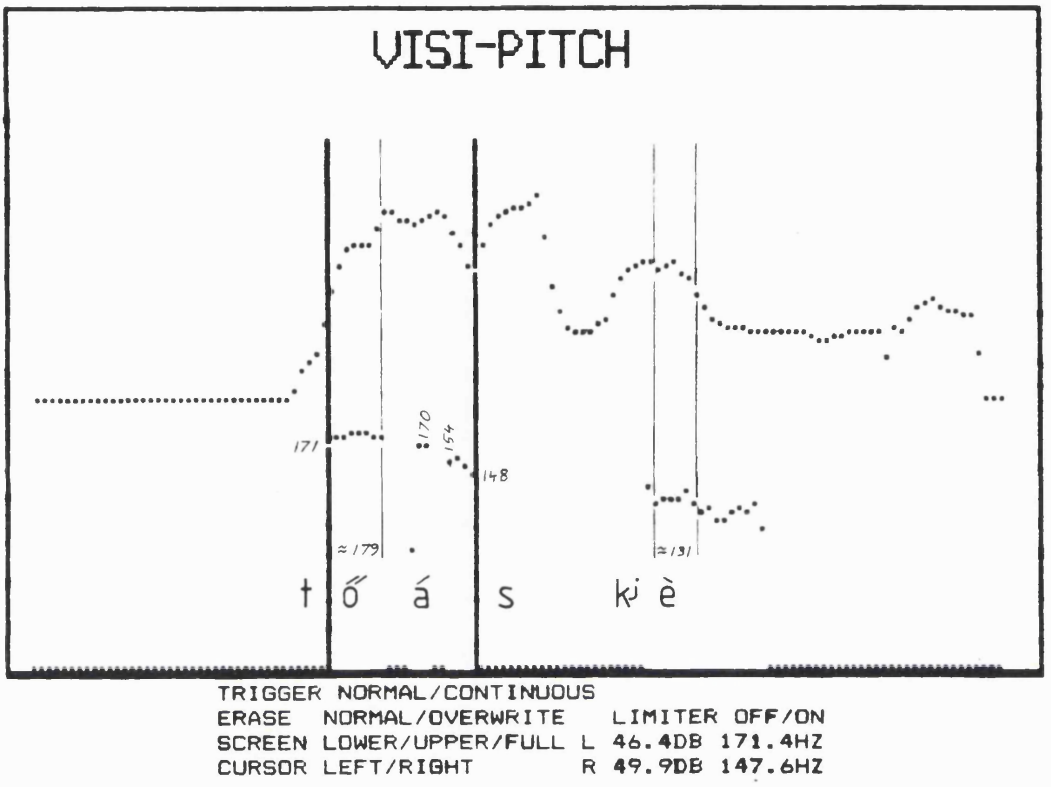
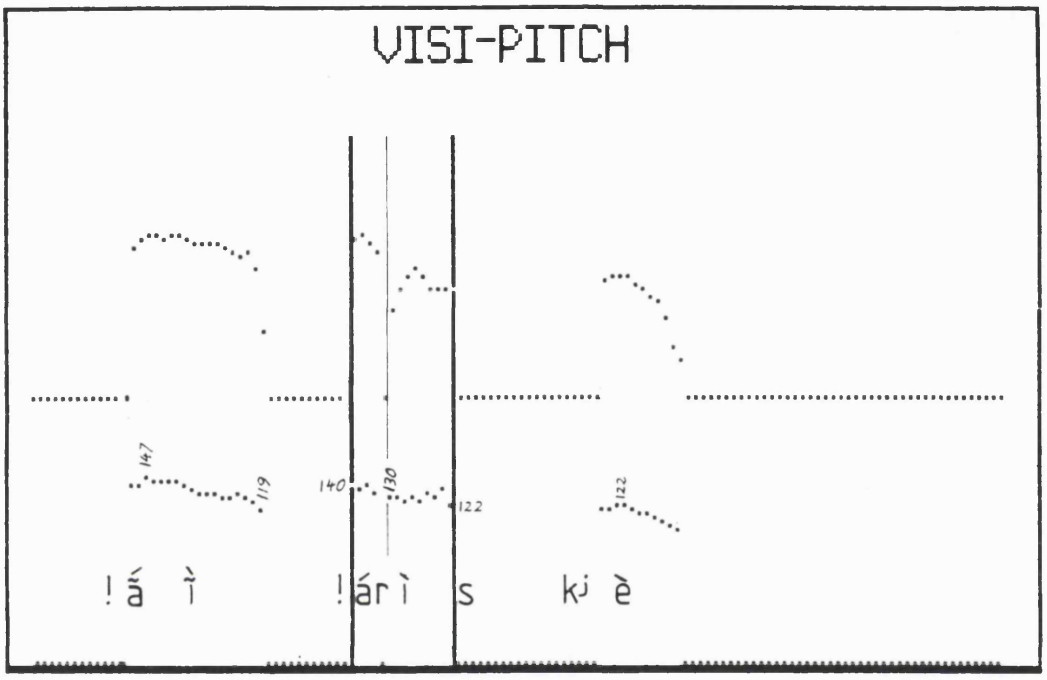


Figure 12a: "Double-High" (Citation), CVV: *tóá́* (> *tóá*) (finish)

Beach (*op. cit.*: 138): "High falling"

This melody commences on the highest onset toneme, *viz.* /4/. As Beach also states, the audial impression is that it falls "very slightly". The average rate of descent of 25 Hz, however, is practically the same as that of 27 Hz for the /32/ melody. Although the descent may be partly attributable to downdrift here, considering that the intensity on the second syllable falls as well, the present analysis will re-analyze this melody as falling a full tone step from /4/ to /3/. Note that Hagman (*op. cit.*: 12) treats it as being level.

Sandhi: /33/ (> /32/)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 54.1DB 139.8HZ
CURSOR LEFT/RIGHT R 46.6DB 122.0HZ

STATISTIC VALUES ARE FOR ALL DATA BETWEEN CURSORS	COL #1	COL #2	CHANGE
AVERAGE FO	135.8	131.9	3.9 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	53.2	48.5	4.7 DB
TIME BET. CURSORS	0.05	0.05	0.00 S
PERTURBATION	1.32	1.99	-.67 %
MAXIMUM FO	139.8	141.1	1.3 HZ
MINIMUM FO	132.4	126.3	6.1 HZ
FO RANGE	7.4	14.8	7.4 HZ
FO AT L	139.8	130.3	9.5 HZ
FO AT R	136.7	137.5	0.8 HZ
INTENSITY AT L	54.1	46.4	7.7 DB
INTENSITY AT R	49.7	47.2	2.5 DB

Figure 11b: "Double-High" (Sandhi), CVCV: -
***!gárí* (> *!gárì*) (hard)**

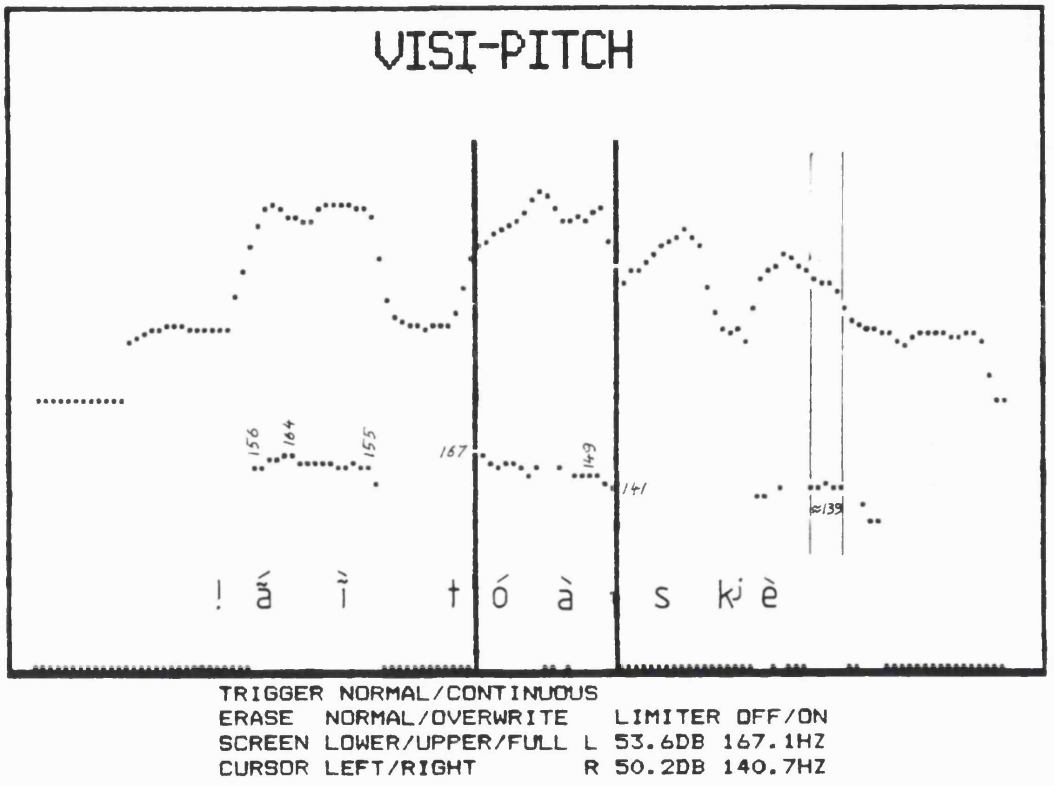


Figure 12b: "Double-High" (Sandhi), CVV:
- *tóá* (> *tóà*) (finish)

In the Sandhi form of the "Double-high" melody both tones are lowered by one step from /43/ to **/32/**. The question whether this change involves a lowering process (*e.g.* register change) or whether it is a paradigmatic switch (cf. Flip-flop rules below, p.102), must remain open at this stage. The fact that the averaged onset of the *Citation* /32/ melody is 5 Hz higher than the onset of the *Sandhi* /32/ (*i.e.* of /43/) seems to be fortuitous, and may be due to the

fact that the Sandhi frame sentence was in most cases uttered after the Citation frame sentence and thereby is subject to downdrift.

- It is apparent from the above diagrams that the respective tonal melodies for CVCV and CVV radicals are essentially the same (Beach's class 5 and 3/2 respectively). Recall that CVV includes next to oral and nasal "diphthongs" so-called "long" oral vowels, *i.e.* CV_1V_1 like *ṹ* (take), and nasal vowels $C\tilde{V}_1\tilde{V}_1$ like *!gû̀* (go) - which, through the nature of their origin (*viz.* CVNV > [$C\tilde{V}\tilde{V}$] = $C\hat{V}$) are always "long".

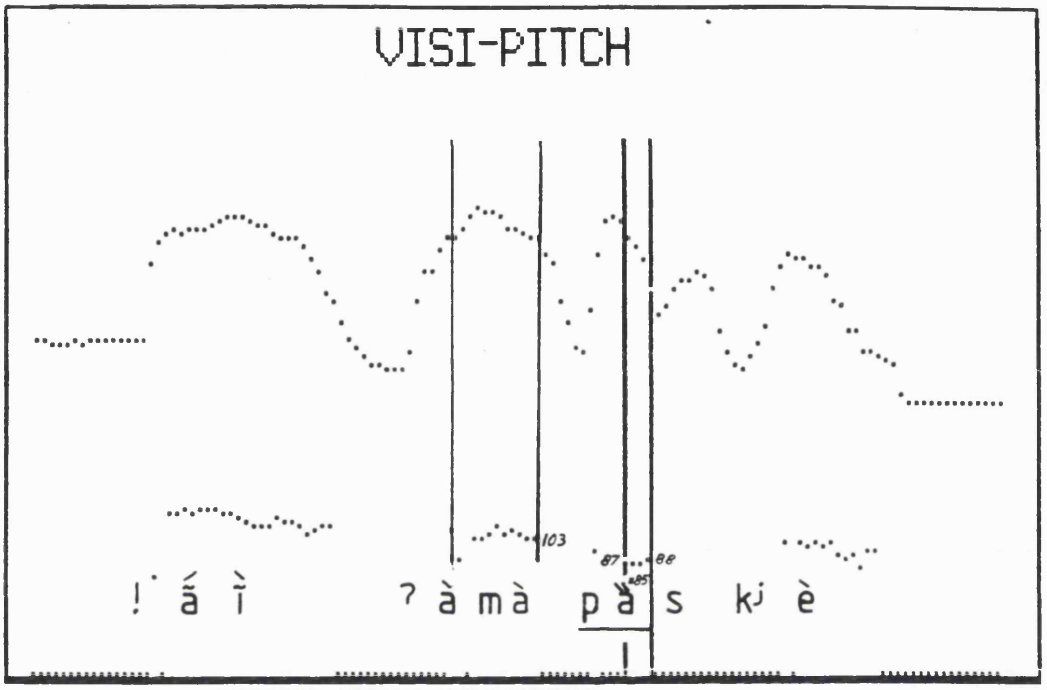
The respective melodies occur not only with the above CVCV and CVV skeletons but also with roots of the CVN type as exemplified in Table 2 above. In these roots the second syllable consists of a nasal consonant only, which - being a sonorant - serves as t.b.u. for the second tone; cf. sect. 2.1.2 e) on p.26).

2.2.1.1 Arguments in Favour of a Register System

Beach's approach of taking roots (of purportedly varying length) instead of syllables as the t.b.u. could well be accommodated in current autosegmental phonology much more comfortably than it could in the theory of his time. Indeed, his contemporary Pike (1948:11) expressed his doubt about

the approach and said that it might require a minor change in the definition of a tone language. Yet there are more arguments which stand against Beach's approach of taking a contour tone as a primitive.

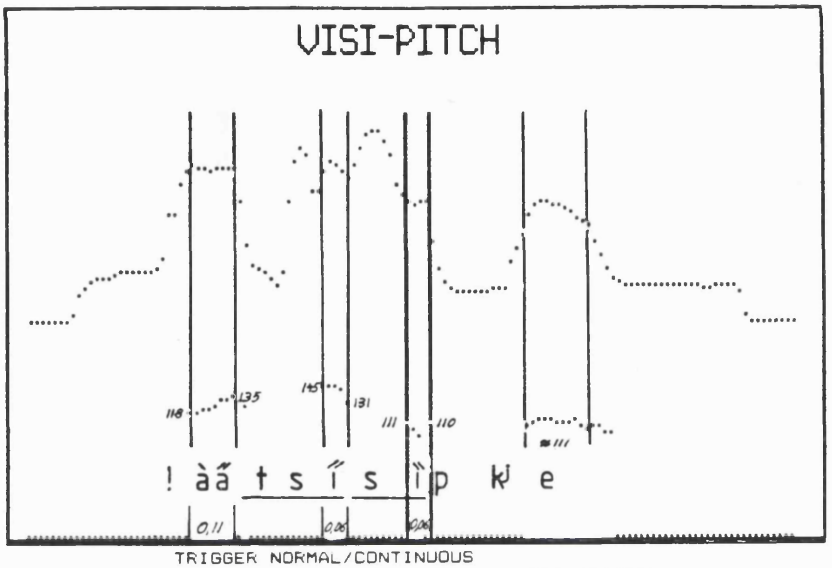
a. The most cogent reason is that Beach would need two independent tonemic systems for Khoekhoe: one for lexical formatives, and one for grammatical formatives. As will become evident below, many grammatical formatives are genuinely monosyllabic. And in such monosyllabic morphemes no rising or falling contours (*i.e.* consisting of **two** tones) appear on single vowels or sonorants. (Such an occurrence would have been a cogent reason to recognize contour tones.) Any change in pitch (portamento) that can indeed be detected on a monosyllabic grammatical formative is conditioned by its environment and has no tonemic significance. A few diagrams may illustrate the tonal behaviour of monosyllabic suffixes and particles:



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 54.6DB 87.2HZ
CURSOR LEFT/RIGHT R 46.9DB 87.9HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	ama	*ba*	
AVERAGE F0	105.2	85.0	20.2 HZ
EXTENDED AV. F0	---	---	--- HZ
AVERAGE DB	56.6	52.4	4.2 DB
TIME BET. CURSORS	0.17	0.04	0.13 S
PERTURBATION	1.67	1.05	0.62 %
MAXIMUM F0	115.1	87.9	27.2 HZ
MINIMUM F0	88.9	83.1	5.8 HZ
F0 RANGE	26.2	4.8	21.4 HZ
F0 AT L	110.4	87.2	23.2 HZ
F0 AT R	102.6	87.9	14.7 HZ
INTENSITY AT L	54.9	54.6	0.3 DB
INTENSITY AT R	54.6	46.9	7.7 DB

Figure 13a: Tone of a grammatical formative: applicative *-bà*



STATISTIC	COL #1 *tsí*	COL #2 *sì*	CHANGE	
VALUES ARE FOR ALL DATA BETWEEN CURSORS				
AVERAGE F0	140.3	104.2	36.1	HZ
EXTENDED AV. F0	---	---	---	HZ
AVERAGE DB	59.3	51.8	7.5	DB
TIME BET. CURSORS	0.06	0.06	0.00	S
PERTURBATION	0.40	4.38	-3.98	%
MAXIMUM F0	145.9	111.2	34.7	HZ
MINIMUM F0	131.0	96.7	34.3	HZ
F0 RANGE	14.9	14.5	0.4	HZ
F0 AT L	145.5	111.2	34.3	HZ
F0 AT R	131.0	110.0	21.0	HZ
INTENSITY AT L	58.7	52.5	6.2	DB
INTENSITY AT R	57.2	45.0	12.2	DB

Figure 13b: Tone of a grammatical formative: adjectival *tsí* and abstract *sì*

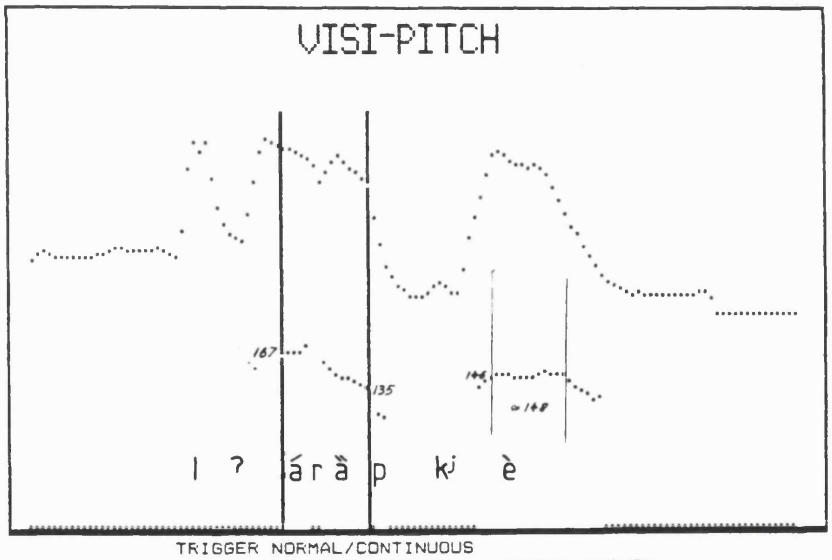
b. Had Beach investigated Sandhi forms and compound words, he would have found that even just for lexical tone he would have required a rather unmanageable number of toneme markings, as he would have needed not only his six marks for the lexical Citation melodies (cf. p.23, Table 1) but additional marks for Sandhi melodies (cf. below, Table 14 on p.119 for an inventory); and, indeed, two more for the additional

(seventh and eighth) Citation melodies to be introduced below (sect. 2.2.3.1/2), apart from trisyllabic Khoekhoe roots (sect. 2.2.3.3) and polysyllabic loanwords. Furthermore, he would have had to introduce special signs for exceptional words like

ǀárà.b (abomasum), (Fig. 14a)

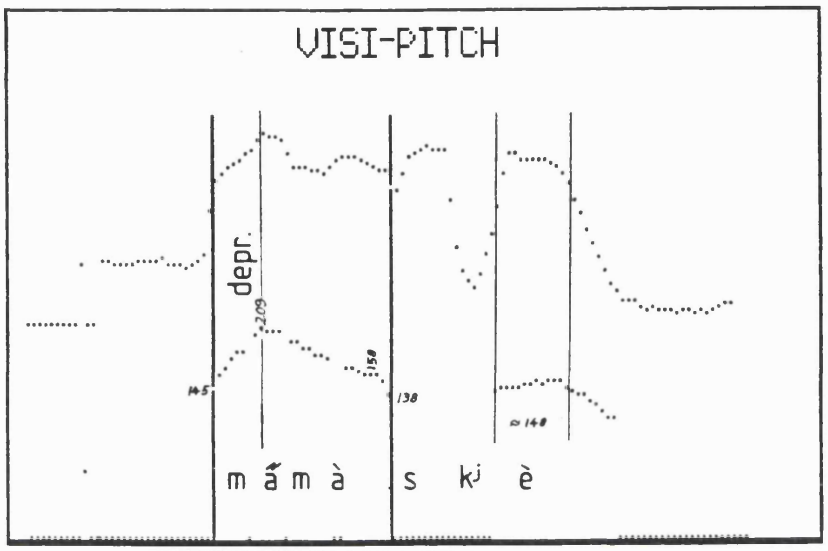
or

mấmà.s (mother) (Fig. 14b)



STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	ǀara.b		
AVERAGE FO	156.3	148.4	7.9 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	59.1	57.9	1.2 DB
TIME BET. CURSORS	0.22	0.19	0.03 S
PERTURBATION	1.24	0.47	0.77 %
MAXIMUM FO	184.0	156.6	27.4 HZ
MINIMUM FO	135.2	145.5	10.3 HZ
FO RANGE	48.8	11.1	37.7 HZ
FO AT L	167.4	146.1	21.3 HZ
FO AT R	135.2	147.8	12.6 HZ
INTENSITY AT L	62.4	60.9	1.5 DB

Figure 14a: Exceptional Melody /31/: *ǀárà.b* (abomasum)



TRIGGER NORMAL/CONTINUOUS
ERASE NORMAL/OVERWRITE LIMITER OFF/ON
SCREEN LOWER/UPPER/FULL L 57.1DB 145.2HZ
CURSOR LEFT/RIGHT R 56.1DB 138.6HZ

STATISTIC	COL #1	COL #2	CHANGE
VALUES ARE FOR ALL DATA BETWEEN CURSORS			
	mamas ge		
AVERAGE FO	176.7	148.5	28.2 HZ
EXTENDED AV. FO	---	---	--- HZ
AVERAGE DB	60.9	59.9	1.0 DB
TIME BET. CURSORS	0.46	0.19	0.27 S
PERTURBATION	0.64	0.36	0.28 %
MAXIMUM FO	209.4	152.3	57.1 HZ
MINIMUM FO	138.6	141.5	2.9 HZ
FO RANGE	70.8	10.8	60.0 HZ
FO AT L	145.2	141.5	3.7 HZ
FO AT R	138.6	146.5	7.9 HZ
INTENSITY AT L	57.1	52.4	4.7 DB
INTENSITY AT R	56.1	56.6	-.5 DB

Figure 14b: Exceptional Melody /42/: *mámà.s* (mother *generic*)

These lexical melodies together with the tones for grammatical formatives would have led to an over-enrichment of his system. For next to a maze of lexical toneme marks Beach would have had to introduce a set of level tones for the grammatical formatives as well, which have no independent justification.

c. If, on the other hand, the melodies were depicted as contour tones in a feature system with features like [+/-rising] and [+/-falling], then there would have been no means to reflect the extent of the respective rise or fall. In the segmental four-tone system to be proposed below (Table 14 on p.119) the following eleven rising and falling contours will be differentiated:

	CITATION		**SANDHI**
Rising:	/**12**/	(previously /11/)	/21/
	/**13**/	(previously /12/)	/13/
	/14/	(exceptional)	/14/
	/23/	(limited)	/23/
	/**24**/		/22/
	/31/	(exceptional)	/31/
	*/34/	(gap)	
Falling:	/21/	(exceptional)	/21/
	/**32**/	(previously /33/)	/21/
	/**43**/	(previously /44/)	/32/
	/42/	(exceptional)	/31/

Table 4: Rising and Falling Contours

As *i.a.* Woo (1969), Clark (1978:2) and Yip (1980:7) have pointed out, no one in segmental phonology would describe a diphthong [ai] by specifying the transition from [a] to [i]. Instead one describes the two end-point configurations [a] and [i] respectively. In this way one could differentiate between the comparatively greater transition in [ai] and a lesser transition like [ae]. The same principle should hold for tonal contours as well, including "zero" transitions for level melodies like /22/, for that matter. This means that rising and falling melodies on the one hand, and level "tones" or melodies can receive uniform treatment. If rising

or falling melodies were expressed by unitary features, then it would be hard to explain why contours and level tones are subject to the same Sandhi rules and general tonological behaviour.

d. A further reason for representing melodies as consisting of two level tones pertains to the diachronic origin of the tonal system of Khoekhoe (cf. section 2.2.3 on tonogenesis). Beach (*op. cit.*: 248 *et seq.*) has shown that the Korana "mid-level" and "low-mid falling" "tonemes" each have *two* conditioned variants in Khoekhoe that depend on the voicing of the initial proto-consonant: if it was voiced, two rising "tonemes" would respectively appear in Khoekhoe with subsequent devoicing of the consonant. Using our revised notational system for Nama and Beach's for Korana, the following correspondences occur:

KORANA (Beach)		**NAMA**
mid-level + **vl**	>	/3**2**/
mid-level + **vd**	>	/**12**/
mid-low falling + **vl**	>	/22/
mid-low falling + **vd**	>	/**13**/

Table 5: Tonogenesis from Korana to Nama according to Beach

Beach generalizes by saying that both the "tonemes" (*i.e.* melodies) caused by originally *voiced* initial consonants are of the rising type. The degree of transition in the rise differs systematically, however; cf. Fig. 1a/2a vs. 3a/4a, and Fig. 18 on p.135. - In not resorting to a register tone analysis Beach misses the true generalization that originally voiced consonants through depression create *one*

additional, "Double-Low" toneme /ˇˇ/ or /1/ (in our terms) in Khoekhoe. As will be discussed below (footnote 26 on p.142), what truly happens is not that a rise is effected, but that the initial tones of the melodies /**2**2/ and /**3**2/ are depressed to /**1**3/ and /**1**2/ respectively, thus inevitably necessitating a rise to the unaffected tone of the second syllable. A similar diachronic phenomenon is described by Yip (1980: 24) and others for Chinese[5].

e. As the arguments for expressing contour tones as sequences of level tones have been presented at length by Yip *op. cit.* and have also been generally established in the works of others (esp. Leben 1973, Williams 1976, Clark 1978, Anderson 1978) it is considered superfluous to present further arguments against Beach's unitary treatment here. In general it may be observed that the treatment of contours as primitives will obscure certain phonological generalizations concerning perturbations, particularly as assimilations to the shape of a *melody* (as opposed to the on- or offset toneme) are unknown universally - as observed by Anderson (1978: 159) - and *a fortiori* are unknown in Khoekhoe. In addition, register systems generally are more transparent for proving correspondences in tonogenesis. In the case of Khoekhoe an analysis on the level of features will even be required for this purpose.

---

[5]Cf. Hombert 1978 for accounts of experimental evidence that even in non-tone languages the intrinsic F_0 values of vowels after voiced stops are lower than after ~~voiced~~ voiceless stops.

Haacke's (1976) and Hagman's (1977) systems of marking contours as sequences of register tones are considered to be vindicated, therefore.

The next question is how many surface (and underlying) tonemes must be postulated. Considerations of economy should *a priori* give preference to Hagman's three-tone system over Haacke's four-tone system, unless it can be proved that a three-tone system fails to differentiate between the phonemically significant distinctions, and unless it fails to capture certain generalizations. Furthermore, it has to be considered whether considerations of economy should necessarily outweigh considerations of naturalness.

2.2.2. Determination of the Number of Surface Tonemes

A system of three tonemes provides for a theoretical maximum of nine bimoraic melodies. From a quantitative point of view this system is adequate to accommodate the six melodies so far identified, as the following paradigm shows. Those melodies that, according to Hagman, are in fact realised are underlined. (His diacritical marks are here represented by numbers for ease of reference: ˋ = 1, unmarked = 2, ˊ = 3).

	1	**2**	**3**
1	11	<u>12</u>	<u>13</u>
2	21	<u>22</u>	<u>23</u>
3	31	<u>32</u>	<u>33</u>

Table 6: Theoretically possible melodies in a three tone system

Hagman (*op. cit.*: 12) furthermore claims that only six tone combinations are possible in a root, for

> "the first mora may have any of the three tonemes ..., but the second mora may only have a high or a middle tone".

A four-tone system would be considerably over-enriched from a quantitative point of view, as theoretically it allows for sixteen melodies (OCP violations not considered), thus having an excess of ten unrealized melodies.

It will be shown now that Hagman's three-tone system is nevertheless unable to differentiate adequately; certainly, if he wants to uphold his (correct) claim that the second tone of a melody can never be "low", *i.e.* Double-Low in our terms. (See also footnote 26 on p.142 for Elderkin's No Final Low rule.)

Investigation of further data has shown that - at least for the purpose of surface level distinction (*i.e.* contrastive pitch) - two, if not three further tonal melodies must be recognized in addition to the established six. The most important one is the Mid-rising melody /23/ discussed in section 2.2.3.1 (Figures 15-16b) below, with very exceptional instantiations of /14/ and /42/ in section 2.2.3.2. The Citation form of /23/ is hardly discernible from the High-rising melody: it starts to rise at the same level as the High-rising melody, but, crucially, levels out or even descends on the second syllable.

This subtle yet tonemically significant distinction between /24/ and /23/ cannot be reflected by Hagman's three-tone surface system if he wants to maintain any reasonable degree of naturalness, *viz.* that rising contours are tonemically represented as rising, falling ones as falling, etc. There is no further combination available that amounts to a rising melody, for he has already established the theoretical maximum of three rising melodies in a three-tone-system, *viz.*

/12/ (Haacke 1976: /11/, now /12/),

/13/ (*op.cit.*: /13/), and

/23/ (*op.cit.*: /34/, now /24/).

Hagman could only have accommodated this additional melody by representing the - indeed - often only slightly rising melody /12/ (Haacke 1976: "Double-Low" /11/) as a level melody, *viz.* /11/. With that he would, however, have had to waive his claim that no melody ends on a "low" tone (which will be shown below to be phonologically predictable, as his initial "low" tone - Double-Low in my terminology - developed because of originally voiced *initial* consonants, which do not affect the tone of the second syllable); and he would have had to surrender a high degree of naturalness, as firstly, the pitch of his /12/ melody does indeed rise slightly (cf. Fig. 1/2 above, Fig. 18 on p.135); and secondly, his postulation would miss the phonetic fact that the newly identified Mid-rising melody starts not on the lowest available tone but on the same as the High-rising melody; cf. sect. 2.2.3.1 below.

Tonologically speaking, therefore, there are two melodies rising two intervals, and two melodies rising only one interval, apart from the Extreme-rising melody, which rises over the maximum of three intervals. Of each type one commences on the lowest tone and one on some specific tone that is higher than the lowest tone, *i.e.* somewhere in the mid range. In a tonal scale that, for argument's sake, is still open-ended at the top this would establish the following melodies commencing with the lowest tone (represented by /1/): /12/ and /13/. If the number of tonemes is to be kept to the minimum, then the remaining two melodies must be postulated to commence at the next lowest tone, *i.e.* /2/ (which, conveniently, is also supported by tonetic facts). The melodies would thus be /23/ for the one rising one interval, and /**24**/ for the one rising two intervals.

The above considerations explain why the representation of the High-rising melody as /34/, as in Haacke 1976 will, as from now on, have to be changed to **/24/**. It also follows that in a tonemic rendering a further exceptional melody, the "Extreme-rising" melody (section 2.2.3.2 below) will have to be postulated to have the contour /14/.

The facts presented above prove that *a four tone system is the minimal system* that can reflect the contrastive *surface* distinctions of Khoekhoe pitch.

Whether the fact that tonetically even more relative pitches can be identified warrants the introduction of additional tonemes, will be discussed at a later stage (section 2.3). In an attempt to determine the underlying tonological set-up, the possibility of segmental influence on tonemes is to be investigated first.

2.2.3 Tonogenesis in Khoekhoe

Two hypotheses have been offered concerning Proto-Khoekhoe tonogenesis: while Beach (1938:247-253, cf. p.71 for Table 5) argued that the "Nama tone-system is a complication of an originally more simple tone-system" (*op.cit.* 247), *viz.* from four to six "tones" through depression and devoicing, Winter (1980) argued that the !Gora system is a simplification from not only six melodies ("Tonemmuster") in Nama, but even eight in Common Central Khoesaan; cf. also footnote 9 on p.92 as well as p.105.

As the computerized database of the *Khoekhoegowab Dictionary* (Haacke & Eiseb forthcoming) permits an optimally comprehensive breakdown of Khoekhoe tonological and phonological data, a paradigmatic summary is provided in Table 7 (p.80) to verify Beach's claims concerning the interrelation of segmental and tonal phonemes, which in his case were based on a limited because manual survey.

According to Beach

> "there were only four tonemes in "original" Hottentot (Ur-Hottentottisch), as in modern Korana, not six, as in Nama. The two lower-pitched of these four original tonemes each became sub-divided in Nama into main and subsidiary tonemes, as follows: -
>
> (a) Main tonemes ˌN and ˗N.
> Used with roots having the click-effluxes k, kx, and ʔ (together with kxʔ) and roots having the non-click initials s, x, p, t, k, and ʔ (together with kxʔ).
>
> (b) Subsidiary tonemes ˏN and ˎN.
> Used with roots having the click-effluxes g, h and n, and roots having the non-click initials ts, kx, h, (b), d, g, m, and n" (*op.cit.* 251).

The following data are based on a corpus of 2152 CVCV roots extracted from the main corpus in the *Khoekhoegowab Dictionary* at a stage near completion. Bound morphemes are included, if their melody is in Citation form beyond doubt. All loan-roots were excluded from the corpus, so as to eliminate the possibility of distortions due to foreign phonologies. Homotonic homonyms were retained, if they were considered to be semantically entirely unrelated. So were variants of the main dialects, as they are manifestations of different phonotactic constellations; *e.g.* ǁ*khàmű.s* [Damara], ǁ*khàwű.s* [Nama] (dorsal hump), in which the former is an exception while the latter is not, cf. Table 8 on p.95. The reader should bear in mind that the total number of 2152 attestations represents CVCV skeleta only; *i.e.* CVN, CVV and CṼṼ skeleta are not included. None of the paradigms

below will thus cover the entire inventory, and one should not expect identical totals.

Figures that reflect some extent of tonogenesis appear in bold. Of these, the figures that present a clear majority are underlined to indicate either the depressor or the non-depressor effect, whichever the case may be.

	/12/	/13/	/22/	/32/	/24/	/43/	Total
b/p	0	7	1	0	2	1	*11*
d/t	12	16	2	8	12	5	*55*
g/k	12	15	6	9	12	10	*64*
ʔ (V)	3	13	11	15	25	13	*80*
h	5	9	0	0	6	7	*27*
m	3	3	0	1	4	3	*14*
n	5	5	5	2	12	4	*33*
s	1	12	12	14	21	13	*73*
x	0	5	3	14	19	14	*55*
kh	14	17	0	0	3	7	*41*
ts	19	10	0	0	14	8	*51*
Total:	*74*	*112*	*40*	*63*	*130*	*85*	***504***
˥	0	6	20	21	36	17	*100*
˥g	22	16	3	12	15	12	*80*
˥h	31	24	1	2	26	16	*100*
˥kh	0	4	8	15	26	23	*76*
˥n	8	14	0	1	15	8	*46*
Total:	*61*	*64*	*32*	*51*	*118*	*76*	***402***
‖	0	6	16	21	29	15	*87*
‖g	14	18	10	15	24	12	*93*
‖h	19	23	0	0	17	7	*66*
‖kh	0	1	16	17	24	15	*73*
‖n	14	14	1	5	21	13	*68*
Total:	*47*	*62*	*43*	*58*	*115*	*62*	***387***
!	1	9	21	25	34	9	*99*
!g	25	28	9	18	23	14	*117*
!h	28	26	1	3	16	19	*93*
!kh	0	4	12	22	30	15	*83*
!n	25	24	1	11	30	17	*108*
Total:	*79*	*91*	*44*	*79*	*133*	*74*	***500***
ǂ	0	8	13	16	28	11	*76*
ǂg	13	18	12	9	21	13	*86*
ǂh	25	18	0	2	14	18	*77*
ǂkh	0	0	21	14	15	6	*56*
ǂn	17	15	1	3	15	11	*62*
Total:	*55*	*59*	*47*	*44*	*93*	*59*	***357***
Grand Total:	***317***	***390***	***206***	***295***	***588***	***356***	***2152***
Percentage:	14,7	18,1	9,6	13,7	27,3	16,5	100%

27,7

28,4

**

Table 6: Distribution of C_1 with the six major tonal melodies in CVCV skeleta

It is evident from table 7 that the co-occurrence of certain segmental phonemes with particular melodies is not as consistent as Beach maintained, cf. *e.g.*

> "I found very many examples of this efflux [**h** click-efflux, W. H.] in the lists of roots having the rising tonemes **ˏN** and **ˊN** , but *not a single one* [his emphasis, W. H.] amongst the roots having **-N** and **ˋN**" (*op.cit.* 248).

Surface realizations thus are, unfortunately, not (or no longer) predictable enough to reliably permit the merging of certain melodies as contextual variants. A sound for sound inspection may facilitate further discussion. It will not be attempted here, however, to reconstruct diachronic correspondences, as with limited comparative data available this would lead too far afield, and as it is not directly relevant to a synchronic analysis of Khoekhoe tonology.

[p], [t], [k] No complementary distribution is manifested in the bilabial voiceless plosive [**p**]. According to Beach this is not to be expected, as Nama [p] includes both the former voiceless [p] and the voiced [b], which became devoiced after the /22/ and /32/ melodies had been lowered to /13/ and /12/ respectively. The same holds for [**t**] and [**k**].

The fact that [p] is *spelt* b before the lower melodies /12/, /13/ and /22/; and p before the higher melodies /24/, /32/ and /44/) in the official orthography must not be misconstrued as having any phonetic import reflecting voicing. It is merely an orthographic convention to facilitate semantic

distinction without resorting to diacritical tone marks. The same principle applies to [t] (d/t) and [k] (g/k).

[ʔ] In the same way no split is detectable with the glottal plosive [ʔ], *i.e.* Beach's claim (*op.cit.* 251) that the "main" tonemes (/22/ and /32/) occur with [ʔ] is not borne out. The following counter-examples to his claim occur in our data-base:[6]

ʔàrò	(bounce baby gently)
ʔàrù	(dance to reed-lutes)
ʔòrò	(buck to throw rider)
ʔàá	(yes)
ʔàí.s [D.]	(my mother)
ʔànà	(cover w. blanket; dress)
ʔàrí.b, (ʔàri.b, ʔarí.b)	(dog)
ʔàrú	(separate lambs from herd)
ʔàwó.b	(father)
ʔáá.b [D.]	(younger brother)
ʔòá.b	(olive toad)
ʔòmá.b	(fine sediment; tampan)
ʔòrá	(eat corm of nut-grass raw)
ʔòró.s	(animal which has lost its offspring)
ʔùrí	(jump)

By analogy to the previous plosives one might suspect a similar diachronic dichotomy; cf. Halle & Stevens (1977: 208-9) postulation of voiced and voiceless glottal stops [ʔ̬] and [ʔ̥] with the features [+stiff vocal chords] and [+slack vocal chords] respectively. Comparative data from Khoesaan languages are still too scanty to permit a definite conclusion. Beach (1938) and Baucom (1974:7) reconstruct only one form, a voiceless **kx'*. The reader should bear in mind

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[6] All the counter-examples to Beach's determination of depressor consonants will be listed here in the hope that they may serve further comparative studies. English renderings will be confined to the essential.

that, although the glottal stop is not reflected in the Khoekhoe orthography, it appears as radical onset consonant in all roots commencing with a vowel letter in the spelling. Thus, a word like *uri* (jump) still complies with the canonical structure CVCV, *viz.* [ʔuri].

[h] In the case of the glottal voiceless fricative [**h**], depression is consistent. No manifestations of a co-occurrence of initial [h] with /22/ and /32/ exist in the database, only with the depressed melodies. Beach concludes from this that the original /h/ was voiced. Elderkin (1988) sees *h* in Zu|'hôasi as a realization of narrowing (of the rear vocal tract), which generally has a lowering effect. Hombert *et al.* (1977:50) and Schuh (1978:228) report on the depressor effect of *h*, albeit postvocalic *h*, in Arabic and Vietnamese respectively. See the pitch tracings in Fig. 16b on p.111 for the depressor effect of *h* at work in present-day Khoekhoe.

[m] The bilabial nasal [**m**] - which, together with the bilabial plosive [**p**] is least attested as C_1 - corroborates Beach.

[n] The alveolar nasal is not confined to co-occurrence with the "subsidiary" tonemes, contrary to Beach's claim; cf. the counter-examples:

nǎmà, mǎnà	(speak foreign, unintelligible language)
Nǎmì.b	(Namib desert)
nǎmì, dǎmì	(wind (bobbin))

nə̀rì	(today)
nə̀rù	(go around)
nə̀ḿ	(yield (of dough))
nə̀ó, = ǂàó	(plaster)
nə̀rá, bə̀rá	(lukewarm)
nə̀wá	(move in behind s.thing)
nə̀wé	(lick brackish substance)

The reason for this general occurrence of the alveolar nasal, in contrast to the bilabial nasal, must probably be sought in the fact that [n] occasionally alternates with the alveolar plosive [t] (or even [l]), *e.g.*

nə̀mì, də̀mì	(tape (s.) w. thread)
nə̀ḿ.mi, tə̀ḿ.mi, lə̀ḿ.mi	(tongue)
náwà, táwà	(strike (of lightning))
nə̂ú, də̂ú	(flow)
nûù.s, dûù.s	(three-thorn acacia).

As mentioned above, the alveolar stop [t] of Khoekhoe is a merger of the original voiced and voiceless phonemes, which explains why all of the melodies occur with [t] in Khoekhoe. This may account for the similar co-occurrences in [n] in the instances where it is allophonic. Similar dialect variants of the bilabial nasal and stop are not on record, however - which in turn accounts for the exclusive depressor nature of [m].

[s] This sibilant has thirteen counter-examples to Beach's claim that it is a non-depressor, twelve of them being with the /13/ melody.[7] Other than with the /12/ melody no bias towards either depressors or non-depressors is evident for *s*.

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[7] It is notable that counterexamples to non-depressor consonants predominantly occur with /13/, rather than /12/; cf. *s*, *x*, and clicks with *-ʔ* and *-kh*. The reason for this will probably be born out only by comparative data. Cf. Honken's observation (p.85) that Khoekhoe *s-* with /13/ goes back to **ts^{h}*; and Elderkin's contention (1988:134/5) that in Zu|'hõasi pharyngealization (narrowing) has a lowering effect on a following high tone, ˉ ˋ (/13/) thus being the non-depressed variety of ˉ ˉ (/12/).

sà̤m	(swoop down on)
sà̤mí, (sà̤bí)	(separate (grain) from sand by shaking)
sà̤rá.b	(large knife)
sà̤rú.b	(cigarette)
sà̤wá.s	(fire tray)
sà̤wé	(throw w. spinning motion)
sà̤wú	(quoit)
sã̤í	(boil *v.t.*)
sɔ̀ḿ.mi [D.]	(spear)
sɔ̀má	(shelter in shade)
sʉ̀nú	(toboggan)
sʉ̀rí.b	(enlarged family)
sʉ̀rú.s	(adder)

The reason for this overall distribution of /s/ is probably to be sought in the fact that the present sibilant reflex /s/ has its origin in the partial lenition of three phonemes, *viz.* /*ts^{h}/, /*ts/ as well as /*s/, according to Honken (1989:50). Honken (personal correspondence) maintains that Khoekhoe /13/ after *s-* is a reflex of original /*ts^{h}/. Aspiration is known to be one of the laryngeal features having depressor effects; as discussed *i.a.* by Halle & Stevens (1977).

[x] While the velar voiceless fricative *x* consistently fails to occur with /12/, five counter-examples are on record with /13/:

xà̤ḿ	(munch)
xà̤ń	(choke)
xà̤wú	(slender-waisted)
xɔ̀ré, /nɔ̀ré [N.]	(tease, joke)
xʉ̀rú	(jerk (rope) out of *e.g.* hand)

(Cf. *xúrú* (draw out gently, unravel))

[kh/kx^{h}], [ts^{h}] Both consonants are without exception attested to be depressors. According to Honken (*op.cit.*: 47)

"all original ***ts'** and ***dz** merge with ***th** to form a non-glottalized (aspirated) affricate *ts*^{h}". According to Beach (1938:253) the equivalents of Nama *ts* and *kh* are "*strong*-voiced" *dh* and *gh* respectively in !Gora.

[ǀˀ], [ǁˀ], [ǃˀ], [ǂˀ] Clicks with the glottal stop release (orthographically *XV*[8]) clearly show a non-depressor tendency, but counter-examples do occur with each primary articulation and the /13/ melody; cf. footnote 7 on p.84. The counter-examples are the following:

ǀàí	(bespatter)
ǀàmá	(dip bast into liquid and suck dry)
ǀàwí	(make superficial incisions)
ǀàwó, ǀgawó	(play touch)
ǀôã.s	(gland)
ǀôã	(clean baby's bottom)
ǁàwí	(flick thorn)
ǁãã.b	(dorsum)
ǁìí	(tie up tightly)
ǁòwé	(drink like baboon)
ǁòm̀, ǁgòm̀	(ideophone: plonk)
ǁùwú	(*do.*)
ǃòm̀ [N.], *ǃnòm̀* [D.]	(butt, hit)
ǃàmá.b	(white gum of sweetthorn acacia)
ǃàń	(despond)
ǃàró.b [N.], *ǃnàrôbè.b* [D.]	(agama)
ǃàró	(scanty, lean)
ǃãã.s	(part, portion)
ǃèré	(deep, husky)
ǃòḿ.s	(fem. genitals, udder)
ǃòré.s	(dish)
ǃùwú.s	(abscess)
ǂàm̀	(low)
ǂàrí	(crack)
ǂàrí	(w. bitter-sweet aftertaste)
ǂàwé	(cling to back of *e.g.* horse)

[8] *X* here represents any one of the primary click articulations ǀ, ǁ, ǃ or ǂ, and *V* any vowel.

ǂo̍ḿ, ǂgo̍ḿ	(immerse)
ǂo̍ré.b	(sunbird)
ǂi̍í	(stimulate udder by prodding)
ǂo̍á.b	(flank)

[ǀ], [ǁ], [ǃ], [ǂ] As Khoekhoe clicks followed by a voiceless velar plosive release - *i.e.* orthographically */g*, ǁ*g*, *!g* and ǁ*g* - represent a merger of both the voiceless and the devoiced velar plosive releases (Beach *op.cit.* 250), all melodies occur with them.

[ǀ̬h], [ǁ̬h], [ǃ̬h], [ǂ̬h] The release consisting of a delayed glottal fricative - orthographically */h*, etc. - very consistently functions as a depressor, similar to the ordinary glottal fricative *h*. Only the following counter-examples were found:

/hìì	(prod animal in burrow w. stick)
!hàrù	(lean, insipid (of marrow))
/híì.s	(bird's nest)
/hówò.b	(dusk)
!háà	(winnow)
!hárè	(run to take off (of vulture))
!hâ̍à/gấré	(lie on one's back)
ǂháò.b	(plait of tobacco)
ǂhô̍à	(disclose/report news)

Cf. the depressed *ǂho̍̀à.s* (news).

Honken (personal communication) observes that many Khoekhoe words with the glottal fricative release correspond to words with preglottalized nasal clicks in other Khoesaan languages.

[|kx x̂ |x^{h}], etc. The voiceless velar affricate or fricative release (orthographically */kh*, etc.) has clearly been a non-depressor, but not without modern counter-examples. It is noteworthy that this release behaves opposite to the ordinary velar affricative consonant *kh*, unlike the delayed glottal fricative release (*e.g.* ***|h***), which is consistent with *h*. The reason for the depressor effect of *Xkh* is probably to be sought in the fact that the proto-form was glottalic, *viz.* **Xkx^{ʔ}*. In the western, Namidama dialects of the Damara cluster the distinction between the velar (af)fricative release and the glottal fricative release has been largely neutralized, with the effect that the secondary articulations are free variants. A concomitant change in tonal behaviour does not seem to occur (as also confirmed by my informant), but a systematic investigation has not been undertaken yet. If indeed no changes occur, then it simply confirms that the depressor effect is no longer productive. All counter-examples below pertain to the /13/ melody, with none in the /12/ melody:

/khǎ̀ń, /khǎ̀ná [N.]	(crack *v.i.*)
/khǎ̀ú	(skim stick on ǁ*ari*-bush)
/khǔ̀nú, /khùnù	(sip carefully to avoid impurities)
ǁ*hǒ̀ró.s*	(traditional dust-pan)
!khǎ̀ú	(turn mad)
!khǎ̀wí.s	(gap, indentation)
!khǔ̀nú	(hang one's head)
!khǔ̀rí	(turn s. inside out)

/Khǎ̀ń is an instance where a later lexicalizing process has overridden the earlier phonemicization. As will be discussed in section 3.5 on p.225, there exists a device whereby the transitivity of a verb can be changed by means

of tone: several transitive verbs have ergative equivalents with either the /13/ melody (for depressor onsets) or the /22/ melody (for non-depressors). */Khàñ* or */khánà* [N.] is a transitive verb meaning "rive/cleave/split off". The ergative derivative should have employed the /22/ melody because of its non-depressor onset. It happens to use the /13/ melody, however, which shows that the click release is no longer active as depressor. Cf. also the nouns */khàñ.ni* (splinter, fragment) and */khǎñ.ni* or */khǎná.b* (crack, fissure, split). The root */khánà* > */khàñ* also happens to provide instance for the decomposition theory (section 2.1.2, 25) with a concomitant change of melody.

[ŋǃ], [ŋǁ], [ŋǃ], [ŋǂ] The velar nasal accompaniment (orthographically *Xn*) did serve as depressor, but with a considerable number of counter-examples today:

ǁnầì	(bec. erect)
!nầà	(in)
ǂnùwù.b	(large intestine)
/nánà.s, /nánì.s	(coccyx)
ǁnáⁿ.mi	(skin ulcer/cancer)
ǁnầì	(then *emphat. adv.*)
ǁnómà	(milk *poet.*)
ǁnóⁿ̀	(tilt, tip)
ǁnó̂à	(drag along)
!náⁿ̀	(take short cut)
!náⁿ̀	(divide into parts)
!náⁿ̀	(tie sweat-band)
!níì	(allow milk to recede through wrong milking)
!nóè	(grab porridge w. fingers for oneself)
!nóò[1]	(shade eyes w. hand)
!nóò[2]	(position stones as support f. pot)
!nórò	(shield fire from wind) (cf. > *!noo*[1/2] above?)
!nầà	(apply lever to s.)
!nó̂à.-i	(type, sort)

!nôâ	(loiter)
ǂnánà	(soar, glide)
ǂnéè.b	(big piece, chunk)
ǂnórà.b	(flame)

The correlation between secondary click articulations and tonal melody irrespective of primary click articulation is summarized in Table 7a below.

Melody:	**/12/**	**/13/**	**/22/**	**/32/**	**/24/**	**/43/**	**Total**	
X	***1***	***29***	**70**	**83**	127	52	*362*	**22.0%**
Xg	74	80	34	54	83	51	*376*	**22.9%**
Xh	**103**	**91**	***2***	***7***	73	60	*336*	**20.4%**
Xkh	***0***	***9***	**57**	**68**	94	59	287	**17.5%**
Xn	**64**	**67**	***3***	***20***	81	49	*284*	**17.3%**
Total:	***242***	***276***	***166***	***232***	***458***	***271***	***1645***	
Percentage:	**14,7**	**16,8**	**10,1**	**14,1**	**27,8**	**16,5**		**100%**
		└26,9┘						
	└──28,8──┘							

Table 7a: Distribution of secondary click releases with the six major tonal melodies in CVCV skeleta

- From the above "counter-examples" (*i.e.* to a hypothesis of contextual allotones) it is evident that Beach was correct to point out a significant diachronic development, but - as he also correctly understood - that for synchronic purposes there exists too much counter-evidence to establish a three-tone/four-melody system with allotonic variants fully predictable from initial depressor consonants.

According to Beach (*op.cit.* 251), for some time after the contrasting phonetic environments had caused the split of the respective "tonemes" (*i.e.* tonal melodies, *viz.* /32/ > /12/, and /22/ > /13/ respectively), both variants belonged

to the same "toneme". After this allotonic split had established itself, some of the initial consonants coalesced due to the gradual devoicing of the voiced plosive phonemes and of the voiced plosive click efflux. As a result both members of the respective "tonemes" can now occur with the same initial consonant, which means that these allotones have now become tonemic. This is a classical case of tonogenesis (Schuh 1978:228: "development of pitch as a contrastive feature"), as described for various South-Eastern Asiatic languages; cf. *i.a.* Yip (1980:24), or Norman (1988) on the development of tonal registers in modern Chinese, thereby changing a four-tone system to an eight-tone system:

> "Register refers to the effects of initial consonants on the tones of the syllables in which they occur; typically, voiced initials condition a lower pitch and voiceless initials a higher pitch. If voicing is subsequently lost as a distinctive element in a tonal language, as is frequently the case, then these register distinctions become phonemic" (Norman 1988:53).[9]

The reasons for tonal depression can be manifold. Most of the features can be subsumed under laryngealization, *viz.* voicing, aspiration, glottalization, length or breathiness (cf. *e.g.* Wang 1967:94; or Yip 1980:171, who argues that not voicing alone but voiced aspiration (breathy voicing) was

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[9] Winter (1980, and 1981:360) argues to the contrary for Nama, namely that an eight-tone Common Central-Khoesaan system was *reduced* to a six-tone system in Proto-Khoekhoe (and Nama) and further to a four-tone system in !Gora, and that voicing was a concomitant phenomenon of certain tonal melodies. Although I do not have cogent comparative evidence available to refute his reasoning, I consider at least parts of his hypothesis with reservation (cf. section 2.3 for supporting evidence with /24/, however). For one, it is universally a highly unusual process that tone should affect *consonant* types rather than *vice versa*; cf. *i.a.* Hyman & Schuh (1974:108) on West African Languages; Hombert, Ohala & Ewan (1979) for an attempt at a phonetic explanation; Schuh (1987:224); but also Kaye & Charette (1981) for evidence of tonal influence on *vocalic* quality in Dida, and Dimmendal *et al* (1986) for the same in Turkana. Winter's evidence is based on only one further language in addition to Nama and !Gora, *viz.* !Kxoé, and his data do not always support his reasoning. In his "Belegserie" Z^4, which is one of the additional two making up the total of eight melodies for Common Central-Khoesaan, four of the five reflexes quoted for Khoekhoe are quoted with a wrong melody (equivalent to /43/). The melodies according to my data are as follows:

ǁ*gárà*	(draw random lines)
xàm̃.mi	(lion)
nàm̃.mi	(tongue)
ǂnũ̀ù (Winter correct)	(sit down)
tsuxub < *tsũ̀ù* + *xúùb*?)	(night).

The etymology of the last word is uncertain, as it is a contraction.

Elderkin (1989:296) also accepts Beach's analysis against the alternative of Winter and also Köhler (1947), commenting that Winter's analysis is not based on any internal analysis of Kxoé. Tonogenesis did not occur in Zuǀh'ôa and Sandawe, according to Elderkin (*op.cit.* 309). Vossen (1986b) even postulates nine tone classes for some Central Khoesaan languages.

It seems likely that the development was not simply unidirectional all along from Kxoé to !Gora. Honken (personal communication), for instance, pointed out that some skewing occurred in Kxoé, as it did not depress etymons with initial nasals or aspirated consonants, while Khoekhoe did. An investigation of such comparative issues would exceed the confines of this thesis, however.

necessary in Chinese to cause a register split; or especially Halle & Stevens 1977). The most conspicuous - because universally less frequent - depressor causes in Khoesaan languages are vowel phonation types, particularly breathy, pharyngealized and glottalized ("creaky") vowels or their combinations; cf. esp. Traill (1985:38 *et seq.*) for a phonetic analysis in !Xóô, a Southern Khoesaan language. Elderkin (1989 and 1988) examined Snyman's (1975) analysis of Zu|'hôasi, a Northern Khoesaan language, in order to argue for an underlying two-tone system.

None of this interaction of voice quality and glottalization occurs in modern Khoekhoe, however, as none of these phenomena exist in vowels (other than nasality).[10] In all likeliness these voice quality distinctions were lost, leaving a purely tonal residue. An establishment of an underlying tonal system of Khoekhoe thus has to rely exclusively on consonant quality and - perhaps - vowel height and nasality. It will be a topic for future comparative and diachronic research to examine what the regular Khoekhoe correspondences to cognates with breathy or laryngealized vowels are.[11]

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[10] I cannot confirm a claim by Klein (1976) that Damara has V$^{?}$V sequences of like vowels, other than from a single instance I once noticed. It would, however, not be surprising for isolated dialects of Namidama, as its comparative closeness to Proto Central-Khoesaan has been established (Haacke forthcoming).

As Elderkin (1988:129/30) also pointed out for Zu|'hôasi, there seems to be no correlation between the second syllable and the tonal melody in Khoekhoe, as Table 8 shows.[12] A reason for this is not apparent. It is, by the way, noteworthy that the non-occurrence of the mid-vowels *e* and *o* with a nasal C_2 in the second syllable, as well as the non-occurrence of *-mu* holds true for both, the Central Khoesaan Khoekhoe as well as the Northern Khoesaan Zu|'hôasi. However, the very restricted occurrence of the highest Zu|'hôasi melody /'''/ (only with the close vowels, if at all) has no parallel for /43/ in Khoekhoe. If one calculates the percentage shares of the individual Khoekhoe melodies before the tonogenetic split (Table 8), then the representation is fairly regular for the three lower melodies, with only /43/ taking a notably smaller share. This distribution reflects the overall distribution as determined by onset consonants; cf. section 2.3, where the merging of melodies will be elaborated on.

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11 A cursory comparison showed that of the 100 entries used by me in a dialect survey, 16 Naro attestations used pressed vowels. Of these only five words had cognates in the Nama and/or Damara dialect. From this scant sample, at least, no latent depressor tendency can be deduced for Khoekhoe:

Naro	**Khoekhoe**	
|kɑ̰i.s (vl. click)	*|gɑ̃ĩ.b*	(intestines)
tsâ̰i/dzâ̰i	*khâĩ*	(fly up)
tam/tḛm (vl. plosive)	*nàm̃.mi/* (*dàm̃.mi/làm̃.mi*)	(tongue)
||kɑ̰ɑ̰.b (vl. click)	*||gɑ̃ṹ.b*	(tooth)
ǂɑu, ǂɑ̰u	*ǂɑ̃ṹ.s*	(fruit).

12 The higher variant of the High-rising melody detected by Beach (1938:253) which is concomitant with a nasal C_2 and/or a close V_2, is of no concern here as it is fully predictable and does not (yet?) involve a tonogenetic development.

/12/ + /32/: 26,6%

/13/ + /22/: 28,4%

/24/: 30,0%

/43/: 14,8%.

	/12/	/13/	/22/	/32/	/24/	/43/	Total	
-wi	14	18	2	5	21	10	70	
-we	7	13	5	7	17	3	52	
-wa	11	15	8	12	21	9	76	
-wo	10	13	5	9	15	11	63	
-wu	7	23	8	7	27	11	83	
Total:	*49*	*82*	*28*	*40*	*101*	*44*	*344*	31,4
-ri	14	19	12	11	41	16	113	
-re	10	15	8	13	29	12	87	
-ra	17	19	6	15	27	17	101	
-ro	16	14	5	11	23	19	88	
-ru	10	22	6	10	29	20	97	
Total:	*67*	*89*	*37*	*60*	*149*	*84*	*486*	44,3%
-mi	10	7	6	1	20	7	51	
-me	-	-	-	-	-	-	0	
-ma	14	11	4	8	11	4	52	
-mo	-	-	-	-	-	-	0	
-mu	-	-	-	-	(1)*	-	1	
Total:	*24*	*18*	*10*	*9*	*32*	*11*	*104*	9,5%
-ni	5	9	6	9	29	7	65	
-ne	-	-	-	-	-	-	0	
-na	11	9	5	13	12	9	59	
-no	-	-	-	-	-	-	0	
-nu	3	15	4	2	8	7	39	
Total:	*19*	*33*	*15*	*24*	*49*	*23*	*163*	14,9%
Grand Total:	***159***	***222***	***90***	***133***	***331***	***162***	***1097***	
Percentage:	14,5	20,2	8,2	12,1	30,0	14,8		100%
			28,4					
		26,6						
					**			

*||*khàmű.s* [D.]/||*khàwű.s* (hump of animal)

Table 8: Distribution of -C_2V_2 with the Six Major Tonal Melodies in CVCV Skeleta

A check was also made on **CVN** roots, *i.e.* roots where V_2 was lost, as in /ə̀m̀ (breathe). This distribution too does not reveal any correlates between second syllable and melody.

	/12/	/13/	/22/	/32/	/24/	/43/	Total	
-m	28	27	19	25	32	37	168	61,8%
-n	9	12	13	22	30	18	104	38,2%
Total:	*37*	*39*	*32*	*47*	*62*	*55*	*272*	
Percent:	13,6	14,3	11,8	17,3	22,8	20,2		
		26,1						
		30,9			**			

Table 9: Distribution of $-N_2$ with the Six Major Tonal Melodies in CVN Skeleta

The breakdown presented by Tables 8 and 9 may not *eo ipso* be assumed to be relevant, however, as the tone and initial consonant of $syllable_1$ might skew the results. Hence the correlation of the respective second tones of melodies with C_2 were checked, irrespective of the first tone of a particular melody. Table 10 combines the attestations of table 8 and 9 for nasals.

	/-2/		/-3/		/-4/		Total	
-w-	117	34.0%	126	36,6%	101	29,4%	344	25,1%
-r-	164	33,7%	173	35,6%	149	30,7%	486	35,5%
-m-/-m	115	42,3%	93	34,2%	64	23,5%	272	19,9%
-n-/-n	102	38,2%	86	32,2%	79	29,6%	267	19,5%
Total:	**498**		**478**		**393**		**1369**	
Percent:		*36,4%*		*34,9%*		*28,7*		*100%*

Table 10: Distribution of C_2 with $Toneme_2$ of the Six Major Melodies

The purpose of the calculation of averages is simply a practical one. It may be assumed that the distribution of

phonemes (or tonemes) is fairly even in a language, unless disturbed by some phonological process. While still groping in the dark in an unstudied language, it is an alley worth pursuing in the search for clues. As it will turn out, it is indeed a fruitful approach for Khoekhoe.

Although the relatively low number of attestations for /-3/ and /-4/ with nasals is conspicuous at first sight, a calculation of percentage representation of each respective consonant per tone (horizontally), shows that per tone, (columnwise), there is no undue fluctuation.

It can thus be concluded from Tables 8-10 that there is no tonemic correlation between syllable 2 (or C_2) and the melodies.

Hence, for Khoekhoe it can be deduced that - if at all - only C_1 exerts tonemic influence on the tonal melody, apart from the allotonic variants (more or less rising) manifested within certain rising melodies (cf. p.56). In the process of tonogenesis, however, the depressed allotones were phonemicized and their occurrence today is no longer consistently predictable, as evident from Table 7. (Cf. Traill 1990:166 and especially Harris 1987:290 for the loss of phoneticity during lexicalization: an intrinsic phonetic difference becomes phonologized, whereby the original phoneticity of the process becomes obscured through the acquisition of lexical exceptions.) - The discussion of the depressed melodies (/12/, /13/) below (footnote 26 on p.142) will confirm that

their rising shape is due to the fact that only the first syllable and tone was affected.

Having considered the influence of the segmental environment, it remains to establish the underlying tonemes for Khoekhoe.

The basic assumption should be that the underlying number of tonemes or features should be reduced as far as possible, provided that those features should are up in such a way that they capture natural classes:

> "Tones which constitute natural classes in terms of their mutual undergoing or conditioning of phonological rules must share at least one tone feature in order for the natural class (and often, assimilatory process) to be revealed" (Hyman 1986:110);

in particular,

> "tones which become one another should share features" (*op.cit.* 117; cf. also Anderson 1978:135).

Pulleyblank (1986:30) reiterates Yip's claim that universally not more than four phonological levels of pitch are needed for the classification of lexical entries, and that these four tonemes are derived by means of two distinctive features.[13] The question here is, whether the postulation of any such distinctive features would capture appropriate

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[13] But cf. an article by Bearth & Zemp (1967) in which they state that Dan has five phonemic pitch levels.

generalizations, and if so, what kind of features they should be.

The following observations provide clues to the establishment of such underlying features and tones:

1. Three types of associations can be observed among Khoekhoe melodies, two of which involve perturbations, while the third is a lexicalization reflecting tonogenesis:

a) Sandhi associations;
b) Flip-flop associations; and
c) Ergative formation.

a) **Sandhi** forms. The respective Citation and Sandhi forms were described in section 2.2.1 above. For ease of reference the pairs are listed here again:

CITATION		**SANDHI**
/43/	>	/32/
/32/	>	/21/
/24/	>	/22/
/22/	=	/22/
/13/	=	/13/
/12/	>	/21/

Table 11: Paradigmatic Associations of Citation and Sandhi Melodies

Although sandhi forms are not part of the underlying phonology of a language, the Sandhi associations of Khoekhoe can possibly provide diachronic clues. Of the three main linguistic areas representing tone languages (*viz.* American Indian, African, and Sino-Tibetan with

South-East Asian; cf. Wang 1967:93) Khoekhoe tonology is typologically most akin to the South-East Asian type, and indeed, with an astonishing similarity. One of the similarities is that, while, *e.g.*, the neighbouring Bantu languages use syntagmatic displacement through right- or left-moving tones or features - even floating tones - in perturbations, Khoekhoe uses paradigmatic displacement of melodies rather than feature-changing rules (cf. *op.cit.* 94 and especially Schuh (1978:250) on Chinese).

As in Asian languages, tonal distinctions decrease in Khoekhoe Sandhi. Thus, firstly the progenitor (Beach: "main") melody **/32/** shares the Sandhi form /21/ with its "subsidiary" or depressed counterpart /12/ (indicated by the right-hand association lines). As, unfortunately, Sandhi forms were not investigated in !Gora before its extinction, we do not know whether the low-falling /21/ melody already existed before the register split. One might speculate that it did not, as the "Double-Low" toneme /1/ was - at least as a toneme for the first syllable in the Citation /**1**2/ and /**1**3/ melodies - the result of the depressor effect leading to tonogenesis.[14] On the other hand, one might reason that subsidiary melodies originated only for the Citation form, for neither /12/ nor /13/ have their own, special Sandhi form: /12/ reverts to the existing one

[14] Again, this development of additional tones through consonantally induced perturbations is shared with Asian languages (Schuh *loc. cit.*).

of its progenitor melody /32/ (unless it turns out that /21/ was developed as a new Sandhi form for both, availing itself to the newly existent /1/ tone); and /13/ does not change for the Sandhi context (thus sharing with its progenitor melody /22/ the characteristic of not changing for Sandhi).

Secondly, the **/22/** melody retains its Citation form for the Sandhi melody, which is shared by the High-rising /24/ melody (left-hand association lines in Table 11). The diachronic significance of this association still eludes me because of lack of comparative data. More will be said about a merger in /24/ below, section 2.3, especially p.131. Apart from /22/, its depressed counterpart **/13/** likewise retains its Citation form in Sandhi context. This consistent behaviour is further, tonological justification that the claim of Haacke 1976 should be reviewed on tonetic grounds, *viz.* that the Sandhi form of /13/ is /12/; cf. above, p.42.

The "Double-High" /43/ melody is lowered by one step on each tone. But, as systematic feature changing (lowering) is not used in Khoekhoe Sandhi formation elsewhere, one should rather see the Sandhi form of /43/ as a paradigmatic change to the (Citation) /32/ melody (left-hand association line).

In summary, the six Citation profiles have been reduced to four Sandhi profiles, with one of these probably

being a copy of a Citation profile (/32/), and another two being retentions of the original (/22/, /13/). Only the low-falling /21/ melody is exclusive to Sandhi. Overall it can be observed that the initial low tone /2/ is far more resilient to change than any other.

b) **Flip-flop rule**. Khoekhoe employs another type of perturbation, dubbed "flip-flop" by Wang (*op.cit.* 102) in Chinese. For the sake of conformity I retain his name for the rule, but for short call the action "switching". In Khoekhoe the melodies (Citation, and Sandhi accordingly) are paired as follows:

weak		**resilient**
/12/	-	/13/ ⌐
/32/	-	/22/ ⌐
/43/	-	/24/

Table 12: Flip-flop Pairs of Citation Melodies

Flip-flop is confined to lexical phonology, as it occurs only in the formation of compound words. In environments where it does apply (cf. sections 3.2 - 3.2.5), the melodies switch over as paired in Table 12; for instance, /43/ switches to /24/ in a Citation environment, and any subsequent Sandhi form would change to the Sandhi of /24/ (the Flip-flop counterpart of /43/), *viz.* /22/, *e.g.*:

Citation: ǁ***gőé*** (lie) + *ắḿ.s* (mouth) > ǁ***gòé***-*ắḿ* (ambush)
Sandhi: (ǁ***góè***) ǁ***gòè***-*ắḿ*

Within each pair there is one resilient member which switches less easily than its counterpart. Hence, in contexts where **bilateral** switching applies, all members are subject to the Flip-flop rule; in contexts where **unilateral** switching applies, only the weak members switch; cf. section 3.2 *et seq.* for a discussion of the particular cases.

Obviously Flip-flop pair /12/-/13/ is the depressed, subsidiary pair of the progenitor pair /32/-/22/. It is noteworthy that all three resilient melodies again involve the original Low toneme /2/, albeit in depressed form in /13/.

Thus Khoekhoe has two types of perturbations that involve paradigmatic exchange:

(i) the Citation vs. "Sandhi" paradigms, which are conditioned either morphologically or syntactically (cf. chapter 4);

(ii) the "Flip-flop" type, where certain Citation melodies are paired and switch over in certain morphological compounds, with subsequent use of the corresponding Sandhi, should the phonological cycle require it.

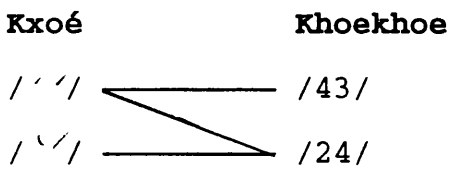
Some further perturbations that involve the substitution of one particular melody, *viz*. Drop, Low, High-rising, will be discussed later.

c) **Ergative formation.** A number of transitive verbs from various tonal melodies have ergative or intransitive counterparts with either /22/ or its subsidiary /13/; cf. p.226 for a list. This fact seems to be strong counter-evidence to Winter's hypothesis that Nama tonology underwent a process of simplification in !Gora (cf. footnote 9 on p.92). There would have been no reason for two supposedly random melodies to have this same derivative function in Khoekhoe. Instead, it seems more feasible that the proto-melody /22/ as present in !Gora already had the function, and that this function survived the register split towards Khoekhoe. Unfortunately the existence of this grammatical process in !Gora can no longer be ascertained. It is also not directly pertinent to the present synchronic description.

Having considered clues from melody movement, some further clues may be derived from the statistical distribution of tonal melodies with consonant onsets, as reflected in Table 7 (p.80). If the shares of the respective basic and subsidiary melodies are added, it strikes one that they constitute a share similar to that of the high rising melody /24/, while the /43/ melody stands singly with a percentage close to that of the subsidiary melodies on their own:

/12/ + /32/:	14,7	+ 13,7	=	**28,4%**
/13/ + /22/:	18,1	+ 9,6	=	**27,7%**
/24/:	?	+ ?	=	**27,3%**
/43/:				**16,5%**

Judging from these figures /24/ can be suspected to subsume two melodies. In this case Winter 1980 may indeed be corroborated. According to his evidence from Kxoé, the High-rising melody /24/ of Khoekhoe merges cognates from his "Belegserie" Z^1 /´´/ (= Khoekhoe /43/) and Z^2 /`´/ (= /24/) in Kxoé, while Kxoé /´´/ has cognates in both /43/ and /24/ of Khoekhoe. Ignoring his group Z^4, which is not supported by my data (cf. footnote 9 on p.92), the relationship is as follows:



Winter maintains that the register split that Beach exposed for the lower melodies occurred not only there but in all eight Common Central-Khoesaan melodies that he, Winter reconstructs. Table 7 does not reflect a bias of the onset consonants in /24/. This cannot be expected with the /24/ melody, as this should comprise both, original (non-depressed) /24/ reflexes, as well as depressed /43/ reflexes. The attestations for /43/ could possibly still be expected

to show a preference for non-depressors. But this is not (no longer?) the case. The phonetic transparency may have been lost through the phonologization. What is of more concern, however, is that of the correct Khoekhoe attestations for /24/ in Winter's series Z^1 (depressed Kxoé /ˊˊ/) seven words start with a non-depressor, while only two start with a depressor, not counting those in which voiced and voiceless consonants have merged. His series Z^3 (Kxoé /ˊˊ/) does support his hypothesis by showing a predominance of seven non-depressors as against two depressors in Khoekhoe /43/, though. This issue will be further pursued in section 2.4.

To conclude, while a split of Khoekhoe /43/ has not been satisfactorily supported with comparative data from several Khoesaan languages yet, it can be accepted with reasonable safety that Khoekhoe /24/ comprises the inventories of two melodies. Whether tonogenesis advanced in the direction of a split towards Kxoé (diversification from the proto-language) or in the direction of a merger towards Khoekhoe (simplification), remains debatable at this stage.

Some hitherto unrecorded data from Khoekhoe may favour the former alternative, as internal evidence seems to suggest that the depressed/subsidiary variant of the /43/ melody is not High-rising /24/ but what I shall label as Mid-rising /23/.

2.2.3.1 A Seventh, Residual Melody: Mid-rising /23/

Only after several years of work on the *Khoekhoegowab Dictionary* project did I encounter the first manifestation of this melody. To the unalerted ear at least, hardly any auditory difference is detectable between the Citation forms of this melody, /23/, and that of /24/. Only the Sandhi form alerts one that something is amiss, as it does not level out to /22/ but remains practically identical to the rising Citation form. The possibility that Citation melodies may consist of sub-categories with different Sandhi forms could be discarded soon, however, as careful scrutiny supported by instrumental evidence showed that even the Citation forms of /24/ and this residual melody are not quite the same. Fig. 15 shows up the typical difference between /23/ and /24/. While the pitch of /24/ (ǁ*gàǰ.b*) rises right up to the target at the end of the second sonorant (crumbling only because of the occlusion of the following consonant *b*, a fact which is tonemically irrelevant), /23/ peculiarly stops rising at the onset of the second syllable and even declines again. This melody appeared to be extremely awkward, as it seemed to represent a contour tone and with that to refute the present bimoraic approach.

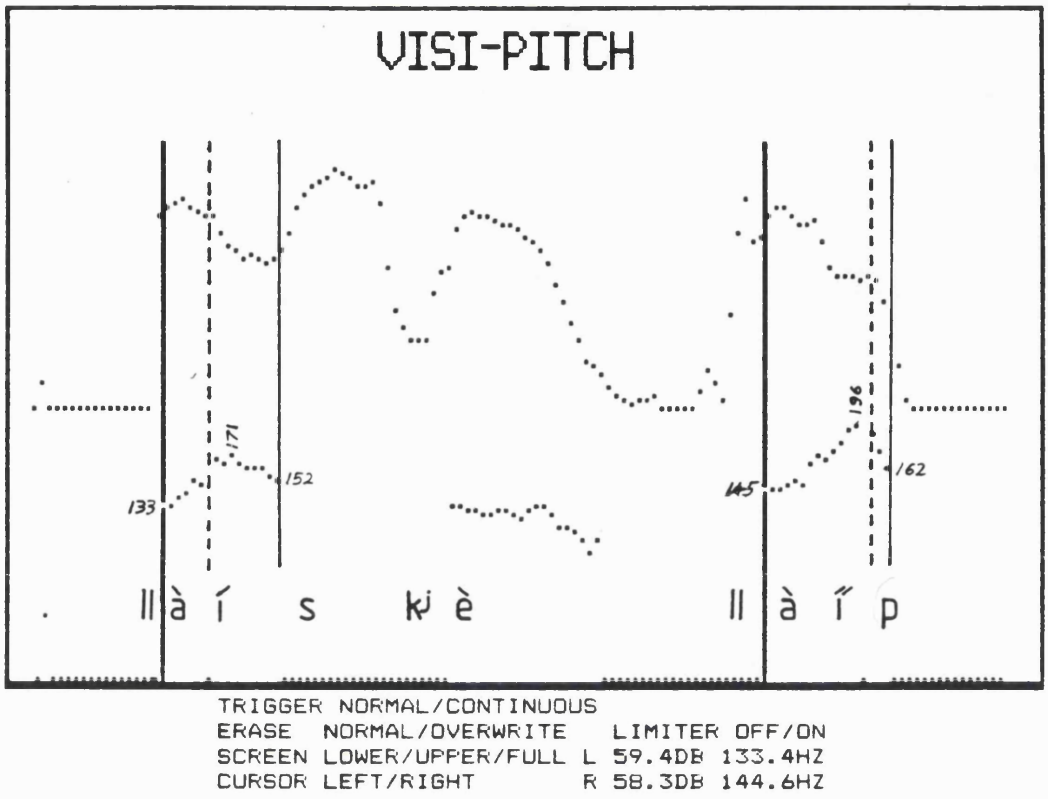


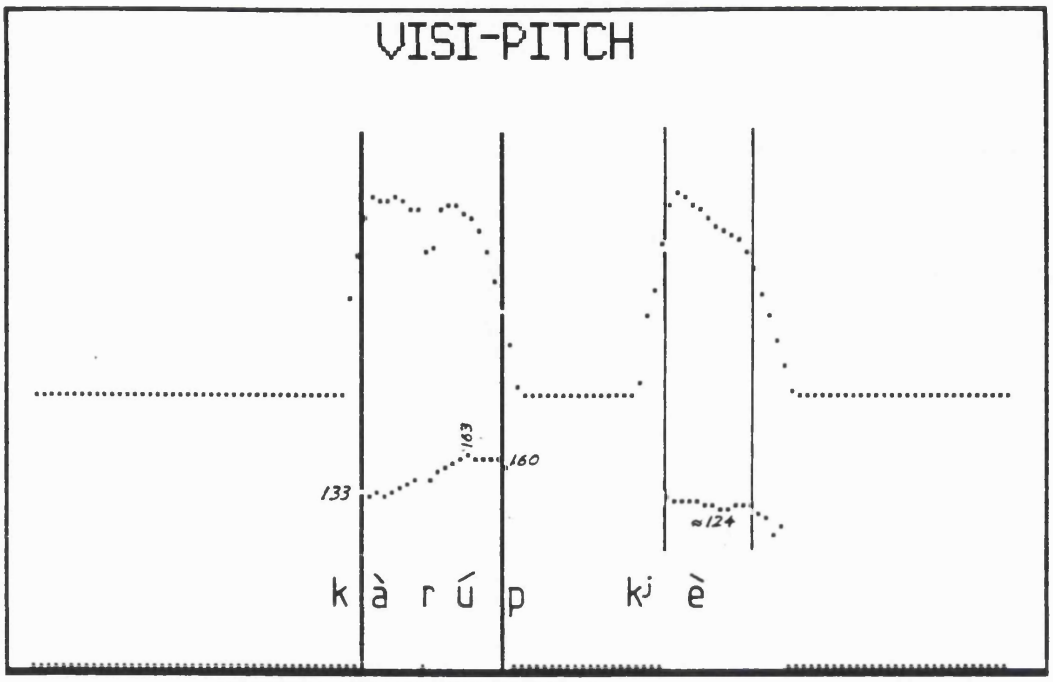
Figure 15: (Higher) Mid-rising /23/ contrasted to (Higher) High-rising /24/: ‖*gàí* (hide *v.i.*) vs. ‖*gàĩ.b* (wrinkle)

An inspection of the onset consonants of all attestations hitherto recorded showed, however, that - ignoring those consonants where devoicing obliterated the original phonetic differences (*i.e.* [p], [t], [k], [ʔ] and *Xg*) - a decisive predominance of depressor consonants suggests that this melody is a depressed version of the Double-High melody /43/. (Cf. Table 13a: depressors are marked **+**, counter-examples **-**; merged consonants are unmarked. Although the evidence from Table 7 does not bear out Beach's classification of the glottal stop as a depressor, it has been marked as one here.) The onset of the first syllable - originally /4/ - is now depressed to a pitch as low as /2/. From this it recovers (almost) to its original pitch of /4/ before

reaching the end of the first syllable, which explains why it must decline on the second syllable to reach its relatively lower target of /3/. It thus resumes the falling contour typical of the /43/ melody. The active depressor effect of the glottal fricative *h* - despite a concomitant surge in intensity - is clearly visible in Fig. 16b (*hṹú* seven).

Although the tonetic behaviour is not always quite consistent, it appears that a "higher" and a "less" mid-rising variant can be recognized depending on the same phonetic criteria listed by Beach for /24/, *viz.* for cases where C_2 is a nasal consonant and/or V_2 is a close vowel.

Hàká (four), which does not conform to Khoekhoe phonotaxis with its intervocalic velar plosive, has a particularly flat profile. It cannot be fitted into any other surface pattern, however, unless one wants to postulate a five-toneme system just for it. I can only surmise that the velar plosive must exert a depressor effect on the second syllable. This cannot be supported by independent evidence, though, as no other root with an intervocalic plosive occurs, and as *k* comprises both originally voiceless and devoiced plosives.



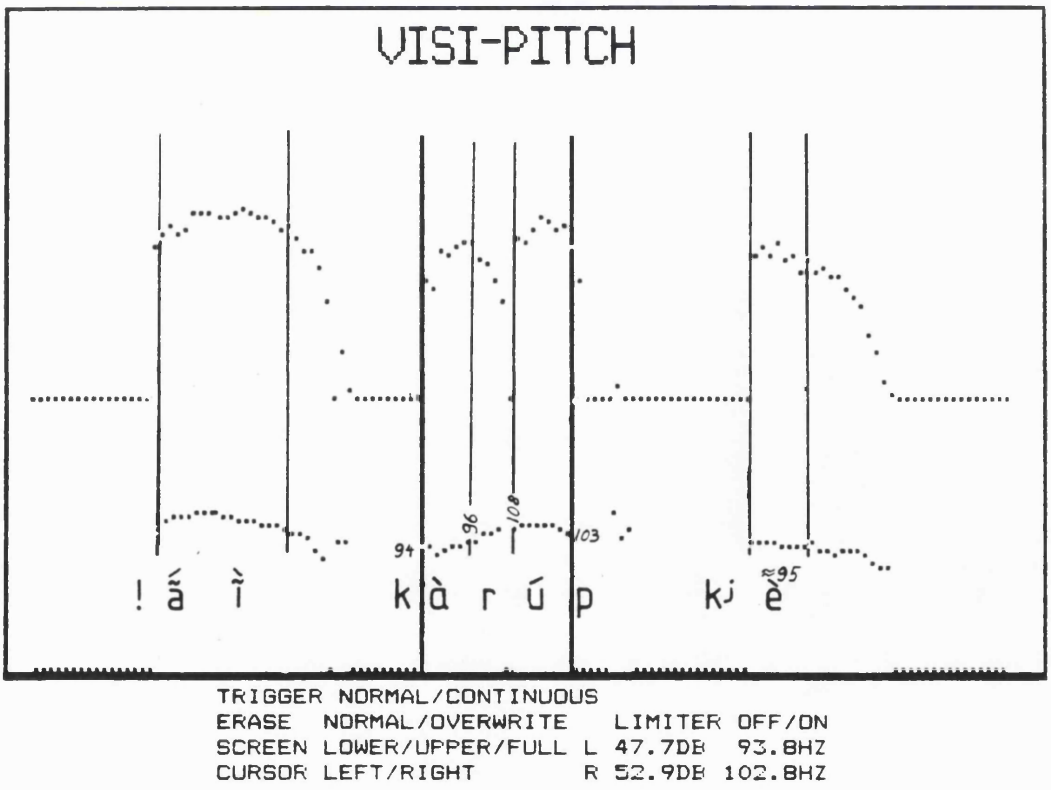


Figure 16a: **(Higher) Mid-rising Melody /23/ (Citation and Sandhi): *gàrú.b* (pulp)**

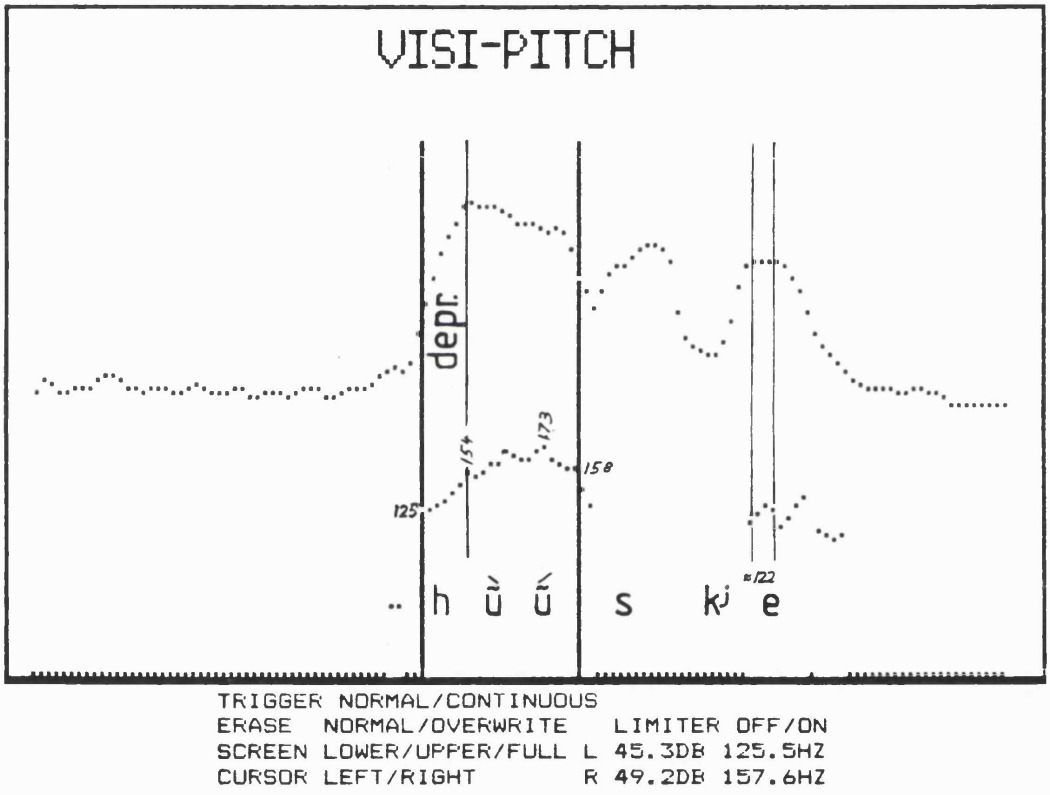


Figure 16b: Depressor effect in the (Higher) Mid-rising Melody /23/ (Citation): *hṵ́ṵ́* (seven)

As the melody /23/ is unrecorded in the literature, and as the number of attestations is limited, a list of all 26 roots encountered hitherto is presented in Table 13a in the hope that comparative data may shed more light on the issue:

Higher Mid-rising

+	*àá.s, ǎá.s*	(hole)
+	*àná.s*	(*Acacia albida*)
+	*ə̀í.s, ə̌í.s*[15]	(liver)
	dùrú.s, də̀rú.s[16]	(mouse)
	gàrú.b	(pulp)
	gàú, gə̀ù	(hide)
+	*hûú, hǔ̂ú*[17]	(seven)
+	*nàú.b, làú.b*	(s. of mushroom)
+	*òmé.b*	(maternal uncle) (<Afr. oom?)
-	**sàiĺ.s*	(canvas) (< Afr. seil)
-	*sànáˊ.s*	(wart)
	/gàí	(shuffle, as in */gàǐ*-dance (sic!))
	**/gèrú.b*	(red wasp)
+	*/nìí, /nî́í*	(fillip pebble w. finger)
	‖gàí [D.]	(hide)
	‖gə̂ǐ.s [D.]	(*Colophospermum mopane*)
+	*‖hàní.b*	(baby-kaross)
+	*‖nàú*	(shave (hair) off head)
	ǂə̂ú.b, ǂə̌ǔ.b	(wild raisin, *Grewia* sp.)

Lesser Mid-rising

	**dùrá*	(desire)
+	**hàkáˊ*[18]	(four)
-	*xàrá, xǎ́rá*	(scratch)
+	*/àrá.b, /ǎ́rá.b*	(ant-hill)
	/gèré	(knock down)
	‖gòó.s	(spoor of running animal)
+	*‖nə̂á.b*	(diaphragm)

Table 13a: Attestations of the Mid-rising Melody /23/

It was a matter of concern that the mid-rising profile is not used consistently by all speakers, and it seems that the younger generations (students) use it less. Where alternative melodies are used, they more often than not are /43/, *i.e.* the original non-depressed version. Otherwise one of

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15 Cf. *kx'ə̃ǐ* ("Hochton") in Kxoé; Köhler 1989:115

16 Obsolete: *tǔ́rú.s*

17 Cf. !Gora *hâu-kx'ûu*

18 See comment on its shallow melody above.

the subsidiary melodies commencing with /1/ is used. A number of roots (marked with an asterisk) do not comply with the canonical phonotactic forms of Khoekhoe roots, a fact which may also be cause for concern. What I found most disconcerting was, that my main informant - whom I consider to be extremely reliable - recently denied the existence of the /23/ melody for */àrá.b*, maintaining that only /43/ is appropriate. I would have conceded mistaken analysis on my part, had I not prepared a Visi-Pitch trace of it some two years ago which clearly shows the /23/ melody. My surmise found most welcome confirmation then from articles by four Khoesaanists, *viz.* that we are probably witnessing here a fluctuation between an older (phonetic) and a newer (phonologized) stage in an ongoing tonogenetic process. Vossen (1991:369) quotes Winter with regard to the unstructured correspondences in clicks reported by Traill, where Winter (1981:356-57) assumes that

> "incomplete phonetic ... developments in the process of expansion over the area of a dialect group provide a situation, in which (a) every single dialect is being either included in, or excluded from, numerous phonetic isoglosses running in various directions, and (b) part of the vocabulary of a dialect represents either an older or already a new phonetic state which here has not become a rule yet" (Vossen's translation).

Elderkin (1989:275), in connection with a case of Zu|'hôasi tone lowering in collocation with pharyngealization suggests as one of several possible assumptions that "a sound change has been caught in progress".

In the light of Winter's assumption (b) concerning the split vocabulary of a dialect, and Traill's observation (in Vossen 1991:369) that "one can find cases of [click] replacement in progress in the form of variability within a single speaker or between two speakers of the 'same' dialect", the fact that the majority of /43/ roots commencing with depressor consonants have not been lowered to /23/ (cf. Table 7, p.80) need not be taken as compelling counter-evidence to discard the treatment of /23/ as an allotonic variant of /43/. Indeed, even contrastive minimal pairs exist, apart from the free /43/ variants already mentioned:

/43/		**/23/**	
nấú	(other)	*nàú.b*	(mushroom)
!ấrá.b	(fissure)	*!àrá.b, !ấrá.b*	(ant-hill)
ǁ*gṓó*	(poultice)	ǁ*gòó.s*	(spoor ...)

A possible cause for concern about the analysis of the /23/ melody as a depressed /43/ melody may be the fact that its Sandhi form /23/ is identical to the Citation form, and does not end on the low toneme, like *Sandhi* /3**2**/ of /43/. The reason for this might be sought in the non-availability of tone space (cf. also Hombert 1978:103). If, for perceptual purposes, the rising contour is to be retained, then the already depressed initial tone /2/ would have to be lowered a further step, thereby obliterating the distinction to /12/. If, alternatively, only the second syllable had assumed the behaviour of the progenitor melody /43/>/3**2**/, then the Sandhi melody of /23/ would have levelled out and become identical to the already existing /22/. Thus a retention of

the Citation form /23/ for Sandhi purposes may be seen as the inevitable option.

While the /23/ melody is a phonetic reality and must be represented distinctively in surface tone marking - which is the most compelling reason to opt for a four-tone instead of a three-tone surface system (cf. section 2.2.2), it does not demand additional underlying distinctions, as (at least in the overwhelming majority of cases) it is phonetically conditioned. The existence of the Mid-rising melody /23/ is further reason to change the tonal representation of the High-rising melody from /34/ to /24/.

To complete the tonal inventory, some further residual melodies should be put on record, before an attempt is made to establish the underlying tonemes.

2.2.3.2 Other, Rare Residual Melodies: /14/, /42/

A numerically even more confined eighth melody can furthermore be identified. It represents the maximum rise possible, *viz.* from the lowest to the highest toneme available in basic melodies: **/14/** (average pitch rise in brackets). Only seven reflexes have been identified:

hi̋ű.s	(fog)
mì kí.s	(aunt)
mà rí.b	(money)
/nò bá, /nobà	(walk briskly)
‖nù̋ű.s	(tuber *Walleria nutans*)
!nâ̋ű	(taboo)
!nù̋ű	(far)

Average range of F˚: **80 Hz**

Table 13b: Attestations of the Extreme-rising Melody /14/

The tonological affinity of these words is not yet clear. All of them are depressed by an initial depressor consonant, as can be seen in rather spectacular form in the pitch tracings below, Figures 17a and 17b. Their tonetic peculiarity warrants the distinctive /14/ notation, as their contours span the full pitch range. As in the case of the /24/ melody, there seems to be no systematic limit to the rise of the second tone, as the pitch scale is open-ended; cf. p.136. This similarity invites the speculation that these forms are depressed forms of the *original* /2a4/ melody, as postulated by Winter; cf. Table 16 on p.143. Against this counts the fact that the Sandhi form of /14/ maintains the rise, albeit to a lesser degree.

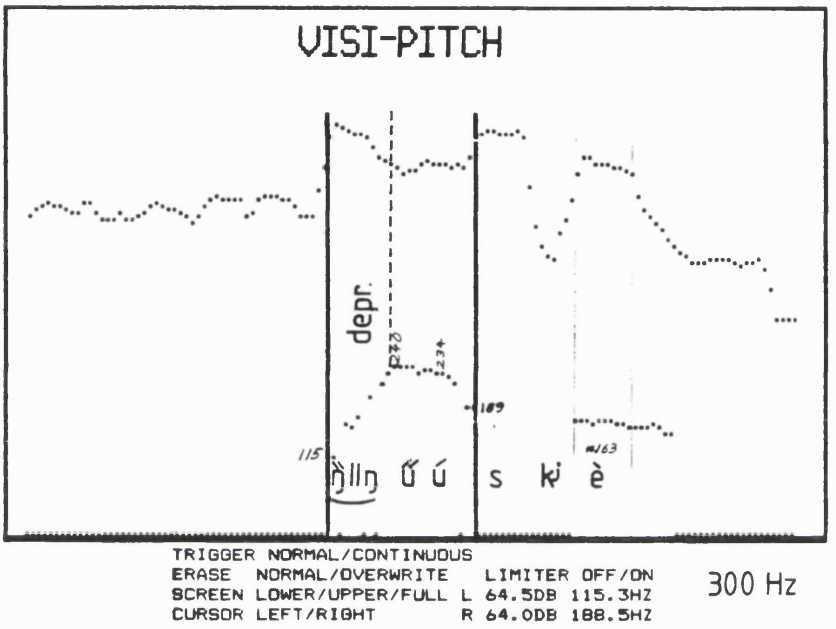

Figure 17a: **Extreme-rising Melody /14/ (Citation): ǁnùú.s (*Walleria nutans*)**

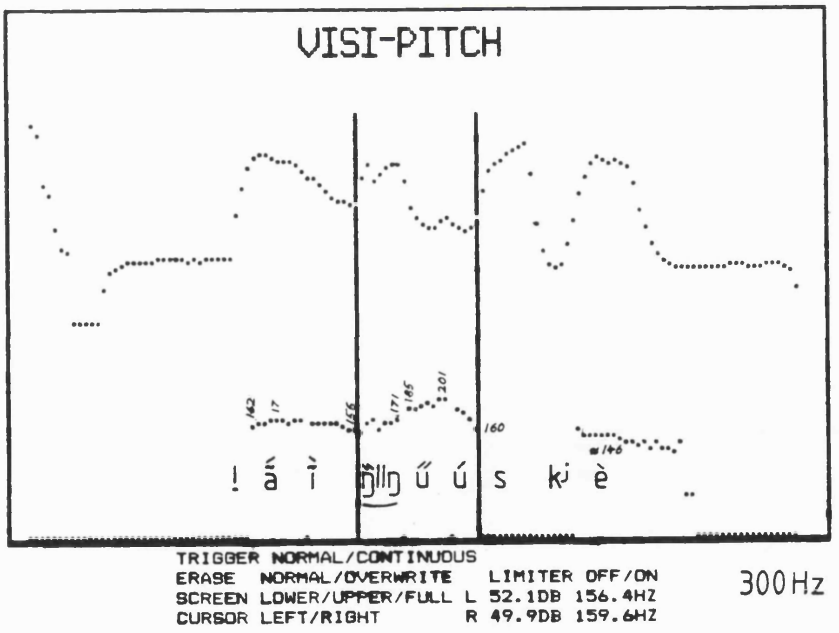

Figure 17b: **Extreme-rising Melody /14/ (Sandhi): ǁnùú.s (*Walleria nutans*)**

A further melody is represented by some five attestations, *viz.* **/42/** (Fig. 14a, p.68):

ǻmà.b	(truth)
kǘnì.s[19] [D.], *kǘní.s* [N]	(wagon)
mǻmà.s	(mother *generic*)
mĺì.s	(maize) (<Afr.: mielies)
hǘgà	(long ago)

Table 13c: Attestations of the Double-High Falling Melody

We can now finalize the surface representations for the total of eleven melodies (six major, five minor to exceptional) so far identified. The fact that not all possible tonal combinations are realized need not be seen as counter evidence, as phonotactic constraints may also bar certain vowel combinations in a language, *e.g.* **e+a*, **e+i*, **o+i* in Khoekhoe. The reason for this would be a topic for future research.

The melody in brackets represents the respective Sandhi form. Shared Sandhi forms are linked with a line. Additions to and changes of the system used in Haacke 1976 *et seq.* are underlined. Very exceptional melodies are marked with an asterisk.

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[19] This word appears to fall even more with some speakers: *kǘn᷄.s*.

	1	2	3	4
1	-	12 (21)	13 (13)	14* (14)
2	21* (21)	22 (22)	23 (23)	24 (22)
3	31* (31)	32 (21)	-	-
4	-	42* (42)	43 (32)	-

Table 14: Revised Set of Tonal Combinations in Citation and Sandhi Melodies

A brief recapitulation of the revisions is called for.

a) The **"Double-Low (level)"** melody was changed from **/11/** to **/12/** in recognition of tonetic detail and tonogenetic facts. For the sake of convenience the tag **"Double-Low"** is retained here.

b) The **"Extreme-rising"** melody **/14/** is marked by an asterisk as exceptional here, as the number of reflexes thus far recorded is extremely limited. Like most of the less well represented melodies its Sandhi form remains unaltered, cf. Fig. 17b.

c) The **"Low-falling"** melody **/21/** is even more exceptional with only one or two reflexes on record, *e.g. /àrà̀.b* It will not be considered any further.

d) The **"Mid-rising"** melody **/23/** is a newly established melody with a fairly limited number of reflexes, being a de-

pressed variant of /43/. Its validity is nevertheless proved beyond doubt by the existence of contrastive minimal pairs involving a "High-rising" member /24/. Both the basic and the Sandhi form are different from the respective forms of the High-rising melody.

e) The tonemic representation of the **"High-rising"** melody has been refined from **/34/** to **/24/** to do justice to the underlying feature matrix (cf. below) as well as tonetic facts, especially to reflect the fact that this melody has a bigger pitch rise than the Mid-rising melody /23/, and that both melodies commence on the same toneme.

f) The **"High (level)"** melody **/33/** has been changed to **/32/** so as to reflect the tonetic fact that it is a falling contour.

g) The **"Double-High"** melody **/44/** has been changed to **/43/** for tonetic reasons. As in the case of /32/ the indication of the decline is also consistent with the decline of their respective Sandhi forms.

h) The **/31/** and **/42/** melodies are so exceptional that they will not be considered in the further discussion.

Having investigated the segmental influence on tonemes and the associations of melodies during perturbations, an attempt can be made to establish the underlying feature system. But before that a brief survey of (apparently) trisyl-

labic roots is called for, to show that they can indeed be ignored for further investigations.

2.2.3.3 Trisyllabic Roots

The preceding investigation of the tonological system was based on the assumption that the decisive tonological characteristics can be derived from the predominantly disyllabic roots of Khoekhoe. It is also known from other Khoesaan languages that their roots are essentially disyllabic (footnote 3 on p.27). In the present section a fairly cursory overview will be presented to offer some insight into the tonological behaviour of more or less lexicalized trisyllabic stems. For lack of space the survey is confined to original Khoekhoe words, *i.e.* loanwords are not considered unless of special interest, as an investigation showed that their behaviour does not throw any new light on the relation between segmental and suprasegmental phonology. Suffice it to remark that the original accent in the loanword is usually but not always realized as a Double-High tone in the Khoesaanized loan.

With the exception of a very limited number of words, apparently trisyllabic roots in Khoesaan can be analyzed as consisting of a disyllabic root that has lexicalized into a single constituent with a suffixal morpheme that has no particular semantic import. By saying this I am making a dis-

tinction, albeit inevitably vague, between the above type of root, and compound stems that obviously are derived from a disyllabic root and a productive suffixal morpheme with its particular semantic or derivational function, *e.g.* the intensive/iterative suffix *-rì*, or the suffix of abstract nouns *-sǐ*.

What is of concern here is that the tonological behaviour reflects that of the morphology: Such lexicalized trisyllabic roots consist of a regular, bimoraic melody with a single tone for the third syllable. In the case of Sandhi it is only reflected in the initial, bimoraic melody, while the appended single tone remains unaffected, apart from possible downdrift or some tonologically insignificant partial assimilation. The fact that this type of trisyllabic root - which constitutes the overwhelming majority of trisyllabic roots - does not have its own melody made up of some or other arrangement of three single tones, is further evidence against Beach's unitary approach (sect. 2.2.1.1, b.). Those words that do seem to manifest tonal spreading (cf. section 2.2.3.3.3), are indeed in favour of his approach, but their number is negligible.

Trisyllabic roots block the application of the Flip-flop rule, as the third syllable acts like any affixal morpheme, *e.g.* like verbal extensions; cf. section 3.2 d) (p.146).

2.2.3.3.1 Bimoraic Melodies Followed by a Single Tone

In the following some representative examples of trisyllabic roots with the various appended morphemes on record are presented (excluding morphemes of an obviously derivative nature). It is notable that, with the exception of *k* (*-ke, -ka, -ku*) and *s* (*-si*) the consonant of these appended morphemes also seems to be subject to the constraint applicable to C_2 in disyllabic roots, *viz.* that it can only be a labial plosive/fricative ([v x̂ ß x̂ b] an alveolar trill (*r*), or a nasal consonant (*m, n*). The two instances of [t] in *hɔ̀ròtɔ́.s* (puzzle bush) and ǁ*nòɛ́dɛ̀* (clumsy) can perhaps be discounted as a plosive allophone of the alveolar trill.

It is conspicuous that many of these trisyllabic roots designate animals or plants. Most of the appended morphemes moreover tend to have one or both of the extreme tones, *i.e.* either Double-Low or Double-High.

In the following lists the Citation form is followed by its Sandhi form after the slash.

-pā́

12+4 *hɛ̀ràpā́.b/hàrɛ̀pā́.b* [D.] (rabas, *Monsonia* spp.)

-bɛ̀/-pɛ́

This particle, which has either a Double-Low or a Double-High tone, is, no doubt, the same one described below (section 3.2.1.2.5) as one "with a rather diverse nature", as it can appear with several word categories, and has no clear semantic function. There is no consistent tonal distribution apparent, according to which disyllabic melodies *-bɛ̀* and *-pɛ́* respectively appear, other than that *-pɛ́* does not seem to occur with /43/. In some formations, the original root does not seem to exist on its own, which leaves only the lexicalized trisyllabic form[20], *e.g.*

43+1 (?)	*hɛ̃́rébɛ̀/hárèbɛ̀*	(be of value)
22+4 (?)	*!gàm̀mɛ́/!gàm̀mɛ́*	(flow together (of rivers))
43+1 (?)	*!gɛ̃́ḿmɛ̀/!gáḿmɛ̀*	(marry)

It is interesting to note that loanwords tend to use the same tonal strategy by analogy. Such loans may have their origin in words ending in *-b* or *-p*, which then introduce an epenthetic vowel between that *-b/-p* and the feminine nominal designant, if that gender is required.

33+1	*dráìbɛ̀.n/dràìbɛ̀.n*	(grapes <Afr. druiwe))
43+1	*kṹnúbɛ̀.s/kúnùbɛ̀.s*	(button <Afr. knoop))
24+1	*sìnĩ̂bɛ̀.s/sìnìbɛ̀.s*	(perky/loose girl <Afr. snippie)

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[20] In such cases it is not possible to determine, whether Flip-flop is involved. Hence the disyllabic input melody cannot be identified with certainty; cf. section 3.2.1.2.5.

-*pő*

12+4 ||*ỏràpő.b*/||*hòràpő.b* (wild cotton)

-*rà*/-*rấ*

This morpheme occasionally occurs in plosivized form -*dà*/-*tấ*. It cannot generally be derived from the present tense marker *ra*, as seems to be called for in certain nouns, *e.g.*

24 ||*gàűdà.b*/||*gàùdà.b* (one who points/shows; *i.e.* hand of clock)

The following noun cannot be based on such a relative construction, however, as the disyllabic melodies do not match:

/*nèèrà.b*, /*nòòrà.b* (he who walks with a measured gait, *i.e.* baboon; Rust 1969: 287),
Cf. /*nòő*, /*nèế* (measure (up)).

The most obvious cases where -*ra* cannot be the tense particle, is in verbs:

43+1 *ấírà*/*áìrà* (render down (fat); fry)
12+1 **s** /*gì́írà*/*gì́írà* (roast (meat) on stick)
Cf. /*gì́ì.b* (scent of cooking fat)

-*rế*/(-*rè*)

12+1 **s** *gầà*, *gầárế*/*gầárế* (foolish, dumb)
44+4 *!gő(á)rế.b*/ (zebra)
!gó(à)rế.b [D.]
Cf. *!gőrế.b*/*!górè.b* [N.] (*ditto*)

-dȅ

24+1 ǁ*nòə́dȅ* (clumsy, awkward)

-rí

This morpheme seems to be distinct from the intensive/iterative morpheme *-rì/-rí*, inasmuch as it seems to have no obvious semantic function (cf. p.214).

12+4 *!nɔ̀̃mrí.b/!nɔ̀̃mrí.b* (rectum)

-rɔ̀/-rɔ́

This morpheme is definitely distinct from the diminutive *-rɔ̀* (for nouns) or *-rɔ́* (for verbs). In certain cases the tonal selection seems to be facultative. Roots with this morpheme are comparatively frequent.

13+1/4 *bɔ̀ɔ́rɔ̀.b, bɔ̀ɔ́rɔ́.b/*
bɔ̀ɔ́rɔ̀.b, bɔ̀ɔ́rɔ́.b (jewel beetle)

See section 3.2.1.2.6, where *-ro* is listed as a Flip-flop trigger in verbs.

-rù/-rú

24+1 *tsàwírù.b/tsàwìrù.b* (rainbow)
12+4 *!nǎ̀èrú.s/!nàèrú.s* (stingray)

Judging by the tonal pattern, the following word is probably not a case of vowel anticipation but, rather, of affixation.

In the Nama dialect the second vowel of the original root has been elided together with its tone.

43+1	*sấúrù/sáùrù* [D.]	(give chase)
41	*sárù/sárù* [N.]	*ditto*

-gầ

33+1	*!kháwàgầ.s/!khàwầgầ.s*	(south)

-ké

43+?	*ǁhấúké.b*	(dassie rat)
43+?	*!khûúké/!khûùké* [D.]	(foolish, dumb)
	!khúúké/!khúùké [N.]	*ditto*

-kű

Words with this morpheme are very rare.

24+4	*!àḿkű*	(decent, proper, tidy)

-sì/-sí

This particle likewise has a dubious status. The derivative morpheme for abstract nouns *-sì* can be seen as a morpheme in its own right with a clearly definable semantic and grammatical domain. Another morpheme, a "verbalizing suffix" is treated below in section 3.2.1.2.4 as a Flip-flop trigger in verbs. The morpheme does, however, also occur to a very limited extent in other contexts, *viz.* in adjectives with Double-Low or Double-High tone; or in concrete nouns, in-

cluding some phonological adaptions of loans. As the disyllabic roots do not exist independently, it cannot be said whether Flip-flop is involved.

ǁgàísí, ǁgàásí [N.], ǁàísí [N.]	(ugly)[21]
hâãsí.b/hâàsí.b	(orphan lamb)[22]

The following two nouns are loans with an epenthetic *i*, borrowed from Afrikaans "roes" and "kous" respectively:

hũrúsì.b/hũrúsì.b	(rust)
kẫúsì.b/káùsì.b	(anklet, sock).

-mà

!ãrómà.s/!áròmà.s	(reason, cause)

This root with -*mà* may possibly be a single instance.

-nà̃/-nã́

This morpheme is fairly frequent; it occurs mostly with nouns or adjectives. While in the latter a derivative function is apparent (cf. sect. 3.2.3.3), this is not obvious in nouns.

12+1	gõònà̃.s/gòõnà̃.s	(cloven hoof)
24+4	ǂĩ̀ĩ́nã́.s/ǂĩ̀ìnã́.s	(egg of louse)

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[21] Compare ǁgái (bad, rotten, wicked), which seems to be semantically akin, but not tonally - unless /32/ was lowered to /12/ tonogenetically, before serving as input to Flip-flop in ǁgaísí.

[22] It is not certain whether this word is an adaption from the Afrikaans "*hans*lam" with an epenthetic *i* before the nominal designant.

-ni

!òẽ́ní.s/!òèní.s	(mopane tree)
!nã̂̀ànì̀.b/!nã̂̀ànì̀.b	(lower jaw-bone)

2.2.3.3.2 Onomatopoeic Repetition of Second Syllable

Words denoting some repetitive noise, in particular, present a sound imitation through repeating the second syllable. Other words belonging to informal or children's language may also be found. In general they exhibit the same tonal behaviour as the constructs above.

43+4	*hű́nú́nű́/húnùnű́*	(grumble; whine (of dog))
43+1	*sí́pí́bì̀/sípìbì̀*	("wee")
32+1	*sóràrà̀/sòrà̀rà̀*	(rustle)
43+4	*xã́wúpű́.s/xáwùpű́.s*	(woer-woer (toy))
43+4	ǁ*gí́rírí́.b/*ǁ*gírìrí́.b*	(parrot, love-bird)
22+3	*!èrèré.s/!èrèré.s*	(loose woman)
43+4	*!ű́rúrű́/!úrùrű́*	(rumble (of stomach))
43+4	*!gő́ró́rő́/!góròrő́*	(patter (of rain))
24+1	*ǂàní́nì̀/ǂànìnì̀*	(creak; crackle)

2.2.3.3.3 Tonal Spreading

To counter the impression that tone association in Khoekhoe is always isomorphic, brief reference should be made to certain trisyllabic loanwords, where tonal spreading seems to occur between the second and third syllables. Indicative of

this is the fact that in the Sandhi forms the third tone is also affected in consonance with the second.

14-4	*mə̀tə́ré/mə̀tárə́*	(pay) < Afr. betaal?
14-4	*(hə̀)rə̀khə́é.s/ (hə̀)rə̀khóé.s*	(dress) < Afr. rok

Certain borrowed kinship terms use the same uncommon tonal pattern /14-4/ with the particle -rə́ ; *e.g.*

14-4	*bə̀tírə́.b/bə̀tíró.b*	(elder brother) < Afr. boet
14-4	*mì̀kírə́.s/mì̀kíró.s*	(aunt) < Dutch moeke

- After this overview of trisyllabic roots it should be clear that they can be ignored for further investigations of the underlying tonology.

2.3 The Underlying Feature System

An attempt to establish a tonological feature system for Khoekhoe should take cognisance of the diachronic development, for it has already become apparent that tonogenesis has played a role in some way through the influence of (former) depressor consonants. Hence a feature system would probably be determined by two stages: a pre-tonogenetic (Proto Khoekhoe?) phase as point of departure, and a subsequent phase reflecting the tonal bifurcation into registers.

the present *tonemes* /2/, /3/ and /4/ (*i.e.* a Low, Mid, High system) can be postulated as diachronically constituting the original surface system - at least for an internal reconstruction of Khoekhoe. The subsidiary "Double-Low" *toneme* /1/, which was brought about by devoicing, should then be handled on a hierarchically distinctive tier, commonly referred to as "register" (cf. *i.a.* Yip 1980:125 *et seq.*). According to Beach the register split only affected the two lower melodies /22/ and /32/, *i.e.* tonemes /2/ and /3/. Although such an unsymmetrical split is possible in principle (cf. *e.g.* Clements 1983:149), it leaves certain problems in Khoekhoe unaccounted for. Firstly, how can two tonemes, *viz.* /2/ and /3/ merge into one toneme in the lower register?[23] Winter's evidence that Nama /24/ equates to two melodies in Kxoé (cf. p.105) also remains unaccounted for. If, on the other hand, one accommodates Winter by simply assuming that the register split applied to all three original *tonemes*, their number would be doubled to six, which seems excessive according to the investigations presented hitherto. It should be remembered that in the present system *four* surface *tonemes* have been postulated to combine into six (or more) *melodies*.

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[23] The four original melodies could, of course, be represented tonemically by means of only two tones (the actual shape of the Proto-Khoekhoe contour is irrelevant here), *viz.*

/43/ /´´/
/32/ /´`/
/24/ /`´/
/22/ /``/.

Such a reduction to two tones would be desirable, as it would provide further evidence of an original two-tone system for Proto-Khoesaan, as aimed for by *i.a.* Elderkin (1989). For Proto-Khoekhoe this would run into problems with register split, however, for the same reasons as mentioned above for the three-*tone* system.

The above calculation (of doubling *tonemes* by means of register) is bound to fail, as tonemes constitute feature matrices, while register is a feature concept itself, *viz.* [+/-UPPER REGISTER]. Hence the tonemes should be reduced to feature terms in turn, in order to be equatable.

It is now postulated that Khoekhoe tonemes consisted of *two* tone features before the tonogenetic split, *viz.* [HIGH] and [LOW] - features as used *i.a.* by Wang (1967), Sampson (1969), Woo (1969) and Maddieson (1970) (in Hyman 1986:111). This yields the following matrices (capitals designate features):

[HIGH]	[LOW]	/Toneme/
+	-	/4/
-	-	/3/
-	+	/2/

Table 15a: Tonal Features of Proto-Khoekhoe

Only three tonemes can be generated out of these features, as the matrix *[+HIGH, +LOW] is logically excluded. For the post-tonogenetic phonology, *i.e.* that of modern Khoekhoe, the feature [UPPER REGISTER] is added. While this feature has the value + in all non-depressed tones (Table 15a), it has the value - for all depressed tones:

[HIGH]	[LOW]	[UPPER REG.]	/Toneme/
+	-	+	/4/
-	-	+	/3/
-	+	+	/2a/
+	-	-	/2b/
-	-	-	/1b/
-	+	-	/1a/

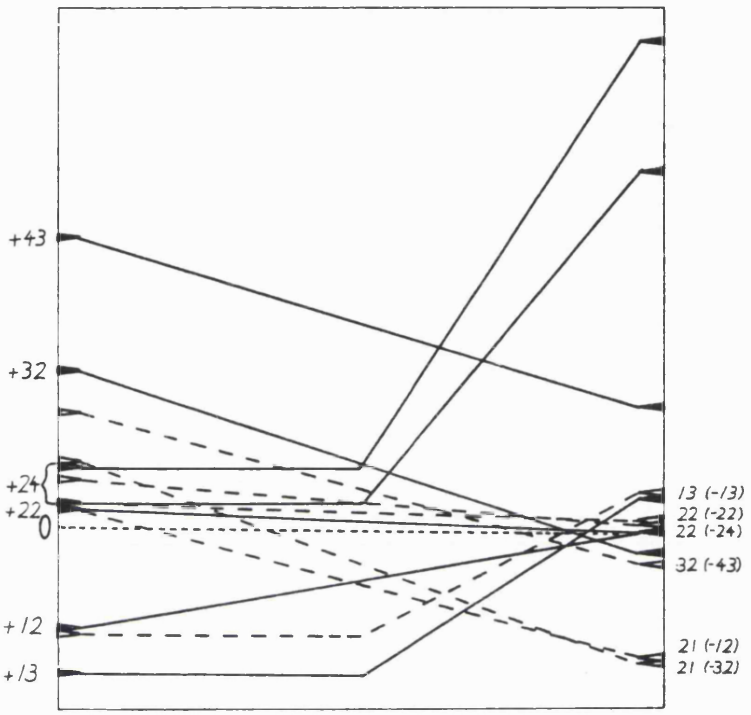
Table 15b: Tone and Register Features of Modern Khoekhoe

Taking into consideration what we already know about the depression of melodies, *viz.* that next to the non-depressed melodies /22/, /32/, /24/ and /43/ there exist the depressed melodies /12/, /13/, /23/ and /24/, the tonemes of Table 15b would yield the following melodies:

Non-depressed	**Depressed**
/43/	
/32/	
/2a4/ <————>	/2b4/
	(/2b3/)
/2a2a/	
	/1b2/
	/1a3/

The above, theoretically based predictions were borne out by instrumental evidence to an extent that was not expected. As the tonogenetic association of /32/ (old notation: /33/) with /12/, and of /22/ with /13/ is counter-intuitive according to either notation and does not permit a convincing derivation of an underlying system, instrumental phonetic evidence was resorted to for possible cues. In order to eliminate the possibility of deception by a notational system that for practical purposes had indeed acquitted itself well during years of tonal marking in the lexicographic pro-

ject, the average onset and offset frequencies of a random sample of *Visi-Pitch* tracings were calculated for each melody. The schematized results are reflected in Fig. 18 below. Pitch was calculated relative to the Low tone /2/ of the indicative marker *ge* in the frame sentence (cf. p.33), and thus serves as a point of reference. By taking /2/ as pitch median with the value 0 (*i.e.* 0 Hz. deviation), the average distances of the respective pitches were calculated, with positive values being higher than /2/ and negative ones lower. Only the onset and offset points of each melody line represent exact values, for these are taken to be the target pitches aimed at for each respective tone in a melody. The ruler-drawn line combining the two points is merely an abstracted indication of the approximate contour of a melody. The purpose is to show that in the Low-rising and the High-rising melodies there is a marked change of inclination about half-way, as the ascent to the second, higher tone only starts in the second t.b.u.. The rise is the more pronounced on the second syllable of these two contours, as they rise over two tone intervals. These schemata should be compared to the actual pitch representations in Figures 1-12b.



Citation (left): ▬▬▬◀ Sandhi (right): ▷- - -◁

Figure 18: Average Onset and Offset Frequencies of the Major Citation and Sandhi Melodies

The following details emerged form the data:

/43/ Citation: +43+18, Sandhi: +17-5

This melody on average falls 25 Hz. Typically the decline towards the lower target pitch of the second toneme only starts in the second syllable. The figures show beyond all doubt that the melody does fall from one toneme to another. The correction of the notation from /44/ to /43/ is thus justified, thereby corroborating Beach but not Hagman (cf.

Table 3, p.30). The Sandhi form with a drop of 22 Hz can, for tonemic purposes, be equated with the Citation /32/ melody. The /43/ and both /32/ melodies have practically the same rate of decline, ranging from 22 to 27 Hz.

/32/ Citation: +23-4, Sandhi: +10-20

The drop of this melody by 27 Hz to a pitch even below that of /22/ is significant, as will be discussed imminently under the subsidiary melodies. The /32/ and /22/ melodies are so close to each other that tonemic identification by ear is difficult for the non-native until checked against their respective Sandhi forms, which differ distinctly. The drop of the Sandhi melody sounds quite drastic to the ear, yet it is practically parallel to the Citation form at a decline of 30 Hz.

/24/ Citation: higher variant +9+73, lesser variant +4+55
Sandhi: +7+1

The fact that the target of the second tone is so much higher than the Double-High toneme /4/ in initial position is of no tonemic significance and can be relegated to a late phonetic interpretation rule. The domain of toneme /4/ can be considered open-ended at the top, as all that matters is that it must be relatively higher than /3/. Factors like excitedness, emphasis (or exaggerated contrastiveness in a recording session) may send the pitch to extreme heights.
The difference between the higher and the less High-rising Citation forms is neutralized in the Sandhi melody, which is equivalent to /22/.

/22/ Citation: +3 0, Sandhi: +4+2

As the difference of 2 to 3 Hz. is hardly perceptible, Citation and Sandhi form can be taken to be virtually identical and truly level.

/13/ Citation: -22+5, Sandhi: -16+6

Perceptually the Citation form of this melody can be distinguished best from that of the /12/ melody by the shape of its contour. Especially in roots with intervocalic consonant the rise on the second syllable is more abrupt than in the /12/ melody. This fact does not argue in favour of a contour tone framework, but is simply to be explained by the proportional difference in rise; /13/ by 27 Hz, and /12/ by only 15 Hz. The instrumental data show that the Sandhi form ends on the same average pitch as the Citation form, proving that the Sandhi form is identical to the Citation form and should no longer be marked */12/. The fact that the Sandhi forms on average have an onset that is 6 Hz. higher than the Citation form, may probably be attributed to assimilation to the preceding *!gâî* /32/ in the test frame, as well as to the strong downdrift on the indicative marker *gè* when uttered as concluding syllable of an elicitation. As *gè* serves as median, the preceding tones will appear to be relatively higher.

/12/ Citation: -15 0, Sandhi: +3-19

A rise of this profile cannot be denied, albeit comparatively more gentle than for the /13/ melody. In the light

of the feature matrices in Table 13b I no longer think that the 7 Hz difference in onset pitch between /13/ and /12/ is fortuitous, as will be discussed in the next paragraph. I also think that the 6 Hz difference for the offset is systematic. The Sandhi form /21/ is tonemically that of the progenitor melody /32/. In this case I cannot see a systematic difference in their pitch discrepancy, though.

The data derivable from Fig. 18 need to be reconciled with the feature matrices in Table 15b. As stated, looking at surface tonemes it remained a stumbling block that the subsidiary melody of /22/ is /13/, and of /32/ is /12/, as the respective second tones do not match in the former pair, and as the rise of /12/ does not reach up to the initial pitch domain of /32/. If, however, one considers the feature matrixes, then it appears to be systematic that the onset tone /1/ of the depressed version of /22/, *viz.* [-H, **+L**, -UR], turns out to be slightly (7 Hz) lower than the onset tone /1/ of the depressed version of /32/, *viz.* [-H, **-L**, -UR]. We are tonetically speaking, thus indeed dealing with two different tones here, *viz.* tone 1a and 1b, but for tonemic (and hence notational) purposes they are re-interpreted as being one and the same tone. Comparative evidence from other Khoesaan languages may possibly prove that we are dealing with a *dia*chronic merging process, here.

With regard to the offset tones, the fact that the /12/ melody on average ends 5 Hz lower than the /13/ melody, may

also be seen as being systematic, for it reflects the fact that the /32/ melody actually descends to below the /22/ melody on the second tone. The /13/ melody may then possibly have been raised beyond the offset pitch of its progenitor melody /22/ by way of a dissimilation process.

It may be a justified question whether the pitch difference of just six or seven Hz is large enough to be detected in speech. In the musical frequency range comparable to that normally used by my male informant (about 90-190 Hz) a full tone interval amounts to 16 Hz (from C_1 at 132 Hz to D). Human beings are able to detect a pitch change of ca. 0,3%, although speech perception would not normally rely on such minute intervals; cf. also Gandour (1978:57).

If we accept that the pitch difference between tone /1a/ and /1b/ is a tonetic reality, even though (today) tonemically insignificant, then we can interpret the coalescence of two underlying melodies in the surface melody /24/ in an analogous way. The lowering effect of the register feature is comparatively big; 25 Hz from /2/ to /1a/, and 38 Hz from /3/ to /1b/, averaging some 31 Hz; while the interval between tonemes /4/, /3/ and /2/ averages only 20 Hz. Lowering caused by register will thus be more than one tone step. Hence the initial syllable of depressed /43/ is lowered to /2b/ [+H, -L, -UR] in /24/, which for tonemic purposes is again interpreted to be tantamount to /2a/ [-H, +L, +UR] or simply /2/. The fact that the onset of /24/ was measured to be either identical to or slightly higher than the median

/2/ is probably attributable to partial assimilation to the very high second syllable.

We can thus conclude that with regard to syllable$_1$, Khoekhoe underlyingly has feature matrices amounting to *six* tonemes, which effectively reduce to four at surface level because of overlap[24]. While tonemes /1a/ and /1b/ form two new melodies in modern Khoekhoe and thereby reduce the number of attestations in their progenitor melodies, an overlap occurs in toneme /2/ of the original and the depressed /24/ melodies, which again accounts for the double amount of attestations in /24/ with relatively few in /43/; cf. again Table 7, p.80. While the register split thus doubles the number of underlying tonemes, it does not double the number of surface melodies.

With regard to the toneme on the second syllable, the "offset" tone, it can be assumed that tonogenesis did not apply; *i.e.* only the three original tones /2/, /3/ and /4/ occur in the Citation forms of lexical melodies, as they were not affected by word-initial depressors for a reason that evades me. The Double-Low toneme /1/ only occurs in the Sandhi melody /21/, but then sandhi melodies are not part of the underlying lexical tonology of a language, as they are the result of morphophonological processes comparable to ablaut in German segmental phonology.

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[24] According to Clements (1983:149), Koopman & Sportiche 1982 maintain that Kagwe has four tones underlyingly but only three on the surface. The synchronic analysis of Khoekhoe can be assumed to reflect the diachronic development.

The claim that $syllable_2$ always employs one of the original, non-depressed tonemes, runs contrary to Yip's contention that the register must remain constant for the entire morpheme[25]. She justifies this constraint with the consequence that her theory is the only one to account for the phenomenon that, of the six rising and six falling contours theoretically possible in a four-tone system no language ever seems to use more than two contours of a type; *i.e.* two rising, two falling. This constraint forces her, however, into a somewhat uncomfortable explanation (*op.cit.* 183) that the Mandarin melody [51] phonologically is consistently upper register /53/, and that the fall over the entire range to the lowest pitch possible is a phonetic detail. Similar arguments would have to be adopted for Khoekhoe with regard to /13/, /12/ and *depressed* /2b4/. But, while Yip could resort to her account because of the fact that there exists only one falling contour in Mandarin, the different extents of the rises in Khoekhoe cannot be accounted for in that way.

This brings us to a further point, namely that Khoekhoe does not fit the observation that never more than two rising or falling contours occur in a language; cf. Table 14, p.119 for the five rising melodies /12/, /13/, (/14/), /23/ and /24/; as well as the falling melodies /43/, /32/, next to /42/ and possibly /31/ and /21/. Khoekhoe is bound to have

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[25] Yip 1980: 126/132. On p.31 she argues, however, that in Shanghai the final syllable of tri-syllabic words has a lower register.

at least three rising melodies: one for each of the three original tonemes /2/, /3/ and /4/ in depressed form.[26]

Yip's constraint that register has to be constant in a morpheme will not be adopted for Khoekhoe, therefore. Particularly, as it was demonstrated that depressor consonants only affect the onset tone of a root.

In conclusion the benefits of the present analysis by way of features should be weighed up. The major criterion is that the features chosen should reveal natural tone classes, as stated by Hyman and Anderson (p.98). The following paradigm is a simplification, in that the hierarchical relationship of the tone and register tiers to each other is not reflected.

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[26] Several authors speak of the "rising" intonation of melodies, effected through the influence of certain initial consonants; *e.g.* Beach 1938:247, Köhler 1947:64, Winter 1981:254, Traill 1985:42. Although technically a correct observation, the word "rising" obscures the causality, as these consonants do not cause the rest of the melody to *rise* higher than otherwise. Rather, one should speak of restitution of the contour after initial depression.

Elderkin (1988:133), in agreement with Hagman 1977:12, stipulates a "No Final Low" (NFL) rule for Zu|'hõasi with analogues in Kxoé and Khoekhoe: it "prevents any pitch contour ending in a low tone; any final low tone is *raised* to mid" (emphasis added, W.H.). - From the above exposition it should be clear now that there is no question of raising, but instead the pre-tonogenetic low tone (our /2a/) in $syllable_2$ is never affected by the register split, as this only affects onset consonants in the *first* syllable. It can probably be contended for all Khoesaan languages which have undergone register split that his NFL rule is not a rule but just an observation.

CITATION FORM Melody	[H	L	UR]	[H	L	UR]		SANDHI FORM Melody	[H	L	UR]	[H	L	UR]
/43/	+	-	+	-	-	+	>	/32a/	-	-	+	-	+	+
/32a/	-	-	+	-	+	+	>	/21/	-	+	+*	-	+	-
/2a2a/	-	+	+	-	+	+	=	/2a2a/	-	+	+	-	+	+
/2a4/	-	+	+	+	-	+	>	/2a2a/	-	+	+	-	+	+
/2b4/	+	-	-	+	-	+	>							
/2b3/	+	-	-	-	-	+	=	/2b3/	+	-	-	-	-	+
/1a4/	-	+	-	+	-	+	=	/1a4/	-	+	-	+	-	+
/1a3/	-	+	-	-	-	+	=	/1a3/	-	+	-	-	-	+
/1b2a/	-	-	-	-	+	+	>	/2a1/	-	+	+*	-	+	-

Table 16: Citation and Sandhi Melodies in Terms of Features

a) The postulation of a **register** feature on a separate tier accounts for a diachronic development that is reflected in present Khoekhoe tonology.

b) In particular, with register spacing being wider than tone spacing (cf. p.139), it accounts for the fact that the tonemes of Khoekhoe are **not spaced equidistantly**, which *i.a.* leads to the situation that /43/ is depressed two tone-steps to /2b3/, etc.

c) The register feature [UR] pairs off the melodies according to the **register split** (cf. association lines on left-hand). In each case the **corresponding tone features**, *i.e.* [H] and [L], are **identical** for the first toneme in the respective progenitor and depressed melodies: thus /32/-/1b2a/ = [$\pm$H $\pm$L], /2a2a/-/1a3/ = [$\pm$H $\pm$L], /2a4/-/1a4/ [$\pm$H $\pm$L]. /43/ has two depressed members apparently belonging to

two different diachronic stages, *viz.* /**2b**4/ and /**2b**3/, but in either case the tonal features are [±H -L].

The tone *feature* constellations thus reflect the natural groupings of the respective non-depressed with depressed melodies in a way that is impossible to achieve with surface tones - even less with unitary contour tones, for that matter.

d) The tonal features furthermore allow **Flip-flop pairs** (Table 12, p.102)) to be grouped in a transparent way that is not possible with surface tones. Each resilient member (/1a3/, /2a2a/, /2a4/, doubly underscored) involves a **[-H +L]** initial tone, irrespective of register. Crucial seems to be the positive value of the **[Low]** feature, as the common characteristic of the weak members (**1b**2a/, /**3**2/, /43/) is that their [Low] feature has a negative value for the respective first toneme. Again, while the surface tonemes have nothing overt in common, the determining characteristic of Flip-flop relationships can be shown to be [+/-**Low**] in terms of features.

On p.216 in section 3.3.1 an argument is presented whereby the divergent behaviour of the /24/ melody in compound nouns is tentatively explained by a difference in feature composition, *viz.* that roots with /2a4/ are subject to Drop, while those with /2b4/ retain the Citation form.

f) The observation that melodies /2a2a/ and /13/ have a derivative function by forming **ergatives** from transitive verbs in other melodies, needs no further comment, as their affinity is explained by the register split of the Low [-H +L] tone. The assumption is that this derivative device already existed before the register split occurred (section 3.5).

g) The fact that tone and register features are independently stable is evidence that they are autosegmental; cf. also Yip (1980:175) for Chinese. The difference remains, however, that in Khoekhoe a register change only affects the first tone of a melody.

The derivation of **Sandhi** melodies is not that transparent. It is some consolation that Hombert (1978:103) observes that the phonetic motivations for Asian sandhi are not always obvious any more. Sandhi forms are not directly equatable with register selection in Khoekhoe. As already pointed out above (Table 11), Khoekhoe paradigmatically replaces melodies in Sandhi contexts. Indeed, Khoekhoe has only one melody which is unique to Sandhi, *viz.* /21/. All other Sandhi melodies also exist in Citation form, being only /32/, /22/, (/23/), (/14/) and /13/. Unless a Sandhi form is rigid, *i.e.* unchanged from its Citation form (/13/, /22/, (/14/), (/23/), (31), (42)), it involves lowering of some kind.

Ignoring Sandhi forms on the grounds that in Asian languages their formation too is not quite transparent, it can be concluded then that the above selection of features adequately reveals the natural classes that can be observed among Citation melodies of Khoekhoe, in the sense required by Hyman (1986) and Anderson (1978) (cf. p.98 above).

3. THE LEXICAL TONOLOGY OF KHOEKHOE

The lexical tonology of Khoekhoe, *i.e.* the word-internal tonal behaviour during concatenation of morphemes, has remained practically untouched in the available literature. A detailed investigation was impossible as long as the perturbed forms of melodies had not been established in their own right as regular "ablaut" series (chapter 2). Without these, only impressionistic observations on general behaviour could be made, as *e.g.* Hagman (1977:18) did in his section on morphotonemics, when he states that in compound noun roots

> "the first root in the sequence is tonally unchanged, but in the second root the tones of both morae become slightly lowered middle tones";

or, that in compound verbs

> "both tones on the first root are lowered slightly, and both tones on the second root are raised slightly".

Beach (1938), who was the first to identify the Citation forms of the six major melodies, stopped short of investigating sandhi behaviour, although he was aware of its existence.

The purpose of this chapter is to demonstrate that, and to describe how the tonological behaviour of compounds can be

categorized in an exact way according to the rules that apply, these being either "Sandhi", "Flip-flop", "Retention of Citation", or the allocation of specific melodies irrespective of the input melody, *viz.* /21/ ("Drop"), /22/ ("Low") or /24/ ("High-rising"), or various combinations of the above. An exact identification of the rule-behaviour within a particular compound is possible owing to the fact that Khoekhoe paradigmatically displaces entire melody feet; cf. Table 11 on p.99 for Sandhi associations. Presumably this is, *mutatis mutandis*, also true for the other Khoesaan languages.

In the following each of these processes will be investigated in turn. Again, the data have been extracted from the electronic data-base of the *Khoekhoegowab Dictionary.*

Contrary to Bantu languages, neither segmental nor neighbouring supra-segmental phonemes influence any rule-application in Khoekhoe morphology. (This makes rule application in the tonological cycle independent of issues like bleeding and feeding.) One example may suffice to show that two compounds with identical juxtaposed segmental phonemes (*u* + ǁ*g*)

as well as identical tonal input melodies behave differently with regard to tonal perturbation[27]:

43 32	**fs**	***kùrű*||*gôã̀***	(build all night until dawn)
43 32	**cd**[28]	***kűrú*||*gâù.b***	(factory).

The diversity of rules occurring in compounds with one and the same root is quite bewildering, as long as one attempts to discover the causality in the *phonological* context. Cf. some further examples with *kűrú* (construct, build) for the different rule applications as indicated by the abbreviations:

43 32	**fs**	*kùrű-ùnù*	(rebuild, modify)
43 24	**cr**	*kűrú-ùű*	(build/construct with)
43 24	**cd**	*kűrú|gàù.b*	(method of construction)
43 43	**fr**	*kùrűtőá*	(finish building)
43 32 1	**cs**	*kűrú||khàãbɛ̀.b*	(artisan).

---

[27] For the convenience of the reader, examples will be preceded by the Citation input melodies in numerical notation, and - unless redundant - by a code denoting the rule that applies to each root in turn during compounding:

- **c**: Citation form (in initial, left-most constituent) (occasionally marked ± above roots, especially in syntactic context, chapter 4)
- **s**: regular Sandhi, *i.e.* Sandhi of the Citation form without Flip-flop having applied first (marked = above the root in syntactic context);
- **f**: Flip-flop (Citation form; occasionally f_c)
- f_s: Flip-flop (Sandhi form)
- **r**: Retention of Citation form in non-initial root (**CR** in text)
- **d**: 'Drop' to /21/ profile (in phrase-final root)
- **h**: change to 'High-rising' melody /24/
- **l**: change to 'Low' melody /22/

If a rule operates vacuously (because Citation and Sandhi are identical), the symbol will be in parentheses. See text for elaboration on the various applications.

[28] It will become evident later (section 3.4) that the /21/ melody on the second root in this case is not the Sandhi form of /32/, but an instance of the Drop rule, which replaces any Citation form in certain types of nominal compounds with the Low-Falling profile /21/.

At this point it may be mentioned that Köhler in a recent publication (1989:112) reports that in Kxoé stress (Druckakzent) on the determiner influences the lexical tone of the compound. This phenomenon cannot be confirmed for Khoekhoe.

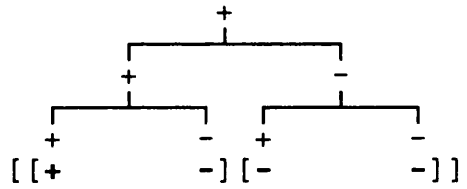
It seems to be the case, then, that phonological context - be it segmental or suprasegmental - is not a determining factor in tonal perturbations in compounds. The determinants are of a semantic and morphological nature, and at times even *ad hoc* to establish contrasts, as will be demonstrated in section 3.2.5.

3.1 The Occurrence Of Sandhi

"Sandhi" refers to the perturbed forms of Khoekhoe that constitute a distinct complementary set of melodies, as described in section 2.2.1 above and summarized in Table 11. When reference to this particular set of perturbed melodies is made, Sandhi is written with a capital letter here, so as to distinguish it from sandhi denoting any kind of tonal perturbation. Unlike such other kinds of perturbation, Sandhi forms occur not only word-internally but also post-lexically, *i.e.* in syntactic context (cf. chapter 4). They constitute the regular kind of perturbation with their own melodies for each respective Citation form and are inherent

to a root, while other processes like Flip-flop or Drop simply refer to a selection of one of the existing Citation or Sandhi forms. "Regular Sandhi" here means that it is the Sandhi form of the original Citation form, not of one that has undergone Flip-flop in a previous cycle.

Regular Sandhi (-) is the most common rule to apply in any concatenation to constituents that are not dominated by a left-most branch, be it on the morphological or on the syntactic level. Only leftmost sisters retain their input Citation form (+) in a phrase-marker, and they will only surface with it if not dominated by a non-leftmost branch.



While this is true for compound words in lexical phonology, it will be argued in the following chapter that this also applies to post-lexical phonology.[29] As said before, it is irrelevant which melodies happen to be concatenated. All are compatible, and no allotonic changes are effected, other than perhaps slight assimilation between the extreme intervals. This, however, amounts to tonetic detail and will not be discussed here. For the sake of illustration a combina-

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[29] Chapter 4 will be devoted to a demonstration that in Khoekhoe syntax all constituents not immediately preceded by a double *left* bracket [[in a bracketed representation of an IC structure, are subject to Sandhi application. The phenomenon will be referred to as Left-branching rule. This domain of rule application was described in Clements (1977) for Anlo Ewe.

tion of the /12/ melody with each of the six major melodies is provided here. It could be done for each of the melodies almost *ad libitum*. The examples are selected at random from verbs. Citation forms are marked here and elsewhere by a plus sign above the constituent; Sandhi forms with a minus sign.

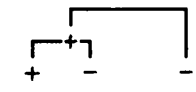
Input		**Rules**	**Citation Form of Compound**	
+	**+**		**+ -**	
12	12	**cs**	*àrù!gûù*	(go and dance to reed-flutes)
12	13	**c(s)**	*!gààdǐí*	(reduce s.one to servitude)
12	22	**c(s)**	‖*hùnù!nâà*	(hollow out (calabash))
12	24	**cs**	*!gâù!nàrù*	(dislodge tree-stump w. blows)
12	32	**cs**	*dàwà‡gòm̀*	(turn (patient in bed))
12	43	**cs**	*!gàì‖óò*	(suffer from epilepsy)

If a compound undergoes Sandhi perturbation because of external conditions (either syntactic of because of embedding in further compounds), this is reflected only in the first root of the component, irrespective of the overall tonological constitution of the compound. The above examples would thus all receive the regular Sandhi melody /21/ of the initial Citation melody /12/, with the subsequent root remaining as it is; thus

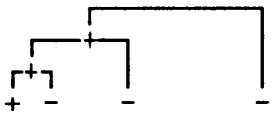
Input			**Sandhi Form of Compound**	
+	**+**		**- -**	
12	12	**cs**	*àrù!gûù*	(go and dance to reed-flutes)
12	13	**cs**	*!gààdǐí*	(reduce s.one to servitude)
12	22	**c(s)**	‖*hùnù!nâà*	(hollow out (calabash))
etc.				

Depending on the structuring of immediate constituents in a compound with more than two roots, the same Left-branching rule applies, yielding a Citation form followed by one or more Sandhi forms. The internal structure of the entire com-

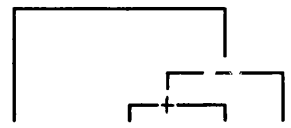
pound is obliterated in the tonological surface form, as the initial Citation form of any embedded constituent is converted to a Sandhi form if this constituent as a whole becomes a Sandhi form by being immediately dominated by a right-hand branch; *i.e.* whenever a parental node is a Sandhi form (minus sign), the surface form will be perturbed to Sandhi. (Square brackets mirror the internal constituent structure as indicated by the phrase-markers.)



surface form:
24 43 32 [**cs**]**s/d** [*ànǐkúnì*]*ꜜgàà.s*
([bird+vehicle]+plain = airport)



surface form:
43 12 43 32 [**css**]**s/d** [[*ǎímûù*]*/gárù*]-*àǒ.b*
([[front+see]+talk incoherently]+man
= clairvoyant)



surface form:
13 43 43 43 **c**[**sss**] *!hâǔ*[[*ꜜnûù-ái*]*!náò*].*s*
(thong+[[sit + on]+ beam]
= riempie-chair)

The answer to the question what type of perturbation applies to a compound, *i.e.* whether Sandhi, Flip-flop or Drop, depends on the internal syntax of the compound and, with that, on its meaning.

3.1.1 Sandhi in Compound Verbs

Although the biradical compounds above have been chosen randomly from verbs, Sandhi permutation is not the type occurring most frequently in verbal compounds. Compound verbs that do employ Sandhi are normally of the following types:

a) <u>noun + verb</u>

Khoekhoe is conspicuous for having transitive and intransitive compound verbs with inherent object ("gatecrash" is one of the rare equivalents in English):

```
                    +   -
13 32 cs            !hǔú!gàð
                    (earth+cut   =  plough)

                    ┌─┬─┐
                    ┌─+─┐ │
                    +   -   -
22 32 22 cs(s)      [!khàè-òm̃]ǂgâ̰à
                    ([dark+hut]+enter   = bec. pubescent
                                          (of girls))

                    ┌─┬─┐
                    ┌+┐ │
                    +  d  -
24 13 24 cds        [ànǽǁgàn̓]ǁgàn̓
                    (bird+meat]+roast   = roast chicken v.i.)
```

The tonological composition parallels that of the syntactic level, where the verb in final position - Khoekhoe is an SOV language - also gets the Sandhi form, while the object-NP as a whole takes the Primary form; see chapter 4.

b) verb + noun

		+	−	
24 13	**c(s)**	*!khàámûŭ́*		
		(pierce+eye	=	stab (s.o.) in h. eye)

Certain nouns following on the verb in compounds have a modifying function and serve like a postposition; thus *e.g. am* (at entrance/mouth/beginning)[30], *ai* (on), */khaa* (with, next to, on the surface) < */khấá.b* (body), *!gâa* (after/again, *i.e.* following previous action) < *!gâấ.b* (back, rear).

		+	−	
13 43	**cs**	*!hûŭ-ám̀*		(knot+mouth = knot end of (string))
32 43	**cs**	*áò-ái*		(throw+face = throw on(to))
32 43	**cs**	*áò!gâà*		(throw+rear/back = throw again)

c) noun + noun

24 43	**cs**	*!àḿkháò*	(feather+backside = fledge (arrow))

---

[30] The use of *am.s* (mouth) as modifier is diverse and difficult to render out of context. In many compounds with *-am* the citation form is retained. Cf. two exceptional compounds to which Flip-flop applies:

43 43	**fr**	*!khàĭ-ấḿ*	(burp while feeding at the breast)
43 43	**fr**	*kàĭ-ấḿ a.*	(most, the majority of).

d) adjective + verb

13 43 **cs** *!hȍrá‖góè*
(cripple+lie = bec. quadriplegic)

e) verb + postposition

43 22	**cs**	*!hőá/ĩ̀ì*	(speak+towards = address (*e.g.* meeting))
43 24	**cr**	*!gãé-ùṹ*[31]	(tie+? = tie (up) with)
43 43 22	**css**	*!hőá-[ám̀!nã̂à]*	(speak+[mouth+in] = interrupt)

Khoekhoe postpositions are derived either from verbs or from nouns. In the case of postpositions derived from verbs, like *ùṹ*, the noun originally served as object and even in the postpositional construction retains its oblique surface case form, *e.g.*

‖ĩ̀iba !oa (towards him) < *‖ĩ̀iba (ra) !oa* (meet/encounter him).

The significant gap in these verbal compounds is verb + verb, the compound which constitutes the major group among the various types. It employs Flip-flop, either with retention of the Citation melody (section 3.2.1.1.1) or with

---

[31] *ùṹ* in Khoekhoe compounds at first sight seems to be the postposition *ùṹ* (alongside), which - in the absence of an alternative - in turn seems to be derived from the verb *ṹú* (take); cf. *daoba uu ra !gûu* (walk next to the road, lit.: take the road and walk). Köhler (1989:115), however, quotes a verb "ú" (also with a high-rising melody) meaning "hinbringen" (take somewhere). This may possibly be a cognate, although non-existent on its own in Khoekhoe. Even though not obviously related semantically, the possibility is inviting tonologically. Also in favour of this latter derivation is the fact that Flip-flop applies only to first roots of compounds, not to second ones.

Sandhi (section 3.2.1.1.2) on the second root, depending on the modifier-head relation.

3.1.2 Sandhi in Compound Adjectives

Compound adjectives normally undergo Sandhi perturbation; that is, adjectives which have not been derived from compound verbs or nouns by means of derivative suffixes like, *e.g.*, *-sa* or *-xa*. For the tonology of the lower derivational cycles (in which the verb or noun was derived according to its own rules) remains unaffected by later derivational processes; cf. below.

a) <u>adjective + noun(s)</u>

Many of these compounds consist of an adjective - or some kind of qualifier - with a noun. They include the extensive array of colourings of domestic animals as well as references to the body; cf. also section 3.2.3.2. The following are some representative examples:

12 43 **cs**	*ǂnùùxóò*	(black+cheek = w. black cheeks (of goat))
13 43 **cs**	*ǂhàwá|kháà*	(wide+body = with broad body, wide-bodied)
22 24 **cs**	*!khàè|àè*	(dark+fire = unmarried (*i.e.* w. nobody to keep fire going))

b) adjective + adjective

22 12 **cs** *ǂgàmà!hòõ* (brown+piebald = skewbald)

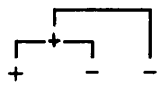
The following exceptions are also on record, however. It is not apparent why they are subject to Flip-flop (without Citation retention on the last root):

12 24 **fs** *ǂnùútòò* (black+mottled = mottled black)

12 24 **fs** *ǂnùúǁgànì* (black+reddish-brown and white = piebald)

12 24 **fs** *!hùní!ùrì* (yellow+white = light yellow, cream)

c) Numeral + noun(s)



32 43 24 **css** [*!gámám*] *!àò* (two+mouth+snake = double-tongued, hypocritical)

43 43 **cs** *!gũí!gâã* (single-layered (of Nama rush hut))

3.1.3 Sandhi in Compound Nouns

The most general tonological behaviour of nominal compounds is to have a root in Citation form followed by one or more roots in Sandhi form: **cs**. Premodification applies within the compound noun, just as it applies on the syntactical

level within the noun phrase. This in turn means that, as the left-most branch retains the Citation form, the one or more subsequent constituents will have the respective Sandhi form. The head of both compound nouns and NPs thus normally appears in Sandhi form, as is evident in the parallel constructions with, *e.g.*, adjectives, descriptive possessives, or relative clauses.[32]

a) <u>Adjective + Noun</u>

```
                ┌──┐
                +  -
43 24 cs        kấí↕khòò.b
                (big+bone  =  femur)
```

Cf. the tonally identical but morphologically disjunctive NP:

```
                        NP
                    ┌───┴──┐
                    +      -
                qualifier  noun
                    |      |
                adjective  |
                    |      |
43 24 cs          kấí    ↕khòò.b
                  (big     bone  =  big/large bone)
```

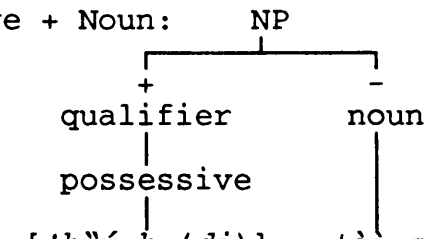
b) <u>Noun + Noun</u>

```
                ┌──┐
                +  -
13 24 cs        !hùú↕àì.s
                (country+badge  =  national coat of arms)
```

---

[32] For a discussion of the tonological behaviour of noun phrases cf. section 4.1. The phrase markers here are simplified for explicatory purposes and should not be construed as making any theoretical claim concerning constituent structure.

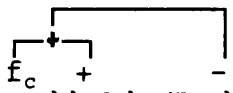
Cf. Possessive + Noun:



13 24 **cs** [*!hʉ̈ú.b (di)*] *ɬàì.s*
(country *poss.p* badge = nat. coat of arms)

Nominal determiners in compound nouns typically relate to descriptive possessives that denote *i.a.* content or construction material.[33] To this type of compound belongs, incidentally, the ethnonym *Khʉ̈èkhʉ̀ë̀* (lit. "human person" < *khʉ̈è.-i* (person)), which differs derivationally and hence tonologically from the deverbal causative noun *khʉ̈ékhʉ̀ë̀.s* (personification).[34]

c) <u>Verb + Noun</u>



32 24 33 **frs** [*ɬgàèɬhàwʉ́*]*-àʉ̈.b*[35]
(pull+sway about+man = s.o who leads astray, seducer)

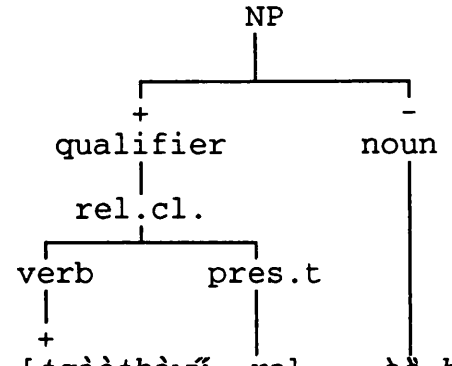
---

[33] See sections 3.3.1 and 3.4.1 for nouns with CR and Drop respectively, in which the premodifier denotes the purpose.

[34] For causative formation cf. section 3.2.1.1.3.

[35] For the operation of the Flip-flop rule in verbs, cf. section 3.2 *et seq.*

d) Relative Clause + Noun



32 24 33 **frs** [*ǂgàèǂhàwű ra*] *àð.b*

It would lead us too far afield to list all types of morphological combinations here. Suffice it to say that nouns with regular Sandhi probably include the compounds based on the very productive head-nouns *áò.b/-i/s* (denoting an agent) and *xúù.b/-i/s* (denoting an object/thing), *e.g.*

+ - -
24 43 32 **css** [*/àé/árì*]-*àð.b* (fire+extinguish+man = fire-fighter)

+ -
24 32 **cs** *ǂkhòñxùů.n* (sweet+thing = sweets)

The reason why it cannot be stated with certainty whether these compounds employ regular Sandhi is that the /21/ Sandhi profile also serves as profile for the Drop-rule; cf. section 3.4.1 below.

3.2 The Occurrence Of The Flip-flop Rule

In section 2.2.3 (b) and Table 12 (p.102) the Flip-flop rule was described. In the present section its occurrence is to

be presented. The establishment of its triggering context was quite a bewildering endeavour and would have been even more so without the assistance of a machine-readable database that allowed a systematic perusal of the entire lexicon to ensure reliability of observations.

As with Sandhi, the phonological environment provided no clues. Switch always occurs in the first root of a pair, if it occurs at all. The second member then normally retains its Citation form (marked as **fr**), but occasionally also takes its Sandhi form (marked as **fs**). A perusal of specific roots in initial position for their proneness to switch, was inconclusive. While some roots are never subject to switching, others are. Yet these do not switch regularly; not even in compound verbs, *e.g.* with *kurú* (construct, build):

43	43	**fr**	*kùrűtőá*	(finish building)
43	32	**fs**	*kùrű-ùnù*	(rebuild, modify)
43	24	**cr**	*kűrú-ùű*	(build with)
43	24	**fr**	*kùrű|hàő*	(assemble)
43	24	**cs**	*kűrú|hàò*	(build jointly/together)
43	32	**cs**	*kűrú||gòă*	(build all night until dawn)

First indications that the switch-trigger is inherent to particular morphemes and also particular constructions, came from certain grammatical formatives (suffixes, cf. section 3.2.1.2 *et seq.*) and from grammaticalized constructions like *i.a.* causative reduplication. A systematic perusal of non-initial *lexical* formatives then showed that switch is triggered by certain roots as well, the exact nature of which will be discussed presently.

Before the various types of constructions and triggers are discussed, some general observations might help the reader to interpret the following data. For the pairing of the respective melodies during switching, as well as for weak and resilient members, see again Table 12 on p.102. It should be kept in mind that, in the course of the phonological cycle, Sandhi can apply to a root which first exchanged its inherent Citation melody under the Flip-flop rule ($\mathbf{f}_{\mathbf{f}}$). Such a root thus has the respective Citation or Sandhi melody of the switched melody, not of the inherent melody. Whether Sandhi applies to Flip-flop or Flip-flop to Sandhi, depends on the cycle of the particular derivation.

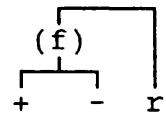
a) Contrary to Sandhi, Flip-flop operates exclusively on the level of lexical phonology ("morphotonology" in structural terms), not of that of syntax. The reason is - as shall be seen - that Flip-flop is meaning-related (depending on semantic junctures), while Sandhi is conditioned by constituent structure.

b) Flip-flop operates retrogressively, *i.e.* the switch is triggered by a subsequent, right-branching constituent. Thus the initial root is the one that undergoes the switch, while with Sandhi it is any non-initial root.

c) Depending on the kind of compound, Flip-flop operates either uni- or bilaterally. In most cases it is unilateral. Causative duplication is one of the few

instances where it operates bilaterally (see section 3.2.1.1.3).

d) Flip-flop only switches *single* initial roots; embedded compounds are impermeable. In such cases it is covert; *i.e.* the initial compound remains unaffected. In compounds where the trigger-root retains its Citation form, this is evidence that the Flip-flop rule as a whole still applies; only that the perturbation concerning the first root applies vacuously (hence, covertly), while the retention of the Citation form on the second root alone is overt.



43 43 43 [**c**s]**r** [*ɬgáńám̀*] *ɬnûĺ*
(close/lock+seat = imprison)

Flip-flop is blocked particularly by grammatical formatives, *e.g.*

12 13 **fr** *dàwábèé* (turn over, skip (*e.g.* picture in book))

but

12 2 13 **c**r *dàwà**sèn**bèé* (turn oneself away)
Cf. *dàwà* (turn around/over *v.t.*, *-sèn* reflex. suff.)

But see section 3.2.1.1.6 for compounds that *trigger* Flip-flop in multiradical verbs.

e) Flip-flop is not automatically associated with Citation-retention on the second root. Although this is the case in the overwhelming majority of verbal compounds (section 3.2.1.1.1), Flip-flop may also be followed by Sandhi (section 3.2.1.1.2).

f) Verification showed that the Flip-flop rule, representing one of the more intricate phonological processes of Khoekhoe phonology, is not applied consistently by all Khoekhoe speakers. There seems to be a trend towards simplification, *i.e.* application of Citation with Sandhi instead, among the younger generations. In order to achieve some kind of regularity, the present investigation only reflects the performance of the co-compiler of the *Khoekhoegowab Dictionary*, who - as systematic cross-checking by machine proved - is extraordinarily consistent in his rule application. See, however, also sections 3.2.3.1/2 for options that he conceded.

3.2.1 Flip-flop in Compound Verbs

Flip-flop is confined predominantly to verbal compounds when different categories of roots are juxtaposed. It applies almost exclusively where the compound consists of two verbs. In compound verbs Flip-flop can be triggered either by a

combination of lexical formatives (section 3.2.1.1), or by a grammatical formative (section 3.2.1.2).

3.2.1.1 Flip-flop in Lexical Compounds

Biradical compounds can consist of either a combination of non-identical verbal radicals (sections 3.2.1.1.1-2), or of *prima facie* reduplications with a special semantic function (sections 3.2.1.1.3-5). If they consist of a combination of non-identical verb-radicals, compounds with *Flip-flop followed by Citation Retention* (**CR** in the text) and compounds with *Flip-flop followed by the Sandhi form* on the second verb, have to be distinguished systematically.

3.2.1.1.1 Flip-flop followed by Citation Retention

Verbal compounds consisting of different roots employ unilateral switching, *i.e.* only the weak melodies /12/, /32/ and /43/ switch, but not their partners /13/, /22/ and /24/. The rule applies covertly nevertheless, which can be deduced from the fact that the subsequent (right-hand) root retains its Citation form (**r**) in both the covert and the overt application of the rule; *e.g.*

43 **32 fr**	*ɬhàrǒ!**áwà***	(climb/clamber upwards)
24 **32 cr**	*!nàmǐ!**áwà***	(throw upwards).

The Flip-flop rule in conjunction with CR appears to be a kind of mirror effect. As stated above in connection with regular Sandhi, Khoekhoe is essentially a left-branching language with pre-modification. An examination of compound verbs employing Flip-flop shows, however, that in these verbs the modifier-head order is reversed in that the initial constituent is the head. Hence the common characteristic of these compounds is that all can essentially be translated:

"DO (X) *TO THE EXTENT/WITH THE RESULT THAT* (Y)", or

"DO (X) *UNTIL* (Y*ed*)".

This means that the second verb (Y) serves as a kind of adverbial modifier of the initial head verb (X), *e.g.*

32 24 **fr** *!gàwì!khàrű* (ride past; *lit.* ride *until* passed)

Cf. *!gáwì* (ride), *!khàrű* (pass, go by).

Such compounds could alternatively be equated to syntactic constructions with the intentional conjunction **î** (so that, in order that), *e.g.*

Aogu ge ra ***!gawi***, ***î*** *gu* ***!kharu*** *(bi)*
men IND. pres ride **so that** they pass (him)
(The men are riding in order to pass him).

Application of the Flip-flop rule with Citation form, therefore, depends on word-internal syntax, for only such verbs serve as trigger which can serve in a compound as a post-

modifier denoting a resultant or intended action. Such a post-modifier can be a compound verb itself; cf. section 3.2.1.1.6.[36]

Below follows a list of roots that were found to trigger the Flip-flop rule with Citation Retention in the *Khoekhoegowab Dictionary*. Although it cannot claim to be exhaustive (while the Dictionary is not yet completed), it should be a fairly comprehensive list. As the machine-readable database brings total perusals of the corpus for *non*-initial morphemes within reach of the achievable (a task that takes even a PC over fifty minutes per search), each root that was examined, could be checked through the entire dictionary. It was found that - unless specifically stated below - if a root serves as trigger at all, it always does so. Flip-flop does not apply if the initial root is a noun root (section

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[36] Köhler (1989:114) has detected a similar compound construction in Kxoé, although tonologically it seems to behave differently. He mentions a productive construction in which the head-verb is the initial verb, and lists five verbs with a modifying function (quoted here without tone, my translations):

'ei	permansive	< (remain behind)
ma	applicative	< (give as present *obs.*)
xu	terminative	< (leave (behind))
xao	comprehensive$_1$	< (collect everything)
ǂhé	comprehensive$_2$	< (pour)

Köhler states that they loose their lexical tone. Tonologically this process seems to be akin to Sandhi in Khoekhoe, although in Khoekhoe these modifying verbs retain their Citation form in most instances, while triggering Flip-flop on the first verb.

Elsewhere (*op. cit.* 105) Köhler reports what seems to be the equivalent to Khoekhoe Flip-flop, a process that, according to Köhler, until then had been reported only for ǁAni by Voßen. Köhler reports that monosyllabic verbs of the low- and high-rising melodies ('TS' and 'MS') undergo a split, and he quotes examples with the 'auxiliary' verb *hâa*, which is a trigger in Khoekhoe as well (section 4.2.2.4). He assumes, however, that the split is pre-programmed into the verb:

'daß im Tonem des einsilbigen Verbs eine die Morphologie steuernde tonale Divalenz vorprogrammiert ist'.

3.1.1) - which seems to be further support for the assumption that Flip-flop is a process not "pre-programmed" into a verb, but triggered by the semantic juncture that holds between the constituents; *i.e.* the word-internal syntax comprising a modifier of result. Certain verbs, *by virtue of their semantic content*, are prone to serve as such post-modifiers.

Each root below is illustrated with one compound only. This is no reflection of its productivity, as this can vary considerably, varying from one instance on record to being fully productive. It is clear from the list that all melodies are involved, albeit to differing extents.[37] This is further evidence that Flip-flop is not dependent on tonological context.

/12/

	dǎwà	(turn around *v.t.*)
43 12	*ùűdǎwà*	(take back (s.thing lent))
	hǎà	(come, arrive)[38]
32 12	*ɬgàèhǎà*	(pull closer)
	/gǒrà	(separate *v.t/i.*)
32 12	*àò/gǒrà*	(throw apart)
	/hűù	(meet, congregate)
43 12	*!khòé/hűù*	(flock together)

---

[37] As all compounds in this section are of the **fr** tonological type, this is not stated explicitly after each input specification, unless a contrast is to be pointed out.

[38] See also */khîî*.

			ǁnâã/ǁnää	(let go (s. held), leave alone)
12	12		*!nǎóǁnâã*	(unload (vehicle))
			!hõõ̀	(bend, fold *v.t/i.*)
24	12	**fr**	*!khǎá!hõõ̀* [N.]	(chase s. around)
24	12	**cs**	*!khàa!hòn* [D.]	(*ditto*)[39]
			ǂnǎmì	(surround)
32	12	**fr**	*ǂgàèǂnǎmì*	(draw a circle)
43	12	**fs**	*ǂnûũ̂ǂnàmì*	(sit around something)

/13/

			bẽé	(disappear)
43	13		*!khòébẽé*	((run away)
			gǎ(r)ú	(be on the way/move)
12	13		*dõégǎú*	(be in the process of moving household/treking
			khẫí	(rise, get up)
32	13		*ǂkhẫàkhẫí*	(push up, jack up)
			khũ̀ú	(go/cross over (elevation))
32	13		*!àwàkhũ̀ú*	(climb over)
			!gǎrú	(scatter, disperse *v.i.*)
43	13		*!òrõ!gǎrú*	(disintegrate from age/use)
			-!hũ̂ṹ	(compete) not used independently
43	13		*!khòé!hũ̂ṹ*	(run a race)
			!gǎnú	(penetrate)
43	13		*ǂàñ!gǎnú*	(know through and through)
			!khǎú	(become mad/insane)
43	13		*!hòã!khǎú*	(gabble incoherently)

/22/

			!àrì	(bec. obliterated)
32	22		*!gûù!àrì*	(disappear without a trace)

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[39] *!Hõõ̀* is unusual in its behaviour and of dubious status concerning Flip-flop. Flip-flop applies only in the Nama dialect, not in Damara. It is particularly unusual that the resilient melody /24/ switches in this case. The present manifestation is the only case on record.

	‖***khùì***	(miss (s.thing lost/absent), hence: struggle to ...)
43 22	*ôa̋‖khùì*	(search for s. in vain)
??	***-!àrì***	(do completely/unperturbed/incessantly) not used independently
32 ??	‖*gàò!àrì*	(bec. chronic (of festering wound))
	-!a̋àpḗ	- not used independently
32 ??	*!gûù!a̋àpḗ*	(make a round of visits)
	!gàù	(leave over)
43 22	‖*òó!gàù*	(survive as the only one)
	!ga̋ù	(cross (*e.g.* river); get drunk)
12 22	*!nàrí!ga̋ù*	(drive across)
	ǂa̋ù	(bec. sufficient/enough)
12 22	*/gǎíǂa̋ù*	(bec. strong enough)
	ǂgàà	(insert)
12 22	*!nǎóǂgàà*	(load (goods) into s.)
	ǂga̋à	(enter)
43 22	*tsòóǂga̋à*	(sink in completely)

<u>/24/</u>

	hàwű	(eat up, consume)
32 24	*ààhàwű*	(drink up)
	sùrű	(dangle, be suspended)
32 24	*àòsùrű*	(swing on a swing)
	tsàű	(bec. exhausted/worn; bec. soft)
32 24	*!gûùtsàű*	(exhaust oneself by walking)
	xùű	(let go, abandon)
32 24	*àòxùű*	(throw away)
	/ûù	(stop doing, leave off)
32 24	*/àn/ûű*	(stop smoking (of fire))

The latter root is fully productive with any verb.

	/gàrá́	(do extensively/incessantly)

See */gàrá́* under section 3.2.1.1.2 for compounds with Citation and Sandhi form respectively.

	/hàó	(meet, come together, unite)

See also under section 3.2.1.1.2.

	/khàĭ́	(be absent/away)
43 24	*/òrő/khàĭ́*	(wear out completely)
	/khìĭ́	(come)
12 24	*/nǎ̀é/khìĭ́*	(come trotting/jogging up)
	||àñ́	(become wedged in)
43 24	*nâ̌ã̌||àñ́*	(lock jaws on s.)
	||à(r)é́	(be together)
12 24	*tsǜní||àré́*	(fuse (by melting))
	||àwó́	(become firmly stuck, jam)
43 24	*mâ̌ã̌||àwó́*	(stand firmly/securely
	||gàú́	(show)
32 24	*/gûù||gàú́*	(demonstrate to s.o. how to walk)

The resultative meaning of the latter compound is not quite evident; yet it employs Flip-flop.

	||gô̌ã́	(descend)
43 24	*ǂhàró||gô̌ã́*	(climb down)
	||khòwã́-ám̀	(open, unlock)
12 24+43	*dǒá||khòwã́-ám̀*	(tear open)
	!àã́	(spread out (to dry))

See under section 3.2.1.1.2.

	!khàǐ	(cold)
13 24	*!hürí!khàǐ*	(get the shivers (from fright))

That this single instance with *!khai* represents a covert switch with the resilient melody **/13/**, can be deduced from the fact that the second root retains its Citation form.

	!khàrű́	(pass, go past)
32 24	*ûì!khàrű́*	(live through/survive (ordeal))
	ǂòǎ́	(go out)
32 24	*ûìǂòǎ́*	(have a narrow escape, come out alive)

/32/

	óà	(return, go back)
12 32	*hõ̀ó-óà*	(recover/ get back (lost item))
	únù	(redirect, reposition)
43 32	*xòǎ́-únù*	(rewrite, edit)

See section 3.2.1.1.2 for *únù* with Sandhi form.

	!óà	(become full, fill *v.i.*)
32 32	*àà!óà*	(drink one's fill; bec. drunk)
	!gúù	(approach, draw near to s.)
43 32	*mâǎ́!gúù*	(stand close(r) to s.)
	ǁǎ̋à	(satisfy one's hunger)
32 32	*ààǁâ̋à*	(drink one's fill of s.thing nourishing)
	ǁkháè	(head off, turn back (moving animals); block way)
43 32	*ǂnùűǁkháè*	(obstruct *e.g.* passage by sitting in it)
	!áwà	(climb onto, ascend)
32 32	*!khàrà!áwà*	(haul/drag up)

	!gáò	(cut)
12 32	*!hòḿ!gáò*	(jerk apart (rope/chain)

/43/

	hoó	(find, receive)
12 43	*ŧnòáhőó*	(score a hit (with bullet/stone)
	ĭí	(pass)
32 43 43	*!gûù-ĭí/kháà*	(walk past s., pass by)
	khűrú	(make a hole right through)
32 43	*!gàòkhűrú*	(cut hole in/through s.)
	mắá	(come to standstill; stand still)
32 43	*ŧgàèmắá*	(stand and tug at s. immovable)
	mắí	(set up, erect)
32 43 **fr**	*òm̀mắĭ*	(erect (*e.g.* monument) *v.t.*)

Compare the figurative use where the verb *óm̀* (build) is taken in its nominal sense of *óm̀.s* (house) and hence does not employ Flip-flop:

32 24 **cs**	*óm̀mâì*	(set up home, *i.e.* get married *v.i.*)
	sáá	(miss mark, fail to hit)

Saa is a fully productive root and is used with practically any verb to denote "(do) wrongly" or "fail to ...".

43 43	*mì`ĭ́sáá*	(mispronounce, say wrongly)
	sĭ́í	(arrive (at destination away from speaker))

Sii is very unusual in its behaviour in that it may undergo Flip-flop itself (in two instances), being the modifier in second position. The reason for this is not obvious, al-

though occasionally a need for contrastiveness seems to be the motivation.

43 43	**fr**	*!òǎsíí,*	(come face to face with)
	fs	*!òǎsíì*	
24 43	**cr**	*ùűsíí,*	(take away to some place)
	fr	*síí-ùű*	

Although evidence is not conclusive, it is assumed that the above compound does not employ *űú* (take). Rather, it seems to use the bound root *ùű* (take s. somewhere), cf. footnote 31, above on the cognate in Kxoé. See the following for contrastiveness:

43 43	**cf**	*űúsìí*	(fetch).

More words with this unusual pattern but with no contrastive equivalent are

43 43	**cf**	*/hűrúsìí*	(go and play! - *as command*)
13 43	**cf**	*ǁnâ̋ûsìí*	(go to find out/enquire)
		tőá	(conclude; come to an end)
12 43		*màátőá*	(cease giving; give away everything)

tsoá

The nature of this root is not quite obvious. Either it is a bound verb, or - more likely - it is the nominal root of *tsö̋á.s* (anus). Judging by its melody it also serves as input to the causative verb *tsöàtsòǎ* following hereafter (see also Flip-flop triggered by causatives, section 3.2.1.1.3). A further indication in favour of the noun is its unusual behaviour of using final Drop after Flip-flop.

43	13	**fd**	*tòā̋tsòa̋*	(come/finish last)
			tsʊ̀àtsòa̋	(begin, initiate)
32	13+caus		*!gʊ̋ùtsʊ̀àtsòa̋*	(depart; learn to walk)
			|ā́rí	(erase; extinguish)
32	43		*ǂkhàù|ā́rí*	(paint over)
			|hā́ná	(take away; rob)
43	43		*!khòó|hā̋ná*	(snatch something from someone)
			-|hó́m̀; -|hó́ǹ [N.]	(block) not used independently
43	43		*!khòó|hó́m̀*	(stop (*e.g.* blood) from flowing by exerting pressure)
			ǁgó́é	(lie down)
32	43	**fr**	*!khā̋àǁgó́é,*	(ambush in lying position)
12	43	**fs**	*dʊ̀éǁgóè*	(sleep over (on trek))

ǁ*Goe* exhibits quite varied behaviour, but for no apparent reason. The above are the only instances on record where it triggers Flip-flop, in the first case with an unusual option; in the latter with subsequent Sandhi. In other instances it involves regular Sandhi:

32	43	**cs**	ǁ*gáàǁgóè*	(lie in ambush)
			ǁgʊ́ʊ́	(lay/put down)
43	43		*!khòóǁgʊ́ʊ́*	(hold/pin down (when wrestling))
			ǁhʊ́ʊ́	(bec. holed, wear through)
12	43		*ǂnā̋ńǁhʊ́ʊ́*	(kick a hole into s.)
			!ó́á	(meet, encounter)
43	43		*!hòā̋!ó́á*	(contradict, backchat)
			!gā́ú	(throw/fling down; unseat (rider))
32	43		*àà!gā́ú*	(drink s.one under the table)

!gŏ́á (count, calculate; honour)

Only instances with covert switches are on record. The fact that *!gôa* retains its Citation form can be regarded as sufficient evidence for its triggering capacity, however.

24 43	*ǂkhàrǐ!gŏ́á*	(underestimate)
	***!khúwú**-ái*	(up-end s.thing hollow)
32 43	*!gûù!khúwú*	(knock s. upside down by walking into it)
	!nǎ́á	(exceed, be more)
12 43	*!nä̋ó!nǎ́á*	(overload (vehicle))
	-ǂuí	(... out) not used independently
43 43	*ǂàñǂúí*	(find out, investigate)
	ǂgáń	(close up (hole/crack))
43 43	*ǂgàé̋ǂgáń*	(enclose with fence, fence in)
	ǂkhaí	(wake up)
32 43	ǁ*gàòǂkhǎí*	(get out of bed in a bad mood)

3.2.1.1.2 Flip-flop followed by Sandhi

A less frequent verbal compound is a type, where Flip-flop on the first root is followed by a Sandhi form on the second root. The semantic difference between the two types of constructions, *viz.* with Citation Retention (**fr**) versus Sandhi (**fs**) after Flip-flop, can be regularly observed with the two verbs */hàó* and *!àá* respectively. Both are quite productive in either function.

/Hào (meet, unite) can occur with different meanings, depending on whether it appears in Citation or Sandhi form (the distinction is parallelled in ǁ*àré̋* (be together):

	-/hàǒ	(converge)
	-/hàò	(do jointly/together).
32 24 **fr**	*!gûù/hàǒ/*	(encounter, come upon one
	-llàré	another (by chance))
32 24 **cs**	*!gûù/hàò/*	(walk/go together)
	-llàrè	

!Àá (spread out (to dry)), too, has different meanings, depending on its function in the compound :

	-!àá	(separate, scatter)
	-!àà	(reduce original by removing some of it).
12 24 **fr**	*/gȍrá!àá*	(dismember (carcass), divide into pieces)
12 24 **fs**	*/gȍrá!àà*	(lessen by removing excess)

When Flip-flop is followed by Sandhi in verbal compounds, the second root also is the modifier, although with a semantic difference. While in the previous compound with Citation Retention the second verb denotes a *result*, the present compound with the Sandhi form denotes an adverbial modification of *manner*, although this is less transparent.

Some roots lend themselves particularly well to this function, just as others lend themselves to serving as "resulting" action; *e.g.*

	-ma = [*mɑ̃́á*]	(stand)

Compounding with *-ma* (... about/around) is very productive. Although the orthography treats this morpheme as a monosyllabic suffix, it is the Sandhi form of the root *mɑ̂́á* (come to

a standstill, stand still), *i.e.* a modifier of manner. Cf. below for *mâ̋á* in its verbal sense.

12 43 **fs** *ɬnaama* = [*ɬnáámâà*] (dance about)

únù (redirect, reposition)

Únù more often than not employs Sandhi after the initial Flip-flop. With the exception of the following pair, the Sandhi version is not used as a contrast to the regular Flip-flop+CR compound (**fr**); *i.e.* the other manifestations occur singly, either with Sandhi or Citation form. The semantic constitution of this compound indicates that the first root is subject to a vacuous application of Flip-flop.

24 32 (**f**)**s**	*ɬgàǐ-ùnù*	(change name of s., *i.e.* call s. *differently*) - manner
24 32 (**f**)**r**	*ɬgàǐ-únù*	(call (s.o.) to repentance, *i.e.* call s.one *in order to* change) - result
		(call (s.) with disguised voice)

The following examples are instances of overt Flip-flop, one with optional variants:

32 32 **fr/s**	*ɬgàè-únù*, *ɬgàè-ùnù*	(change direction/course of s.)
32 32 **fs**	*òm̀ùnù*	(make alterations (to building); build differently (from original plan))

/gàrá́ (do extensively/incessantly)

Although semantically the two versions of */gara* are not obviously related, their melodies do suggest that it is the Citation and Sandhi form of one and the same verb:

-*/gàrá́* (do extensively/incessantly);
-*/gàrà* (hinder/prevent from doing)

Both versions are quite productive.

43 24 **fr** *kòó́/gàrá́* (keep an eye on)
43 24 **cs** *kó́ó/gàrà* (prevent s.one from looking)

The following examples involve roots that occur as post-modifiers of manner within compounds. Where contrasts are on record, at least one has been included to enhance the understanding of the nature of the modification. It is apparent that the compound with the Citation form has the original meaning of the second verb (being the "result"), while the one with the Sandhi form has a derived meaning that is not as transparent.

sá́ó (follow closely)
32 43 **fs** *!khàràsáò* (follow s. while dragging s.else)
12 43 **fs** ||*nə̀́ésáò* (follow (lead singer))

tòó́ (variegated, mottled)
12 24 **fs** *ǂnʉ̀útòò* (mottled black)

má́á (come to standstill; stand still)
43 43 **fr** *!khòé́má́á* (run/travel at top speed - albeit comparatively slow; give out after going at high speed)
43 43 **fs** [*!khòé́má́ə̀*] (run about; cf. above: *-ma*)

		/hűrú	(play)
12	43	**fs** *ǂnõ̀á/húrù*	(throw/shoot in play)
		ǁgànĩ́	(reddish brown and white)
12	24	**fs** *ǂnũ̀ú||gànì*	(piebald, black and white)
		!ő́á	(meet, encounter)
43	43	**fs** *ǂnàű́!óà*	(beat back (calf, while milking)
43	43	**fr** *ǂnàű́!ő́á*	(hit back, return a blow)
		!gűũ̀	(go, walk)
43	32	**fs** *ǂnűű́!gűũ̀*	(go to sit down)
		!khő́é	(run)
24	43	**fs** *!nã̋á!khóè*	(run/hurry to s.one's rescue)

This is an exceptional case of bilateral Flip-flop with /24/.

		ǂòã́	(go out)
43	24	**fs** *ǂnàű́ǂòà*	(break out/appear (of rash)) (cf. Afrikaans: uitslaan)
		ǂgáògù	(pass each other/meet (on way))
32	32+2	**fs** *ààǂgàõ̀gù*	(move about in drinking-crowd)
		ǂnãm̀ì	(surround (enemy))
43	12	**fs** *ǂnűű́ǂnàmĩ̀*	(sit around s.thing)

3.2.1.1.3 Formation of Causative Verbs with /21/

Causatives in Khoekhoe are formed by an apparent reduplication of a root; however, with special tonological behaviour. As Marantz (1982:436) points out, reduplication should best be treated not as a constituent copying process but as a normal affixation process:

> "there is nothing special about reduplication other than the resemblance between the affix and the stem to which it is added".

This is also the case in Khoekhoe. It is a compounding process similar to the one described in the previous section, whereby the second root acts as a modifier of the first root.[40] The second, modifying root still expresses the resulting action, be it transitive or intransitive. Causativization has its special tonological behaviour, by virtue of which a compound with identical roots is recognized as a causative. It employs *bilateral* Flip-flop[41] (**f**), and - significantly - final Drop (**d**) on the second root. By virtue of this Drop it is distinguished from other reduplications, *viz.* the "progressive" and verbs of pretence; cf. the following sections. The Drop in this verbal compound seems to be indicative of the fact that it is the object that undergoes the action denoted in this root, for this is also the case in compound verbs that comprise the action of the object next to that of the subject; cf. section 3.4.2. The Sandhi form ($\mathbf{f}_s$) of the entire compound is quoted underneath each Citation form ($\mathbf{f}_c$); cf. Table 11 on p.99 for the Sandhi forms.

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[40] To make a principled difference between the juxtaposition of identical roots and non-identical roots is as trivial as differentiating between "long vowels" (derived from juxtaposed identical vowels) and "diphthongs" (derived from juxtaposed non-identical vowels) in Khoekhoe phonology; cf. section 2.1.2.

[41] As elsewhere, the tonological rules are no longer applied very consistently in the causative by the younger generations. Some speakers apply unilateral Flip-flop here or are even inconsistent. Even my informant provided optional alternatives in some cases, *e.g.*

22caus **f/cd** *!áì!àǐ, !àì!àǐ* (expose s. by clearing surroundings).

12		***!hə̏à***	(bent, curved, crooked *a.*)
12caus	**f$_c$d**	*!hə̏á!hòà*	(bend, curve *v.t.*)
	f$_s$d	*!hə̏á!hòà*	
13		***!hə̏rá***	(crippled, deformed; maimed *a.*)
13caus	**f$_c$d**	*!hə̏rà!hòrà*	(cripple, maim *v.t.*)
	f$_s$d	*!hòrà!hòrà*	
22		***gòn̄***	(move; quiver *v.i.*)
22caus	**f$_c$d**	*góǹgòn̄*	(set in motion; move (to and fro) *v.t.*)
	f$_s$d	*gòn̄gòn̄*	
24		***sâa***	(rest *v.i.*)
24caus	**f$_c$d**	*sâ̌ásầà*	(allow to rest *v.t.*)
	f$_s$d	*sâàsầà*	
32		***sóm̀.mi***	(shade *n.*)
32caus	**f$_c$d**	*sòm̀sòm̀*	(make shade by erecting s.thing; cast a shadow *v.t.*)
	f$_s$d	*sòm̀sòm̀*	
43		***!gű́í***	(one *num.*)
43caus	**f$_c$d**	*/gùí̌/gùì̈*	(unite, consolidate; order *v.t.*)
	f$_s$d	*/gùì/gùì̈*	

As the melody of the second root is /21/ irrespective of the Citation melody, the semantic identification depends entirely on the melody of the first, head root. The second is a post-modifier even tonologically, in that the /21/ Drop marks the *causative* modification of the compound.

3.2.1.1.4 Formation of Verbs of Pretence with /24/

Another verbal compound making use of apparent reduplication is what is here termed the verb of pretence, as the resultant meaning of such verbs is "pretend to ...", "sham/feign ...". These verbs furthermore add the reflexive verbal ex-

tension -*sèn*. Verbs of pretence in most cases employs unilateral Flip-flop, though certain instances with resilient melodies are on record. The distinctive difference is that the profile on the repeated root changes to /24/ irrespective of the original Citation form. This rise is quite marked, especially in the higher variant with a close V_2 or nasal C_2 (Fig. 20). But as this is a regular occurrence, the melody can be considered to be tonemically /24/.

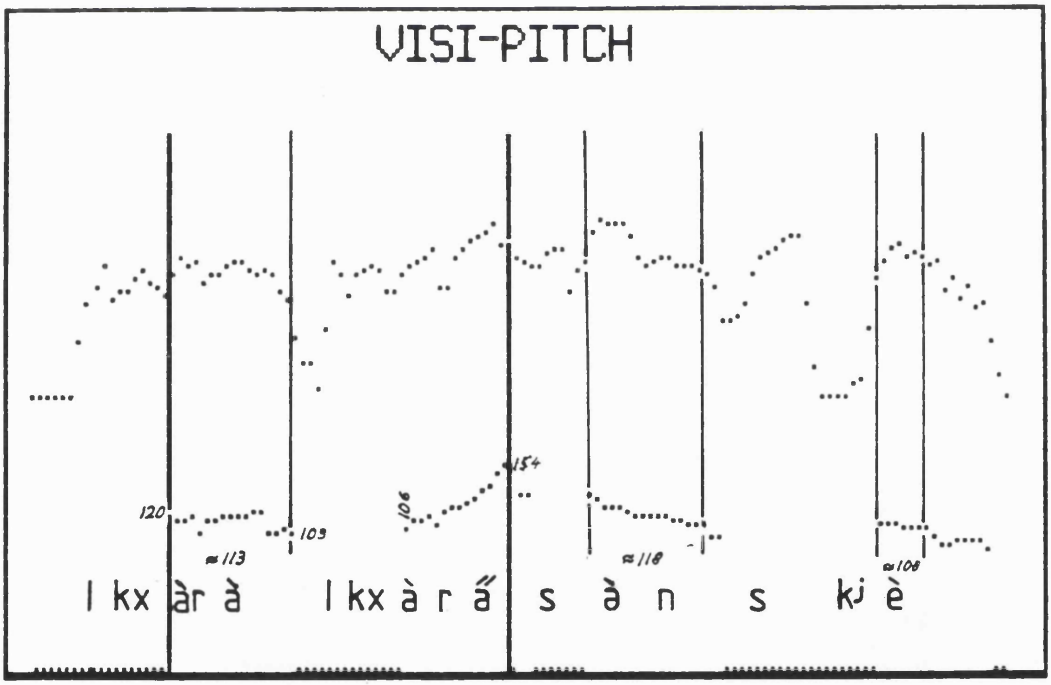


Figure 19a: Verb of Pretence (less rising, Citation): /*khàrà*/*khàrá̋sèn* (pretend to change one's ways)

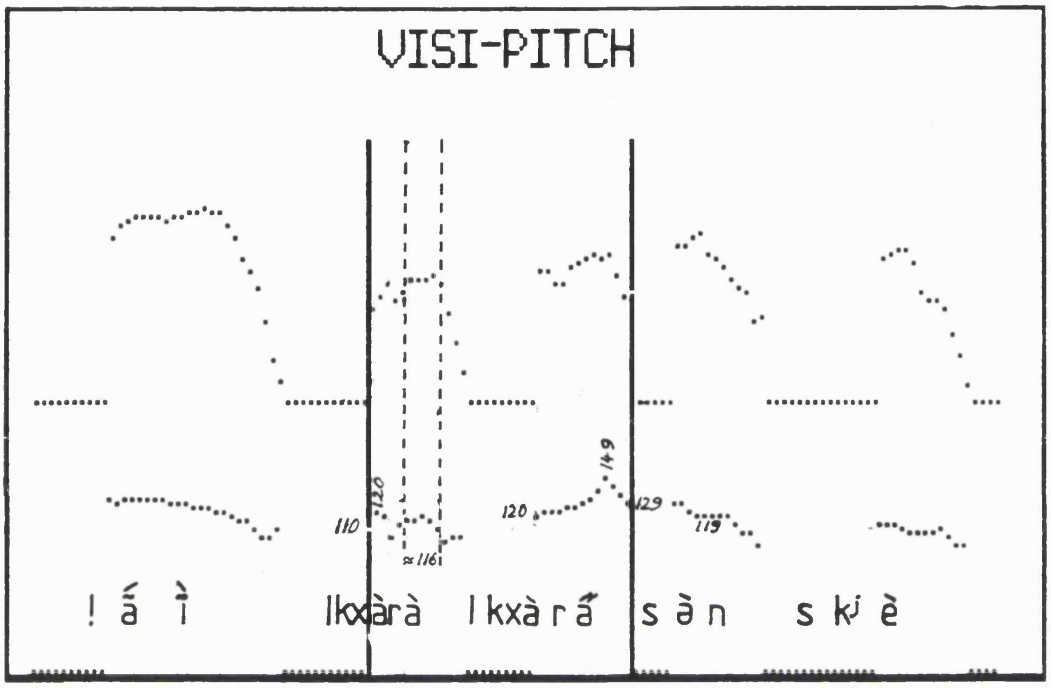


Figure 19b: Verb of Pretence (less rising, Sandhi):
/khàrà/khàrásèn (pretend to change one's ways)

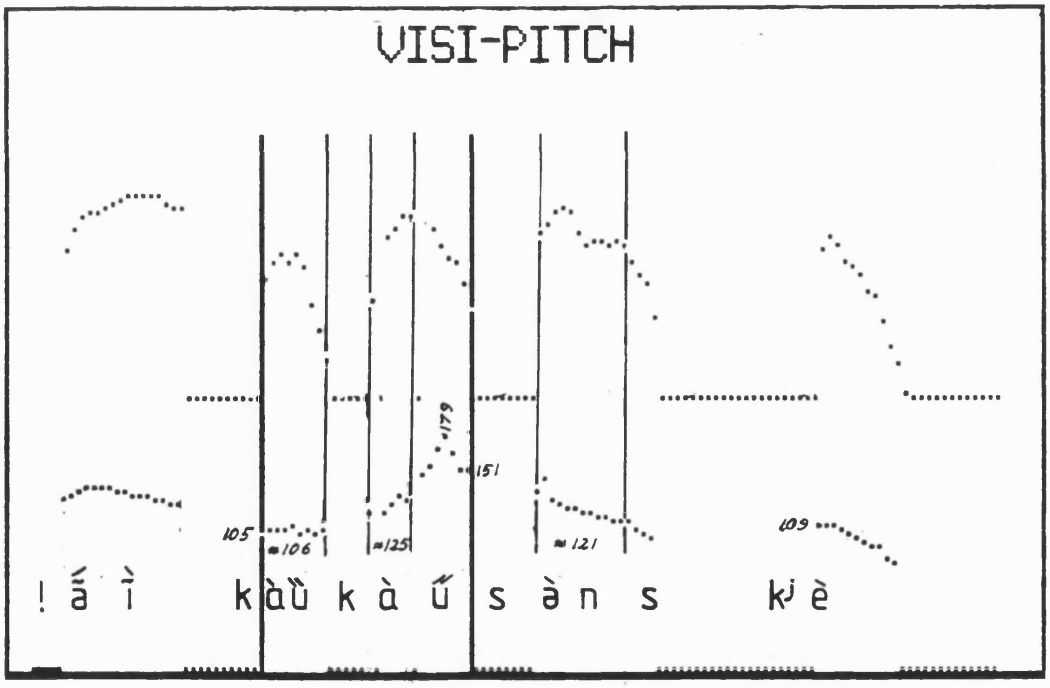


Figure 20: Verb of Pretence (higher rising, Sandhi):
gàùgàúsèn (pretend to hide)

Verbs of Pretence:

12ost	**fh/ch**	*gə̈úgàűsèn/ gə̈ùgàűsèn*	(pretend to hide)
13ost	**fh**	*khə̈ùkhùűsèn*	(puff o.self up w. anger)
22ost	(**f**)**h**	*/khàrà/khàrə́sèn*	(pretend to change o.s.)
24ost	(**f**)**h**	*tàrə́tàrə́sèn*	(act like woman (of girl))
24ost	**fh**	*tsə́útsàűsèn*	(sham tiredness)
32ost	**fh**	*àò-àősèn*	(imitate adult (of child))
43ost	**fh**	*ǂgàĭ́ǂgàĭ́sèn*	(behave ostentatiously)

Further derivatives like infinitive nouns can be based on such verbs, or adjectives by means of the derivative suffix *-xə̀* (wh. is prone to ...); *e.g.*

24ost	**fh**	*ə́ú-àűsèn.s*	((emotional) bitterness *n.*)
12ost	**fh**	*/gə̈á́/gàĭ́sènxə̀*	(who habitually poses as being strong *a.*)
12ost	**fh**	*/gə̈á́/gàĭ́sèn-xə̈sə̈̀.b*	(habit of posing ... *n.*)

Certain derived adjectives employ the same reduplication with the /24/ melody, followed by the adjectival derivative suffix *-sə̀*. Such adjectives have the meaning "wh. can be ...ed" or "...able/ible"; cf. p.205.

3.2.1.1.5 Formation of Progressive Verbs with /22/

The third type of compound based on reduplication is the progressive. This construction employs unilateral Flip-flop on the first radical, and - as semantically distinctive characteristic - the /22/ melody on the second radical (**1**

for "Low"). Progressive verbs are always intransitive (unless made transitive by a further radical or the applicative extension *-ba*) and denote "turn (into) ...". Especially with ethnonyms it is understood mainly derisively: "degenerate into a ...".

12	*!gǟà.b*	(servant)
12prog **fl**	*!gǟá!gàà*	(bec. spattered/dirty (like servant))
13	*/nǒré.b*	(ghost, apparition)
13prog **cl**	*/nǒré/nòrè*	(turn into a ghost)
22	*Sàà.-i*	(Saan-person, Bushman)
22prog **cl**	*sààsàà*	(become Saanized/a Bushman)
24	*!nàrḗ.b*	(hail, ice)
24prog **cl**	*!nàrḗ!nàrè*	(freeze, turn into ice)
32	*!khā̂à.b*	(soot, smoke/nicotine stain)
32prog **fl**	*!khā̂à!khā̂à*	(bec. discoloured from smoke)
43	*/hűú.b*	(distress, claustrophobia)
43prog **fl**	*/hùű/hùùsà*	(distressing, annoying *a.*)

Three roots, *ǂkhűú*, *kùwű́* and *!gṓā̋* behave exceptionally in that they employ the progressive formation (*i.e.* reduplication with /22/) to form *transitive* verbs, which in effect are semantically equivalent to causatives. One of these roots, *ǂkhűú*, behaves furthermore exceptionally, in that it does not undergo Flip-flop, despite of having a weak /43/ Citation form. Nothing can be concluded about the behaviour of *kùwű́*, as it has a resilient melody. The reason for the behaviour of these two roots may be that they are already transitive themselves.

43	***ǂkhűú***	(kill (vermin) by squashing under nail *v.t.*)
43prog **cl**	*ǂkhűú ǂkhùù*	(crush/smash (esp. stone) *v.t.*)

Compare this to the practically synonymous regular causative derived from the *in*transitive counterpart:

22	***ǂkhùù***	(crumble/collapse under pressure *v.i.*)
22caus **fd**	*ǂkhúù ǂkhùù*	(crush/smash ... *v.t.*)

24	***kùwű***	(beat up, finish off)
43	*khõ̋á*	(break, fracture *v.t.*)
43 24prg **fcl**	*khõ̋á kùwű kùwù*	(shatter/break completely *v.t.*)

43prog **fl** *!gõ̀á!gõ̀à* (calculate (mathematically))

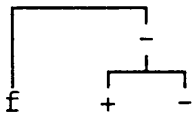
- Whether the use of the /22/ melody in these intransitive progressive compounds, is significantly connected to the use of the non-depressed melody /22/ for intransitive verb derivation, must remain speculation at this stage (cf. section 3.6).

3.2.1.1.6 Flip-flop in Multi-radical Verbs

The fact that Flip-flop can be triggered by embedded compounds themselves is further proof that the trigger-function is not *per se* "pre-programmed" into a root, but that it is triggered by the *post*-modifying function that a constituent within a compound may assume. In the following example the

post-modifier serves as adverbial extension of "manner", leading to the Sandhi form of the compound:

32 32 22 **f**[**s**(**s**)]



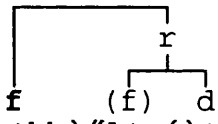
!gûù[*sòrè↓gâà*]
(walk *until* sunset, walk all day)

Cf.

32	*!gûù*	(go; walk)
32	*sórè.s*	(sun)
22	*↓gâà*	(enter; set (of sun))
32 22 **cs**	*sórè↓gâà*	(pass/spend a day)

Causatives themselves can cause or not cause further unilateral switching, depending on whether the causative reduplication has a post-modifying function denoting the "result":

43 22caus **f**[**fd**]$_{\mathbf{r}}$



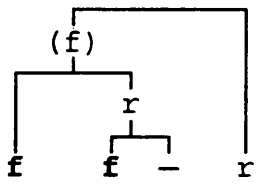
!khòó[*!géè!gèè*]

Cf.

43	*!khóó*	(hold; catch)
22	*!gèè* [D.], *!gàè* [N.]	(calm down, compose o.self)

As mentioned in observation d) on p.164, the actual switching effect of the Flip-flop rule applies vacuously to the initial constituent if it is a compound itself. The following example is an instance of a threefold application of the Flip-flop rule, though only two overt switches occur. The switch embedded deepest is overt, being triggered by the grammatical formative *-xà*, which indicates that in certain

deictic verbs of movement the movement is in the direction of the speaker; thus *ǂoáxa* (*come* out). The second switch (*!khoe*) is also overt, as it is a single root. But the highest switch is blocked by the fact that the head-verb now is a compound.



43 24 1 24 [*!khòē*[*ǂōáxà*]]*xùū*
(come running out of (*e.g.* house))

Cf.

24	*ǂòā*	(go out)
43	*!khōé*	(run)
24	*xùū*	(let go, abandon)

3.2.1.2 Flip-flop triggered by Grammatical Formatives

A limited number of grammatical formatives trigger Flip-flop. It may be for contrastive reasons, as several of them need to be distinguished from homophones.

3.2.1.2.1 Applicative Verbal Extension *-bà*

Of the four verbal extensions that Khoekhoe employs, one, the applicative *-ba* (do for, do on behalf of) triggers unilateral Flip-flop. The suffix itself never undergoes any change.

12 > 13	*!nə̀rì* (drive)	>	*!nə̀ríbə̀* (drive for)
13 = 13	*ű́rí* (jump)	>	*ǜríbə̀* (jump for)
22 = 22	*sàrì* (visit)	>	*sàrìbə̀* (visit for)
24 = 24	*!nàrǐ́* (steal)	>	*!nàrǐ́bə̀* (steal for)
32 > 22	*óà* (return)	>	*òàbə̀* (return to)
43 > 24	*kű́rú* (make)	>	*kùrű́bə̀* (make for)

This verbal extension even affects the tone of certain grammatical formatives, *viz.* *-be* and *-sǐ*. This is rare in Khoekhoe.

43 **f**	*ǂkhàwǐ**bè***		(use (s.thing) as cushion)
	*ǂkhàwǐ**pé**bə̀sèn*		(use (s.thing) as cushion)
*13	*hə̀ìsǐ*	*v.i.*	(send message)
	hə̀ìsíbə̀	*v.t.*	(send message for/to)

The applicative *-ba* even affects the tone of certain causative reduplications: The typical /21/ melody of the second root changes to /22/; *e.g.*

13+caus	*də̀nàdànə̀*	(walk at head of/lead (anim.s))
	*də̀nà**dànà**bə̀hə̀.s*	(guidance)
43+caus	*àǐ-àibə̀*	(lead, walk in front of)

The reason why /21/ switches to /22/ is not apparent, unless one wants to argue that /21/ is the depressed version of /32/, which is the regular Flip-flop counterpart of /22/.

3.2.1.2.2 Internal Reflexive *-n-*

Khoekhoe has a productive process whereby certain verbs with

incorporated object can also accommodate a formative *-n-* with reflexive function. It is assumed that it is a reduced form of the reflexive verbal extension *-sèn*, though this full suffixal form does not trigger Flip-flop. *-n-* triggers Flip-flop unilaterally.

32 13 **c(s)**	*ǂkháùmûǔ*	(apply ointment to s.one's eye)
32 2 13 **f(s)**	*ǂkhàùǹmûǔ*	(apply ointment to one's own eye)

3.2.1.2.3 Directional Suffix *-xa*

This suffix modifies certain verbs of movement to mean "move in direction of speaker". Flip-flop is bilateral here, and seems to serve as a contrastive means to disambiguate these and deverbative adjectives with *-xǎ*. The latter denotes abundance of anything (who is in the habit of (doing)/ who frequently (does)) and does not trigger switch.

The directional suffix may possibly have its origin in the verb *xáà* (attack, close in on) with the Sandhi form /21/.

13	*khǜí*	(go/cross over elevation)
	khǜìxǎ	(come over elevation)
cf.	*khǜíxǎ*	(wh. frequently crosses ... *a.*)
22	*ǂgâà*	(go in)
	ǂgâàxǎ	(come in)
24	*ǁgôá́*	(descend, go down)
	ǁgôǎ́xǎ	(come down)
cf.	*ǁgôǎ́xǎ*	(inclined to go down)
24	*ǂkhèré́*, *ǂkhé́réxǎ*	(appear, become visible)

3.2.1.2.4 Verbalizing Suffix *-sɨ̀*

In a few cases listed below a verbalizing suffix *-si* modifies stems in a way which seems to escape a generalized semantic rendering. All derivatives - with the exception of *tôasi* - are transitive verbs. The transitive verbs all denote some action that processes something. This suffix *-sɨ̀* triggers bilateral Flip-flop (but cf. *bɑ̀á*), and is distinct from the adjectival suffix *-sɨ̀*, which never triggers Flip-flop.

12		*dɑ̀ì*	*v.t.*	(suck (milk from teat))
	f	*dɑ̀ísɨ̀*		(suckle; breast-feed)
13		*bɑ̀á.b*	*n.*	(vegetable dye made from bark)
	c	*bɑ̀á(sɨ̀)*	*v.t.*	(dye/bark (tanned skin)
24		*xàú*	*v.i.*	(defecate)
	f	*xáúsɨ̀*		(empty (intestines of slaughtered animal))
24		*tôã̋*	*v.t.*	(do without, fall short of)
	f	*tôã̋sɨ̀*	*v.i.*	(pass away, die)
12		*dɑ̀à*	*v.t.*	(step, tread)
12 **24**	**ff$_s$**	*dɑ̀átôàsɨ̀*	*v.t.*	(fall short of matching (s.one's) stride)
23		*màrí.b*	*n.*	(money)
23 24	**cf$_s$**	*màrítôàsɨ̀*	*v.i.*	(be short of money)
13		*!hɯ̀ú.b*	*n.*	(earth, soil)
24		*!nòmá.b*	*n.*	(root)
13 **24**	**cf$_c$**	*!hɯ̀ú!nṍmásɨ̀*		(uproot; eradicate)
24		*ǂûű́*	*v.t.*	(eat)
24		*ǂűűsɨ̀*		(feed/spoonfeed (person))
32		*áà*	*v.t.*	(drink)
		ààsɨ̀		(water (anim.); feed liquid to (child/invalid))

The following verbs can be inferred to be of the same type, even though the roots in isolation do not exist:

*12	*sə̀rósɨ̀*	(slit open (abdominal skin of animal))
*13	*hə̀ìsɨ̀* v.i.	(send message)
12 43 *13	**csf.** *hə̀rà-ámhàìsɨ̀* v.t.	(squander through mismanagement)
*13	*khə̀àsɨ̀*	(head off (animals); separate from rest)

Cf. *khə̀á.b* (war, animosity)?

*24	*!ɔ̋ásɨ̀*	(tend/herd (animals))
*24	*!khə̋résɨ̀*, (*!khə́résɨ̀*)	(treat w. respect)

In the following instance the Flip-flop rule is blocked by the fact that *-si* is suffixed to a compound as opposed to a single root:

12 43	[*ɬhɔ̋ə̀-ám̀*]*sɨ̀*	(ask (traveller) for news).

3.2.1.2.5 Suffix *-pə́/-bə̀*

The suffix *-pə́/-bə̀* has a rather diverse nature, in that it can function as adverbial derivative, as enumerative and nominal suffix, and to a limited extent even with verbs in a semantic capacity that is not quite obvious. See also the discussion of *-be/-pe* in the formation of trisyllabic verbs, section 2.2.3.3.1 above. Cases like */gàm̋mə̀sèn*, which is synonymous with the causative */gàm̋/gàm̋sèn* (warm oneself), indicate that */-be/* provides transitivity for one additional argument in certain contexts; but against that see *!gə́ró*. (The suffix assimilates fully after nasal consonants, hence *-me*, *-ne*.) An allomorph with a /4/ tone exists next to one with /1/. The limited number of occurrences does not allow

a reliable statement on their tonal distribution. As is the case with *somme/sonne* (cast shadow over s.) below, the variant may even be facultative.

Flip-flop seems to be bilateral with verbs, judging from the few instances on record. Neither with nouns nor adverbs is Flip-flop triggered, though. The adverbial suffix differs moreover, by having a Low tone: *-bè*.

12		*ǂhə̀ù.b*	*n.*	(fresh dung)
12	**f**	*ǂhə̀úpé*		(treat (cow) w. dung (by smearing on dugs to discourage calf))
43		*!khóó*	*v.t.*	(hold)
12		*/gə̀ì*	*v.i.*	(grow strong)
43 12	**ff**	*!khòó/gə̀ípé*	*v.t.*	(uphold (belief))
13		*!hǒró*	*v.t./i.*	(trickle)
13	**f**	*!hǒròbě*	*v.t.*	(let down/lower (*e.g.* rope))
24		*/gàĭ̋.s*	*n.*	(trad. Damara pantomime dance)
24	(**f**)	*/gàĭ̋pé*	*v.t.*	(sing desultorily; recite)
24		*ǂâĭ̋*	*v.t./i.*	(think about/of; think)
24	**f**	*ǂâĭ̋bě̀sèn*	*v.t.*	(think about (s. specific))
32		*kám̀*	*v.t.*	(take a sip of (liquid))
32	**f**	*kàm̀mě̀*	*v.t.*	(hold (liquid) in mouth)
32		*sóm̀.mi*	*n.*	(shadow, shade)
32 1/4	**f**	*sòm̀mě̀, sòm̀mé*	*v.t.*	(cast shadow over (s.))
		sòǹně̀, sòǹné	*v.t.*	(*ditto*)
32		*/gám̀*	*num.*	(two)
32	(**f**)	*/gàm̀mě̀*	*v.t.*	(double; pair off)
		/gàm̀mě̀.s	*inf.*	(reduplication)
		/gàm̀mé.s	*n.*	(pair of counters in "African chess"-game)
32		ǁ*kháà*	*v.t.*	(be able to (do), can (do))
32	**f**	ǁ*khààpésèn*	*v.t.*	(practise, teach oneself)
43		*/gáḿ*	*v.i.*	(heat up, bec. hot)

43	**f**	*|gàm̋mȅsèn,*	*v.r.*	(warm oneself)
	f	*|gàma̋bȅsèn*[42]*,*		(*ditto*)
	f	*|gàm̋|gàm̏sèn*		(*ditto*)
43		*!ga̋ró* [N.]	*a.*	(a little, a small quantity of)
43 43 1	**cf**	*|gű́í!gàrőbȅ*	*v.i.*	(come/go singly/ sporadically)

3.2.1.2.6 Verbalizing Suffix *-ro*

Khoekhoe to a very limited extent employs a kind of causative verbal suffix *-rȍ*. It is distinct from the two diminutive suffixes (*-rò* for nouns, *- rő* for verbs) firstly by its inherent tone, and, secondly by triggering Flip-flop.

13		*!hȍró*	(trickle)[43]
13	**f**	*!hȍròrȍ*	(suspend, let hang (*e.g.* rope))
24		ǁàí̋	(bec. wrinkled)
24	**f**	ǁa̋írȍ	(bec. creased/crumpled)
43		*|őó*	(stink, smell foul)
43 1	**f**	*|òőrȍ*	(cause to decompose (*e.g.* hide for tanning)

Compare the diminutives:

43 4	**c**	*|őórő*	(smell a little)
43 2	**c**	*|őórò.b*	(a bit of a bad smell)
43		*|gű́í*	(similar, identical *a.*; one *num.*)
	f	*|gùí̋rő*	(compare; weigh; match)

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[42] In this compound the original form of *|ga̋m̋, viz. |ga̋má* has been preserved.

[43] Cf. *!hȍròbȅ* above.

3.2.2 Flip-flop in Nominals

Flip-flop does not normally occur in compound nouns, unless they include constituents like compound verbs that themselves involve Flip-flop, or unless such nouns employ Flip-flop on an *ad hoc* basis for purposes of contrast or disambiguation. Illustration of the various cases will be presented now. One interesting type of monoradical noun is a noun by virtue of the derivative function of tone (section 3.2.2.3).

A type of noun that may coincidentally include Flip-flop in its lower derivational cycle of the verb, is the infinitive/gerund, or another type of abstract noun which is formed simply by attaching a N^d to the verb stem: the infinitive (*inf.*) takes the third person feminine singular ***s***, the abstract nouns either the feminine ***s*** or masculine ***b***; *e.g.*

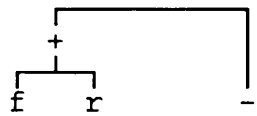
43 22 **fr**	*v.t.*	*!khòó‡gàà*	(take (s.thing) and put it in; accommodate)
	inf.	*!khòó‡gàà.s*	(to take ... and put in; to accommodate, accommodating)
	n.	*!khòó‡gàà.s*	(index of book)
	n.	*!khòó‡gàà.b*	(contents).

As this is a syntactic issue, it will not be discussed here any further.

3.2.2.1 Flip-flop in Derived Compound Nouns

Derived compound nouns are mostly based on verbs. These verbs can be employed in various ways in the derivation. Flip-flop then occurs in the derivational cycle of the embedded constituent, if it occurs at all, and is not essentially part of the noun-formation.

a) **Agents**



32 24 32 [**fr**]**s** [*!gûù/hàő*]$_{Vb}$-*àð.b*
go+together + man
(fellow traveller; camp-follower)

The Flip-flop in the above example is triggered verb-internally by */hàő* as discussed in section 3.2.1.1. A further discussion under nominals is thus superfluous. In the same way instrumental nouns (tools/implements) or nouns of locality are formed, as well as any kind of endocentric compound noun to which the verb is attached as a premodifier. A few examples should suffice (verbs in square brackets).

b) **Instruments**

43 2 43 32 [**fs**]**s** **[***kòőǹáì***]***xùǔ.s*
look+*refl*+on+thing
(mirror)

c) **Place**

12 24 32 [**fr**]**s** **[***!nǎrí‡òā***]***!khàǐ.s*
drive+exit+place
(turn-off; lay-by)

d) **De-adjectival Abstract Nouns**

43 32 2 1 1 **fr** [*!khòǒ-óàsèn*]*sa̰sɨ̰.b*
catch+return+*refl.*+*adj.*+*nom.*
(reservedness, introversion)

The above compound verb (literally: hold oneself back) is converted into an adjective by the derivative suffix *-sa̰* (or *-sá* for intransitive verbs), which in turn serves as input to the exocentric abstract noun formed by the derivative nominal suffix *-sɨ̰*. Neither suffix triggers any tonological response. This is a regular process. The suffix *-sɨ̰* can also be affixed directly to certain verbs.

3.2.2.2 Flip-flop in Endocentric Compound Nouns

In nouns where the qualifier and the head noun are compounded into one concept - similar to English "black bird" vs. "blackbird" - Flip-flop may be employed for the purpose of disambiguation. The perturbation of the head may be any one of three possibilities: none (*i.e.* CR), Sandhi or Drop. An alternative strategy, however, is to retain the Citation form in both the qualifier and the head (section 3.3.1). In a noun phrase, any head undergoes Sandhi if a qualifier precedes it (section 4.1).

In the present cases Flip-flop applies bilaterally.

12 24	**fs**	*!hǜní!òm̀.mi*	(lit.: blond pollard = praise name for German)
		**!hǜnì !òm̀.mi*	
12 24	**fd**	*!hǜní/àǒ.b*	(Cape cobra)
		!hǜnì /àò.b	(yellow snake)
12 43	**fr**	*!nărí!ǒó.b*	("rybyl", adze)
		!nărì	(drive *v.t.*)
		!oó.b	(axe)
13 12	**fr**	*ǂhǎùkhǒè.n*	(simple/common people)
		ǂhǎú	(even, smooth; plane)
24 24	**fd**	*ǎú-ànì.s*	(pied starling)
		àǔ ànì.s	(bitter bird)
24 12	**fs/d**	*/ǎwá/hǒă.b*	(caracal)
		/àwá /hǒă.b	(red cat)
43 24	**fs**	*kàǐ/àò.b*	(black mamba)
		kǎí /àò.b	(black snake)
43 13/23	**fd**	*!khòé-àrì.b*	(greyhound)
		!khǒé ra ǎrí.b	(a running dog)

3.2.2.3 Noun Derivation by Means of Flip-flop

Khoekhoe makes limited use of a tonological device to differentiate certain common nouns from infinitives/gerunds. As said before, the latter are formed from verbs simply by appending the N^d ***s***, without any tonal change. Common nouns may be derived furthermore by means of a distinctive melody, which - with one exception - is the Flip-flop alternative. This device applies bilaterally, and may even be applied in cases where the N^d is not the feminine ***s***. The following list comprises all instances on record.

Verb			**Noun**		
12	*dǟ̀wì*	(castrate)	13	*dǟ̀wí.b*	(herd of castrated anim.s)
				dǟ̀wírà̀.b	(castrated animal)
			cf.	*dǟ̀wì.s*	(castration)
12	*mū̃ù*	(see)	13	*mū̃ú.s*	(eye)
13	*gõ̀á*	(foam)	12	*gõ̀à.s*	(foam)
13	ǁ*hǟ̀wú*	(flame/flare up)	12	ǁ*hǟ̀wù.b*	(flame)
			but:	ǁ*kháwù.b* [N.]	
24	*tùű*	(rain)	43	*tű́ú.s* [D.]	(rain)
				tű́ú/nànù.s [N.]	
24	*/khā́má*	(bec. erect (of penis))	43	*/khā́ḿ.mi*	(semen)[44]
24	ǁ*ā̃ā̃*	(love; cherish)	43	ǁ*ā̃ā̃sà̀.s*	(girlfriend)
			cf.	ǁ*ā̃ā̃sà̀*	(beloved *a.*)
24	*ǂūű*	(eat)	43	*ǂű́ú.s*	(food)
32	*sáà*	(gather, glean)	22	*Sàà.b/-i/s*	(Bushman)
32	*ǂhṍà*	(report)	12	*ǂhõ̃à.s*	(report)[45]
43	*mī̃í*	(say)	24	*mī̃ī̃.s*	(word)
43	*/ā́wó*	(wear old clothes)	24	*/àwő.b*	(refuse)
43	*/gā́ú*	(put suckling to another dam; rhyme; *i.e.* make to fit)	24	*/gàű́.b*	(manner; melody; price)
43	ǁ*őó*	(die)	24	ǁ*òő.b*	(death; disease)
			24	ǁ*òő.s*	(epidemic)

Köhler (1989:116) observed similar derivations in Kxoé, including *tuu*, although he did not establish any regularity.

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[44] This is one of the fairly rare instances of elision of V_2 in a CV_1NV_2 root (according to Beach's "decomposition theory") where both reflexes are still preserved.

[45] This pair is exceptional in that it does not employ the regular Flip-flop association. It does, however, still exhibit regularity by reflecting the tonogenetic shift from /32/ to /12/ - an interesting instance of a transition "frozen" in the process. The initial consonant *ǂh* served as depressor; cf. Table 7.

3.2.2.4 Flip-flop triggered by Grammatical Formatives

Few nominal derivative morphemes exist, hence few instances of Flip-flop are to be reported. Most of them use Flip-flop on an *ad hoc* basis, primarily to establish contrast; see section 3.5.

-rə̀/-rə́

24	**f**	*ǂgə́érə̀.s*	(earring)
Cf.		*ǂgə̀ə́.s*	(ear)
43	**c**	*‖ű́írà.b* [D.]	(rich man)
	f	*‖ùfrə̀.b* [N.]	(*ditto*)
Cf.		*‖ű́í*	(thrive, gain weight)

Flip-flop in the following two nouns seems to be due to *-rə̀*, as the adjectival suffix *-tsí* is not normally a Flip-flop trigger. It is, however, unusual to have overt Flip-flop appear in compounds.

12 41	**f**	*də̀ótsfrə̀.b*	(blister beetle)
Cf.		*də̀ò*	(burn, singe)
12 41	**f**	*də̀wítsfrə̀.b*	(formicine ant)
Cf.		*də̀wì*	(castrate)

-bə̀

13		*khʊ̀ré.n*, *khʊ̀rèbə̀.n*	(brood of birds)
Cf.		*khʊ̀ré*	(hatch)
24		*!khű́rúbə̀.b*	(sour residue of butterfat)
Cf.		*!khùrű́*	(sour)
43		*!àmmè.b*	(yellow scorpion)
Cf.		*!ámmè*	(yellow)

3.2.3 Flip-flop in Compound Adjectives

Flip-flop can occur in three types of adjective: in multi-radical derivatives from verbs or nouns where Flip-flop is part of the derivational cycle of the embedded constituent; in endocentric compounds; and in mostly monoradical derivatives wherein the derivative morpheme triggers Flip-flop.

3.2.3.1 Multi-radical Derivatives

In this type of derivative the Flip-flop permutation is not essentially part of adjective formation, as it occurs lower down in the derivational cycle of the embedded constituent when it occurs at all. A few illustrations will thus suffice. This type of adjective is formed by any one of the three freely productive derivative morphemes that can be suffixed to nominal or verb stems, as the case may be. None of these formatives exercise any tonological influence - other than some exceptions reported below.

a) **-*xà̤*[46]** (Hagman 1977:32: "attributive") can be suffixed to either verb or noun stems to indicate abundance. With verbs it may be translated as "in the habit of ...", "quick to ...", "prone to ..."; with nouns as "rich/abounding in ...", "full of ..." or "...y". As nouns are not partial to Flip-flop anyway, Flip-flop occurs mainly in deverbal derivatives.

12 32 1	**fr**	*[!ná̤ǂgóò]xà̤*	(inclined to trot into hiding) (of esp. jackal))
32 13 1	**f?**	*[ààkhà̤nú]xà̤*	(given to drunkenness)
43prog	**fl**	*[ǂûûǂûù]xà̤*	(fertile, productive; fecund)

b_1) **-*sa*** is suffixed to transitive verbs and forms adjectives that in English are translatable as past participials or passives, *viz.* "(wh. h. been) ...ed" .[47]

43 32 1	**fr**	*[!khòó-óà]sà̤*	(withheld; retained)

There does exist a type of adjectival derivation with this suffix, though, that belongs in a special semantic category, and that does employ unilateral Flip-flop as part of the derivational mechanism after reduplicating the root. Like

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[46] One instance of *-xá* (with a double high tone) as adjectival derivative is on record, *viz.*

ǂìxá, ǂìsá (pretty, beautiful).

It seems, that this is formed by analogy to the suffix *-sá*, which follows on intransitive verbs. The adjectival suffix *-xá* should not be confused with the Flip-flop-triggering directional suffix *-xá* that forms deictic verbs of movement (section 3.2.1.2.3).

[47] Krönlein (1889) and, accordingly, Rust (1969) in their dictionaries render such derivations as "wh. can be ...ed" or "...able". This meaning is denied by my co-compiler of the *Khoekhoegowab Dictionary*, Eliphas Eiseb in practically all cases; especially so, if the suffix *-sa* is optionally preceded by the passive verbal extension *-he*. See, however, the special derivatives with reduplicated root and /24/ melody, which probably mislead Krönlein into an unwarranted generalization.

the formation of verbs of pretence (section 3.2.1.1.4), this construction employs the rising /24/ melody on the repeated root, but with a different meaning. Such adjectives, which are not too frequent, can be subsumed under the general meaning "which can be ...", or "...able/ible".

12ost **fh**	*ǂhâ̋á ǂhấsà*	(urgently needed, essential)
Cf.	*ǂhâ̋à*	(be in need of)
13ost (**f**)**h**	*bɔ̀ɔ́bɔ̀ɔ́sà*	(censurable, reprehensible)
Cf.	*bɔ̀ɔ́*	(censure; mock)
13ost (**f**)**h**	*/gùí /gùísà*	(scorned (bec. of surfeit))
Cf.	*/gúí* [D.]	(get tired of (esp. edibles))
22ost (**f**)**h**	*dî̀ídî́sà*	(questionable; wh. ought to be asked)
Cf.	*dî̀ì*	(ask)
24ost (**f**)**h**	*mûúmûúsà*	(worth viewing/watching)
	cf. *mûú*	(view, admire; watch)
32ost **fh**	*tàòtàósà*	(embarrassing, shameful)
Cf.	*táò*	(feel ashamed)
32ost **fh**	*ǂàwìǂàwísà*	(boring, sicken, vex)
Cf.	*ǂáwì*	(bore, sicken, vex)
43ost **fh**	*ǂàńǂàńsà*	(well-known, famous, notorious)
Cf.	*ǂáń*	(know, be acquainted with)
Cf. also		
43caus **fd**	*ǂàńǂàńsà*	(wh. h. been informed; wh. h. been made known)

The following example with the /12/ melody is irregular as it does not switch (see also the option for *gàùgàúsèn*, p.186):

12ost **ch**	*mûùmûúsà*	(wh. can be seen, *i.e.* evident, apparent)
Cf.	*mûù*	(see)

Needless to say, the respective abstract nouns can also be formed from any of the adjectives with *-sɑ̀* by means of the derivative suffix *-sɪ̀*.; *e.g.*

ɬhɑ̃̂ɑ́ɬhɑ̃̂ɑ́sɑ̀sɪ̀.b (urgent need).

The following verbal roots behave exceptionally in employing Flip-flop in adjectival derivations without reduplication:

12 **c/f** *dɑ̃̀wìsɑ̀, dɑ̃̀wísɑ̀* (castrated, spayed)

24/13 **c/f** *ɬíísɑ̀* (raised; of esp. insect's posterior)

ɬííxɑ̀ (inclined to raise)

b_2) ***-sa*** is suffixed to intransitive verbs. In isolated cases options are conceded. In most cases, however, these are not true options, but rather practically synonymous derivatives from the respective transitive and intransitive verb.

32 24 4 **fr** **[***kààkàwú***]***sɑ́/-sɑ̀* (amnesic; mentally deficient)

13caus 24 4 **fdr** **[***tsʊ̀ɑ̀tsʊ̀ɑ̀-ǁàwʊ́***]***sɑ́* (resolute from the start, principled)

c) ***-ʊ̀*** (Hagman *loc.cit.*: "privative"), or in references to internal or inner/mental states ***-ʊ̀!nɑ̃̂ɑ̀***, serves to derive negative adjectives. Deverbative adjectives may be translated as "tending not to ..."; denominal ones as "...less" or "without/lacking ...". Again, the derivational process is fully productive with verbs and nouns, and whether Flip-

flop occurs or not, depends entirely on the derivational cycle of the embedded constituent.

12	**f**	*[hɔ̀ɔ́bǎsèn]ò*	(without income/earnings)
44 32	**fs**	*[hâǎ!khàǐ]ò*	(without place to stay, homeless)
24	(**f**)	*[!âǔbǎsèn]ò!nâà*	(hopeless, despondent)

3.2.3.2 Endocentric Compounds

Endocentric compound adjectives are comparatively rare, with the overwhelming majority of adjectives being derivatives formed with one of the above suffixes. Most endocentric adjectives consist of an adjective followed by a noun, while some - especially colour-adjectives - may consist of two adjectives. The tonological behaviour does not seem to be predictable, and may assume *ad hoc* behaviour to disambiguate homonyms; *e.g.*.

32 43	**fr**	*!gâì!gâǎ*	(fortunate/lucky (in avoiding disaster))

But:

32 43	**cs**	*!gâì!gâà*	(flavour-improving)[48]
Cf.		*!gâì*	(good *a.*)
		!gâǎ.b	(back, rear *n.*)

The following set of examples, all based on the adjective *ǂnûǔ* (black), shows that normally (unilateral) Flip-flop occurs when one adjective qualifies another; but Sandhi nor-

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[48] Said of person who is believed to supernaturally improve the flavour of the animal he kills.

mally occurs like in a noun phrase when an adjective - or any qualifier for that matter - precedes a noun. Many of these adjectives serve to identify small-stock; cf. also section 3.1.2 a) above.

12 43	**cs**	*ǂnûũ!áò*	*a+n*	(black-necked)
12 13	**cs**	*ǂnûũdȁ̃ná*	*a+n*	(black-haired; w. black head)
12 43	**cs**	*ǂnûũxóò*	*a+n*	(w. black cheeks)
12 13 2	**ff**	*ǂnûũ-!nàm̃rì*	*a+n+a.deriv.*	(w. black flanks)
12 24	**fs**	*ǂnûũtòò*	*a+a*	(mottled black)
12 24	**fs**	*ǂnûũǁgànì*	*a+a*	(piebald, black and white)
12 22	**c?**	*ǂnûũ!nâà*	*a.+postp.*[49]	(blackish; dusky)

For no apparent reason, the above type of compound can occasionally also employ Flip-flop, or optional alter-natives:

24 43	**fs**	*/ǎwá!áò*	(with red/rufous neck)
24 43 1	**cs/fs**	*/àwǎx'!gâà/ /ǎwáx'!gâà*	(w. reddish stripe along back (of Pinzgauer cattle))

3.2.3.3 Flip-flop triggered by Grammatical Formatives

The following derivative morphemes trigger Flip-flop in adjectives. As their semantic characteristics are not always explicit, they are listed without further ado.

a) **-na** is productive as derivative especially in conjunction with the verbal root *ǂûũ* (eat), with which it forms a verb *ǂûũnà* (have a craving for). This word in

[49] *!Nâà* means 'in'. It is characteristic of Khoekhoe that postpositions can form parts of lexical compounds, especially verbs. As on the level of syntactic tone when they follow a noun, postpositions always take the Sandhi melody in a compound word.

turn serves to derive adjectives. Although *ǂûúnà* itself involves Flip-flop, it does not normally trigger further Flip-flop.

32 24 ?	**cf.**	*ǂgáèǂûùnà*	(who has a craving to smoke)
43 ?		*hîĭnấ*	(mendacious, untruthful)
Cf.		*hîĭ* (do)?	

See also above, section 2.2.3.3 for *-na* in apparently trisyllabic nouns.

b) **-re** is very confined in its occurrence. Hagman (1977:33) ascribes to it the function of describing sex membership, as he only has the latter two of the following examples:

12	**f**	*gâ̆árế*	(foolish, dumb, stupid)
32	**f**	*àòré*	(male; courageous, manly)
24	?	*tà(r)árế*	(female)

The latter example clearly exhibits *ad hoc* disambiguation, for it does not employ the regular Flip-flop alternative /43/. The reason probably is, that this would neutralize the distinction with the verbal suffix *-rè* (be on the lookout for ...), *viz.*

24	**c/f**	*tàrấrè, tấrárè*	(look for a wife).

Cf. also the deadjectival nouns:

43	**f**	*àwŭrế.b*	(moth; butterfly)
Cf.		*ấwú*	(fold, fold up *v.t.*)
32	**f**	*ǀgàm̀màrế.b*	(cousin; nephew; compeer)
Cf.		*ǀgámᷝ*	(two)

c) ***-rá̋***

13	(**f**)	*hȍárá̋*	(only, sole)
Cf.		*hȍá*	(all *num.*)
22	(**f**)	*!khàèrá̋*	(untidy; slipshod)
Cf.		*!khàè*	(dark)
24	(**f**)	*tsàḿ́(rá̋)*	(soft; powdery; supple)
24	(**f**)	*tsàűrá̋*	(soft; powdery; supple)
Cf.		*tsàű*	(bec. worn; bec. pulpy/soft)
32	**f**	*ǁgàòrá̋*	(unpleasant, unsavoury (of smell/taste/words)
Cf.		*ǁgáò*	(rot, putrefy, decompose)
43	**f**	*/gùĭrà*	(homogeneous, of same type)
Cf.		*/gűí*	(one)
24	**f**	*ká̋írà*	(old, aged)[50]
Cf.		*kàĭ*	(grow up, bec. an adult)
24	**f**	*/á̋wárà*	(reddish; pink; lilac)
Cf.		*/àwá̋*	(red *a.*)
??	?	*!òá̋rá̋.s*	(daughter-in-law)
43	**f**	*ǁùĭrá̋.b* [N.], *ǁűírà.b*[51] [D.]	(rich man)
Cf.		*ǁűí*	(thrive, flourish)

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[50] Although there is no cogent evidence, it can be safely assumed on semantic grounds that *ká̋írà* is derived from *kàĭ* (grow up) and not from *ká̋í* (big, large). Judging by this and the following example with *-rà*, which are the only cases on record, *-rà* must probably be treated as a morpheme in its own right, as it triggers bilateral Flip-flop with /24/.

[51] While the Nama form is lexicalized, the Damara form is a pronominal relative clause, literally: "he who flourishes". In the latter case *ra* is the present inchoative tense/aspect marker.

3.2.4 Flip-flop in Numerals

Khoekhoe employs a genuine decimal system. Numbers above ten are formed by adding the unit followed by the formative *-/à* to the ten(s). If it is a single unit of ten (*i.e.* **10**+(1...9), thus **11-19**), *disi* (ten) can be dropped as redundant. (Although *disi* is spelt like a disyllabic root, it is pronounced *dʃ̈ísí*. This will not be reflected below.) It is speculated that this formative *-/a* is an abbreviation of the verb */árò* (add, attach), but this is not beyond doubt. Of interest here is, that *-/a* triggers Flip-flop, but for no apparent reason not consistently.

43		**c**	(*disi*)***/gűí***/*à*	(eleven)
32		**f**	(*disi*)***/gàm̀***/*à*	(twelve)
13		**f**	(*disi*)***!nʊ̈nà***/*à*	(thirteen)
23	except.		(*disi*)***hàká***/*à*	(fourteen)
32		**c**	(*disi*)***kórò***/*à*	(fifteen)
24		**f**	(*disi*)***!nấní***/*à*	(sixteen)
23	except.		(*disi*)***hűú***/*à*	(seventeen)
44	1	**c**	(*disi*)***||khấísà***/*à*[52]	(eighteen)
12	2	**c**	(*disi*)***khʊ̈èsè***/*à*	(nineteen)

Flip-flop occurs unilaterally with the regular roots in the designation of tens:

32	**f**	***/gàm̀****disi*	(twenty)
13	**c**	***!nʊ̈ná****disi*	(thirty)
32	**f/c**	***kòrò-/kórò****disi*[53]	(fifty)
24	**f**	***!nấní****disi*	(sixty)

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[52] Flip-flop is predictably blocked in this and the following numeral by the suffixes *-sà* and *-sè* respectively.

[53] This alternative was supplied by Levi Namaseb, as I do not have Eliphas Eiseb's judgement on record.

In the case of "thousand", */óà* (full) switches optionally, *e.g.*

32 **f/s** *disi/**òà**disi/* (ten thousand)
*-/**òä**disi*

3.2.4.1 Ordinal Numerals

Ordinal numbers are formed by suffixing the root ||***ĩì*** to the cardinal number. This root, traditionally considered to be a pronoun stem, escapes translation. In Haacke (1976:69-86 and 1977) it was argued that ||*ĩì* together with *tìĩ́*, *sìĩ́* and *sàã̃*[54] are definite articles denoting "communicatory status". In terms of a componential feature definition these roots can best be defined semantically as follows (significant features only):

ti	***si***	***sa***	||***ĩ***
+SPEAKER +SINGULAR ...	+SPEAKER -ADDRESSEE -SINGULAR ...	+ADDRESSEE ...	+DISCUSSED ...

||*ĩì* has a peculiar tonological behaviour. Apart from always being subject to the Drop-rule (cf. below) in compounds, it triggers Flip-flop only when it functions as derivative for ordinal numerals, but with the exception of *kórò*||*ĩ̀ì*. In the other numerals Flip-flop applies even bilaterally. *Kórò*

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[54] The official orthography does not reflect the fact that these morphemes are disyllabic like any root: *ti*, *si*, *sa*, ||*ĩ*.

(five) resists Flip-flop for some unknown reason, as is the case in cardinal numerals:

32	22	**fd**	*ǀgàm̀ǁîì*	(second)
13	22	**fd**	*!nʊ̀nàǁîì*	(third)
23	22	**-d**	*hàkáǁîì*	(fourth)
32	22	**cd**	*kórʊ̀ǁîì*	(fifth)
24	22	**fd**	*!nâníǁîì*	(sixth)
23/43	22	**fd**	*hûúǁîì*, *hûűǁîì*	(seventh)

ǁîì does not trigger switch in *nominal* compounds. Such nouns identify a social category of people, *e.g.*

12	22	**cd**	*!hàʊ̀ǁîì.b*	(member of family/tribe)
43	22	**cd**	*ǂÁónîì.n*[55]	(Topnaar people).

3.2.5 *Ad Hoc* Disambiguations through Flip-flop

As already sporadically mentioned before, Flip-flop may occur on an *ad hoc* basis where semantic disambiguation is required.

43	43	**fs**	*mâã̀-ám̀*	(wait pertinaciously i.o. to corner)
43	43	**cr**	*mâã́-áḿ*	(block (entrance to pen) in order to catch animal)
43	43	**fs**	*hîì́ǀhúrù*	(waste, squander)
43	43	**cs**	*hîì́ǀhúrù*	(engage in sexual play (of children))

While in many cases the instances are isolated, other roots are fairly productive in this way.

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[55] In certain nouns the click of ǁîì is elided, leaving only the (originally velar) nasal inserted in the morphophonemic junction by the glottal release type of the click:

[ǂʔaoŋǁʔîì] > [ǂʔaonîì].

-rì/-rí This verbal suffix has intensifying or iterative import. As a rule it does not trigger any kind of perturbation, other than a few cases of Flip-flop. The following contrasts are also established by means of Flip-flop:

43 2	**c**	*mâ̋ărì*	(get stuck, get bogged down)
43 4	**f**	*mâ̋árí*	(dun, insist on payment of debt; pressurize)
Cf.		*mâ̋á*	(stand)
43 2	**c**?	*‖gűìrì*[56]	(place more firewood under pot)
43 4	**c**	*‖gűírí*	(elevate (s.) by placing on longish object)
Cf.		*‖gűí*	(lay down)
12 2/4	**c/f**	*mű̋ùrì, mű̋úrí*	(look after, keep an eye on)
43 4	**f**	*ɬnû̋úrí*	(sit in expectation of (esp. food))
43	**c**	*ɬnű̋írì*	(elevate (*e.g.* jack) with support that is not long; *tune reed flutes??*)
		ɬnű̋írí	(dilute w. water; burn (s.o. unwelcome by concealing coals in sand)

-sɛ

Two instances are on record for a noun that switches with the grammatical formative *-sɛ̋/sɛ̀*. It may be to distinguish the noun from the adverb.

22 1	**f**	*!kháèsɛ̀.b*	(lit. "dark one", *i.e.* black mamba)
cf.	**c**	*!khàèsɛ̀*	(darkly *adv.*)
43	**c**	*!khɔ́ésɛ̀.b* [D.]	(runner; sprinter)
	f	*!khɔ̀ɛ́sɛ̀.b* [N.]	

[56] The /43/ melody on this root needs to be confirmed.

3.3 Retention Of The Citation Form

Retention of the Citation form pertains to the melody of *non*-initial roots in compounds. The unmarked alternative is that non-inital roots will have their respective Sandhi form, just as non-leftbranching syntactic components have. One context for the CR form is provided by preceding Flip-flop. As this has been discussed before (section 3.2.1.1.1), it will not be considered any further here.

Of more interest are cases where the initial root has the normal Citation form, yet is followed by another CR form. The word "retention" implies that the change to the Sandhi form is considered as the less marked process, judging merely by comparative numbers. This CR occurs most frequently in nouns.

3.3.1 Retention in Nouns

If CR occurs in nouns, then these normally form a specially unified concept, instead of the regular qualifier-head relationship analogous to that of a noun phrase.

32 12	**cr**	*!gâ̂ìhàm̀.mi*	(fragrance, perfume)
cf.	**cs**	*!gâ̂ì hàm̀.mi*	(pleasant scent)
12 24	**cr**	*ǂnûûǁgàḿ.mi*	(pure/unadulterated water)
cf.	**cs**	*ǂnûù ǁgàm̀.mi*	(black water)
24 43	**cr**	*ǂkhàrí!áwú.s*	(subcalibre rifle, ".22")
cf.		*ǂkhàrí́ !áwù.s*	(small rifle)

A surprising fact is that in nouns CR is largely, albeit not entirely consistently, complementary with final Drop. Apart from a few exceptions, compounds that employ CR all have the /43/ or /24/ Citation form, while Drop occurs with all melodies except /43/ (cf. section 3.4.1 below for exceptions). The fact that /24/ may occur with either, CR or Drop, may have its origin in the tonogenetic merger of two melodies into /24/ (cf. section 2.3, especially Table 15b). As the shared characteristic between /43/ and /24/, is the *tonal* feature matrix [+HIGH, -LOW] (but with opposite values for the [U.REGISTER] feature) for the first tone of the respective melody, it can be surmised that those /24/-melodies that retain the Citation form have the melody /2**b**4/, while /2**a**4/ melodies are subject to Drop. The dualistic behaviour of the modern /24/ melody would thus be due to the tonogenetic register split: with those /24/-radicals that use Drop being [+U.R], and those using CR being [-U.R]. This can only be established beyond doubt, however, once adequate comparative data from other languages become available.

Certain synonyms using different nouns and melodies for the second root provide evidence that CR must be subject to phonological or tonological determinants, as the semantic requirements are identical for synonyms. Only those compounds with the /43/- or /24/-melody retain the Citation form:

43 **24 cr**	*kấí-ànǐ̋.s* [D.]	(black vulture)
43 13 **cd**	*kấígòrə̀.b* [N.]	*ditto*
13 **43 cr**	*khŏ̋á-ấḿ.s*	(place of fracture)
13 32 **cd**	*khŏ̋á!khàl̏.s*[57]	*ditto*
32 **43**/13 **cr/d**	*ómấrí.b/ ómàrl̏.b*	(house-dog)
32 **24 cr**	*sórèhòré̋.b*	(sun-friend, *i.e.* fata morgana)
32 13 **cd**	*sórègùl̏.s*	(sun-sheep, *i.e.* fata morgana)
43 **43 cr**	*tsấókhấ̋á.s*	(ash-pan)
43 13 cd	*tsấó!òrə̀.s*	*ditto*

In the latter pair of synonyms the premodifier states the *purpose* of the head-noun, *viz.* "a pan for ash". To the question whether this compound could also employ regular Sandhi, *e.g. tsấó!òré.s*, my informant replied that that would mean "a pan made of ash".[58]

32 **24 cr**	*!Úì‡ûŭ.s*	(Lord's Supper)
32 **43 cr**	*!úì-ấḿ.s*	(supper)
32 24 **cs**	*!úì‡ûù.s*	(supper)

!Úì-ấḿ.s shows that with certain nominal roots the Citation form is retained, even if the compound does not have a specialized meaning. The most notable of these roots, in which tonological criteria may outweigh semantic criteria, are presented below:

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[57] It can be inferred from the semantic nature of the compound and the tonological behaviour of its synonym that /21/ here is an instance of Drop, not of regular Sandhi of /32/.

[58] Although this seems to be an indicative reply, counter-examples are on record, to be sure:

13 22 **cd** *dànǐ!khàrl̏.s* (honey-beer).

Drop is employed, even though the premodifier (*dani.b*) indicates the material the referent of the head-noun is made of.

43 ***ǎí.s*** (face; front; surface)

The root *ǎí* also serves as postposition meaning "on, on top of"; cf. section 3.1.1. As initial root in compounds, it has the meaning of "first (in time/place)", *e.g.* *ǎí!gûŭ* (walk first/in front; lead (spiritually); make progress).

24 43 **cr**	*sâă̰-ǎí.s*	(lair, resting-place)
cf.	*sâă̰*	(rest)

43 ***aá.s***	(hole; burrow)	
13 43 **cr**	*ǂgǜí-ǎá.s*	(nostril)

43 ***am.s*** (mouth (general); estuary; tip, point)

In compounds *ǎḿ.s* often has the special meaning of "connecting point, link".

43 43 **cr**	*!hǘí-ǎḿ.s*	(initiative)
Cf.	*!hǘí*	(originate)
24 2 43 **cr**	*!khàárì-ǎḿ.s*	(place where fire was started (esp. through arson))
32 43 **cr**	ǁ*árà-ǎḿ.s*	(point of severance)

24 ***|àm.mi***	(tip, extremity, end; termination)	
43 24 **cr**	*ǂgǎó|àḿ.s*	(apex of heart)

43 ***|uí.s***	(stone, rock; mountain)	
43 43 **cr**	*xốń|ǘí.s*	(grinding-stone, pestle)
43 43 43 **csr**	*xốńáì|ǘí.s*	(stone to grind on, *i.e.* mortar)

43 ***!gâá.b***	(back, rear)	
32 43 **cr**	*ǂáì!gǎ̃á.b*	(instep, dorsum of foot)

A special kind of compound noun that belongs here consists of what amounts to a noun phrase with a possessive qualifier

before a head noun. In a normal NP the head as non-leftmost branch will receive the Sandhi form (cf. section 4.1):

$$\{[(\overset{+}{\text{possessive}})_{\text{Qualif.}} \quad \overset{-}{\text{stem}}]N^{d}\}_{NP}$$

This tonal behaviour between two nouns is sufficient indication that this concatenation is a possessive qualifier preceding a head, with the result that the possessive particle *di* may be omitted as redundant. In these special concepts, however, the head noun retains the Citation form. Unless earlier clerical tradition prevails, such constructs are today spelt conjunctively by convention, despite the fact that a nominal designant comes to stand word-internally - at least orthographically.[59]

43 43 **cr**	*ǎís|khǎá.b*	(front/facing/obverse side)
Cf.	**ǎí.s (di) |kháà.b*	(side of the face)
23 24 **cr**	*wèkhéb|àm̀.s*	(week-end)
Cf.	*wèkhéb (di) |àm̀.s*	(end of the week)
43 24 **cr**	*Élób Mî'.s*	(the Word of God, *i.e.* the Bible)
	Élób (di) mî'ì.s	(God's word)

[59] Until very recently Khoekhoe was the only Khoesaan language subject to some language engineering, as it is used officially in schools. The orthography was officially standardized by language planners in collaboration with a committee consisting of representatives of Khoekhoe speakers. For an account of the literary development, see Haacke 1989. In Zu|h'ôa a review of officially recognized orthographic standardization was initiated recently by mainly non-governmental organizations.

3.3.2 Retention in Verbs

In the following only such examples will be given that cannot be construed as covert Flip-flop; *i.e.* only compounds with "weak" initial melodies will be quoted. Generally, CR is not very common with verbs, except in onomatopoeic reduplications or iterative verbs.

43 43	**cr**	*!hőá!gâ̋á*	(talk behind back, *i.e.* expose/report (culprit))
Cf.	**cs**	*!hőá!gâà*	(re-discuss)
43 12 32	**csr**	**[***!khőódàð***]**-*óà*	(follow track to origin)
43 43	**cr**	*ǎílǁgűí*	(harness (draught-anim.) into leading position)
Cf.	**cs**	*ǎílǁgúì*	(lay down first)

The following are instances of an onomatopoeic reduplication and an iterative verb, respectively:

13 43 43 2	**ccc**	*hà̀í-***[***!gőó!gőó***]***sè.s*	(cardinal woodpecker)
43 43 1	**cc**	*!gâ̋á!gâ̋ábè*	(walk/move backwards)

3.3.3 Retention in Adjectives

Adjectives derived from nouns or verbs that entail CR will not be quoted here, as this derivational process has been illustrated before (section 3.2.3.1). Only one derivational construct deserves mentioning, though, as it is particularly productive and entails CR in itself, *viz.* *-(ǂgâ̋ó)xà̀*, which indicates keenness. It is based on the verb *ǂgâ̋ó* (want) and/or the noun *ǂgâ̋ó.b* (heart).

32 43 1 **cr**	*!khám̀(ǂgǎó)xà̰*	(quick to fight, belligerent)
24 43 1 **cr**	*ǂûŰǂgǎóxà̰*	(insatiable)

Retention here seems to serve the purpose of disambiguation, as some human characteristics are conceived as symbolic qualities of the heart. As such *ǂgǎó* (heart) will receive the Sandhi form appropriate for any premodified head-noun.

24+4 43 **cs**	*tsàűrǎǂgáò*	(soft-hearted, *i.e.* inclined to weep (of esp. man))
24 43 1 **cs**	*sùwűǂgáòxà̰*	(light-hearted, *i.e.* inclined to weep (of esp. man))

Adjectives that employ CR without the use of derivational suffixes are very rare in Khoekhoe. CR, thus, is not a feature typical of adjectival derivation *per se*.

13 43 **cr**	*!nõ̀ná-ǎí*	(tending to produce triplets)
24 43 **cr**	*ǂkhòő/gűí*	(lit.: bone-only, *i.e.* bony)

3.4 Final Drop

By Drop I refer to the permutation whereby any melody (except /43/) is replaced with the Low Falling /21/ melody. This feature was discussed as the distinctive characteristic of causative reduplication (section 3.2.1.1.3), where it is linked to bilateral Flip-flop on the initial root. In that context Drop occurs with all melodies, including /43/.

3.4.1 Drop in Nouns

Except for the causative, Drop is confined almost exclusively to nouns, apart from some compound verbs entailing the object action (cf. below). It was stated in section 3.3.1 above that in nouns Drop is more or less complementary with CR. While /24/ does occur with both, Drop and CR, by far the most of the /24/-nouns are subject to Drop.

The following compounds reflect their morphological status in the tonal behaviour: the adjective employs regular Sandhi, while the noun employs Drop.

24 24 **cs** *ɬàf̋ùrì* (copper; brass **a.**)
24 24 **cd** *ɬàf̋ùrl̋.b* (copper; brass **n.**)

As is the case with certain nouns that are prone to CR, so some nouns are particularly prone to use Drop in compounds. Similar to compound verbs with Flip-flop, it is probably not the case that the Drop-triggering capacity is an inherent feature of such nouns. Rather, it is their semantic content that makes them prone to be used *i.a.* as instruments, the *purpose* of which is then specified by the premodifier. *Hl̋áí.b* (tree/stick) is a typical instance.

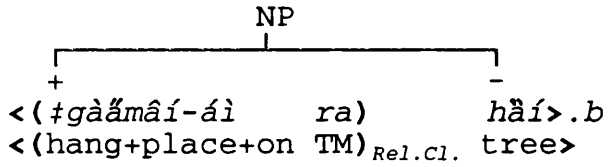
13 ***hl̋áí.s/b*** (tree/stick)

This noun drops in the great majority of attestations.

24 43 13 **crd** *[ɬgàáf̋mâf̌]hàl̋.b* (branch erected as hanger for (kitchen) utensils; hat-stand)

24 43 43 13 **crss** [*ǂgàǎmâǐ-áì*]*hǎí.b* (branch/tree on which s.thing is hung)

While the first compound denotes a particular piece of (traditional or modern) furniture, the second is tantamount to a noun qualified by a reduced relative clause. The full relative clause in a NP, *i.e.* with tense/aspect marker (TM), would be as follows:



Ai in the latter compound is the postposition "on", which typically is integrated into the verb in relative clauses.[60] The presence of this postposition conveys the basically syntactic nature of this type of nominal compound.

24 ***/gàǘ.b*** (manner, way style; melody)
32 24 **cd** *!gáwì/gàǜ.b* (style of riding; gait)

Two exceptional nouns do occur in which a /43/ melody is regularly subject to drop, *viz.* ǁ***áé***.*b* and *ǂǘú.b*:

43 ***ǁáé.b*** (time)
43 43 **cd** *!hǒáǁàè.b* (occasion f. talking; speaking-time (in debate))
cs *!hǒás (di) ǁáè.b* (*ibid.*)

43 ***ǂǘú.b*** (character, personality)
43 24 43 **crd** [*!nǎé-ùǘ*]*ǂùǜ.b* (innate character)

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[60] For a discussion of this kind of relative sentence formation, see Haacke 1985.

3.4.2 Drop in Verbs entailing Subject and Object

Khoekhoe has an unusual type of compound verb, wherein the second verbal root denotes the action of the object. It is typical of these compounds that they employ final Drop on all melodies. Speakers differ in the use of the Citation form or Flip-flop for the first root. The examples below reflect the usage of the main informant.

The initial verb will be a verb of perception like *mûù* (see) or *hõõ* (find). Note that in these verbs even /43/ is subject to Drop, albeit optionally.

12 13	**cd**	*mûùgà(r)ù*	(see (s.)	moving away/on)
12 12 4	**cd**	*mûù!gòãxá*	(see (s.)	approaching)
12 43	**cd/fr**	*mûùmâã/ mûúmáá*	(see (s.)	standing
12 43	**cd**	*mûù‖gòè*	(see (s.)	lying down)
12 21	**c(d)**	*mûù‡nõã ‡nõã < ‡nûũ hâã*	(see (s.)	sitting)

3.4.3 Drop in Ordinal Numerals

The reader is referred to section 3.2.4.1 again, where it was reported that the article ‖îì undergoes Drop in ordinal numerals, preceded by Flip-flop (with the exception of *kórò*). Ordinal numerals, next to causative formation seem

to be the only type of construct in which Flip-flop and Drop combine.

3.5 Derivative Function of Tone: Transitive vs. Intransitive Verbs

Instances where tone has derivative functions occurred in the sections before, *e.g.* in the formation of the causative (Drop /21/), the progressive (Low /22/) or verbs of pretence (High-rising /24/). All of these derivations involved compounds; *i.e.* morphological means were part of the derivational process. In section 3.2.2.3 the derivation of nouns by means of Flip-flop was described. Although no compounding plays a role here, a morphological device is involved next to tone, in that the N^d ***s*** is added to the stem.

There does exist a type of tonological derivation in which tone is the sole determining factor; this is the derivation of intransitive verbs from transitive ones in ergative relations.[61]

The non-depressed Low melody /22/ and its depressed equivalent Low-Rising /13/ (*i.e.* Beach's joint "Low-mid falling" tone in Korana (1938:239)) serve in Khoekhoe to form the intransitive or ergative equivalents of certain transitive

[61] Köhler (1989:116) reports a similar derivational process for Kxoé. Most of his intransitive examples belong to his high-mid falling melody.

verbs. It is taken that the ergative verbs are the derived forms, and not *vice versa*, as any of the remaining four melodies are represented among the transitive verbs. Inspection of the following verbs will show that their affiliation with /22/ or /13/ depends on whether the initial consonant is a depressor type or not (cf. Table 7, p.80). Some of the consonants are indeterminate, of course.

a) Intransitive Verbs with Low /22/

/32/

lámˋ	*v.t.* (shatter, smash)
làmˋ	*v.i.* (deflate; go down (of swelling))
!gáòˋ	*v.t.* (cut)
!gàòˋ	*v.i.* (stop/cease raining, *i.e.* "cut off")
!khómˋ	*v.t.* (demolish, let collapse)
!khòmˋ	*v.i.* (collapse, fall in, tumble down)
ǂkháwèˋ	*v.t.* (split (wood); saw/cut lengthwise)
ǂkhàwèˋ	*v.i.* (split, crack (of wood))

/43/

lárˇí	*v.t.* (erase, wipe out; extinguish)
làrì	*v.i.* (bec. obliterated; evaporate)
ǂkhúˇú	*v.t.* (squash (vermin) under nail)
ǂkhùù	*v.i.* (crumble/collapse under pressure)

b) Intransitive Verbs with Low-Rising /13/

/12/

dʰ̈à	*v.t.* (tear, rip, rend)
dʰ̈á	*v.i.* (tear, rip, rend)
khʰ̈ù	*v.t.* (light/kindle (fire); set alight)
khʰ̈ú	*v.i.* (burn, be on fire; burn o.s.)
khʰ̈rà	*v.t.* (unfold, unfurl)
khʰ̈rá	*v.i.* (unfold)
khʰ̈rè	*v.t.* (straighten, unroll; panel-beat)
khʰ̈ré	*v.i.* (straighten out (of snake); hatch)
khʰ̈wà	*v.t.* (open)

khȍwá *v.i.* (open up; disintegrate; unfold)

khȕù *v.t.* (blow up, inflate)
khȕú *v.i.* (bec. bloated, swell)

tsȍm̀ *v.t.* (cause (sand) to slide down (slope)
tsȍḿ *v.i.* (slide/run down (of sand down slope))

!gȍrà *v.t.* (separate; divide; distribute)
!gȍrá *v.i.* (separate; branch off; part company)

ǁ*hȁ̀wù* *v.t.* (fan (fire))
ǁ*hȁ̀wú* *v.i.* (flare up; bolt)

!hȕì *v.t.* (open (wound))
!hȕí *v.i.* (rupture, burst open; explode)

ǂhȕ̀wì *v.t.* (burn down; incinerate, set fire to)
ǂhȕ̀wí *v.i.* (be on fire)

/24/

!khàǹ́, *v.t.* (rive/split off; slit (thin thongs))
!khánà [N.]
!khȁ̀ǹ́, *v.i.* (crack (of glass, wood))
!khȁ̀ná[62]

/43/

khȏ̃á *v.t.* (break; quarry; infringe (law))
khȏ̃á *v.i.* (break, fracture)

ǁ*hȗ́ú,* *v.t.* (perforate, make hole right through)
khȗ́rú
ǁ*hȕ̃ú,* *v.i.* (become holed, wear through)
khȕ̃rú

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[62] This word is an irregular derivation, as clicks with voiceless velar affricate/fricative releases are not depressors. A possible reason why the non-depressed /22/ melody is not used for the intransitive verb, may be to avoid ambiguity, as the Sandhi form of transitive /24/ verbs is also /22/. Unfortunately no further attestations with /24/ are on record, which would allow an observation whether this is regular behaviour for /24/ melodies.

4. THE POST-LEXICAL TONOLOGY OF KHOEKHOE

In the present chapter a descriptive overview will be presented over tonological behaviour of the major syntactic structures of Khoekhoe. In essence this amounts to a statement of which constituents receive the Citation form, and which the Sandhi form, marked above the constituent with + or - respectively. As shown in the previous chapter, only the first, *i.e.* leftmost constituent of a compound word is affected by external Sandhi, as required by syntax. It should be kept in mind that the Citation form of the first root in a compound word need not be the inherent Citation form of the root, as it is in isolation, but may be the Citation form of the corresponding Flip-flop melody as demanded by the juncture in the compound, *e.g.*

43		**c**	+ *!khŏó*	(catch)	= inherent Citation
43		**s**	- *!khóò*	(catch)	= inherent Sandhi
43	24	$\mathbf{f_c r}$	+ *!khòŏǁàrĕ*	(partnership)	= flip-flop Citation
43	24	$\mathbf{f_s r}$	- *!khòòǁàrĕ.s*	(partnership)	= flip-flop Sandhi

It follows, for example, that, if a compound word is indicated to receive the Sandhi form (-) in a particular syntactic sequence, then this occurs irrespective of the particular tonological composition that was generated at the level of lexical tonology. This also holds for a tonological domain of a constituent as a whole, irrespective of the internal constituent structure, as will be shown below in the

case of the noun phrase (section 4.1). A distinction is to be made, thus, between *internal* Citation and Sandhi within a word as determined by the lexical phonology, and *external* Citation and Sandhi as determined in syntactic context by the post-lexical phonology. As mentioned before, the only kind of perturbation of *lexical* melodies that is found in post-lexical tonology, is Sandhi.[63] Flip-flop, Drop, etc. do not operate at the level of syntax. Hence it is sufficient to mark sentence constituents simply + or - on the status line above the constituent.

In order to clarify the exposition it should be mentioned here that the Khoekhoe data in essence corroborate the findings of Clements (1977) that

> "tone rules ... are sensitive to the distinction between left-branching and right-branching phrase structure, in the sense that the tonal processes do not operate across any sequence of two or more left brackets [[in the bracketed representation of an IC structure. Sequences of]] have no such effect." (*op. cit.* 80).

In the following presentation phrase-markers will not be used, as the statements are reflections of surface structures only and should not be construed as biased to any particular syntactic theory, especially as the unusually flexible syntax of Khoekhoe allows for discontinuous constituents in certain perturbations. In order not to be

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[63] Ignoring changes caused by floating tones in the interrogative; cf. section 4.3.

side-tracked by these syntactic issues, the present presentation will make use of bracketing instead.

4.1 The Noun Phrase

The general principle of Khoekhoe post-lexical tonology can best be illustrated with the noun phrase. As this topic has already been investigated in Haacke (1976:209-234), only a brief summary will be presented here. In essence the principle amounts to the fact that - as Clements (1977:77) states - external Sandhi rules operate across domains independently established by the rules of syntax: for Khoekhoe specifically this means that all and only constituents immediately preceded by a double constituent boundary [[will take the external Citation form (+); all other constituents will take the external Sandhi form (-). This principle holds regularly for constituents comprising one or more lexical formatives (*i.e.* a stem). The behaviour of grammatical formatives will not be investigated in depth here.

It should be emphasized that the above rule holds only of phrasal constituents, *viz.* down to qualifiers and the head of the NP. Word categories like demonstratives or adjectives cannot be included, as at that level any constituent is embedded in multiple brackets, *e.g.* $[_{qual.}[_{adj.}kai]_{adj.}]_{qual.}$ Relative clauses and possessives will have their own internal cycle of tonal bracketing again: relative clauses be-

cause of their sentential nature (cf. section 4.4.1); and possessives, having the structure #NP *di*#, as the NP in turn can have its internal array of qualifiers.

In the case of the Khoekhoe noun phrase Clement's rule amounts to the following, *viz.* that the first constituent in the lexical specification of a NP has the Citation form, while all subsequent syntactic constituents (*i.e.* qualifiers and the stem serving as head) up to the N^d governing that NP receive external Sandhi. A brief elaboration of the surface structure of the NP is called for here.

The minimally adequate NP consists of a pro-form alone, *viz.* the (post-clitic) nominal designant[64]:

{N^d}
{*b*}
(he).

---

[64] While this N^d on its own essentially is in the nominative, lexically specified NPs will - for the sake of illustration - be given with the oblique case *-a*, as used *i.a.* in the object. Brackets are used here with the following significance:

Braces **{}** embrace the entire NP, possibly including appositive NPs, as terminated by a *case marker*. NPs containing one or more appositions actually subsume two or more NPs, which are not specially marked here.

Wedges **<>** embrace the entire lexical specification (**l.sp**) of a NP as terminated by a N^d.

Parentheses **()** embrace qualifiers.

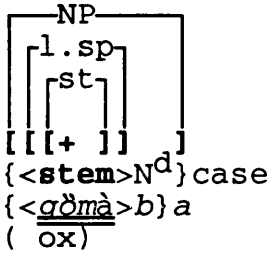
The stem (**st**) of the head is doubly underlined.

The N^d, being a grammatical formative, is ignored in the following exposition. See section 4.1.1 for its tone.

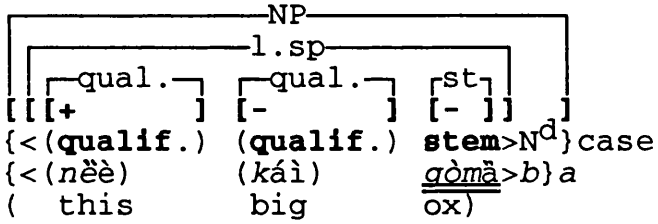
The association lines should not be misconstrued as phrase markers. They serve as alternatives to subscript labels in order to identify brackets that form pairs.

A *lexical specification* <...> may be added, consisting of the stem of the head noun and/or qualifiers of various complexity:

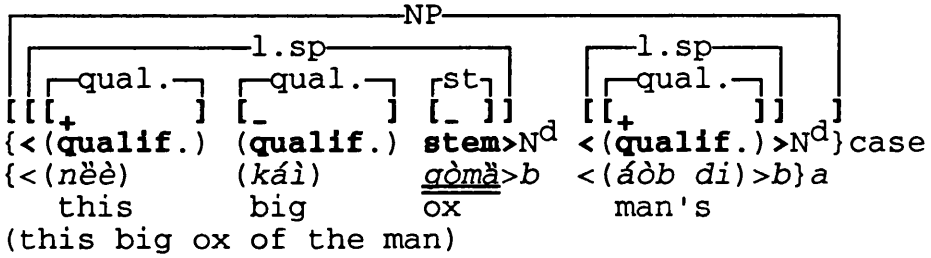
Stem alone:



With attributive qualifier(s):



With attributive and/or appositive qualifiers:



The following examples from Haacke (*op.cit.* 226), employing only stems with the conspicuous High-rising melody, may serve to illustrate the tonological behaviour. To avoid clutter, the translations will not be repeated after the

first example. All mean basically the same, with only shifts in emphasis. Each internal NP is governed by the masculine plural N^d *gu* (*gu* + *a* > *ga* for the oblique case).

```
    [[[+    ] [-  ] [-      ]   [-   ]]   [[+       ]]  ]
S1 {<(ǁnàã) (ǂàù) (!ûù ra)     ǁqûù>gu  <(tàrãs di)>ga}
       those  tame  graze+PRES springbuck woman POSS
    (Those tame grazing springbuck of the woman)

    [[[+    ] [-  ] [-   ]] [[+       ]]
S2 {<(ǁnàã) (ǂàù) ǁqûù>gu <(!ûũ   ra)>gu

    [[+        ]] ]
    <(tàrãs  di)>ga}

    [[[+  ] [-     ] [-   ]] [[+       ]]
S3 {<(ǂàũ) (!ûù ra)  ǁqûù>gu <(tàrãs di)>gu

    [[+   ]] ]
    <(ǁnàã)>ga}
```

A special construction needs to be mentioned, which escapes the rules of bracketing. If the demonstratives have referential use - *i.e* refer to a previously mentioned but not necessarily visible object, then a following adjective or relative clause will commence with Citation tone:

```
       +      +     -         -
S1a {<(ǁnàã) (ǂàũ) (!ûù ra)   ǁqûù>gu ...
    (the said tame  grazing   springbuck ...).
```

The tonal bracketing rule may also, in not too common usage, be overridden by deliberate comma intonation between two qualifiers. In that case the qualifier after the pause will recommence with the Citation form.

Elderkin (1989: 100 *et seq.*) uses a system of three "surface pitch levels". The suspicion that a system of two "levels", *viz.* external Citation and Sandhi, may have been obscured by the interference of downdrift in Sandawe, seems to be corroborated at least in one instance beyond doubt. According to Elderkin

> "two nouns in an associative construction use a difference of level to indicate that construction. ... The first noun has the level which is appropriate to the NP; the second noun, the head noun, has a level one below that of the first noun" (*op. cit.* 103).

This construction of Sandawe is, no doubt, the exact equivalent of the associative/possessive of Khoekhoe; cf. section 3.1.3 b) on p.160). One can thus expect to find similar mechanisms in other Khoesaan languages as well. The possessive marker *di* in Khoekhoe is largely redundant, as the tonal relation in attributive usage, *viz.*

$$[[\text{noun}^{+}]_{\text{Qual}}\ [\text{noun}^{-}]_{\text{Head}}]_{\text{NP}},$$

between the two NPs adequately reflects the qualifier status of the initial NP. If such a qualifier consists of a noun only - or a NP for that matter, it must by default be a possessive. I use the catch-all term "qualifier" for demonstratives, articles, adjectives, numerals, possessives and relative clauses, as all have the same syntactic behaviour.

4.1.1 The Nominal Designant and the Object Marker

Although it would lead us too far afield to treat the tonal behaviour of grammatical formatives systematically, paradigms with the nominal designants (N^ds) and object markers are provided here, as their tone may have distinctive functions within the sentence. Actually both types of markers are systematic variants of the same formative, *viz.* person-gender-number markers. But in order to avoid proliferation of terminology, their rather diverging nomenclature is retained here.

Nominal designants have one of two tones in subject position:

N^ds in the dual and in the neuter/common gender, as well as 3rd person feminine plural *dɪ̀* have a Double-Low toneme /1/;

all other N^ds have a Low toneme /2/.

These tones are stable, *i.e.* they are not sensitive to the tone of a preceding stem. In turn they also do not affect the melody of the stem. See, however, below for the influence of the oblique case marker *-a*.

	SINGULAR			DUAL			PLURAL		
	I	II	III	I	II	III	I	II	III
MASCULINE	*tà*	*ts*	*b/mì /nì*	*khɔ̀m*	*khɔ̀*	*khɑ̀*	*gè*	*gò*	*gù*
FEMININE	*tà*	*s*	*s*	*m̀*	*rɔ̀*	*rɑ̀*	*sè*	*sò*	*dɨ̀*
NEUT./COM.	-	-	*-ɨ̀*	*m̀*	*rɔ̀*	*rɑ̀*	*dɑ̀*	*dù*	*n̄*

Table 17: Nominal Designants

For the object markers the tones are the same as for the N^{d}s (subject markers), except that the markers commencing with a nasal, *viz.* first person feminine and neuter/common dual *mì* and third person neuter/common plural *nì* have a Low tone /2/.[65]

	SINGULAR			DUAL			PLURAL		
	I	II	III	I	II	III	I	II	III
MASCULINE	*tè*	*tsì*	*bì*	*khɔ̀m*	*khɔ̀*	*khɑ̀*	*gè*	*gò*	*gù*
FEMININE	*tè*	*sì*	*sì*	*mì*	*rɔ̀*	*rɑ̀*	*sè*	*sò*	*dɨ̀*
NEUT./COM.	-	-	*ɨ̀*	*mì*	*rɔ̀*	*rɑ̀*	*dɑ̀*	*dù*	*nì*

Table 18: Object Markers

In NPs taking the oblique case marker *-a* (other than the subject of interrogative sentences), the tone of the Nd is assimilated to Double Low. This follows from the "sentential hypothesis", according to which the oblique form

---

[65] This behaviour seems to be at variance with the fact that at least *m*, if not *n* has depressor tendencies in radicals.

is a grammaticalized form of an underlying sentence.[66] As such the last constituent in the sentence - being the tense/aspect marker *a* (*alias* oblique suffix) is in the Sandhi form, *i.e.* lowered:

Sàà* **tà ǎ	>	*Sàà***tǎ**
(I am a Bushman)	>	(Bushman *obl.*)

It follows that lexically specified NPs with those N^ds that have a Low tone /2/ and which remain identical for nominative and oblique, *viz. tà, gè, gò, sè, sò,* can nevertheless be differentiated for case by virtue of their tone; *e.g.*

*tìí***tà**	< **tìí à tà*[67]	(I) = nominative
*tìí***tǎ**	< **tìí tà ǎ*	(I) = oblique

Compare the following examples:

S4a *Tìí***tà** *gè rà mûù*
(*I* am seeing)

S4b *Tìí***tǎ***+gò gè rà mûù*
(You are seeing *me*)

In relative clauses this tonal distinction can be crucial:

---

[66] Cf. Haacke (1976, '77, '78, '79, '92) for the "sentential hypothesis", which claims that surface nouns are underlyingly derived from minimal sentences employing the present stative T/A marker **a**:

Copulative: #Vbl T/A N^d# *tara+(a)+s* "she is one who is woman > woman" = grammaticalized Nominative;

Predicative: #Vbl N^d T/A# *tara+s+a* "she is woman" = grammaticalized Oblique.

It is the latter configuration which essentially remains sentential, its grammaticalized form with the present stative marker *a* being the oblique N^d**a**. See also S8p and S9p below.

[67] As already mentioned in footnote 54, the official orthography perpetuates the oversight of the traditional spelling that *ti* and *sa* are disyllabic stems. They are spelt phonetically here to accommodate tone marks.

S5a *Tìǐtà gò* mûũ tàràs gè ...
(The woman whom *I* saw ...)

S5b *Tìǐtà gò* mûũ tàràs gè ...
(The woman who saw *me* ...)

Note that the tone of the following tense/aspect marker corresponds to that of the N^d. It does so even if the N^d is of the Double-Low type, which shows no difference between nominative and oblique. In this capacity the T/A marker (*go*) serves to differentiate subject and object:

S6a Sàǎkhŏ **gò** mûũ tàràs gè ...
(The woman whom you two saw ...)

S6b Sàǎkhŏ **gò** mûũ tàràs gè ...
(The woman who saw you two ...)

Although grammatical tone is not to be pursued further, it may be pointed out here that tone also has grammatical functions in Khoekhoe.[68]

4.2 The Declarative Sentence

In the following the tonological behaviour of the major surface structures of positive and some negative indicative sentences will be presented, followed by the interrogative

---

[68] Clements (1977:9-11) remarks that Ewe is frequently cited with Chinese as a paradigmatic case of a language in which tone is primarily lexical in function. He adds that, while it is almost true at the level of underlying representation, tone "has an added, incremental function at the level of surface representation". With regard to grammatical formatives this seems to hold for Khoekhoe too.

in sub-section 4.3 *et seq.* In order to avoid a proliferation of brackets, only essential ones will be allocated, not necessarily down to the terminal syntactic constituent. The statement will be confined to constituents with lexical formatives. Although a tense/aspect marker (**T/A**) may be marked + or -, this is done primarily not to obscure the pattern with regard to the lexical categories. N^ds are never considered for bracketing. Sentence numbers occasionally are followed by *p* for positive and *n* for negative.

4.2.1 Permutations of Sentences with Predicative and/or Copulative Interpretations

The following material will be arranged from the minimal construct that can serve as sentence (imperatives ignored), expanding to SOV sentences.

4.2.1.1 The Minimal Sentence

The minimal requirement for a Khoekhoe declarative sentence is to have one stem, apart from at least a nominal designant as pro-form for the subject. This stem serves as head of the predicate. As N^ds are clitic by nature, the normal subject-predicate sentence is ungrammatical, unless the subject-N^d follows on, *e.g.*, a conjunction:

```
                    ┌Vb.Gp┐
       [        [[+ ]  [-  ]]]
S7p  (o)+s[69] gè   rà    màä
        she IND  PRES  give
     ((and) she is giving)[70]
```

```
                      ┌──Vb.Gp──┐
                   ┌──┴──┐      │
        [     [[[+  ][-   ]][-  ]]]
S7n  (...)+s  ge   màà  tàmà  hãã
        she IND  give  NEG   AUX
       (she is not giving)
```

In matrix sentences the final constituent always appears in Sandhi form, even tense/aspect markers are lowered (but cf. relative and adverbial clauses below, section 4.4). In the negative the verbal and the negating morpheme *tàmà* form an inseparable constituent. This warrants the insertion of another pair of constituent brackets, which in turn predicts the Citation form on the verbal, even if the verb group appears at the end of a sentence. The P-marker inserted above shows that on the syntactic level the same principles of Sandhi allocation apply, as on the lexical level: a constituent will surface in Citation form if it is not dominated by a Sandhi context within its syntactic domain; cf. section 3.1, p.151.

---

[69] It is an official orthographic convention that those N^ds which contain no vowel, *i.e.* **b**, **s**, **ts**, **m**, and **n**, are spelt conjunctively with the preceding word, irrespective of its constituent status. For the convenience of the reader a "+" sign is inserted here whenever the postclitic N^d does not form a syntactic constituent (*i.e.* lexically specified NP) with the preceding constituent.

[70] The Khoekhoe continuous tenses cover both the continuous and the habitual aspect of English. For the sake of brevity the translations will not reflect both.

[[+] [-]]
S8p *Mɑ̀à+s ge rɑ̀*
(she is giving) = Predicative interpretation

See Fig. 21a (p.242) for the sentence melody of the declarative minimal *predicative* sentence.

[[[+][-]] [-]]
S8n *Mɑ̀à tàmà+s ge hɑ̂ɑ̀*
(she is not giving)

[[+][-]]
S9p *Mɑ̀à rà+s gè*
(she is one who gives) = Copulative interpretation

See Fig. 22a for the melody of the declarative minimal *copulative* sentence.

[[[+] [-]]]
S9n *Mɑ̀à tàmà+s ge*
(she is not one who gives)

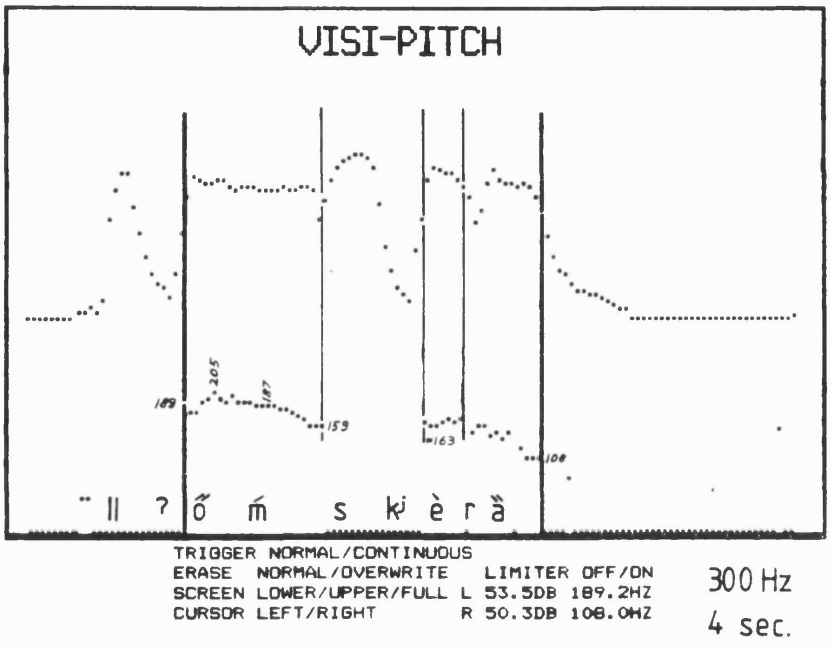


Figure 21a: The Declarative Minimal Predicate Sentence: ll*ő́ḿs gè rǎ*. (She is asleep)

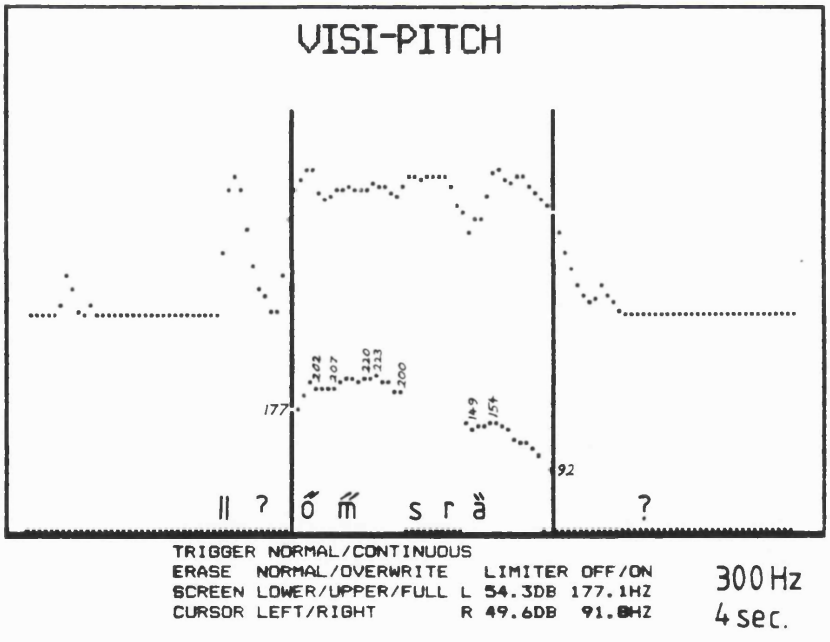


Figure 21b: The Interrogative Minimal Predicate Sentence with Floating Tone: ll*ő́ḿs rǎ?* (Is she asleep?)

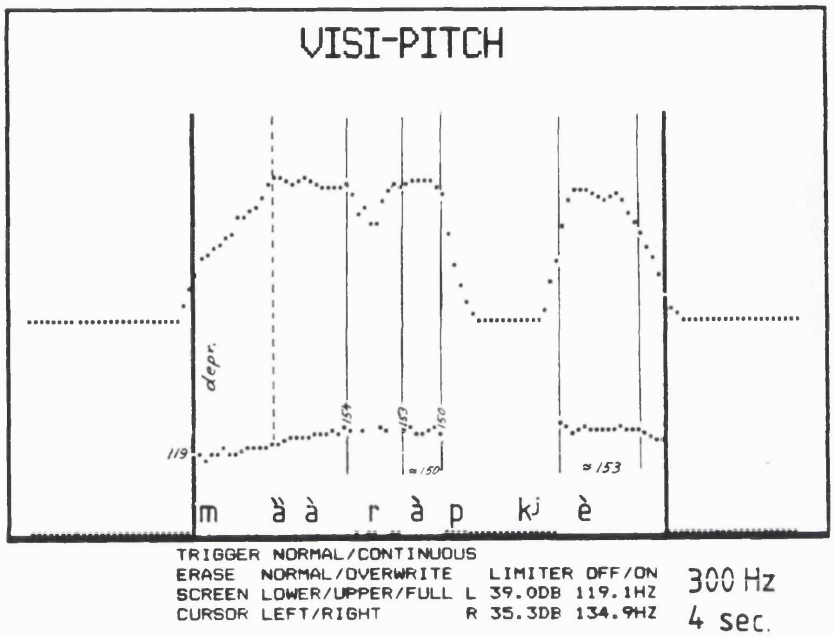


Figure 22a: **The Declarative Minimal Copulative Sentence: *Mäà rà+b gè* (He is one who gives)**

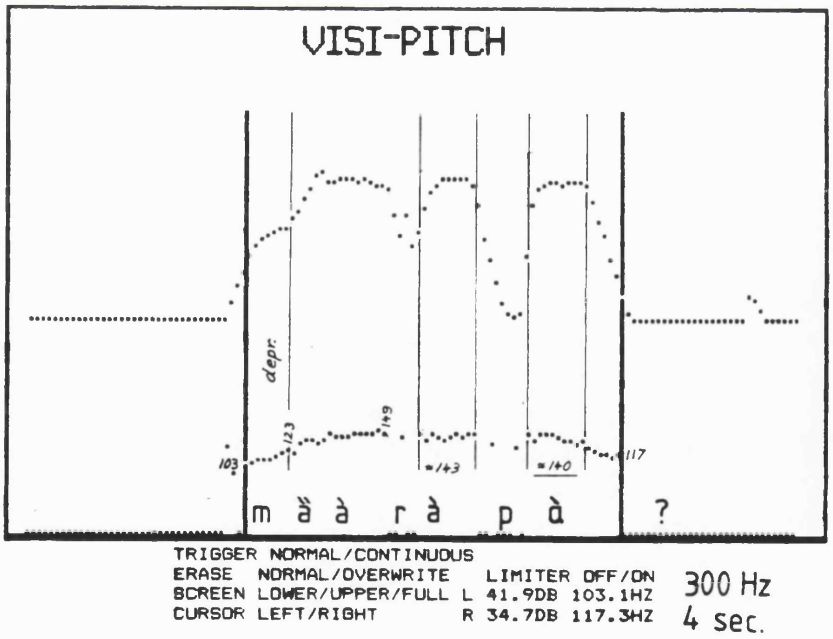


Figure 22b: **Interrogative Minimal Copulative Sentence: *Mäà rà+bà*? (Is he one who gives?)**

The difference between the predicative and copulative interpretations in minimal sentences is crucial to the understanding of Khoekhoe syntax, as was argued *i.a.* in Haacke 1977 ("sentential hypothesis"). But this difference will not be covered consistently here from a tonological point of view, as only syntactic order but not tone is employed to bring forth the difference. The fact that tone is not used, however, shows clearly that syntactic tone is post-lexical and merely reflects surface structures; cf. the following section for this.

4.2.1.2 Sentence with Lexically Specified Subject

Three perturbations of this type of sentence are possible, leaving the subject and VP undisrupted:

```
   [[+    ]NP   [[+ ][-  ]]VP]
S10p Nàmā́s  gè  rà  mà̀à̀
     (the Nama woman is giving)

   [[+    ]NP   [[[+  ][-   ]][-  ]]VP]
S10n Nàmā́s  gè   mà̀à  tàmà  hā́à̀
     (the Nama is not giving)

   [[+     ]NP    [[+  ][-  ]]VP]
S11p Nàmā́s   gè   mà̀à  rā̀
```

S11p is a less common variant of S7p and has no negative equivalent of its own.

```
  [[[+  ][+R]] [-   ]   ]
S12p Mà̀à  rà   Nàmàs ge
     (the Nama is giving)      = predicative
     (she is a Nama who gives) = copulative
```

As mentioned above, the syntactic tone of Khoekhoe does not reflect underlying structures. Hence, the difference in meaning is not borne out by the tone pattern in sentences like S12p. The predicative sentence is derived from S10p through mere subject-predicate inversion for the purpose of topicalization (and subsequent internal inversion of the predicate, as tense/aspect markers cannot stand sentence-initially). The copulative sentence consists, in its surface structure, of a noun preceded by a relative clause, *viz.*

{<(*Mãà rà***)**$_{\text{Qual}}$ *Nàmà***>***s***}** *ge*.

In either construction *Nama* will have the Sandhi form, as it is not preceded by a double bracket.

```
 [[[[+  ][-   ]][+R ]][-   ]   ]
S12n Mãà  tàmà   hãã   Nàmàs gè
```

In S12n the effect of Relative Retention (**R**) is apparent in that the AUX *hãã* retains its Citation form, despite being in a right-branching and even sentence-final constituent. With monosyllabic T/A markers like *rà*, (S12p), the effect is not apparent, as they do not have lexical tone melodies.

```
  [[[+  ][+R]] [-   ]   ]
S12* Mãà  tàmá  Nàmàs gè
     (the Nama is not giving)          = predicative
     (she is a Nama who does not give) = copulative
```

In inverted negative sentences like S12n *hãã* is frequently omitted, giving S12*. In that case a very slight raising

effect is perceivable on *tàmà*. See also section 4.4.1 for Relative Retention.

4.2.1.3 SOV Sentences

The least marked surface order of sentence constituents is SOV in Khoekhoe. However, owing to the extreme flexibility already mentioned, some eight permutations are considered grammatical, not counting subject deposition. As the matter has been discussed elsewhere (Haacke 1978:67-9), and as only the tone is of concern here, the semantic detail will largely be omitted below. It will be borne out that the left-branching principle also applies consistently here.

The overall meaning of the sentences is "(the) *Nama* is giving to the woman". In general, the sentence-initial position is the topic position. Words have been chosen simply for their ease of pronunciation and tonal conspicuousness. They are not necessarily the same as used in the pitch tracings, which had been prepared earlier for initial investigations and were selected to illustrate particular points.

```
    [[+  ]   [S[+   ] ]S [[+ ][-  ]]]
S13p Nàmâs gè   tàrâsà    rà  màã
     Nama  IND  woman    T/A give
```

The fact that the object-NP, and also the deposed subject (cf. below, p.251) always commence with the external

Citation form, provides independent evidence that surface NPs taking the *oblique* case form *-a* essentially remain embedded sentences underlyingly, as they employ the predicative strategy **#Verbal N^d T/A marker#**; see footnote 66 above. The brackets of the embedded *S*-constituent provide the second left bracket, which triggers the Citation form. The labelling of these brackets will be omitted further on.

```
   [[+    ]   [S[+    ] ]S [[[+  ][-    ]][-  ]]
S13n Nàmấs gè   tàrấsà      màà  támá   hâà
     Nama  IND  woman       give NEG    AUX
```

As the tonal behaviour of the negative should be clear from sentences S7n-S9n, the equivalents with object will not be quoted any further.

```
   [[+    ]   [[+    ] ][[+  ][- ]]
S14  Nàmấs gè  tàrấsà    màà  rà

   [[+    ]    [-] [[+  ] ][-  ]]
S15  Nàmấs gè rà   tàrấsà màà

   [[+    ]    [[+ ][-  ]] [[+   ] ]]
S16  Nàmấs gè   rà  màà(,)  tàrấsà

   [[+    ]    [[+  ][- ]] [[+   ] ]]
S17a Nàmấs gè   màà  rà(,)  tàrấsà
     (the Nama is giving - to the woman)  = Predicative

   [[+    ]   [NP[[+  ][-R]][-    ] ]NP]
S17b Nàmấs gè     màà rà   tàràsà          = Copulative
```

While S17a is an ordinary predicative sentence with delayed object, probably an afterthought topic with comma intonation, S17b is a coreferential copulative sentence. The

"complement"[71] {<(*mằà rà*) *tàrà>s*}à constitutes a NP with attributive qualifier (relative clause). Hence the head constituent *tara* receives the Sandhi form in S17b, being a non-initial constituent within the NP.

Elderkin (1989:118) states that "an object NP can be, and often is, raised to level 1 when following the verb". The assumption is inviting that Sandawe seems systematically to employ exactly the same distinction between predicative and copular sentences as does Khoekhoe. If this is so, then it would have further implications for an analysis of Sandawe syntax as a whole.

```
  [[[+    ] ][[+ ][-R ]][-    ]    ]
S18  Tàrấsà    rà  mằà    Nàmàs gè
     (The Nama is giving to the woman        = predicative)
     (She is a Nama who gives to the woman   = copulative)
```

As in the case of S12p, the tone does not reflect the underlying difference between copulative and predicative in S18. For either interpretation *Namas* is not preceded by a double bracket, hence its Sandhi form. The actual surface tone is that which would apply to the extended minimal Copulative sentence, *i.e.* a copulative sentence with one NP but which includes one or more attributive qualifiers:

$$\{<(\overset{+}{T}\grave{a}r\acute{a}\acute{s}\grave{a} \quad r\grave{a} \quad m\grave{a}\grave{a})_{Qual.} \quad \overset{-}{N}\grave{a}m\grave{a}>s\} \; g\grave{e}.$$

---

[71] In Haacke 1979 it was argued that the "complement" actually is the deposed subject. The coreferential copulative sentence is a cleft sentence, in which subject deposition is triggered by topicalization of the predicate.

When this qualifier is a relative clause, its last constituent (here *mɔ̀à*) retains its Citation form, instead of having the Sandhi form. Both meanings are acknowledged for S18 nevertheless.

Fig. 23 presents the negative equivalent of S18, using the Low-Rising *khɔ̋è.s* (woman) as object. The Double-Low tone of the oblique case marker -ɔ̏ is clearly recognizable. Note that the auxiliary *hɔ̋ɔ̀* is in the Citation form because of Relative Retention.

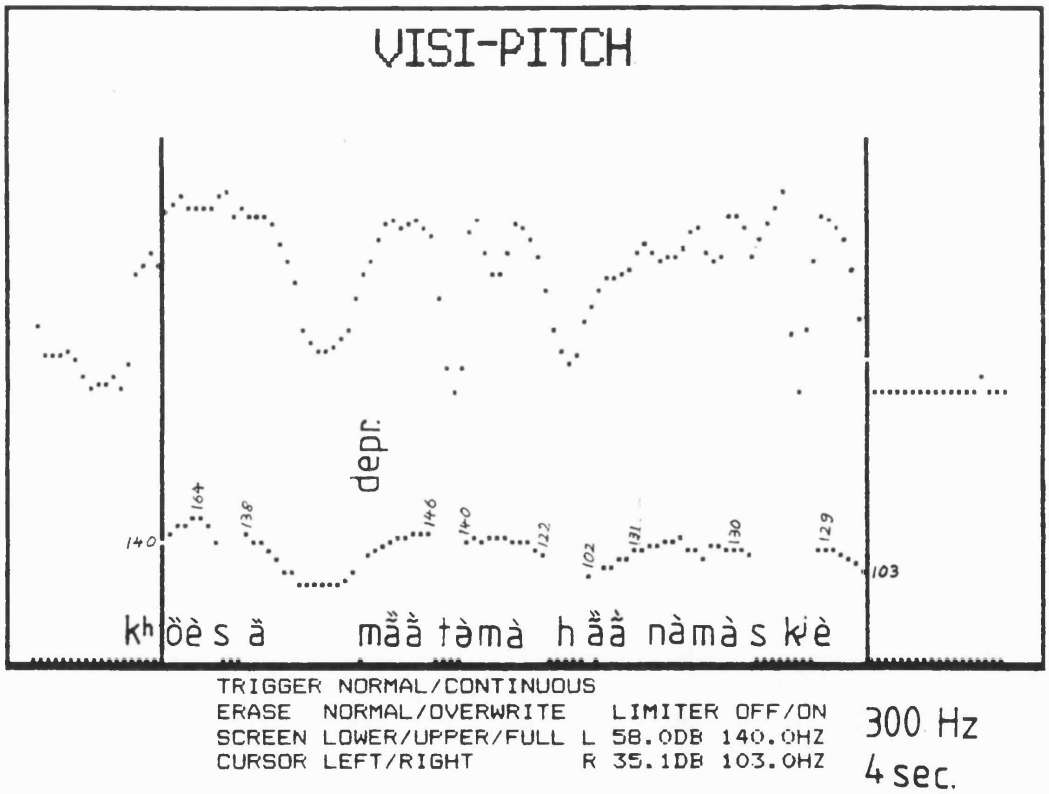


Figure 23: Ambiguous Negative Sentence with Fronted Object: *Khɔ̋èsɔ̏ mɔ̋ɔ̀ tàmà hɔ̋ɔ̀ Nàmà.s gè* (The Nama does not give to the woman; She is a/the Nama that does not give to the woman)

```
  [[[+   ][+R]][-    ]      [[+    ] ]]
S19  Mɔ̀à  rà   Nàmàs gè(,,) tàrɔ́sɔ̀
```

The above sentence is understood primarily in its predicative sense (with delayed object: The Nama *does* give - to the woman). But in a suitable context the structure should also convey the coreferential copulative interpretation (she - the woman - is a Nama who gives).

$[_S[+\ ][-\ ][[+\ \ ]\ ][-\ \ ]\ \ ]_S$
S20a *Mȁà rà tàrȃsȁ Nàmàs gè*
(the Nama *does give to the woman*) = predicative

Rel.Cl
$[_S[[+\ ][-\ ][[+\ \ ]\ ]][-\ \ ]\ \ ]_S$
S20b *Mȁà rà tàrȃsȁ Nàmàs gè*
(she is a Nama who gives to the woman) = copulative

As the bracketing predicts, no Citation/Sandhi differences can be expected to differentiate between the predicative and copulative interpretations. The ambiguity is similar to that in S18. In S20a the entire predicate is topicalized through subject-predicate inversion. The subject, therefore, is no longer preceded by a double left bracket, albeit for a different reason than *Nàmà* in S20b. In S20b Relative Retention would be expected on the case suffix of *tàrasa*. However, my data do not confirm this beyond doubt.

One further permutation is quite common. Contrary to the above constructions, which all involve *inversion* of some kind, this one employs *fronting*. By fronting I mean that the constituent to be topicalized is moved into the sentence-initial slot, which is immediately before the subject N^d. In unmarked sentences this position is held by the lexical specification of the subject, being the normal

topic. If, *e.g.*, the object is fronted, then the subject specification is deposed to a position normally - but not always - after the sentence type marker (*e.g. ge* for the indicative). The subject specification is deposed with a copy of the N^d and takes the oblique - *i.e.* essentially predicative! - form (cf. Haacke 1978). Because of this underlyingly sentential nature the deposed subject is embedded in double brackets like the object. This leads to a retention of the external Citation form; cf. S13 for the object.

```
  [[[+   ] ]    [[+   ] ][[+ ][-  ]]]
S21 Tàrấsà+s gè Nàmấsà  rà  màà
    (to the woman she - (she being) the Nama - is
    giving)
```

The above nine permutations of a simple SOV sentence show consistently that tone rules operate in domains commencing with a sequence of two or more left brackets, as argued by Clements. The present account relies on the "sentential hypothesis", according to which NPs in the oblique retain their sentential nature and thereby provide an additional set of brackets.

Once the left-bracketing principle is recognized, it is also clear why Khoekhoe, despite its high degree of tonal versatility, cannot make a tonal distinction between a deposed subject and an object. It would have been just nice if tone could have served to disambiguate NPs with identical N^ds, *e.g.*

S22 *Os ge* ***Nàmásà*** ***tàrásà*** *rà màà*
(? Then she, (being) the Nama, gave to the woman)
(? Then she, (being) the woman, gave to the Nama)

Both NPs, being in the oblique case, take the Citation form. Normally the deposed subject comes first, though, as it follows immediately on the sentence type marker (*ge*).

It now remains to describe the behaviour of some auxiliaries, before coming to interrogative formation and embedded sentences.

4.2.1.4 The Completed Aspect Marker *hã̀à*

There are three heterotonic homophones *hâa* to be distinguished in Khoekhoe:

hã̋á (inchoative verb) live, stay, reside; remain behind;
hâ̋á (stative verb) exist; be present;
hã̋à (auxiliary verb denoting completed aspect).

The present investigation concerns only the aspect marker (also loosely referred to as AUX), as it has tonal implications for the main verb. In the affirmative *hã̋à* denotes completion of an action, but with lasting effect, *e.g.*

S23 *Axab ge kai hâa*
(The boy has become big (and hence still is)).

Hâà triggers unilateral Flip-flop in the main verb:

```
                                          ┌──Vb.Gp──┐
   [[+   ]    [-  ]]   [[+  ]   [[+   ][-  ]]]
S24  Kàrő+b gè hâà   /   ||ǐìb gè  kàrő  hâà
     (He/it has dried out)
Cf. kàrő (dry out)  = resistant to Flip-flop.
```

```
                                          ┌──Vb.Gp──┐
   [[s+  ]    [-  ]]   [[+  ]   [[s+  ][-  ]]]
S25  Hàrá+b gè hâà   /   ||ǐìb gè  hàrá hâà
     (He has swallowed)
Cf. hárá (swallow)  = weak, i.e. susceptible to Flip-flop.
```

Hâà essentially acts with the main verb like a compound verb. For this reason the main verb has the Citation form of its switched melody even in sentence-final position, as the verb group (Vb.Gp) constituent has not been disrupted at surface level and thus provides the second bracket needed for the Citation form. In the case of a minimal sentence, only the main verb is fronted, not *hâà*.

Fig. 24 illustrates a sentence like S24 and S25:a minimal sentence with the auxiliary *hâà*. The Low /22/ root *gòwà* (argue) allows comparison of the N^d tà (I) and the indicative marker *gè*, showing that both have a single Low tone.

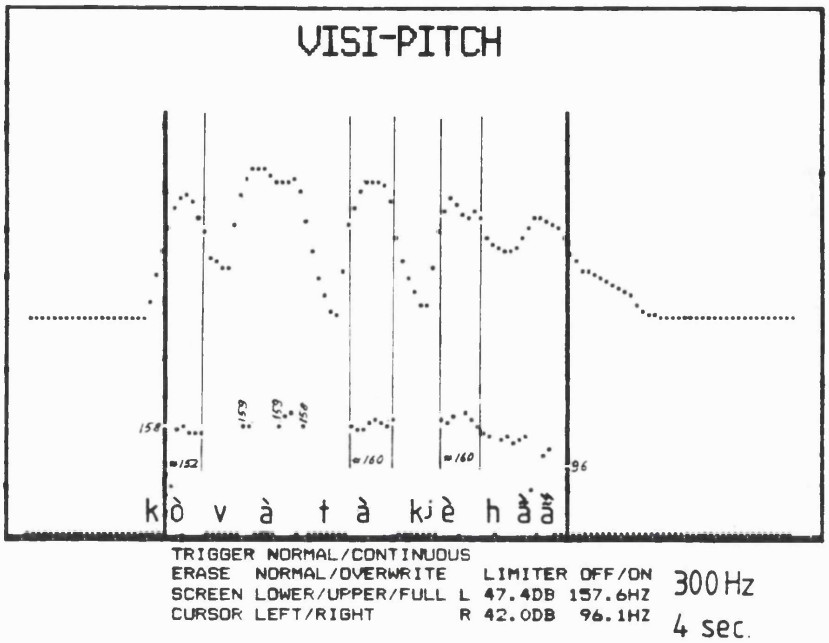


Figure 24: Declarative Minimal Predicate Sentence with Auxiliary *hầã*: *Gòwà tà gè hầã* (I have argued)

As is the case with lexical compounds, cf. p.164, d), Flip-flop cannot apply to the main verb in the negative, for the negative formative *tàmà* acts like a constituent within a compound verb. (Although orthographically it is spelt disjunctively, *tàmà* also proves to be a compound element for morphological reasons, for it cannot be removed from its position immediately adjacent to the main verb during any sentence permutation whatever.)

```
                                                  ┌──────────Vb.Gp──────────┐
    ┌──────Compd──────┐                           ┌──────Compd──────┐
  [[[+   ][-   ]]   [- ]] [[+  ]  [[[+   ][-   ]][-  ]]]
S26  Kàrố  tàmà+b gè hầã  /  ‖Fìb ge  kàrố  tàmà  hầã
     (He has not dried out/is not drying out)

  [[[+   ][-   ]]   [- ]]  [[+  ] [[[+   ][-   ]][-  ]]]
S27  Hấrá  tàmà+b gè hầã  /  ‖Fìb ge hàrấ  tàmà  hầã
```

Changes affecting *hâã* in questions and relative clauses will be discussed below.

4.3 The Interrogative

For ease of reference the sentence number of the declarative counterpart will be quoted in brackets after the relevant interrogative sentence.

von Essen (1966) devoted an article to the interrogative, which was based on tape recordings made by Prof Ernst Dammann in 1953, incidentally with the same informant that served for the present investigation. In this article von Essen first mentioned the raising of the word in initial position of an interrogative sentence, as will be discussed below.

It must be stated from the outset that the tonological behaviour of the interrogative could not be reduced to one underlying element without doubt, for various types of changes seem to manifest themselves at surface level. This problem is aggravated by different usages by different speakers. In the following minimal interrogative sentences, for instance, the main informant, Pastor Eiseb offered two alternatives: one with unilateral Flip-flop, the other one with a raising influence that must be ascribed to a floating tone. The

Flip-flop strategy was categorically rejected by a representative of the younger generation.

4.3.1 Minimal Interrogative Sentences

In general it can be said that the initial slot, *i.e.* the topic slot immediately preceding the N^d, harbours a defective interrogative morpheme which affects the fronted word in the initial slot tonologically. The nature of this effect will be shown below. Recall that "minimal" sentence refers to a sentence that meets the minimal requirement for a sentence by having one stem only as head of the VP, *i.e.* without a lexical specification of the subject.

The following pitch tracing shows the raising effect on the second syllable of a Double-High melody (cf. furthermore Figures 11a/12a on p.60 for the normal, falling pitch curve of the /43/ Citation form). This is the minimal sentence for which the main informant also used Flip-flop as alternative:

S28 ||ò᷈m᷈+s *ra?* / ||ó᷈m᷈+s *ra?* (S8p)
(Is she asleep?)

For minimal interrogative sentences with the AUX *hẫà* only versions with unilateral Flip-flop were offered by the informant, *i.e.* there is no tonal distinction between declarative and interrogative, other than the presence or absence of the indicative marker *gè*:

S29 *Hàrá̋+b hẫà?* (S25)
(Did he swallow?)
Cf. *hárá* /43/

The raising influence can be perceived though, albeit minimal because of the close proximity of the tones, with the stative verb ǁ*kháà* (can, be able to do). While in the indicative (S27a) ǁ*kháà* evidently takes the Sandhi form, it is raised in the interrogative (S27b). Its exact status is not clear, however. It does not simply take the Citation form /32/, for the melody is rather level, if it does not even rise very slightly. This difference may possibly be relegated to overlaying intonation.

S30a *Hárá ǁkhàà̃+b gè à̃*
(He can swallow)

S30b *Hárá ǁkháá+b à̃?*[72]
(Can he swallow?)

During negation of the minimal sentence only the negative morpheme is affected. *Tàmà* is raised by one tone step to *támá*:

S31 *Hárá támá+b hẫà?* (S27)
(Did he not swallow?)

---

[72] *à̃* in this and the previous sentence is the stative T/A marker required by the stative verb ǁ*kháà*.

In conclusion, it could not be determined that the floating interrogative tone has the effect of exactly raising any input melody by, say, one step. Instead, the auditory impression is more that it is a matter of *in*tonation.

4.3.2 Interrogatives with Lexically Specified Subject

If a subject in an interrogative sentence is lexically specified, it takes the oblique case form.[73] While deposed subjects and objects have a Double-Low tone on the suffix -à, the subject in topic position of an interrogative sentence has a Low tone, *viz.* NPà; cf. Fig. 25 below. The lexical specification itself is not affected tonally, despite being in the topic position.

The sentential origin of this NP construction is cogently manifested in the two alternative interrogative formations, as discussed in *i.a.* Haacke (1978:28 *et seq.*):

---

[73] Hagman (1977:139/140) overgeneralizes by saying that all subject NPs in the interrogative have the form **NPà**. It follows from the sentential hypothesis that a NP cannot have the case suffix -*a* if there is no lexical specification, for underlyingly this would mean that the tense/aspect marker *a* would surface without having a predicate head (the specification).

In Haacke (1978:55-70) an argument was presented that the occurrence of the oblique in the subject of the interrogative is due to an underlying question morpheme. With the autosegmental concept of defective morphemes in the form of floating tones available, this point could probably be argued more convincingly now.

S32a *Tàrí+tsà?*[74]
(Who are you?)

While the above, grammaticalized utterance is the normal question, it can be articulated with emphasis as separate words in true sentential mode:

S32b *Tàrí+ts à?!*
(Who *áre* you?!)

It is quite apparent that this is the predicative inversion of the minimal sentence

S32c **+ts à tari?*
you T/A who

The Double-Low tone on the tense/aspect marker in S32b can be ascribed to the fact that it stands in sentence-final position.

Below follows a selection of the most important interrogative patterns. The reader should be able to infer the other patterns by analogy to the patterns listed for the declarative. Fig. 25 illustrates sentence type S33 with lexically specified subject, here with the Low /22/ ǁǐì.*b* (he). Note the Low tone of the oblique case marker -*à*, which is raised by the defective Question morpheme. Each tone in the sentence is Low, with slight final downdrift on the Sandhi version of *kàrǒ* (dry out, harden).

---

[74] The High tone previously (1976) allocated to the oblique suffix in interrogatives is now corrected to Low: NPà, while objects and deposed subjects have NPa̋. As mentioned before, the Low and High tone on their own are rather close to each other.

[[[+]Q] [[+] [-]]][75]
S33 *Nàmấsà rà màä̋?* (S10p)
(Does the Nama give?)

[[[+]Q] [[[+][-]][-]]]
S34 *Nàmấsà mäà tàmà hâ̋ä?* (10n)
(Is the Nama not giving?)

[[[+] [+R]] [-]Q]
S35 *Mä̀à rà Nàmàsà?* (12p)

S35, and with it S38, are problematic for the present account. With the subject-NP *Nàmàsà* taking the Sandhi form, it means that the preceding constituents represent a relative clause as explained for the declarative S12p; *i.e.* according to the tone the sentence is an extended minimal copulative sentence. Certain speakers interpret the interrogative version predicatively only, while others offer both interpretations.

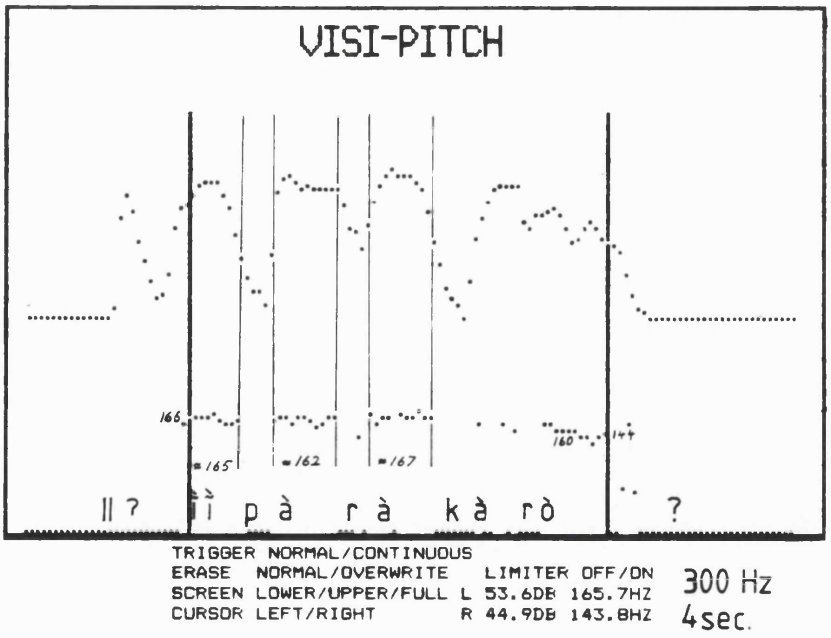


Figure 25: Interrogative Predicative Sentence with Object: ‖*Ì̀ìbà rà kàrò?* (Is it drying out?)

---

75 The symbol 'Q' represents the defective interrogative morpheme which causes tonal raising.

4.3.3 Interrogative SOV Sentences

As long as the object is not fronted into the initial slot, the interrogative follows, *mutatis mutandis*, the declarative patterns, with the difference that the subject is in the oblique form. Of more interest are the sentences involving fronting. In interrogative sentences it is even more important than in declarative sentences that the topic (of interrogation) is fronted into the initial slot. This holds for both general and specific questions. The tonological behaviour is the same for both types, though.

```
  [[[+   ]Q] [[+   ] ] [[+ ][-  ]]]
S37  Nàmấsà   tàráṣà   rà  màǎ?          (S10p)
     (Is the Nama giving to the woman?)
```

Fig. 26 illustrates the negative equivalent of the interrogative S37, with *khòè.s* again serving as object. The High-Rising melody of *Nàmấ.s* and the oblique *-à* are raised intonationally by the defective Q morpheme.

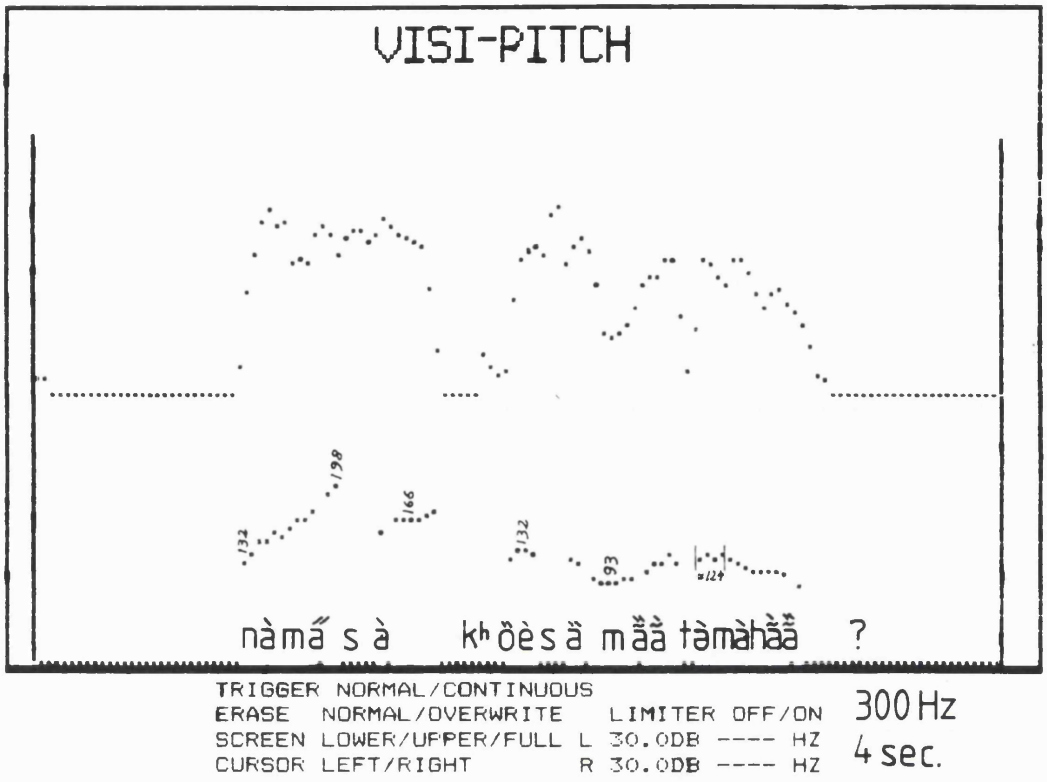


Figure 26: Negative Interrogative Predicate Sentence: *Nàmā́sà khȍèsȁ mā̋ȁ tàmà hā̋ȁ* (Does the Nama not give to the woman?)

While the above sentence is comparatively unmarked with regard to focus assignment, a more explicit and hence preferred way is to depose the subject by fronting the object into the initial slot. But now the subject is not deferred to its normal deposed position after the sentence type marker. Instead, it is preposed to the entire sentence. Note that the subject *Nàmā́sȁ* now has the Double-Low final tone normal for deposed subjects, while the constituent in the initial slot (*i.e.* before the N^d, thus *tàrā́sá*) undergoes raising by the defective interrogative morpheme (Q). In the case of an object the oblique *-a* gets a High tone through raising.

S37 *Nàmấsà*$_{(,)}$ *tàrấsá+s rà màà?*
(Does the *Nama* give to the *woman*?)

NP
[[[+]] [[+][+R] [-]]Q]
S38 *Tàrấsà rà mấà Nàmàsà?* (S15)
(Does the Nama *give to the woman*? = pred. only)

S38 escapes explanation of its tonal behaviour for the same reason as S35. Although it has the tonological patterns pertaining to copulative sentences, it is understood primarily predicatively, if not even exclusively by some speakers. Again, speakers differ on the issue.

[[+]] [$_S$[+Q] [-] [[+]]]$_S$
S39 *Tàrấsà*$_{(,)}$ *màà+s ra*$_{(,)}$ *Nàmấsà?*
(Is she, the Nama, *giving* to the *woman*?)

In S39 the object *tarasa* has been advanced to a position in front of the entire sentence constituent. The initial slot is occupied by *maa*. It thus gets the Citation form because of its S-initial position.

[[[+]Q] [[+]] [[+][-]]]
S40 *Tàrấsá+s Nàmấsà rà màà?* S18
(Is the Nama giving to the *woman*?)

Interrogative raising affects any morpheme in the initial position, including the object marker:

S41a ||*Khàù tè+s gè nĩ̀ĩ̀*
(She will invite me)

S41b ||*Khàù té+s nĩ̀ĩ̀?*
(Will she invite me?)

4.4 Embedded Sentences

Embedded sentences comprise relative and adverbial clauses. In principle they are subject to the same rules as matrix sentences, with the exception that their final constituent retains the Citation form, thereby providing the link to the matrix sentence.

4.4.1 Relative Clauses

The retention of the Citation form in the last constituent of the relative clause cannot be accommodated as a case of double left bracketing. It is a special device linking the left-branching relative clause to its antecedent. This link cannot be conceived as a floating tone, however, as it is not a matter of raising as in the interrogative, but rather a clear matter of Citation retention above Sandhi. Hence it is dubbed Retention (R).

```
        ┌──────────────l.sp──────────────┐
        │ ┌──────────Rel.Cl──────────┐   │
[[[[[+  ] ] [[+ ][+R  ]]] [-   ]     [[+ ][-   ]]]
S42 <( /Àéśà   rà  khàù)   tàrà>s gè   rà  ||nàë
    (The woman who is lighting a fire is singing)
```

Relative retention applies to the last constituent of any relative clause, irrespective of how intricate it is. Further examples are, therefore, redundant.

4.4.2 Adverbial Clauses

The following observations hold only for adverbial clauses embedded by means of one of the four adverbial suffixes, *viz.* *-sè*, *-!ầ*, *-gà* and *-pá*.[76]

As in the case of relative clauses, the internal tone rules are the same as for matrix sentences, with the exception of the final constituent. This, as in relative clauses, retains the Citation form and is also marked R here.

```
                ┌─────────Adv.Ext─────────┐
                │ ┌──────clause──────┐    │
              [[[[+  ] ] [[+ ][+R  ]]]
```

S43 *Tàrấs gè /áésà rà* ***khàú****sè rà* ǁ*nàè*
(The woman is singing while lighting a fire)

S44 *Tàrấs gè /áésà rà* ***khàú****!ầ rà* ǁ*nàè*
(The woman is singing, although she is lighting a fire.)

```
    ┌─────Adv.Ext─────┐
    │ ┌────sentence──┐│
   [[[+  ] [[+ ][+R  ]]]]
```

S45 *Tàrấs rà* ǁ***naè****pá+ts ge hẫá tìdè*
(You cannot stay where the woman is singing)

In the case of adverbial clauses these rules likewise apply to sentences of any complexity.

---

[76] Contrary to what is normally held, *e.g.* Hagman (1977:131), the suffixes *-se* and *-!â* are not freely interchangeable. *-se* embeds adverbial clauses of modality, and *-!â* adverbial clauses of concession, which imply incompatibility or contradiction. *-ga* embeds clauses of purpose, and *-pa* adverbial clauses of place.

5. CONCLUSION

In this thesis it has become clear that Khoekhoe tonology fits into a typological framework that is not quite unknown, *viz.* a system known from South-East Asian languages, in which melodies are exchanged paradigmatically. A set of Citation melodies has a corresponding set of Sandhi melodies. It has been shown that lexical tone in Khoekhoe is based on a bimoraic foot, and that each melody must be analyzed in terms of two tonemes out of a set of four. An analysis of these tones in terms of a HIGH and a LOW tone feature on one tier, and a UPPER REGISTER feature on another, *i.a.* permits an account of the Flip-flop rule, as well as of a tonogenetic split in Khoekhoe, according to which three original tonemes split into six through the influence of depressor consonants. For practical purposes only four surface tonemes need to be recognized, however, bacause of partial overlap.

Two major perturbational processes are at work: Sandhi, which has its own set of melodies and operates lexically as well as post-lexically; and Flip-flop, which operates only lexically and is simply an exchange of input Citation or Sandhi melodies. Sandhi rules operate across domains that are independently defined by rules of syntax. Khoekhoe tone has lexical as well as grammatical and derivational function.

It can be assumed that other Central Khoesaan languages, if not most languages of the Khoesaan family, should be ana-

lysed in similar typological terms to those used for Khoekhoe. This, in turn, should provide further evidence for their affinity.

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