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It has been observed that tonal phenomena occur in quite a few Indo-Aryan languages in the northwestern corner of the South-Asian subcontinent. This paper presents a study of the tone system of one of these languages, Kalam Kohistani. After establishing that Kalam Kohistani has five contrastive surface tones—a high tone, a low tone, a rising tone, and two types of falling tone—I propose an analysis of these tones in terms of Autosegmental Phonology. Furthermore, some observations are made on the relation between aspiration and tone, and on the functional load of tone in Kalam Kohistani. Its relatively rich inventory of tones makes Kalam Kohistani, along with two of its close neighbors, stand out as unique among the Indo-Aryan languages.[*]

1. Introduction

Kalam Kohistani is spoken in the upper parts of the Swat valley in the North-West Frontier Province of Pakistan, an area that is popularly known as *Swat Kohistan* or *Kalam Kohistan*. The principal Kalam Kohistani speaking villages in the Swat valley are Kalam, Utror, Ushu, and Matiltan. The same language is also spoken across the mountains in the West, in Dir Kohistan, where Thal, Lamuti, Biar, and Birikot are the main Kohistani speaking villages. In the *Linguistic Survey of India*, the language goes by the name of *Garwi* (Grierson1919:507ff.). Barth (1956:52) reports that *Gawri* is a more accurate form of this name. In Morgenstierne (1940) it is called *Bashkarik*. Among the Kalami people these names are hardly used, if at all familiar. They themselves normally call their language simply *Kohistani* (Barth 1956:52, Rensch 1992:5, Baart 1997:4f.).

Kalam Kohistani, along with Torwali (which neighbors it in the South) and Indus Kohistani (which neighbors it in the East), is classified as belonging to the Central or Kohistani Group of the so-called "Dardic" languages (Strand 1973:302, 2003). Dardic, in turn, belongs to the northwestern "zone" of Indo-Aryan (cf. Masica 1991:446f.). The exact number of speakers of Kalam Kohistani is not known, but the present-day figure is probably in the range of 60,000 to 70,000 speakers, including those in Dir Kohistan (Baart 1997:3f.).

The data on which this paper is based were collected between October 1991 and August 1995. In this period, I was able to spend four summers in Kalam, and to make several shorter trips to the area. My principal language consultant was Mr. Shahe-Room, a jeep driver from Kalam Kas, who was in his thirties at the time. Data were checked extensively with another speaker, Mr. Muhammad Zaman, a college student from village Shahoo, who was in his early twenties at that time. Both are native speakers of Kalam Kohistani (it should be noted, though, that MZ has a Kalami father and a Torwali mother, and is bilingual from early childhood). In a less formal way, many other Kalami people have shared information about their language.

The remainder of this paper is organized as follows: In section 2 I briefly introduce the phenomenon of tone, especially as it occurs in languages of northern Pakistan. Section 3 presents

[*]The research on which this paper is based was carried out in Pakistan under an agreement of cooperation between the National Institute of Pakistan Studies (NIPS), Islamabad, and SIL International. I am particularly thankful to Dr. Ghulam Hyder Sindhi and Dr. Tariq Rahman, both of NIPS, for their support. The paper has benefited from valuable comments by Carla Radloff, Ron Trail, Keith Snider and an anonymous referee for *Linguistic Discovery*. Without the enthusiastic support and hospitality of my language consultants and many other friends in Kalam this work would not have been possible. Their help is gratefully acknowledged.

a summary of the Kalam Kohistani phoneme system. In section 4 I discuss the methodology followed in my study of Kalami tone. On the basis of the observations presented in section 5, I argue that Kalam Kohistani has five contrastive surface tones: a high tone, a low tone, a rising tone, and two types of falling tone. Section 6 proposes a phonological analysis of the Kalam Kohistani tones. The subject of section 7 is the correlation between aspiration and low or rising tone, and the use of tone in marking lexical and grammatical contrasts in Kalam Kohistani. Section 8 summarizes the findings of this paper.

2. Tone

The term *tone* has been defined in different ways. According to one point of view (e.g. McCawley 1964, cited in Fromkin 1978:3), tone is distinguished from other uses of pitch by its lexicalness, that is, tone is an inherent property of the words of a language. In this view, we speak of tone when a word (or a smaller meaningful unit such as a suffix or prefix) brings its own pitch characteristics to the utterance. In a non-tonal language like English, this is not the case. The shape of the pitch contour with which a word is pronounced in English (for instance a rising pitch, followed by a falling pitch) is not tied to the word as such. It can always be replaced by another contour (for instance a stretch of low pitch, followed by a rise) without affecting the identity of the word, although changing the pitch contour will normally involve a change of intonational meaning.

One way to test for the presence of tone in a language is to use a fixed carrier sentence (also called "sentence frame") such as 'could you show me the ___ once more', and substitute many different words for the underlined blank (*could you show me the table once more*; *could you show me the box once more*; *could you show me the apple once more*; etc.). In English the same pitch contour (for instance involving a rising and falling pitch on the substitution word) could be used for each of the resulting sentences. In a tone language one will find that, when put in the sentence frame, some substitution words necessarily carry a different pitch contour than other words in that slot (although this difference may not show up in each and every sentence frame that is constructed). One may find, for instance, that many words carry a falling pitch, while some words are consistently spoken with a rising pitch. This constitutes evidence that the language is tonal.

If there is tone in a language, chances are that the different tones are contrastive, that is, that they may be used as the sole distinction between different words or grammatical elements. Kalam Kohistani has many examples of this, such as /ɓooɾ/ 'lion' (with high tone) vs. /booɾ/ 'Pathan' (with low tone). Other languages may have tone but none or only very few of such minimal pairs.

Tonal phenomena have been observed in quite a few languages of the northwestern corner of the South-Asian subcontinent, although most of these have not been extensively studied (see Baart 2003 for an overview of reported or suspected tone languages in northern Pakistan). Punjabi is a classic example; its words are grouped into three tone classes: those with low-rising tone, those with high-falling tone, and those with mid or unmarked tone. A relation was noted between the loss of voiced aspirates ([bh], [dh], etc.) and the emergence of tone in Punjabi (cf. Masica 1991:118-9 and references cited there). In the Northern Areas, Shina and Burushaski appear to have tone systems that are surprisingly similar to each other, where long vowels may sometimes bear a conspicuous low-rising tone, contrasting with the falling pattern occurring elsewhere (see, e.g., Schmidt and Kohistani 1998; Radloff 1999). In Chitral district, Khowar and Dameli are languages for which a distinctive low-rising tone has been observed (Morgenstierne 1932:49, 1942).

Concerning Kalam Kohistani (or rather its Dir Kohistan dialect, which he called Bashkarik, as was remarked above), Morgenstierne (1940:210) noted a distinction between a rising and a falling tone in several monosyllables. He went on to say: “The short time at my disposal did, however, render a thorough investigation of this interesting problem impossible.” The present paper takes up the challenge that Morgenstierne left us, presenting evidence for the presence of five contrastive tones in the language. The shape of these five tones is not static; rather, their realization is dependent on the intonational and morphosyntactic environments in which they occur. The focus of the current paper is the identification of the contrastive tones of Kalam Kohistani. A more in-depth account of processes of tonal change in Kalam Kohistani has been presented in another paper (Baart 1999b).

3. The Kalam Kohistani Phoneme System

3.1 Vowels

Kalam Kohistani has a system of six short vowels that each have a long counterpart. These are presented in Table 1. In this paper, a long vowel is indicated by writing the vowel symbol twice.

	front		back	
	short	long	short	long
close	i	ii	u	uu
mid	e	ee	o	oo
open	a	aa	ɑ	ɑɑ

Table 1: Kalam Kohistani oral vowels

Vowel changes play an important role in the morphology. Many nouns form their inflected form (used to indicate plural number as well as oblique case) by means of a vowel change, as in /ʃɑɑk/ ‘a piece of wood’, /ʃaak/ ‘pieces of wood’. Different forms of adjectives (masculine, masculine inflected, feminine) are also related through vowel changes, as in /ɾɑɑn/ masc. ‘good’, /ɾaan/ masc. infl. ‘good’, /ɾeen/ fem. ‘good’, and so are the endings on verb tenses (indicating agreement with a masculine singular, masculine plural, or feminine noun phrase). Finally, where masculine nouns have feminine counterparts, these too are often related through a vowel change, as in /kukuɾ/ ‘rooster’, /kikiɾ/ ‘hen’ (see Baart 1999a:169ff for an analysis of vowel change processes in Kalam Kohistani).

The front vowels all have a palatalising effect on preceding velar consonants; *k*, *g*, and *ŋ* are pronounced [kʲ], [gʲ], and [ŋʲ] when a front vowel follows, as in /gaan/ ‘big’ which is pronounced [gʲaan].

Most vowels have nasalized counterparts. In this paper these are written with a superscript tilde, as in /mə̃ə̃/ ‘my’.

3.2 Consonants

The inventory of consonants is presented in Table 2. Aspirated plosives and affricates are represented with digraphs: *ph, th, ʈh,* etc. *ɬ* is a voiceless lateral fricative. *l* and *ɬ* are separate phonemes (for instance /lɑɑm/ ‘village’ vs. /ɬɑɑm/ ‘cedar wood’), but there is a close affinity between the two: *ɬ* may turn into *l* before a voiced consonant, as in /pɑɬ manə̃/ [pɑɑl manə̃] ‘it is called a leaf’.

f and *q* mainly occur in loan words and tend to be replaced by *p* and *x*, respectively. *ɣ*, *z*, and *x*, too, mainly occur in loan words.

		labial	dental	retroflex	palatal	velar	post-velar
plosive	aspirated	ph	th	ʈh		kh	
	voiceless	p	t	ʈ		k	q
	voiced	b	d	ɖ		g	
affricate	aspirated		tsh	ʈʂh	tʃh		
	voiceless		ts	ʈʂ	tʃ		
	voiced				dʒ		
fricative	voiceless	f	s	ʂ	ʃ	x	h
	voiced		z			ɣ	
nasal		m	n	ɳ		ŋ	
glide		w			j		
lateral	voiced		l				
	voiceless		ɬ				
flap			ɾ	ɽ			

Table 2: Kalam Kohistani consonants

4. Method

For the investigation of Kalam Kohistani tone, a list of 86 nouns was compiled in such a way that words with different numbers of syllables (one vs. two vs. three syllables per word) were represented, different perceived stress patterns were represented (final stress vs. penultimate stress), as well as different suspected tone categories (at the time when the list was being compiled, it was already clear from informal observation that there were at least two different tones). This list is given in the appendix. Nouns were used in this initial study, rather than verbs or adjectives, because they are easier to fit in different kinds of sentence frames.

Eight sentence frames (see section 2 above) were constructed, accounting for different positions in the sentence in which the substitution words could occur. One important distinction here is whether the substitution word is the last word in the sentence or not. In tone languages, sentence intonation may affect the shape of the tones of words, particularly in sentence-final position. So, a frame was included where the substitution word is the last word in the sentence, while in other frames it was not the last word. Also, different syntactic positions for the substitution slot were taken into account, such as subject, object of a verb, and object of a postposition. In order to account for the possibility of tones influencing the shape of neighboring tones, I tried to vary the words surrounding the substitution slot in such a way that some would always carry high pitch, and some low pitch. The eight sentence frames are given in Table 3, with the word /daɾ/ ‘door’ in the substitution slot for illustration.

Frame A:	ĩĭ	daɾ				this is a door
	this	door				
Frame B:	ĩĭ	daɾ	ĩĩmɑɑg	thuu		this door is here
	this	door	here	is		
Frame C:	ĩĭ	miiʃ	kee	daɾ	thuu	near this man is a door
	this	man	near	door	is	
Frame D:	ĩĭ	miiʃ	maka	daɾ	paʃɑɑnt	this man is showing me a door
	this	man	to.me	door	he.shows	
Frame E:	ĩĭ	miiʃ	daɾ	maka	paʃɑɑnt	this man is showing me the door
	this	man	door	to.me	he.shows	
Frame F:	ĩĭ	poo	daɾ	kee	baaṣt	this boy is sitting next to the door
	this	boy	door	with	sat.down	
Frame G:	ĩĩmɑɑg	daɾ	nɑ̃ɑ̃t			there is no door here
	here	door	is.not			
Frame H:	aaska	daɾ	manã			this is called a door
	to.this	door	they.say			

Table 3: Sentence frames used to investigate Kalam Kohistani tone

In all, 8 x 86 different sentences were constructed. These were recorded on audio tape (except for a few sentences that were deemed unnatural or inappropriate by the language consultant), with my principal language consultant SR as speaker.

Next, a phonetic transcription was made of the utterances on the tape, including a transcription of the course of pitch over each utterance. In the transcription of pitch, I greatly benefited from the use of *Speech Analyzer*, a computer program for acoustic analysis of speech developed by SIL International. The pitch graphs that are presented in the discussion below were produced with this system.

On the basis of the data thus collected, it appeared that the words of the word list could be grouped into five different tone classes, each with its own pitch characteristics. Once this had been established, I was able to extend the analysis to most of the other language data that I had collected so far, including grammatical categories other than nouns. This resulted in the discovery of many minimal pairs that provide ample evidence for contrast between the five tones.

5. Contrastive Tone in Kalam Kohistani

In this section, I present evidence illustrating the typical surface pitch patterns of each of the five tones, viz. high level pitch, high-to-low falling pitch, low level pitch, low-to-high rising pitch, and delayed high-to-low falling pitch. (As we will see, the difference between the high-to-low falling pitch and the *delayed* high-to-low falling pitch is that the delayed falling pattern typically falls from the last syllable of a word onto the first syllable of the next word, while the regular falling pattern is fully executed within the word itself.)

In the following subsections, one-syllable words will be looked at first, next multi-syllable words are discussed. Following this, minimal pairs are presented for each of the theoretically possible contrasts.

5.1 Evidence for monosyllables

The lower panel of Figure 1 presents the pitch graph for the word /daɾ/ ‘door’, put in the frame sentence C:

ĩĩ miiʃ kee daɾ thuu ‘near this man is a door’.

In Figure 1, the phonemic annotation directly above the waveform in the upper panel indicates what part of the graph corresponds to each sound in the sentence. The beginning and end of the substitution word /daɾ/ are marked by vertical lines. The two parallel dotted lines in the graph mark the upper and lower extremes between which pitch fluctuates. They are slanted, indicating that average pitch decreases over the course of an utterance. This physiologically based tendency for average pitch to start relatively high and end relatively low is called *declination* in the phonetic literature, and is assumed to occur universally in the languages of the world (Clark & Yallop 1990:284; Yip 2002:9).

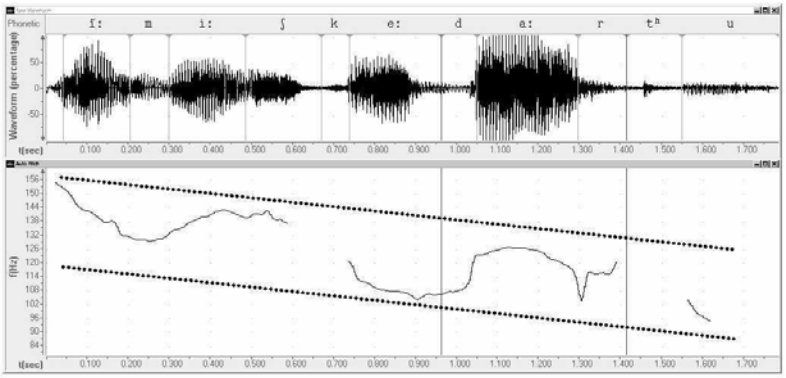

Figure 1. Waveform and F_0 graph for **/daɾ/** ‘door’ (high, level tone) in frame C

In this particular frame sentence, pitch is normally low on the word /kee/ ‘near’ that precedes the substitution word, and is also low on the word /thuu/ ‘is’ that follows. What we observe for this example is that pitch rises to a relatively high level early in the word /daɾ/, and remains high throughout the word.

As an aside we may notice that the duration of the vowel /a/ of /daɾ/ is quite long in this example. In fact, /daɾ/ is one of many words that have a short vowel when spoken in isolation and utterance-finally, and a lengthened vowel utterance-internally. A more extensive discussion of this interesting phenomenon can be found in Baart (1997:46ff., 1999b:101ff.)

Figure 2 shows another sentence with /daɾ/ (frame sentence D):

ĩĩ miiʃ maka daɾ paʃɑɑnt ‘this man is showing me a door.’

In this sentence, too, the high, level pitch on /daɾ/ is clearly visible. Note that in this frame sentence, the word that precedes the substitution word (/maka/ ‘to me’) has low pitch, but the word that follows (/paʃɑɑnt/ ‘is showing’) starts out high and then has a falling curve on the second syllable.

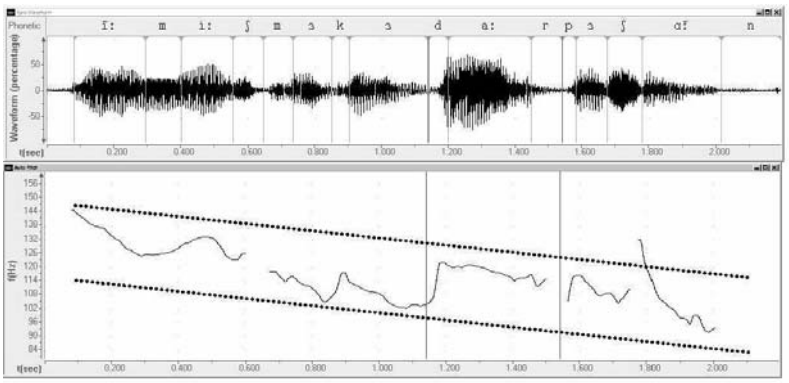

Figure 2. Waveform and F_0 graph for **/dɑɾ/** ‘door’ (high, level tone) in frame D

Figure 3 shows the word /bɑɑn/ ‘excuse’ substituted in frame sentence C (this particular item was not included in the original list, but is used here as its segmental structure makes for a better comparison with the other words under discussion in this subsection). Again, pitch rises to a relatively high level early in the word. In contrast to the word /dɑɾ/, pitch falls during the pronunciation of the word /bɑɑn/ and reaches a relatively low level near the end of the word.

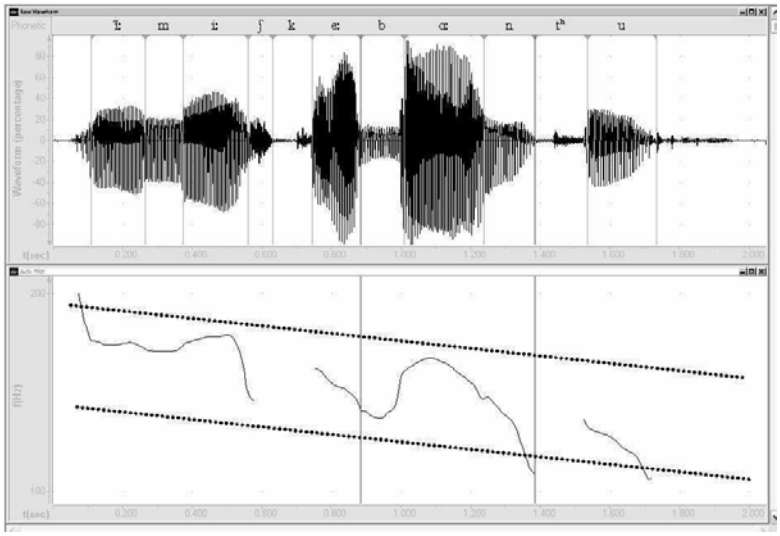

Figure 3. Waveform and F_0 graph for **/bɑɑn/** ‘excuse’ (high-to-low falling tone) in frame C

This high-to-low falling pitch curve can also be observed in Figure 4, which shows the word /bɑɑn/ in frame D. Note that the word that follows (/paʃɑɑnt/) has low pitch throughout, as opposed to the high and falling pitch it has in Figure 2. What we may tentatively hypothesize here is that /bɑɑn/ ‘excuse’ not only has falling pitch itself, but it also has a “depressing” effect on the pitch of the word that follows.

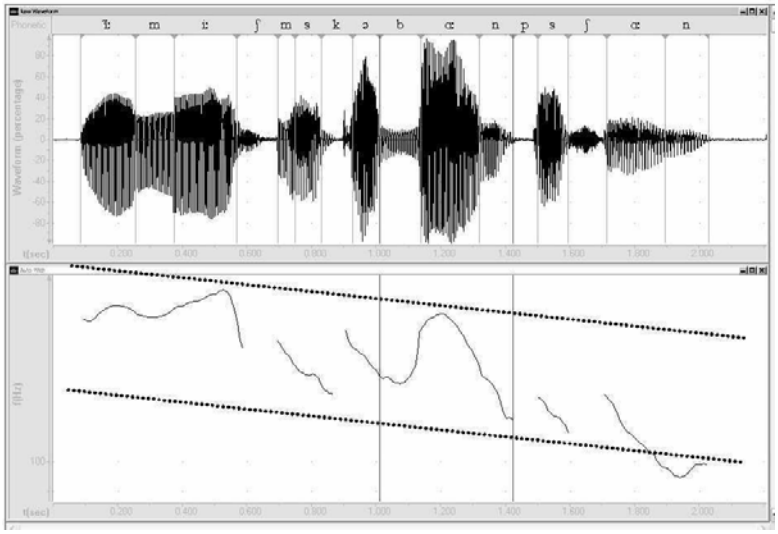

Figure 4. Waveform and F_0 graph for **/bɑɑn/** ‘excuse’ (high-to-low falling tone) in frame D

Figure 5 shows the word /baan/ ‘utensils’ in frame sentence C. Although some minor pitch perturbations can be observed in the graph, pitch remains relatively low throughout the word, and so is clearly distinct from the pitch curves on both /dar/ ‘door’ and /bɑɑn/ ‘excuse’. The same pattern can be observed in Figure 6 where /baan/ ‘utensils’ is embedded in frame D.

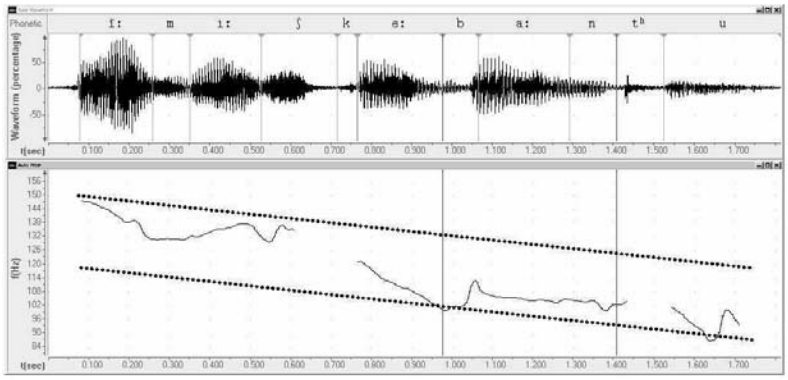

Figure 5. Waveform and F_0 graph for **/baan/** ‘utensils’ (low, level tone) in frame C

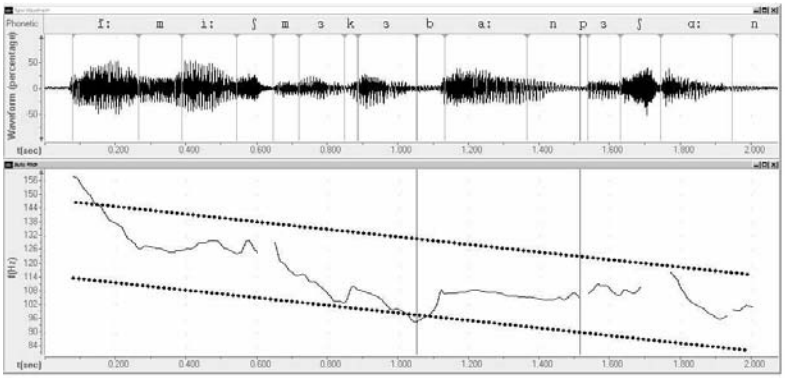

Figure 6. Waveform and F_0 graph for **/baan/** ‘utensils’ (low, level tone) in frame D

Figure 7 gives the data for the word /goor/ 'horse' in frame C. We observe that pitch starts out low at the beginning of the word and gradually rises to become high near the end of the word. The pattern is again distinct from that on the previous three words. The rising pitch is also seen in Figure 8 (/goor/ in frame D).

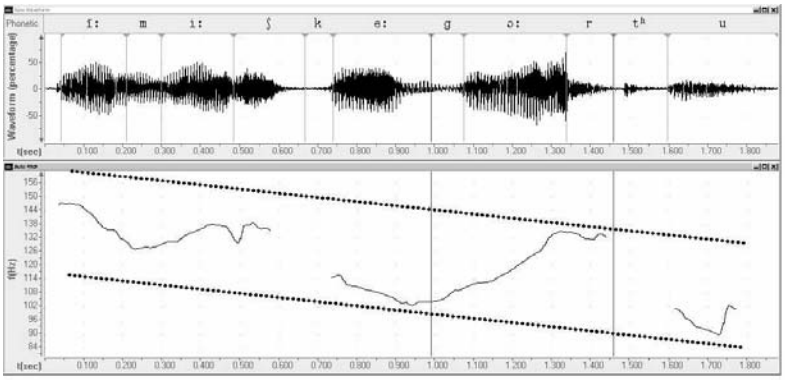

Figure 7. Waveform and F_0 graph for **/goor/** 'horse' (low-to-high rising tone) in frame C

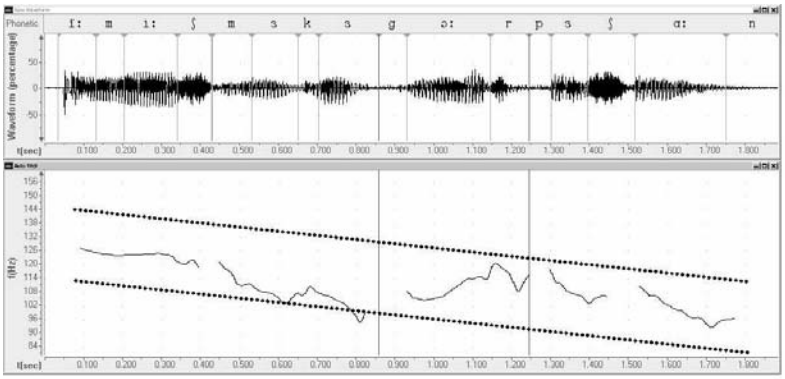

Figure 8. Waveform and F_0 graph for **/goor/** 'horse' (low-to-high rising tone) in frame D

There is one more tone to be discussed. However, in frame C, where low pitch precedes and follows the substitution word, the fifth tone cannot be clearly distinguished from the high level tone discussed above. Figure 9 presents the data for the word /baal/ 'hair' embedded in frame C. As is the case with /dar/ 'door' (see Figure 1), pitch rises early in the word and remains steady at a relatively high level.

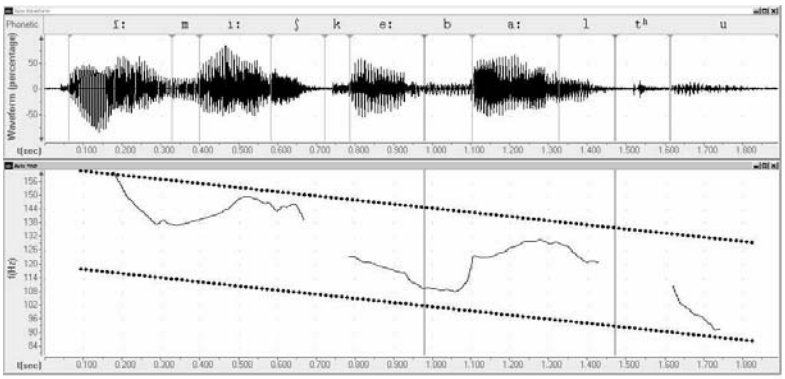

Figure 9. Waveform and F_0 graph for **/baal/** ‘hair’ (delayed high-to-low falling tone) in frame C

The difference between the high tone and the delayed falling tone can be seen if a word with high tone follows the substitution word. Frame D provides an example of such a word. In Figure 2 we saw the word /daɾ/ ‘door’ in the sentence:

ĩĩ miiʃ maka daɾ paʃɑɑnt ‘this man is showing me a door.’

We observed high, level pitch on the substitution word /daɾ/. The following word, /paʃɑɑnt/ ‘is showing’, also started out on a high pitch, and then had a falling curve on the second syllable.
Now look at Figure 10, showing the word /baal/ ‘hair’ embedded in frame D. The difference between /daɾ/ and /baal/ shows up in what happens with the following word. In Figure 2 the word /paʃɑɑnt/ starts out high. In Figure 10, on the other hand, it bears a low pitch from the beginning. We can say, then, that the word /baal/ is associated with a falling pitch, but the peculiarity is that pitch falls, so to speak, from the end of /baal/ “onto” the first syllable of the next word. For this reason, I have called this category “delayed high-to-low fall”. The difference with the regular high-to-low fall is that there the fall in pitch is executed fully within the word.

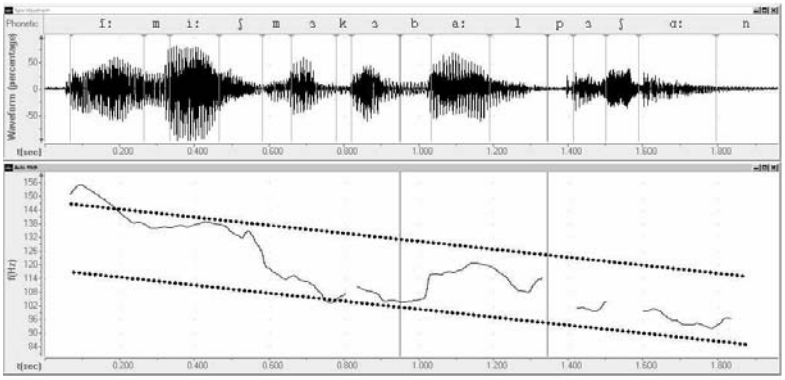

Figure 10. Waveform and F_0 graph for **/baal/** ‘hair’ (delayed high-to-low falling tone) in frame D

Not only does pitch fall from the end of the word /baal/ onto the first syllable of the next word, but it can also be observed that pitch remains low throughout this following word. This “depressing” effect that the delayed falling tone has on the following high tone, was also observed for the regular falling tone (Figure 4).

5.2 Evidence for tonal contrasts in polysyllabic words

The substitution list also included two and three-syllable words. For these, the same five tonal patterns were observed. Figures 11-15 present examples of pitch graphs, using frame D with the following words: /biɾe/ ‘girl’, /batshooɾ/ ‘calf’, /bubaj/ ‘apples’, /dataɾ/ ‘fireplace’, and /dɑɑwɑɑl/ ‘wall’.

In Figure 11, /biɾe/ ‘girl’ has relatively high pitch on both syllables and can be grouped in the class of words carrying high, level tone.

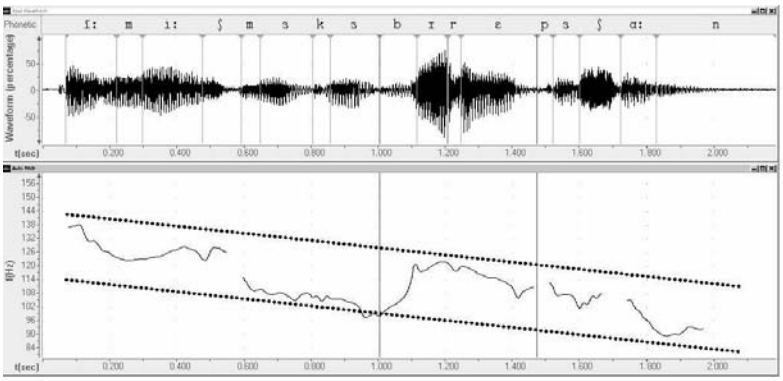

Figure 11. Waveform and F_0 graph for **/biɾe/** ‘girl’ (high, level tone) in frame D

/batshooɾ/ ‘calf’ (Figure 12) has relatively high pitch on the first syllable, falling to low on the second syllable, and thus can be grouped in the class of high-to-low falling tone. Pitch remains low on the following verb.

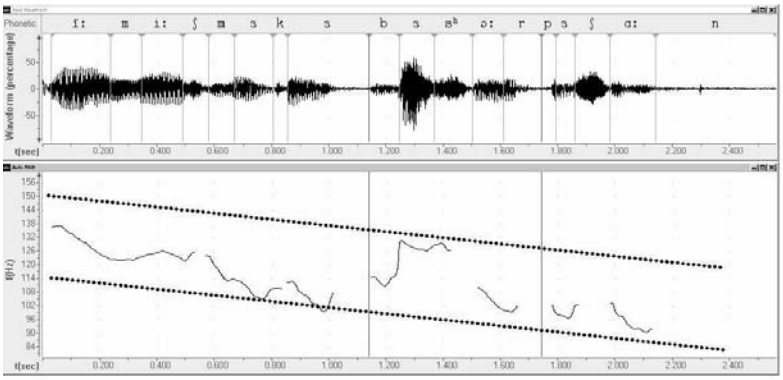

Figure 12. Waveform and F_0 graph for **/batshooɾ/** ‘calf’ (high-to-low falling tone) in frame D

/bubaj/ ‘apples’ (Figure 13) has low pitch on both syllables and can be assumed to carry low, level tone.

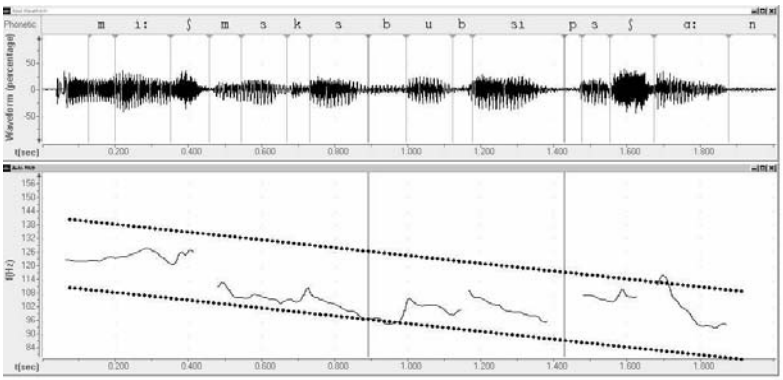

Figure 13. Waveform and F_0 graph for **/bubaj/** ‘apples’ (low, level tone) in frame D

/datar/ ‘fireplace’ (Figure 14) starts out low in the first syllable, and rises to high in the second syllable. It belongs to the class of words having low-to-high rising tone.

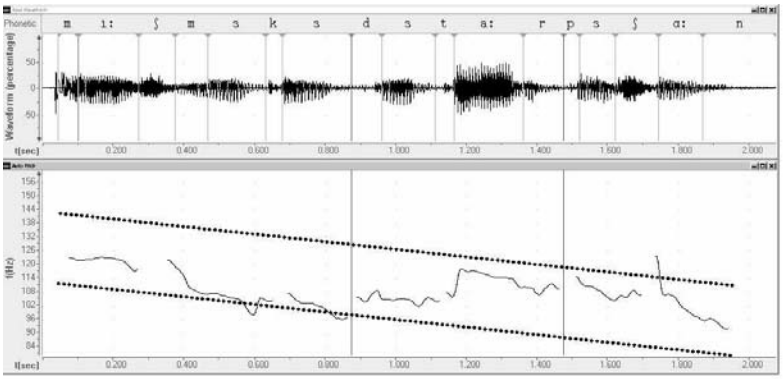

Figure 14. Waveform and F_0 graph for **/datar/** ‘fireplace’ (low-to-high rising tone) in frame D

Finally, the word /daawaal/ ‘wall’ (Figure 15) shows us the delayed high-to-low falling tone: pitch reaches a relatively high level on the second syllable, then falls onto the first syllable of the next word. The pitch on this next word stays low throughout.

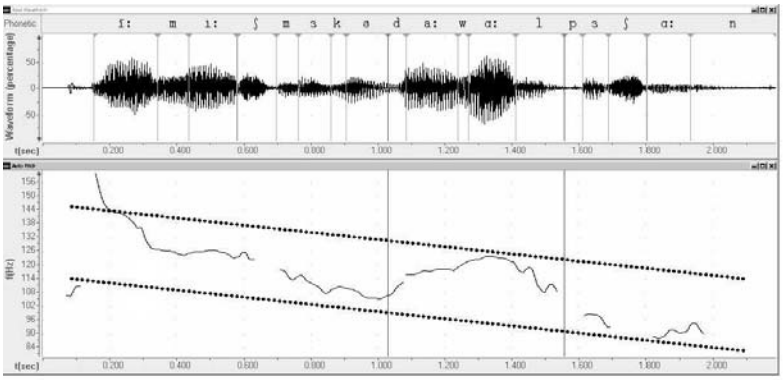

Figure 15. Waveform and F_0 graph for **/daawaal/** ‘wall’ (delayed high-to-low falling tone) in frame D

When we look at three-syllable words, we find that the pitch curve that is characteristic for the tone of the word is executed towards the end of the word. For instance, in a three-syllable word with rising tone, pitch is relatively low on the first two syllables, and reaches a high level only on the last syllable. This is illustrated in Figure 16 for the word /almɑɑɾej/ ‘cupboard’, embedded in frame D.

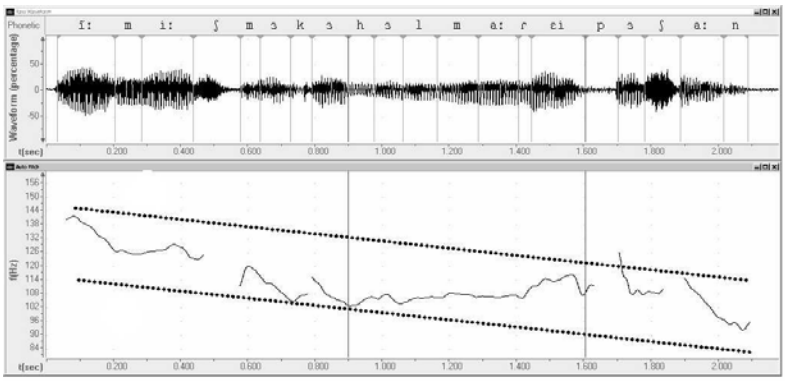

Figure 16. Waveform and F_0 graph for **/almɑɑɾej/** ‘cupboard’ (low-to-high rising tone) in frame D

5.3 Minimal pairs

The 86-word list did not include minimal pairs for tone, but further investigation revealed that the language has many minimal pairs to illustrate contrast between the five tones that were established. In Table 4, minimal pairs are given for all of the ten theoretically possible contrasts.

high level	*falling*	*delayed falling*	*low level*	*rising*
boor	boor	boor	boor	
‘lion’	‘lions’	‘deaf’	‘Pathan’	
goor	goor			goor
‘partridge’	‘partridges’			‘horse’
bɑɑn	bɑɑn		bɑɑn	
‘joint’	‘excuse’		‘bowl’	
			ʈʂhɑɑɾ	ʈʂhɑɑɾ
			‘loss’	‘milk jet’
		baaɾ		baaɾ
		‘many’		‘Open!’

Table 4. Minimal sets of words illustrating contrastive tone in Kalam Kohistani

6. Representation

The subject of this section is how the five tones of Kalam Kohistani can be represented phonologically. I present a proposal using concepts from the theory of Autosegmental Phonology (see Goldsmith 1990; Yip 2002:65ff).

First, I assume that we need to posit no more than two distinct tonal levels for Kalam Kohistani: H (High) vs. L (Low). While for some languages, systems of three distinct tonal levels (High, Mid, and Low) and more have been attested (see Anderson 1978:145, Yip 2002:24ff), this does not seem to be the case in Kalam Kohistani. Phonetically, H normally corresponds to relatively high pitch, and L normally corresponds to relatively low pitch.

It is further assumed that the contour tones can be decomposed into sequences of level tones: a rise is a low tone followed by a high tone, and a fall is a high tone followed by a low tone. Such sequences of tones are called *melodies.* Using the symbols H and L introduced above, the combination HL designates a falling melody, and the combination LH a rising melody. The term melody is usually extended to include level tones (H or L), when these function on a par with HL and LH as units that are associated with words or morphemes. H and L can then be said to constitute "monotonal" melodies, and HL and LH "bitonal" melodies.

What was called high level tone above, then, can be represented phonologically as *H.* The high-to-low falling tone can be represented as *HL,* the low, level tone as *L,* and the low-to-high rising tone as *LH.* The representation of the delayed falling tone will be discussed below.

Presumably each morpheme of the language is associated with one of these melodies. Which melody goes with which morpheme is unpredictable (although some constraints on the association of tones and morphemes are discussed in section 7.1), so this information has to be specified in the dictionary entry of a morpheme. However, how the tone or tones of a melody associate with the vowels within a morpheme (that is, which vowel bears which tone) is predictable and can be accounted for by a rule.

Basically, tones associate "from-right-to-left" in Kalam Kohistani. That is, the last tone of a melody associates with the last vowel of the morpheme, the other tone associates with the second to last vowel and any previous vowels; this is illustrated in (1) and (2) below. If a word is monosyllabic, then both tones associate with the vowel of that syllable, see (3). If a melody consists of only one tone, then it associates with all the vowels of a word, as in (4). In examples (1-4) I illustrate these associations by drawing lines between the tones and the vowels that are associated.

(1) lukuʈoɾ 'children' (2) aŋusiɾ 'finger-ring'

LH HL

(3) gooɾ 'horse' (4) biɾe 'girl'

LH H

The direction of association is significant; in many other tone languages tones and vowels associate from left to right (Goldsmith 1990:19), pairing the first tone of a melody with the first vowel of the morpheme, and so on.

Now, the delayed falling tone can be represented as *H(L).* The brackets indicate that the L does not take part in the initial association process (it is *inert*, in Goldsmith's terminology). In other words, the H is initially associated with the last vowel and any previous vowels of a word, while the L remains unassociated or "floating". When words are put together in a sentence, the floating L tone may associate with the first vowel of the following word, as in /baal paʃɑɑnt/ 'is

showing hair' (Figure 10), where the first vowel of /paʃɑɑnt/ carries relatively low pitch, instead of its normal high pitch (seen in Figure 11). The analysis is illustrated in (5).

(5) baal paʃɑɑnt 'is showing hair'

H(L)

Of course, HL and H(L) consist of the same sequence of tones; the only difference is how these tones associate with the vowels of a word. It would be attractive if the analysis could collapse HL and H(L) into a single melody, and could account for the different association by means of some principle or rule. This would reduce the inventory of melodies by one, and produce a nice, symmetrical system, but at the moment I do not see how it can be done without complicating some other part of the analysis. Baart 1999b:95f. argues that the H(L) melody may be the result of a historical change where word-final segmental material was lost, leaving behind a floating L tone that used to be associated with it. Similar processes have been observed for other languages (for a good example, see Snider 1986 on Chumburing, a tone language of Ghana).

In my data as presently transcribed (over 2,250 words with established tone), the number of occurrences of each melody are as given in (6). It appears that the odd-behaved H(L) melody is actually the most frequent of all in this database.

(6)

H	519		L	111
HL	578		LH	473
H(L)	585			

7. Functional Aspects of Kalam Kohistani Tone

The distribution of melodies over the Kalam Kohistani vocabulary is partly constrained by the presence or absence of aspiration on certain types of consonants (section 7.1). Even so, there is a fair amount of cases where words are minimally distinguished by tone alone (section 7.2). Also, tone is used grammatically in marking the distinction between the base form and inflected form of some nouns (section 7.3).

7.1 Aspiration and tone

From a survey of all the monosyllabic words in my data it appears that monosyllables with an initial aspirated voiceless consonant (52 cases) all bear an L-initial melody (i.e. L or LH melody); monosyllables with an initial *h*, too, bear an L-initial melody (11 cases, plus one exception: /heez/ H(L) 'menses'). Also, in polysyllabic words a syllable with an aspirated consonant is normally associated with L.

Monosyllables with an initial unaspirated voiceless consonant, almost always bear an H-initial melody (214 cases); less than 10 cases have an L-initial melody, e.g. /xɑt/ L 'letter'. In polysyllabic words, syllables with an initial unaspirated voiceless consonant do sometimes bear a low tone, but only when this low tone is part of an HL or LH melody; exceptions are /mooʈuu/ L 'now', /tuku/ L 'then'. Syllables with an initial voiced consonant may bear all types of tones. Finally, monosyllables with an initial vowel (36 cases, e.g. /ɑʈʂ/ H 'eye') all bear a high or falling melody. In polysyllabic words, vowel-initial syllables may bear other tones, too.

What is most conspicuous among these observations is that aspiration almost always co-occurs with L or LH melody, while lack of aspiration (on initial, voiceless consonants) very often co-occurs with H, HL, or H(L) melody. Consequently it is difficult to find real minimal pairs for aspiration in Kalam Kohistani: the contrast between aspirated and unaspirated consonants is almost always accompanied by a tonal contrast. How this situation arose historically should be the subject of further study.

7.2 Functional load

A search through my database of a total of over 2,250 words with transcribed tone revealed 96 words that are distinguished only by tone from at least one other word in the language. Examples of minimal pairs for tone were given in section 5.3.

For comparison, I conducted searches for minimal pairs involving a few other distinctive features. In these other searches, I was not able to take tonal differences between words into account, so the numbers are actually higher than they, strictly speaking, should be.

There are 343 words in my database that are minimally distinguished (ignoring tonal differences) by vowel height from at least one other word in the language.

There are 148 words in the database that are minimally distinguished by the feature voice from at least one other word in the language.

There are 121 elements that are minimally distinguished by the feature nasality from at least one other word in the language; in this count I have included contrasts between consonants (*b* and *m*, *d* and *n*, etc.) as well as between vowels (*ee* and *ẽẽ*, *oo* and *õõ*, etc.).

The feature tone, then, may be a little less productive in minimal distinctions between words as compared to the other three features studied. However, the count for tone is still in the same order of magnitude as that of the other three features, and it should be remembered that the counts for the other features may be inflated.

7.3 Grammatical use

Apart from marking lexical distinctions, i.e. distinctions between different words of the language, tone is also used grammatically to mark the distinction between base form and inflected form of some nouns.

Many Kalam Kohistani nouns have two forms: the base form is used for the singular when no postposition follows; the inflected form is used for the plural as well as when a postposition follows (Baart 1999a:35). Often, nouns are inflected through a vowel change: /ʃɑɑk/ ‘a piece of wood’, /ʃaak/ ‘pieces of wood’. If the base form has a melody ending in H, then often the inflected form has a melody ending in L (Baart 1999b:96f.). /ʃɑɑk/, for instance, bears melody H, while /ʃaak/ bears melody HL. There are also cases where the vowel does not change. In such cases, tone becomes the only indication of the distinction between base form and inflected form. Examples are /ɓooɾ/ H ‘lion’ vs. /ɓooɾ/ HL ‘lions’, and /bubaj/ LH ‘apple’ vs. /bubaj/ L ‘apples’.

8. Conclusion

In this paper I have presented evidence for the existence of five contrastive tones in Kalam Kohistani: a high tone, a low tone, a rising tone, and two types of falling tone. The two falling tones are distinct in that one involves pitch falling from relatively high to relatively low *within*

the word, while the other tone involves relatively high pitch on the word itself, falling to relatively low on the first syllable of the next word.

Next, an analysis of this tone system was proposed that recognizes two tonal levels, H (High) and L (Low), and where contour tones are seen as sequences of level tones. It was shown that a dictionary entry only needs to specify a melody for a word; how the tone or tones that make up a melody associate with the vowels of that word can be accounted for by a general rule, irrespective of the number of tones in the melody and the number of vowels in the word.

Finally, the functional load of Kalam Kohistani tone was discussed. Even though there is a strong correlation between aspiration and low or rising melody, there is a fair amount of cases where words are minimally distinguished by tone alone. Also, tone is used grammatically in marking the distinction between the base form and inflected form of some nouns.

Among the many tone languages that are found in the northwestern part of the Indo-Aryan territory, Kalam Kohistani stands out due to its rich inventory of contrastive lexical melodies. One usually finds only two (as in Shina, for example) or three (as in Punjabi) contrastive patterns. There are two other languages in the close vicinity of Kalam Kohistani that have more than three contrastive melodies. Torwali (located immediately south of the Kalam Kohistani area) has at least four contrastive tones (Lunsford 2001:34ff), and so does Kalkoti (in Dir Kohistan, which is bordering Swat Kohistan to the West), according to my own preliminary analysis.

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Appendix: Word List

This list contains the 86 words that were recorded in the sentence frames. The abbreviation *v.length.* indicates that the last vowel undergoes lengthening utterance-internally.

almɑɑˈɾej	*LH*. cupboard. *noun, fem.*
aˈŋɑɑɾ	*H(L).* fire. *noun, masc.*
aˈŋiɾ	*H; v.length*. finger. *noun, fem.*
aŋuˈsiɾ	*HL*. finger-ring. *noun, fem.*
ããj	*H(L)*. mouth. *noun, fem.*
baal	*H(L)*. hair. *noun, masc pl.*
baan	*L*. utensils. *noun, masc pl.*
ˈbatshooɾ	*HL*. calf. *noun, masc.*
bɑɑg	*LH*. place. *noun, masc.*
biˈɾe	*H*. girl. *noun, fem.*
buˈbaj	*L* apples. *noun, fem pl.*
buˈʈaan	*H(L)*. shoes. *noun, masc pl.*
daɾ	*H; v.length.* door. *noun, masc.*
daˈɾin	*LH; v.length.* land. *noun, fem.*
daˈtaɾ	*LH; v.length.* fireplace. *noun, masc.*
dɑɑˈwɑɑl	*H(L)*. wall. *noun, masc.*
dɑn	*H*. tooth. *noun, masc.*
doos	*H*. day. *noun, masc.*
duˈkɑɑn	*H(L)*. shop. *noun, masc.*
dut	*L; v.length.* lip. *noun, masc.*
dʒaa	*LH*. brother. *noun, masc.*
dʒoˈɑɑɾ	*H*. maize. *noun, fem.*
ɖɑɑg	*H(L)*. back (of body). *noun, masc.*
eʈʂ	*H(L)*. eyes. *noun, fem pl.*
gɑɑ	*L*. grass. *noun, masc.*
ˈgedɑ	*HL*. donkey. *noun, masc.*
go	*H*. ox. *noun, masc.*
goom	*L*. wheat. *noun, masc.*
gooɾ	*LH*. horse. *noun, masc.*
hal	*L; v.length.* plow. *noun, masc.*
him	*LH*. snow. *noun, fem.*
is	*H; v.length.* woman. *noun, fem.*
ɪʃˈpo	*H*. sister. *noun, fem.*
jɑl	*H*. mill. *noun, masc.*
kɑɑɾ	*H(L)*. work. *noun, masc.*
kɑɑs	*HL*. bowl. *noun, masc.*
keˈʈoo	*H(L)*. cattle. *noun, masc.*
koˈtʃeɾ	*H(L)*. clothing. *noun, masc.*
kuˈkuɾ	*H(L)*. chicken. *noun, masc.*
kuɾˈsi	*H*. chair. *noun, fem.*
kuˈtʃuɾ	*H(L)*. dog. *noun, masc.*
kuʈ	*H; v.length.* knee. *noun, masc.*

kheeɾ	*LH*. field. *noun, fem.*
lɑɑm	*H(L)*. village. *noun, masc.*
lɑɑˈʈen	*LH*. lamp. *noun, fem.*
lukuˈʈoɾ	*LH*. children. *noun, masc pl.*
ˈmanuʈʂ	*HL*. men. *noun, masc pl.*
mɑɑn	*H(L)*. skin bag. *noun, masc.*
miiʃ	*H(L)*. man. *noun, masc.*
muk	*H; v.length.* face. *noun, masc.*
ˈmulɑn	*HL; v.length.* mullah. *noun, masc.*
nan	*H; v.length.* river. *noun, fem.*
naˈzooɾ	*H(L)*. nose. *noun, masc.*
nɑk	*H; v.length.* fingernail. *noun, masc.*
ˈpaaɾen	*HL*. shirt. *noun, fem.*
pał	*H; v.length.* leaves. *noun, masc pl.*
pɑn	*H*. path. *noun, fem.*
poo	*HL*. boy. *noun, masc.*
phɑˈkol	*LH*. Chitrali cap. *noun, masc.*
sabˈzii	*H*. vegetable. *noun, fem.*
sɑ	*H*. bridge. *noun, fem.*
suˈnuq	*H; v.length.* box. *noun, masc.*
suˈɾɑɑj	*H(L)*. jug. *noun, fem.*
ʃaan	*H(L)*. bed. *noun, masc.*
ʃaˈlɑ	*H*. wood. *noun, masc.*
ʃɑɑk	*H*. wood; stick. *noun, masc.*
ʃiˈleʈ	*H; v.length.* ladder. *noun, fem.*
ʃiʈ	*H; v.length.* house. *noun, fem.*
taˈbi	*H*. baking plate. *noun, fem.*
taˈlun	*H; v.length.* rice. *noun, fem.*
tɑɑ	*HL*. woollen wrap. *noun, masc.*
tɑm	*H; v.length.* tree. *noun, masc.*
thoos	*L*. head. *noun, masc.*
thun	*LH*. pillar. *noun, fem.*
tsɑˈʈɑk	*H; v.length.* road. *noun, masc.*
tʃaˈlɑk	*H; v.length.* spinning wheel. *noun, masc.*
tʃaˈlɑp	*H; v.length.* turban. *noun, masc.*
tʃitʃ	*H; v.length.* breast. *noun, fem.*
ʈep	*HL*. cap. *noun, fem.*
ʈik	*H; v.length.* button. *noun, masc.*
ʈhong	*LH*. axe. *noun, masc.*
ʈʂhooɾ	*L*. walnut. *noun, masc.*
uˈmaɾ	*H(L)*. age. *noun, fem.*
uu	*H(L)*. water. *noun, masc.*
uuʈ	*H(L)*. camel. *noun, masc.*
xaˈlaq	*L*. people. *noun, masc.*