

The Role of Phonatory Location in the Evolution of the Far-Northwestern Indo-Âryan Languages

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Abstract

The evolution of Proto-Indo-Âryan anterior and posterior phonation underlies much of the phonological distinctiveness of the far-northwestern Indo-Âryan languages. Speakers of these languages use anterior phonation for accented phonation, but the glottal location of unaccented phonation in the individual languages varies geographically. Unaccented posterior phonation appears among the languages of the Indus Valley (e.g., *Ṣinâ'* and its western offshoots, *Bhaṭ'esa*), while unaccented anterior phonation appears in the Indo-Âryan languages to the west (e.g., *Paša'î*, *Gawâr-b'âti*, *Khow`ar*), as it does in the neighboring Irânian and Nûristânî languages. It appears that unaccented phonation in these western Indo-Âryan languages was originally posterior, but it changed to anterior under the influence of Irânian. Such a change spawned further distinctive changes in the phonological systems of these languages, while unaccented posterior phonation determined a different evolutionary course for the other languages of the region.

1 Introduction: Characteristic Vocal Qualities in the Hindu-Kush Region

Carla Radloff must have encountered numerous multilingual conversations in her monumental linguistic quest to elucidate the dialects of the Şinâ' (Shina) language (Radloff 1992). In such situations she must have wondered, as have I, at the variety of vocal qualities that distinguish the native languages of the conversational participants. The question naturally arises: what constitutes these vocal qualities, and how did they evolve out of Old Indo-Âryan?

I discuss this question primarily with reference to my own field research on the Indo-Âryan languages Degân'o (Eastern Paşa'î), Gawâr-b'âti, Kal'aşa-mandr/mun, Khow`ar, the Acharêtâ' (Palôlâ') dialect of Şinâ', Uşuj'u, and Bhat'esa-zib. Languages that I have heard but not closely investigated also include Dâmiâ-bâşa, Torwâli, and Garv'i.

In southern Chitral I became aware of the differing vocal qualities of the many languages spoken there, as I encountered them during numerous multilingual conversations. There the contrast between the vocalism of the Nûristânî and Irânian languages on the one hand and the vocalism of the Indo-Âryan languages on the other was apparent. Further investigation of the phonatory processes that produce the tonal systems of Khow`ar and the archaic Şinâ' dialect Acharêtâ' expanded my awareness of the importance of anterior and posterior phonation in the evolution of Indo-Irânian, and naturally led me to explore the phonologies of the other dialects of Şinâ'. Guided by the pioneering research of our colleague and mentor, Ruth Schmidt, it was in the phonatory underpinnings of Şinâ' dialectology that Carla's and my interests coincided.

I have discerned laryngeal and phonatory activity from acoustic, visual, and proprioceptive observations of speech; but the absence of more sophisticated observational techniques in the difficult field conditions of the region leaves the precise anatomical nature of these speech processes to be determined.

I must also note that the observations reported here are based mostly on the speech of men, as my interaction with female speakers was limited in the stricter Islâmîc areas of the Indo-Irânian Frontier region.

2 Physiology: Location and Degree of Glottal Tensing and Supraglottal Linkages

All researchers who have noticed tones in the region's languages have analyzed them acoustically and formulated models based on parameters of high, low, falling, and rising pitch. Perhaps more useful for pedagogy and the understanding of linguistic evolution is an analysis based on the physiology that underlies the production of pitch and tone.

Phonation occurs when the vocal folds are tensed to produce noise or vibration in the exhaled pulmonary airflow. Speakers of the region's languages target differing levels of tension at specific locations along the vocal folds. A comparison of the phonatory types within the region reveals three basic phonatory parameters:

- the location of glottal tensing along the vocal folds,
- the degree of glottal tensing,
- the temporal position of glottal tensing relative to other speech processes.

2.1 Phonatory Target Locations

The target locations for tensing along the vocal folds include:

- the anterior (or ligamental) portion,

- the posterior (or arytenoidal) portion, or
- a combination of both.

Anterior and posterior phonation produce respectively a high or low pitch, and a switch in phonatory location during a vowel produces a falling or rising tone on the vowel. In languages with phonemic tonal contrasts, the accent marks ` and ´ respectively indicate the point of transition from anterior to posterior and posterior to anterior voicing.

2.1.1 Anterior Phonation

Anterior phonation is produced by tensing the anterior (ligamental) portion of the vocal folds while keeping the arytenoidal portion closed tight (Catford 1977: 102). Speakers of all the region’s languages use anterior phonation for accented phonation (´V or `V). Speakers of the Irânian and Nûristânî languages use anterior phonation for unaccented phonation (V) as well.

2.1.2 Posterior Phonation

Posterior phonation is produced by tensing the posterior (arytenoidal) portion of the vocal folds while keeping the anterior portion closed (Catford 1977: 103). This process produces a lowered pitch, and it appears to enlarge the laryngeal cavity, producing a slight megaphonic effect. It also restricts the pitch-raising effect of accented anterior phonation, producing a narrow pitch-range between accented and unaccented vowels. When strengthened, posterior phonation produces the whispery voice of the traditionally-called “voiced aspirate” consonants (Catford 1977: 101, 106).

Some degree of posterior tensing during phonation occurs in all the Indo-Âryan languages of the Frontier, but posterior phonation is lacking in the Irânian and Nûristânî languages.

Posterior phonation is used for unaccented phonation in Acharêtâ’ (and probably other Šinâ’ dialects) and Bhat’esa-zib. It is used for one type of accented phonation (V) in Khow`ar, Dâmiâ-bâşa, Kalkoṭi [?], Garv’i, and Torwâli.

2.1.3 Mixed Anterior and Posterior Phonation: Indo-Âryan

Anterior and posterior phonation are not mutually exclusive. The Indo-Âryan languages that border the anterior-phonated Irânian and Nûristânî languages have adopted the latter’s unaccented anterior phonation, while retaining a degree of simultaneous posterior phonation and supraglottal tension characteristic of their Indo-Âryan origin. Such Irânian-influenced languages include Degân’o (Eastern Paša’î), Kal’âşa-mandr/mun, Khow`ar, Gawâr-b’âti (and other Peç-Valley languages?), Dâmiâ-bâşa, Garv’i, and Torwâli. In Acharêtâ’ anterior accent is superimposed on default posterior phonation.

For each individual dialect among those with simultaneously mixed phonation, the balance between the acoustic effects of anterior and posterior phonation provides a dialectal signature. But nowhere does the simultaneous mixture or non-mixture of anterior and posterior phonation produce a phonemic contrast, other than one of accent.

2.2 Degrees of Glottal Tensing

Of the range of possible glottal tensing, the following degrees are of importance here, listed in increasing order of tension:

1. default (unaccented) phonation (**V**),
2. accented phonation (**ʹV**, including (2a) primary and (2b) secondary accent),
3. stopped phonation, ending in glottal closure or creak (**Vʔ**),
4. whisper, either anterior voiceless or posterior voiced (consonantal *ph*, *bh*, etc.).

2.2.1 Default (Unaccented) Phonation (**V**)

Default phonation is that which is normal (unmarked) for the environment in which it occurs. It is used for unaccented phonation of vowels and for unmarked voiced consonants. Its location along the vocal folds is dialect-specific and may also depend on its location in an utterance. For example, in Garv'i and Torwâli the pre-tonic default phonation of an utterance starts out with low pitch (whether from low-pitched anterior phonation or from posterior phonation is unclear); but it shifts to anterior after the tonic, before laxing into posterior at the utterance's end (Baart 1999: 90 ff., Lunsford 2001: 36-38).

2.2.2 Accented Phonation (**ʹV**)

Accented phonation is produced with greater glottal tension than default phonation. The result is a raised pitch for accented anterior phonation and a lowered pitch for accented posterior phonation, relative to the pitch of default phonation.

Two degrees of accented phonation, primary and secondary, have been noted in Khow`ar (Strand 2012), Acharêta' (Strand 2000/2001), and Bhaṭ'esa-zib (Strand 2001c), and they probably occur in all the region's languages.

2.2.3 Stopped Phonation (**ʹVʔ**)

Stopped phonation, ending in glottal closure (**Vʔ**) or creak, was noted by Baart (1999: 95) on words with "delayed falling" ("H(L)") tone in Garv'i. Such glottal closure is a consequence of the shift to posterior phonation at the end of an utterance, and therefore non-phonemic.

2.2.4 Whisper ("Aspiration": *ph*, *bh*)

Whisper is produced with a tensing and narrowing of the glottis, which causes turbulence and noise in the air stream (Catford 1977: 96 ff.). It occurs concurrently with posterior phonation and oral consonants to produce the region's whispery-voiced consonants ("voiced aspirates"). Anterior voiceless whisper concurrent with oral stops apparently produces the "voiceless aspirated" consonants of the region's languages. With whispery consonants the concurrent tensing of whisper lasts somewhat beyond the closure of the consonant before laxing to normal phonation.

2.3 Supraglottal Effects

All phonation in the region's languages is accompanied by a general tensing of the laryngeal muscles. When strengthened, laryngeal tension may spread upward through the muscles that control the ventricular folds, the epiglottis, the hyoid bone (causing fronting or backing of the tongue), and the jaw (in concert with further fronting of the tongue), as manifested by the phonetic evolution of the region's languages.

2.3.1 Non-Phonemic Glottal-Laryngeal Tensing

Characteristic of the Indo-Âryan languages are degrees of glottal or ventricular noise-producing tensings. Such tensing produces an acoustically “small” or “tight” voice when phonation is anterior or an acoustically “big” or “open” voice when phonation is posterior. None of these tensings provide phonemic contrasts, but they impart much distinctiveness to the sound of each dialect.

2.3.2 Laryngeal-Lingual Linking

Anterior laryngeal tension may push the tongue forward, and posterior laryngeal tension may pull the tongue backward. Such displacement of the tongue has had consequences in the evolution of the vocalic and consonantal systems of the region’s languages, as discussed below (§3.3).

2.4 Temporal Position

Some languages show phonemic contrasts in the timing of the onset of accentual tensing relative to a vowel (Şinâ’, Ačharetâ’) or in the timing of the cessation of accentual tensing relative to the beginning of a word (Garv’i, Torwâli, Kalkoṭi). Details appear below (§3.1.3, §3.2.2).

3 Evolution: Front vs. Back Tensing as a Determiner of Indo-Irânian Phylogeny

The earliest changes propelling the divergence of the Indo-Iranian languages – the changes that determined the ultimate relationships between the Indo-Âryan, Nûristânî, and Irânian languages – were primarily ones of glottal and lingual fronting and backing. From late Proto-Indo-European the Proto-Indo-Irânian language inherited both anterior and posterior phonation, which persist in the Indo-Âryan languages. In the Irânian and Nûristânî languages anterior phonation apparently became so strongly tensed that it precluded posterior phonation altogether. The effects of strengthened posterior phonation appeared early in the development of Proto-Indo-Âryan, with the rise of the retroflex consonants and the retention of posterior-voiced consonants.

The shift to exclusively anterior phonation in Irânian and Nûristânî became a defining phonological characteristic of those languages. The shift affected the Indo-European so-called “voiced aspirated” consonants, which were produced with posterior phonation and partially constricted vocal folds. The early Irânian and Nûristânî shift to anterior phonation caused the voiced aspirated consonants to lose their posterior phonation and become anteriorly voiced, thus merging with their counterpart “unaspirated” voiced consonants.

Coupled with strengthened anterior phonation is an often strong lingual fronting in Irânian and Nûristânî, which had profound consonantal effects. The strong lingual fronting of Nûristânî affected the evolution of the vowel systems of those languages, propelling them from lax-tense to close-open.

Successive waves of tongue fronting have apparently emanated out of the Nûristânî-Irânian-speaking region for over five thousand years. The first two waves encompassed the Indo-Âryan languages during the Indo-Irânian stage of development, so that all the Indo-Irânian languages were affected by them. Waves of tongue fronting emanated even farther through the ancient Indo-European-speaking communities, causing many or all of the same changes that occurred in the Irânian and Nûristânî languages to occur in the Slavic, Romance,

and Germanic languages at later times (Strand 2013). The manner in which the latest wave of Irânian fronting has affected the far northwestern Indo-Âryan languages is discussed below (§4.1).

The backing of the tongue in Indo-Âryan likely arose out of the generalization of posterior phonation in the Indo-Âryan languages. As stated above, posterior phonation tends to pull the tongue back. Through certain sound changes a series of tongue-backed (“retroflex”) consonants, which contrasted with dental ones, arose in early Indo-Âryan.

Writings of the ancient Hindu grammarians describe the phonation of Old Indo-Âryan, as evidenced by Sanskrit (Whitney 1960: 28 ff.; Varma 1961: 161 ff.). These form the source from which we may trace the evolutionary development of posterior phonation in the various modern languages. Old Indo-Âryan source-forms that appear in the tables below are mostly from Turner (1966), with associated entry numbers (“Turner #”) from that work.

In Sanskrit accented phonation carried a raised pitch (*udâtta-*) that was opposed to the default “non-raised” (*anudâtta-*) phonation. The existence of a high falling tone (*svarita-*) on a single vowel points to the abrupt transition from high to non-high pitch that is indicative of a switch from anterior to posterior phonation during the production of the vowel. It is probable that the default phonation in Sanskrit was posterior.

Among the Indo-Âryan languages of the far northwest there is an evolutionary sequence of posterior whispery-voicing moving forward from consonants to the following vowel, which resulted in a sequence of default-voiced consonant plus posterior-voiced vowel.

Among some of these languages there was a further evolutionary stage in which the probable OIA default phonation changed from posterior to anterior. This change triggered a further evolutionary stage in some languages, at which point only a default anterior-voiced consonant remained. The evolutionary sequence is summarized as: $C^{\#}V > C^{\#}V > CV$.

Finally, there is a group of languages in which the position of accented phonation may occur contrastively before, during, or after the production of a vowel (§2.4).

The distribution of the evolutionary stages of posterior-voiced consonants vs. phonation type among the region’s languages is summarized in Table 1. The following sections elaborate on the distribution of languages seen in the table.

| Accented Phonation | Default Phonation | Phonetic Tone | Evolutionary Development of Whispery Posterior-Voiced Consonants | | |
|--|-------------------------|---------------|--|---------------------------------|-------------------------------|
| | | | Retention | Posterior Phonation | Anterior Phonation |
| | | | $C^{\#}V$ remains | $C^{\#}V > C^{\#}V$ | $C^{\#}V > CV$ |
| Anterior | Posterior | no | Bhaṭ'esa-zib, Indus-Kôhistâni [?] | | |
| | Anterior + Posterior | no | Kal'âsa-m., SW Paša't | | Degân'o Paša't, Gawâr-bâti |
| Anterior + Position | Posterior | yes | (Sanskrit.) Acharêtâ', Uṣu'j'u | Ṣinâ': Gilgit, Kôhistyô | |
| Anterior or Posterior | Anterior + Posterior | yes | | Khov`ar, Dâmiâ-bâsa | |
| Anterior or Posterior + Position | Anterior + Posterior | yes | | Garv'i, Torwâli, Kalkoṭi [?] | |

Table 1. Distribution of Anterior and Posterior Phonation in Far Northwestern Indo-Âryan.

3.1 Descendant Languages with Inherited Posterior Whispy-Voiced Consonants

Those languages that have retained OIA posterior whispy-voiced consonants (“voiced aspirates”) include SW Paša’î (Morgenstierne 1967: 48-49), Kal’āša-mandr/mun (Morgenstierne 1973, Strand [field notes]), Indus-Kôhistâni (Buddruss 1959), Bhaṭ’esa-zib (Strand 2001b, c), Acharêṭâ’ (Strand 2000/2011), and Ušuj’u (Strand [field notes]).

3.1.1 Bhaṭ’esa-zib: Default Anterior Phonation without Position: No Tones

Data on Bhaṭ’esa-zib come from my brief field observations (Strand 2001b, c).

Unaccented phonation is posterior in Bhaṭ’esa-zib; accented phonation is anterior.

There are two levels of accent, normal ‘ and strong ‘. Pitch, vowel length, and tenseness apparently are a function of the degree of accent. Unaccented vowels are low-pitched, lax, and short; accented vowels are higher-pitched, tenser, and longer, and strongly accented vowels are even higher-pitched and longer.

The position of accent within words appears to be non-predictable.

The backing of the “retroflex” (backed apical) consonants appears to be coupled with a backing of the position of phonation in the vocal folds, so that a preceding vowel has a lower pitch than it would if followed by a non-retroflex consonant (e.g., *ṣ’âṣ* ‘spouse’s mother’). Such backing appears to lax the voicing on final voiced retroflex consonants (e.g., *p’uJ* ‘grandson’).

Bhaṭ’esa-zib speakers retain the OIA initial whispy posterior-voiced consonants, including *ḥ* (Table 2).

| Bhaṭ’esa: $C^h = C^h$, $h = ḥ$ | | | | |
|----------------------------------|--------------------|---------------------------------------|----------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>gh’ũ</i> | big | <i>g^han-’a-</i> | compact; firm; dense | 4424.1 |
| <i>ghi’û</i> | ghee | <i>g^hr-t’-a-</i> | ghee | 4501 |
| <i>gh’ô</i> | horse | <i>g^hoṭa-</i> | horse | 4516 |
| <i>ghu’ai</i> | mare | <i>g^hoṭ-i-ka-:-</i> | mare | 4516 |
| <i>dh’îr</i> | stomach | <i>ḍ^hiḍḍ^ha-</i> | belly | 5589.1 |
| <i>dh’û̃</i> | smoke | <i>d^hû-m’-a-</i> | smoke | 6849.1 |
| <i>bhi’õ</i> | sister | <i>b^hag-in-i-:-</i> | sister | 9349 |
| <i>bhaṭ’era</i> | Bhaṭera | <i>b^haṭṭa-</i> | lord; noble | 9402 |
| <i>bhaṭ’e sa zib</i> | Bhaṭera language | <i>b^haṭṭa-</i> | lord; noble | 9402 |
| <i>bhaṭsi’â xel</i> | name of a lineage | <i>b^haṭṭa-</i> | lord; noble | 9402 |
| <i>bh’edẽ</i> | ewe | <i>b^heḍra-</i> | ewe | 9606 |
| <i>bh’iḍ</i> | ram | <i>b^heḍra-</i> | ram | 9606 |
| <i>Jhâz’e</i> | brother’s wife | <i>b^hrâṭṭr-jâya-:-*</i> | brother’s wife | 9660 |
| <i>Jhâd’i</i> | brother’s daughter | <i>b^hrâṭṭr-duhi-tṭr-*</i> | brother’s daughter | |
| <i>Jhẽ wal’i</i> | agnate | <i>b^hrâṭṭr-</i> | brother | 9661 |
| <i>Jh’õ</i> | brother | <i>b^hrâṭṭr-</i> | brother | 9661 |
| <i>Jh’oç</i> | brother’s son | <i>b^hrâṭṭr-putra-</i> | brother’s son | 9664 |
| <i>hi’ũ</i> | snow | <i>him’-a-</i> | cold; frost; snow | 14096 |

Table 2. Bhaṭ’esa: Retention of Whispy Voice.

Posterior whispery voicing of medial consonants and *h* was largely anticipated to an initial voiced consonant (Table 3).

| Bhaṭ'esa: ← ^h , <i>h</i> | | | | |
|-------------------------------------|--------------|-----------------------------|---------------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>bhu'âiṭ</i> | son's wife | <i>vad^hû-ṭi-</i> | young wife or woman; son's wife | 11251 |
| <i>dhî</i> | daughter | <i>duhi-t'ṛ-</i> | daughter | 6481 |
| <i>mh'al</i> | father | <i>maha-lla-ka-</i> | old; feeble | 9935 |
| <i>mh'el</i> | mother | <i>maha-ll-i-ka-</i> | old; feeble | 9935 |
| <i>mh'eṣ</i> | buffalo (f.) | <i>mahi-ṣ'a-</i> | great; powerful; buffalo | 9964 |

Table 3. Bhaṭ'esa: Anticipated Whispery Voice.

In several words medial whispery posterior-voiced consonants and *h* were lost in consonant clusters (Table 4) or under unclear developmental conditions (Table 5).

| Bhaṭ'esa: -CC ^h -, -[C ^h , <i>h</i>]C- > C | | | | |
|---|------------------|---|----------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>'âru</i> | peach | <i>ardd^hu-</i> | peach | 1103 |
| <i>d'ed</i> | yoghurt | <i>dad^hi-dugd^ha-:-*</i> | curds and milk | 6148 |
| <i>s'in</i> | river | <i>s'ind^hu-</i> | river | 13415 |
| <i>k'um</i> | shoulder | <i>skamb^ha-*</i> | shoulder-blade; wing | 13640 |
| <i>k'om</i> | shoulders | <i>skamb^ha-*</i> | shoulder-blade; wing | 13640 |
| <i>t'i</i> | thee | <i>tu-b^hyam</i> | thee [dative] | 5889.5 |
| <i>z'ib</i> | tongue; language | <i>jihv'a-:-</i> | tongue | 5228.1 |

Table 4. Bhaṭ'esa: Loss of Whispery-Voicing in Clusters.

| Bhaṭ'esa: -[C ^h , <i>h</i>]- > Ø | | | | |
|--|---------------|--------------------------------|------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>d'âi</i> | beard | <i>dâḍ^h-i-ka-:-</i> | beard | 6250 |
| <i>s'um</i> | earth; ground | <i>s'u-mahânt-</i> | very great | 13493 |

Table 5. Bhaṭ'esa: Loss of Whispery-Voicing Medially.

A few modern consonants have an unexplained loss of the OIA posterior whispery voicing (Table 6).

| Bhaṭ'esa: C ^h > C | | | | |
|------------------------------|---------|---------------------------------|-------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>g'u~ḍ</i> | button | <i>g^hu~ṭa-</i> | knot; tag; button | 4483 |
| <i>bâri'u</i> | husband | <i>b^hâr-iyâ-pa-*</i> | husband | 9467 |

Table 6. Bhaṭ'esa: Unexplained Loss of Whispery Voicing.

3.1.2 Kal'ąsa-mandr/mun: Default Anterior Phonation without Position: No Tones

Observations on Kal'ąsa come from my own unpublished field research on the dialects of Mumuret (Kalm.m) and Urtsun (Kalm.u) and Morgenstierne's (1973) data from the dialects of Rumbur (Kalm.r) and Urtsun (Kalm.u).

Default phonation in Kal'ąsa is anterior with a strong posterior component. Kal'ąsa shares with K mk'ata-vari, Gaw r-b' ti, and perhaps D mi -b sa a characteristic 2^3_1 intonation on declarative utterances. This intonation pattern may have been adopted from K mk'ata-vari.

Characteristically, Kal'ąsa speakers prolong the accented vowel with an accompanying falling pitch as accented phonation returns to default.

Kal'asa speakers retain the OIA initial posterior whispery-voiced consonants (Table 7).

| Kal'asa: C ^h = C ^h , ħ = ħ | | | | | |
|--|---------------------------|----------------------------|-------------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| d ^h r'âus | Drosh | d ^h r'â-us* | Drosh | | Kalm.u |
| g ^h at- | ask for; want | g ^h aṭt-a-ti* | decreases; is wanting | 4415 | Kalm.u |
| g ^h oŋa | big | g ^h an-'a- | compact; firm; dense | 4424 | Kalm.m |
| g ^h au | ravine; valley | g ^h ala-* | stream | 4453 | Kalm.r |
| g ^h er' | turn around [VT] | g ^h er-* | make go round | 4474 | Kalm.r |
| g ^h er- | turn around [VI] | g ^h ir-* | go round | 4474 | Kalm.r |
| g ^h oʔa | horse | g ^h oʔa- | horse | 4516 | Kalm.u |
| ʃ ^h au | forest | ʃ ^h alla- | bush | 5355 | Kalm.r |
| q ^h ang- | bury | q ^h ank- | cover | 5574.2 | Kalm.r |
| q ^h ap | wide; broad | q ^h appa-* | lump | 5580.1 | Kalm.r |
| q ^h ak | waist; back | q ^h â-kka-* | back; waist | 5582 | Kalm.r |
| q ^h a~k | waist; back | q ^h â-kka-* | back; waist | 5582 | Kalm.u |
| q ^h uk | meeting | q ^h uk-ya-ti | approaches | 5592 | Kalm.u |
| q ^h e~ik | knee | q ^h onga-* | projecting part of body | 5605 | Kalm.u |
| d ^h or | hopper; grain-bin | d ^h ar-a- | holding; supporting | 6740 | Kalm.r |
| d ^h ar- | keep | d ^h âr-'aya-ti | holds; carries; keeps | 6791 | Kalm.r |
| b ^h and- | order | b ^h and-a-ti* | orders | 9385 | Kalm.r |
| b ^h aira | Bâri | b ^h âr-i-ka- | porter | 9464 | Kalm.r |
| b ^h er'u | husband | b ^h âr-iyâ-pa-* | husband | 9467 | Kalm.m |
| b ^h a- | be able | b ^h âv-aya-ti | causes to be | 9477 | Kalm.r |
| b ^h as | flame | b ^h âs'a- | light | 9480 | Kalm.r |
| b ^h ʔia | man from Bhi'oʔi | b ^h i'oʔi* | Bhi'oʔi | | Kalm.u |
| b ^h ut | demon | b ^h û-t'a- ? | been | 9552 ? | Kalm.u |
| b ^h unjeu | earthquake | b ^h ûmi-čala- | earthquake | 9560 | Kalm.r |
| b ^h umbur | wasp | b ^h ramara- | large black bee | 9651 | Kalm.r |
| huñ- | kill | ħ'an-a- | strikes; kills | 13963 | Kalm.r |
| ħ'an | house; temple | ħand ^h a-* | place; house | 13970 | Kalm.r |
| ħ'aŋyak | stool | ħayana- | covered palanquin | 13977 | Kalm.m |
| ħar'ila | brass | ħ'ari-ta- | yellow; green | 13985.1 | Kalm.u |
| ħa~r'ir | thief; enemy | ħar-i-ṭ- | thief | 13989 | Kalm.u |
| ħ'au | plow | ħal'a- | plough | 14000 | Kalm.r |
| ħiŋq'au | bachelor; unmarried woman | ħiŋq-âla-* | wandering | 14090 | Kalm.r |
| ħ'uluk | heat | ħûlu-kka-* | heat | 14148 | Kalm.u |
| ħ'iřa | theft | ħr-ti- | seized | 14149 | Kalm.r |
| ħ'eman | winter | ħem-a-nt'a- | winter | 14164.1 | Kalm.u |

Table 7. Kal'asa: Retained Whispery Voice.

Through an unclear initial strengthening process, in a few monosyllables they became whispery voiceless consonants (Table 8).

| Kal'aşa: C ^h - > Ch- | | | | | |
|---------------------------------|-----------------------|-----------------------------|---------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| <i>kh'as</i> | grass | <i>g^hâs'a-</i> | food; pasture grass | 4471 | Kalm.r |
| <i>č'onk</i> | thorn | <i>ʃ^hank-*</i> | clump; cluster | 5323.1 | Kalm.r |
| <i>čh'aṭ</i> | single time; drumbeat | <i>ʃ^haṭṭ-*</i> | sudden movement | 5327.2 | Kalm.r |
| <i>ph'ar</i> | burden | <i>b^hâr-'a-</i> | burden | 9459 | Kalm.r |
| <i>čh'u</i> | daughter | <i>du^hi-t'ṛ-</i> | daughter | 6481 | Kalm.m |

Table 8. Kal'aşa: Devoicing of Whispery Voice.

The initial consonant of *b^h'ava-* 'become' became *h*, as in Khow`ar. A few forms have an unexplained loss of the OIA posterior whispery voicing on the modern consonant (Table 9).

| Kal'aşa: C ^h - > C- | | | | | |
|--------------------------------|------------------------------|---------------------------------|------------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| <i>dr'aus</i> | Drosh | <i>d^hr'â-us*</i> | Drosh | | Kalm.r |
| <i>ḡ'inḡek</i> | [kind of carnivorous animal] | <i>ḡ^hinḡa-*</i> | belly | 5589.3 | Kalm.u |
| <i>baçh'añ</i> | small ornamental bell | <i>b^hak-ša-ṇa-</i> | cup | 9340 | Kalm.r |
| <i>b'ari</i> | Bâri | <i>b^hâr-i-ka-</i> | porter | 9464 | Kalm.r |
| <i>b'it</i> | roof board | <i>b^hit-ta-</i> | fragment; split timber | 9493 | Kalm.u |
| <i>bunjeu</i> | earthquake | <i>b^hûmi-čala-</i> | earthquake | 9560 | Kalm.r |
| <i>b'aya</i> | brother | <i>b^hr'âṭṛ-</i> | brother | 9661 | Kalm.m |
| <i>b'ayautr</i> | brother's son | <i>b^hrâṭṛ-putra-</i> | brother's son | 9664 | Kalm.r |

Table 9. Kal'aşa: Loss of Whispery Voice.

Posterior whispery voicing of medial consonants was largely anticipated to an initial (default-) voiced consonant (Table 10).

| Kal'aşa: ← ^h | | | | | |
|------------------------------|---------------------------------------|---------------------------------------|-------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| <i>g^h'on</i> | stench | <i>gand^h'a-</i> | stench | 4014 | Kalm.r |
| <i>g^h'amb'uri</i> | flower | <i>gand^h'a-pûr-i-ka-:-</i> | flower | 4015 | Kalm.r |
| <i>d^h'am'ei</i> | tail | <i>dumb^h'a-</i> | tail | 6419 | Kalm.r |
| <i>d^h'o-</i> | milk | <i>doḥ-a-ti*</i> | milks | 6592.2 | Kalm.r |
| <i>b^h'on-</i> | bind | <i>bad^h-n'â-ti</i> | binds; suppresses | 9133 | Kalm.r |
| <i>b^h'onyak</i> | skin on which new-born baby is placed | <i>band^h-îya-*</i> | to be bound | 9143 | Kalm.r |
| <i>b^h'i-</i> | fear | <i>bi-b^h'e-ti</i> | fears | 9241 | Kalm.u |
| <i>b'ahul</i> | name of a constellation (Pleiades?) | <i>bahu-la-:-</i> | Pleiades | 9195 | Kalm.r |
| <i>lh'uy</i> | blood | <i>l'oḥ-i-ta-</i> | red; blood | 11165 | Kalm.m |

Table 10. Kal'aşa: Anticipation of Whispery Voice.

If no such initial consonant existed, the medial consonant retained its posterior whispery voicing (Table 11), but in a few cases the posterior whispery voicing was anticipated to the beginning of a vowel-initial word as *h* (Table 12), or the medial consonant became *h* (Table 13).

| Kal'aşa: -C ^h - = -C ^h - | | | | | |
|--|-----------------------|------------------------------|-------------------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| 'ad ^h ek | smallish | ard ^h 'a- | half | 644 | Kalm.r |
| ad ^h 'e | half | ard ^h 'a- | half | 644 | Kalm.r |
| 'ad ^h u | day | ard ^h a-divasa- | noon | 654 | Kalm.r |
| id ^h 'on | stone andiron; tripod | ud-d ^h â-na- | stand; rest | 2014 | Kalm.m |
| ad ^h 'y- | run | ud-d ^h âv-aya-ti* | runs away | 2020 | Kalm.r |
| ud ^h 'un | dust | ud-d ^h ûđi-* | excessive dust | 2025 | Kalm.s |
| ud ^h 'ul- | tear asunder | ud-d ^h û-ta- | shaken; shaken off; thrown up | 2026 | Kalm.r |

Table 11. Kal'aşa: Retention of Medial Whispery Voice.

| Kal'aşa: ← ^h ; ^h > <i>fi</i> | | | | | |
|--|---------|---------------------------|------------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| haly'a | brought | 'â-lab ^h -a-te | takes hold of; obtains | 1362 | Kalm.r |
| h'uşum | yoke | upa-şamb ^h -a- | support | 2266.2 | Kalm.u |

Table 12. Kal'aşa: Anticipation of Whispery Voice.

| Kal'aşa: -C ^h - > -fi- | | | | | |
|-----------------------------------|--|-----------------------|-------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| bah'u | a girl who marries into one's family; SoWi; BrWi | vad ^h 'u:- | bride; son's wife | 11250 | Kalm.m |

Table 13. Kal'aşa: Lenition of Whispery Voiced Consonants.

In a number of words medial whispery posterior-voiced consonants and *h* were lost because of minor or unclear developmental conditions or inaccurate etymologies (Table 14).

| Kal'asa: - <i>h</i> -, - <i>h</i> - > Ø | | | | | |
|---|-------------------------|-------------------------------------|---------------------------------------|----------|---------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Dialect |
| <i>aĵinĵ'ik</i> | near | <i>ad^hy-ant-'ena</i> | close to | 276 | Kalm.u |
| <i>ĉetr'au</i> | Chitral Town | <i>kṣetra-'ard^ha-</i> | part; place; country; "half a field" | 643 | Kalm.m |
| <i>agr'-</i> | get tired | <i>â-g^hrâ-p-aya-ti</i> | causes to smell; get satiated | 1062.1 | Kalm.r |
| <i>až'ai</i> | apricot | <i>âṣâḍ^h-îya-</i> | of the month <i>âṣâḍ^hâ</i> | 1474 | Kalm.r |
| <i>indr'e~</i> | rainbow | <i>indra-d^han'uṣ-</i> | rainbow | 1577 | Kalm.r |
| <i>ĉu'ane</i> | snake | <i>kṣob^ha-</i> | agitation | 3751 | Kalm.u |
| <i>gard'okh</i> | donkey | <i>garda-b^ha-ka-</i> | donkey | 4054 | Kalm.r |
| <i>ĉ'uŋ</i> | beard | <i>ĉung^ha-*</i> | beard; moustache | 5254.2 | Kalm.r |
| <i>prelik</i> | light | <i>pra-b^hâ-la-</i> | light | 8711 | Kalm.r |
| <i>b'uj-</i> | awaken [VI] | <i>b'ud^h-ya-te</i> | is awakened | 9279 | Kalm.r |
| <i>buj'-</i> | awaken [VT] | <i>b'ud^h-ya-te</i> | is awakened | 9279 | Kalm.r |
| <i>mauræ</i> | sweet | <i>mad^hu-r'a-</i> | sweet | 9793 | Kalm.r |
| <i>mr'aç</i> | mulberry | <i>mad^hu-ra-vṛkṣ'a-*</i> | tree with sweet fruit | 9796 | Kalm.m |
| <i>m'oč</i> | middle | <i>m'ad^h-ya-</i> | middle | 9804 | Kalm.r |
| <i>mačhum'ara dada</i> | father's middle brother | <i>mad^h-ya-m'a-</i> | middlemost | 9810 | Kalm.m |
| <i>m'eñ</i> | cloud | <i>meg^ha-</i> | cloud; rain | 10302 | Kalm.r |
| <i>am'eña</i> | ewe | <i>mend^ha-</i> | ram | 10310.1 | Kalm.m |
| <i>am'eñyak</i> | lamb | <i>mend^ha-</i> | ram | 10310.1 | Kalm.m |
| <i>vad'ok</i> | ax | <i>vard^ha-ka-</i> | cutting | 11374 | Kalm.m |
| <i>b'ad-</i> | grow | <i>v'ard^ha-te</i> | grows | 11376 | Kalm.r |
| <i>bad'ir</i> | (sledge-[?]) hammer | <i>vard^h-ir-a-</i> | axe; hammer | 11385 | Kalm.s |
| <i>bedark'ar</i> | ill; sick | <i>vi-d^harg-a-*</i> | without movement | 11751 | Kalm.r |
| <i>b'itr</i> | clear sky | <i>vîd^hriya-*</i> | clear sky | 12051.3 | Kalm.r |
| <i>isk'ou</i> | peg | <i>skab^ha-*</i> | post; peg | 13638 | Kalm.r |
| <i>th'um</i> | tree | <i>stamb^ha-</i> | pillar; post | 13682 | Kalm.r |
| <i>an'ora</i> | hungry | <i>an-âhâra-</i> | abstaining from food | 299 | Kalm.r |
| <i>'a</i> | l | <i>aĥ-'am</i> | l | 992 | Kalm.m |
| <i>ĵ'ip</i> | tongue | <i>ĵihv'a-:-</i> | tongue | 5228 | Kalm.r |
| <i>ĵur'uk</i> | girl | <i>duhit'r-</i> | daughter | 6481 | Kalm.m |
| <i>bâz'i g^hal</i> | Bazgal | <i>bahî-ra-*</i> | external | 9183 | Kalm.u |
| <i>br'u~ ṣiṣ</i> | precipice | <i>brĥ-an-t-</i> | tall; high | 9302 | Kalm.r |
| <i>li-</i> | lick | <i>liĥa-ti</i> | licks | 11069.1 | Kalm.r |
| <i>lo'iṣṭ</i> | male monal pheasant | <i>loh-i-ṣṭha-</i> | very red | 11169 | Kalm.m |

Table 14. Kal'asa: Loss of Whispery Voice.

In summary, Kal'asa mostly retains OIA whispery voicing in the face of default anterior phonation, probably through the influence of the strong posterior component of default phonation in that language.

3.1.3 Acharêtâ': Default Posterior Phonation + Position: Tones

If a language retains whispery posterior-voiced consonants, tonal contrasts may arise from contrasting times in the switch between default and accented phonation during the production

of an accented vowel. *Acharêta'* exemplifies this situation with its contrasting initiation of anterior-voiced accent at the onset or the offset of a tense (long) vowel (Strand 2000/2001). This was probably the case in early *Ṣinâ'*, but most dialects have since lost their original whispery-voiced consonants (e.g., Schmidt and Kohistani 2008: 30).

Data from *Acharêta'* come from my own observations (Strand 2000/2001, 2000/2011).

The accentual system of *Acharêta'* is essentially that of Sanskrit posited above. Default phonation is posterior; accented phonation is anterior. Accented lax (“short”) vowels only have time to carry the high pitch of anterior phonation, but accented tense (“long”) vowels are long enough to show a *svarita*-like high falling tone as phonation switches to its posterior default across the vowel.

The default phonation of vowels in *Acharêta'* is produced with posterior phonation and back tensing of the larynx. Throughout the vowel this process produces a fundamental frequency (F_0) that may be more or less progressively lowered, the degree of lowering corresponding to the intensity of the speech. There is also a slight megaphonic effect. Back tensing strengthens slightly over utterance segments, producing a strong step-down lowering of F_0 over the length of an utterance.

Accented phonation is anterior, superimposed on the default posterior phonation. The range of pitch between accented and unaccented vowels is somewhat narrow, because of the restriction of larynx raising caused by the concomitant pull of posterior tensing.

Accented lax (short) vowels are indicated by the accent mark (') preceding the vowel's symbol.

The position of accent on tense (long) vowels is distinctive. On tense vowels with vowel-onset accent, indicated by the accent mark placed before the vowel, anterior accentual tensing starts at the beginning of the vowel and then drops, producing a falling pitch throughout the vowel. On tense vowels with vowel-offset accent, indicated by the accent mark placed after the vowel, anterior accentual tensing begins toward the end of the vowel, while the entire vowel sustains normal posterior tensing. The result is a level, falling-rising, or rising pitch across the vowel, depending on the intensity of speech. Thus there is a contrast between, e.g., offset-accented *râ't* ‘night and day (24-hour period)’ vs. onset-accented *r'ât* ‘blood’.

Almost all long vowels with offset-accent occur in the final syllable of a word. In a few forms offset-accented long vowels appear penultimately. Most of these contain whispery-voiced consonants which may have influenced their development: *dhrî'sto* ‘seen’, *lhô'ko* ‘little’, *mhô'ro* ‘sweet’, *ghâ'nu* ‘big’. The interrogative pronouns *kô'ro*, *kô'so*, etc. ‘which one’ are compounds of *kô'* ‘who’ plus a deictic pronoun. Only *jâ'bli* ‘runny sap’ (cf. Pashto *ž'âwla* ‘resin’) is anomalous.

Acharêta' speakers retain the OIA initial posterior whispery-voiced consonants (Table 15).

| Acharêta': <i>ɦ</i> and <i>ɦ</i> Retained | | | | |
|---|--|----------------------------------|----------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>ghâ'nu</i> | big | <i>g^han'a-</i> | compact; dense | 4424.1 |
| <i>ghî'r</i> | ghee | <i>g^hrt'a-</i> | ghee | 4501 |
| <i>gh'ûro</i> | horse [m.] | <i>g^hoṭa-</i> | horse | 4516 |
| <i>ghr'ôṇ</i> | stench | <i>g^hrâṇ'a-</i> | smelling | 4531 |
| <i>jhâ't</i> | hair (generic; animal) | <i>j^hâtṭha-*</i> | hair | 5334.2 |
| <i>-j^huli</i> | on top | <i>j^hulya-ti*</i> | swings | 5406 |
| <i>jhuṭ'a</i> | adulterated (gold, silk, <i>tila</i>) | <i>j^hûṭṭha-*</i> | false | 5407 |
| <i>dhê'r</i> | belly | <i>d^hera-*</i> | belly | 5589.6 |
| <i>dh'ut</i> | mouth | <i>d^hutta-*</i> | mouth [contemptuous] | 5853.27 |
| <i>dharâ'ṇ</i> | earth | <i>d^har'a-ṇi:-</i> | ground | 6744 |
| <i>dhuw-</i> | wash (not textiles or hair) | <i>d^huva-ti*</i> | washes | 6833.1 |
| <i>dhum'î</i> | smoke | <i>d^hûmika:-</i> | smoke | 6849.2 |
| <i>dhâtâ'r</i> | hearth | <i>d^hmâtra-*</i> | fireplace | 6888 |
| <i>bh'us</i> | straw | <i>b^husa-*</i> | chaff | 9293.2 |
| <i>bhak'ulo</i> | fat; thick | <i>b^hakkha-*</i> | lump | 9330.1 |
| <i>bhê'ṇ</i> | sister | <i>b^hagini:-</i> | sister | 9349 |
| <i>bhûṅ'êli</i> | hemp | <i>b^hang'a-</i> | hemp | 9354 |
| <i>bhanj-</i> | hit (direct contact) | <i>b^hanja-ti*</i> | breaks | 9363 |
| <i>bhân'ôl</i> | stable | <i>b^hânḍa-agâra-</i> | treasury | 9442 |
| <i>bhar'îw</i> | husband | <i>b^hâriyâ-pa-*</i> | husband | 9467 |
| <i>bh-</i> | be able | <i>b^hâv-aya-ti</i> | causes to be | 9477 |
| <i>bhî'ûri</i> | Bhî'orî | <i>b^hî'orî*</i> | Bhî'orî | |
| <i>bh'it</i> | board | <i>b^hit-ta-</i> | split timber | 9493 |
| <i>bh'oçi</i> | vagina | <i>b^hoçca-*</i> | defective | 9524.5 |
| <i>bh-</i> | become [past and nonfinite stem] | <i>b^hû-t'a-</i> | been | 9552.1 |
| <i>ghumâ'l</i> | earthquake | <i>b^hûmi-çala</i> | earthquake | 9560 |
| <i>bhr'uj</i> | birch | <i>b^hurja-</i> | birch | 9570.1 |
| <i>bh'ûro</i> | deaf | <i>b^hora-*</i> | defective | 9633 |
| <i>bhrimboṛ'î</i> | wasp | <i>b^hramar'a-</i> | large black bee | 9651 |
| <i>bhrâj'ay</i> | brother's wife; friend's wife | <i>b^hrâtur-jâya:-</i> | brother's wife | 9660 |
| <i>bhr'o</i> | brother | <i>b^hr'âtṛ-</i> | brother | 9661 |
| <i>bhrâp'utr</i> | brother's son | <i>b^hrâṭṛ-putra-</i> | brother's son | 9664 |
| <i>haḍ'ung</i> | bone | <i>haḍḍa-</i> | bone | 13952 |
| <i>hay'îni</i> | native-style chair | <i>hayana-</i> | covered palanquin | 13977 |
| <i>hâ'l</i> | plow | <i>hâl'a-</i> | plough | 14000 |
| <i>hîmâ'l</i> | avalanche | <i>hîma-çala-*</i> | avalanche | 14100 |
| <i>h'uluk</i> | heat | <i>hûlukka-*</i> | heat | 14148 |
| <i>haywâ'n</i> | winter | <i>hemant'a-</i> | winter | 14164.1 |

Table 15. Acharêta': Retention of Initial Whispery Voice.

A paucity of modern words have lost initial whispery voicing (Table 16).

| Ácharêtâ': C ^h - > C- | | | | |
|----------------------------------|-----------|-----------------------------|-------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>g'ír-</i> | go around | <i>g^hír-*</i> | go round | 4474.1 |
| <i>q'ôk</i> | back | <i>q^hâkka-*</i> | back; waist | 5582 |
| <i>d'uri</i> | dust | <i>d^hûqí-*</i> | dust | 6835 |
| <i>babâ'y</i> | apple | <i>b^habba:-*</i> | apple | 9387 |

Table 16. Ácharêtâ': Loss of Initial Whispery Voice.

Posterior whispery voicing of medial consonants was anticipated to the initial consonant (Table 17).

| Ácharêtâ': ← ^h | | | | |
|---------------------------|-------------------------------|------------------------------------|-----------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>ghrô'k</i> | worm | <i>gaved^huka-</i> | kind of snake | 4104 |
| <i>mhô'ro</i> | sweet | <i>mad^hur'a-</i> | sweet | 9793 |
| <i>mhâr'ôço</i> | mulberry | <i>mad^hura-vrkş'a-*</i> | tree with sweet fruit | 9796 |
| <i>bh'un-</i> | down (elevation or direction) | <i>bund^ha-</i> | bottom | 9820.1 |
| <i>bh'uri</i> | wage | <i>v'rd^hi-</i> | increase; prosperity | 12076 |

Table 17. Ácharêtâ': Anticipation of Medial Whispery Voice.

If no such initial consonant existed, the medial consonant retained its posterior whispery voicing (Table 18).

| Ácharêtâ': -C ^h - = -C ^h - | | | | |
|--|--------------|----------------------------------|--------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>oq^hól</i> | flood | <i>ava-dq^hâl-a-</i> | falling-down | 773 |
| <i>uq^hîw-</i> | flee | <i>ut-d^hâvaya-ti*</i> | runs away | 2020.2 |
| <i>urbh-</i> | fly | <i>ut-b^hara-ti</i> | raises | 2038.1 |
| <i>bad^hîr</i> | sledgehammer | <i>vard^hira-*</i> | axe; hammer | 11385 |

Table 18. Ácharêtâ': Retention of Medial Whispery Voice.

Rarely, the posterior whispery voicing was anticipated to the beginning of a vowel-initial word as *h* (Table 19).

| Ácharêtâ': ← ^h ; ^h > ^h | | | | |
|---|----------------|----------------------------|--------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>hû'nd-</i> | up (direction) | <i>ûrd^hv'a-</i> | erect; being above | 2426 |

Table 19. Ácharêtâ': Anticipation of Medial Whispery Voice.

Non-anticipated posterior whispery voicing was lost in medial consonant clusters (Table 20).

| Acharêâtâ': -C ^h - > -C- | | | | | |
|---|--------------------------|-----------------------|--|---------------------------|----------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # |
| C ₁ C ₂ ^h > C ₂ | <i>'ubo</i> | light (weight) | <i>ut-b^hûta-</i> | come forth | 2046 |
| | <i>bûd'ôlo</i> | spider | <i>buđđ^ha-</i> | defective | 9268.3 |
| | <i>b'ûđo</i> | old (animate) | <i>buđđ^ha-*</i> | old | 9271 |
| | <i>b'îđo</i> | very; much; many | <i>vi-v^hřdd^ha-</i> | grown; large | 11929 |
| | <i>b'uđi</i> | bribe | <i>v^hřdd^hi-</i> | increase; prosperity | 12076 |
| | <i>bađ'îl</i> | man's name | <i>vard^hira-*</i> | axe; hammer | 11385 |
| C ₁ ^h C ₂ > C ₂ | <i>w'in</i> | lightning bolt | <i>vid^hna-*</i> | pierced | 12109 |
| C ₁ C ₂ ^h > C ₁ | <i>isť^hum</i> | yoke | <i>upa-šťamb^ha-</i> | support | 2266.2 |
| | <i>ř'âmi</i> | jaw (lower) | <i>ř'amb^ha-</i> | tooth; jaw(s) | 5137 |
| | <i>š'umo</i> | parrot | <i>šumb^ha-*</i> | parrot | 12503 |
| | <i>ř'ombo</i> | trunk | <i>stamb^ha-</i> | pillar; post | 13682 |
| d ^h y > ĵ | <i>aĵ'a-</i> | up (higher elevation) | <i>ad^hy-ad^hi</i> | on high | 274 |
| | <i>-ĵ'e</i> | up in | <i>ad^hy-ad^hi</i> | on high | 274 |
| | <i>w'âĵ</i> | stomach; rumen | <i>ûbad^hya-</i> | animal's stomach contents | 2417.1 |
| | <i>m'êĵi ang'uri</i> | middle finger | <i>m'ad^hya-</i> | middle | 9804 |
| C ^h C > CC | <i>'âbru</i> | cloud | <i>ab^hr'a-</i> | rain-cloud | 549 |
| | <i>b'îdri</i> | clear sky | <i>vid^hriya-*</i> | clear sky | 12051.3 |

Table 20. Acharêâtâ': Loss of Medial Whispery Voice.

In a few words medial posterior whispery-voiced consonants and *h* were lost because of minor or unclear developmental conditions (Table 21).

| Acharêâtâ': -h- > Ø | | | | |
|---------------------|--------------------|------------------------------|--------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>g'âđu</i> | big (animate); old | <i>gâđ^ha-</i> | dived into | 4118 |
| <i>d'êři</i> | beard | <i>dâđ^hika-:-</i> | beard | 6250 |
| <i>n'êwi</i> | umbilical cord | <i>n'âb^hi-</i> | navel | 7062.1 |
| <i>pr'âl</i> | light | <i>pra-b^hâla-</i> | light | 8711 |
| <i>š'uwo</i> | good | <i>šub^ha-</i> | bright; good | 12532 |
| <i>š'ŋo</i> | porcupine | <i>šuvâvid^h-*</i> | porcupine | 12766.2 |
| <i>s'um</i> | dirt | <i>s'u-mahânt-</i> | very great | 13493 |

Table 21. Acharêâtâ': Unexplained Loss of Medial Whispery Voice.

Almost all instances of non-etymological whisper, both voiced and voiceless, arose to restrict the airflow of a following continuant, that is, a spirant, *r*, or nasal stop.

An OIA cluster of stop + sibilant resulted in a voiceless aspirated affricate (especially *kʃ* > *çh*), except in word-final position (Table 22).

| Acharêtâ': Whisper from Sibilants | | | | | | |
|------------------------------------|-------------------------|---------------------------------|----------------------------------|--------------------------------------|----------|--------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| <i>kʃ</i> - > <i>çh</i> - | <i>çhâtr'ôl</i> | Chitral | <i>kʃetra-'ard^ha-</i> | part; place; country; "half a field" | 643 | OIA |
| | <i>çhâtrâl'ûčo</i> | man from Chitral | | | | |
| | <i>çh'ôñ</i> | hollyoak (generic) | | | | |
| | <i>çhâñm'uṭ</i> | hollyoak tree | | | | |
| | <i>çhâ'r</i> | waterfall | <i>kʃar'a-</i> | flowing; water | 3662.1 | OIA |
| | <i>çhâr'ôngo</i> | grape stalk | | | | |
| | <i>çhu~ç-</i> | straighten | <i>sû~kʃa-*</i> | straight | 13548 | OIA |
| | <i>çh'udro</i> | thick (liquid) | | | | |
| | <i>çhup-</i> | wash (textiles or hair) | <i>kʃup-ya-te</i> | is pressed | 3719 | OIA |
| | <i>çh'îñ</i> | dark | <i>kʃîñ'a-</i> | worn away | 3690 | OIA |
| | <i>çh'îk</i> | feces; coward | | | | |
| | <i>çhî'r</i> | milk | <i>kʃîr'a-</i> | milk | 3696 | OIA |
| | <i>çh'îri</i> | udder | <i>kʃîr'a-vat-</i> | furnished with milk | 3700.2 | OIA |
| | <i>çh'îtr</i> | field (cultivated) | <i>kʃ'etra-</i> | land | 3735 | OIA |
| <i>çhup-</i> | wash (textiles or hair) | <i>kʃupya-te</i> | is pressed | 3719 | OIA | |
| <i>çhu~ç-</i> | straighten | <i>sû~kʃa-*</i> | straight | 13548 | OIA | |
| <i>-kʃ-</i> > <i>-çh-</i> | <i>açh'ârî</i> | walnut tree | <i>akʃ'oṭa-</i> | walnut | 48 | OIA |
| | <i>âçh'âru</i> | fir | <i>akʃa-dâruka-*</i> | kind of tree | 30 | OIA |
| | <i>açh'î</i> | eye | <i>'akʃi-</i> | eye | 43 | OIA |
| | <i>açhirô'</i> | puffball mushroom | | | | |
| | <i>açh'ô'r</i> | walnut | <i>akʃ'oṭa-</i> | walnut | 48 | OIA |
| | <i>kachû'l</i> | hard sap | | | | |
| | <i>daçh-</i> | look | <i>dʁkʃa-ti*</i> | sees | 6507.1 | OIA |
| | <i>dêçh'îñi</i> | right | <i>d'akʃîña-</i> | right | 6119 | OIA |
| | <i>mâçhur'î</i> | bee | <i>mâkʃika-kara-*</i> | bee | 9990 | OIA |
| | <i>mêçh'i</i> | honey | <i>mâkʃik'a-</i> | honey | 9989.1 | OIA |
| <i>paçh'î</i> | paddle on mill wheel | <i>pakʃ'iya-</i> | pertaining to wings | 7640.2 | OIA | |
| <i>-kʃ-</i> > <i>-ç</i> | <i>k'âç</i> | grass | <i>k'akʃa-</i> | undergrowth | 2589 | OIA |
| | <i>dhr'âç</i> | grape | <i>dr'âkʃa:-</i> | vine; grape | 6628.1 | OIA |
| | <i>prâwâç</i> | waist | | | | |
| <i>-çč-</i> > <i>Ch...č-</i> | <i>kh'âçu</i> | bad | <i>kačča-</i> | raw; unripe | 2613 | OIA |
| | <i>khâč'aṛo</i> | ugly | <i>kačča-*</i> | raw; unripe | 2613 | OIA |
| <i>ts</i> > <i>éçh</i> | <i>bachâ'r</i> | young bull (1 year to maturity) | <i>vatsa-tar'a-</i> | young bull before copulation | 11241 | OIA |
| <i>ts</i> > <i>éçh</i> > <i>çh</i> | <i>baçh'ûro</i> | calf (to 1 year) | <i>vatsa-kuḍa-*</i> | calf | 11239 | OIA |

Table 22. Acharêtâ': Whisper Arising from Sibilants.

Medial spirants produced initial whisper (Table 23).

| Acharêta': Whisper from Medial Spirants | | | | | | |
|---|-----------------|-------------------|----------------------|------------------------|----------|--------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| CVS > CS > Ch | <i>âghâ'</i> | sky | <i>â-kâš'a-</i> | sky | 1008 | OIA |
| CVS > ChVS | <i>aṇabhîš</i> | nineteen | <i>ûn'a-vi~šati</i> | nineteen | 2411 | OIA |
| | <i>bh'eš-</i> | sit | <i>'upa-viša-ti</i> | approaches; sits down | 2245.1 | OIA |
| | <i>bhîš</i> | 20 | <i>vi~šat'i</i> | twenty | 11616 | OIA |
| | <i>kh'uši</i> | left | <i>kuša-</i> | depraved; crippled | 3364 | OIA |
| | <i>dhô'ṛ</i> | yesterday | <i>doṣ'a:-</i> | night; evening | 6590 | OIA |
| | <i>phuṣ'a</i> | seer | <i>puṣ'a*</i> | shaman | | Kmv |
| | <i>rhâs'ô</i> | kind of plant | <i>r'asa-vant-</i> | juicy; tasty | 10657 | OIA |
| | <i>thô's</i> | back of neck | <i>tos</i> | shoulder | | Kmv |
| CṼS > ChṼS | <i>bhê'~š</i> | beam; timber | <i>v'a~šya-</i> | crossbeam | 11182 | OIA |
| | <i>mhâ'~s</i> | meat; flesh | <i>mâ~s'a-</i> | flesh | 9982 | OIA |
| | <i>rh'û~s</i> | musk deer | <i>r`au~z</i> | musk deer | | Khow |
| CVST > ChVST | <i>dhrî'sṭo</i> | saw [irreg. past] | <i>dṛṣṭ'a-</i> | seen | 6518 | OIA |
| | <i>lhâ'sṭ</i> | plain | <i>lašt*</i> | plain | | Elr |
| | <i>ghrâ'st</i> | wolf [m.] | <i>grasṭṛ-</i> | swallower | 4362 | OIA |
| | <i>ghr'asti</i> | wolf [f.] | <i>grasṭṛ-</i> | swallower | 4362 | OIA |
| CVST > ChVT | <i>nikh-</i> | go out | <i>niḥ-ṣkada-ti*</i> | jumps out | 7114 | OIA |
| | <i>baṭh'êri</i> | kind of juniper | <i>vi-ṣṭara-</i> | spread-out thing; tree | 11987.1 | OIA |
| CV _v > ChV _w | <i>ghâ'w</i> | cow | <i>gav-a-</i> | cow or bull | 4093 | OIA |
| | <i>rhô'</i> | song | <i>râva-</i> | yell | 10716 | OIA |
| | <i>th'î</i> | thy | <i>tuv'am</i> | thou | 5889 | OIA |

Table 23. Acharêta': Whisper Arising from Medial Spirants.

Medial *r* produced anticipated whisper (Table 24), as did some instances of medial *t* and *ɖ*.

| Acharêta': Whisper from <i>r</i> and Retroflex Stops | | | | | | |
|--|--------------------|---------------------------|-------------------|-------------------------------|----------|--------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| CVr > ChVr | <i>dh'ûra</i> | far | <i>dûr'a-</i> | distant | 6495 | OIA |
| | <i>bhirô'</i> | male | <i>vîr'a-</i> | man; male | 12056 | OIA |
| | <i>bh'îro</i> | goat [m.] | <i>vîr'a-</i> | man; male | 12056 | OIA |
| | <i>mhâr-</i> | kill | <i>mâr'aya-ti</i> | kills | 10066 | OIA |
| | <i>phâr'-</i> | across; over | <i>pâr'a-</i> | bringing across; further side | 8100 | OIA |
| | <i>pharaṛ'â</i> | across; over [indefinite] | <i>pâr'a-</i> | bringing across; further side | 8100 | |
| | <i>sithâ'r</i> | sitar | <i>sitâr</i> | sitar | | Prs |
| CVṭ > ChVṭ | <i>ph'âṭu</i> | feather | <i>pâṭ'û</i> | feather | 7627 | Kmv |
| | <i>dhêr'um</i> | pomegranate | <i>dâḍîma-</i> | pomegranate tree | 6254.1 | OIA |
| | <i>ph'ûṛi</i> | smallpox | <i>poḍa-*</i> | hollow | 8398.1 | OIA |
| | <i>nih'âṛa</i> | near | <i>nikaṭam</i> | near | 7136 | OIA |
| CVrS > ChVS | <i>khaṣ'î</i> | hoe | <i>karṣ'î-</i> | furrowing | 2909 | OIA |
| Vr > hVr | <i>hâraṇḍhrô'k</i> | Arandu Valley | <i>ârand'u</i> | Arandu | | |
| | <i>hâraṇ'û</i> | Arandu | <i>ârand'u</i> | Arandu | | |
| | <i>hâraṇ'ûčo</i> | man from Arandu | <i>ârand'u</i> | Arandu | | |
| | <i>hâ't</i> | flour | <i>ârta-*</i> | flour | 1338 | OIA |
| | <i>h'êṛi</i> | duck [f. for generic] | <i>âṭ'i-</i> | an aquatic bird | 1127 | OIA |
| CṛC > CVrC > ChrVC | <i>bhrôk'î</i> | fat on kidneys | <i>vṛkk'a-</i> | kidneys; heart | 12064.1 | |
| | <i>bhr'uk</i> | kidney | <i>vṛkk'a-</i> | kidneys; heart | 12064.1 | OIA |
| Cr > Chr | <i>dhrak-</i> | pull | <i>drakk-*</i> | drag | 6613 | OIA |
| | <i>dhrâ'l</i> | markhor hair | <i>drol</i> | spiderweb | | Kmv |
| | <i>ghr'ôm</i> | community; village; town | <i>gr'âma-</i> | troop; village | 4368 | OIA |
| CVr > ChrV | <i>dhr'ûk</i> | narrow valley | <i>dur-g'a-</i> | impassable | 6429 | OIA |

Table 24. Acharêta': Whisper Arising from *r*, *t*, or *ɖ*.

Medial nasal consonants produced initial whisper (Table 25).

| Acharêta': Whisper from Nasal Consonants | | | | | | |
|--|--------------------|-------------------------|---------------------|---------------------------|----------|--------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| (C)VN > (C)hVN | <i>haŋô'</i> | egg | <i>ânđ'a-</i> | egg; testicle | 1111 | OIA |
| | <i>bhâng'i</i> | rooster | <i>bângi</i> | cock | | Prs |
| | <i>gh'onji</i> | storeroom | <i>ganja-</i> | treasury; grainstore | 3961 | OIA |
| | <i>jhâmatrô'</i> | son-in-law | <i>jamâtraka-*</i> | daughter's husband | 5198.2 | OIA |
| | <i>ghan'âtu</i> | intelligent | <i>jan'â-ti</i> | knows | 5193 | OIA |
| | <i>jhândurâ'</i> | snake | <i>yantura-*</i> | offspring; creature; worm | 5110.1 | OIA |
| | <i>hangâ'r</i> | liver | <i>jigar [?]</i> | liver | 10394 | Prs ? |
| | <i>jh'on-</i> | know; recognize | <i>jan'â-ti</i> | knows | 5193 | OIA |
| | <i>jhî~</i> | louse (large) | <i>y'ûka:- [?]</i> | louse | 10512 | OIA |
| | <i>jh'ûni</i> | nettle | <i>yûniya-</i> | string-like | 10519 | OIA |
| | <i>khangâ'r</i> | sword (native) | <i>xnğr</i> | sword | | Sogd |
| | <i>rh'onđo</i> | mangy (goats only); bad | <i>runța-</i> | defective | 10770.4 | OIA |
| | <i>th'ongi</i> | ax | <i>țanka-</i> | spade; hoe; chisel | 5427.1 | OIA |
| | <i>șâkathong'i</i> | large ax | <i>țanka-</i> | spade; hoe; chisel | 5427.1 | OIA |
| | <i>ghuwen'i</i> | Afghan | <i>awğân</i> | Afghan | | Psht |
| <i>ghwâñâ'</i> | Pashto | <i>awğân</i> | Afghan | | Psht | |
| C...NC > Ch...N | <i>bhiy'ôn</i> | willow | <i>veta-danđa-*</i> | willow stem | 12098 | OIA |
| | <i>bhiyân'm'uț</i> | willow tree | <i>veta-danđa-*</i> | willow stem | 12098 | OIA |
| s...~kș- > çh...~ç- | <i>çu~ç-</i> | straighten | <i>sû~kșa-*</i> | straight | 13548 | OIA |

Table 25. Acharêta': Whisper Arising from Nasals.

In at least one form whisper arose from an unclear source (Table 26).

| Acharêta': Unclear Source of Whisper | | | | | |
|--------------------------------------|-------|---------------|-----------|----------|--------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| <i>yh-</i> | come | <i>y'â-ti</i> | comes to | 10452 | OIA |

Table 26. Acharêta': Unclear Source of Whisper.

Contrary to the examples of Table 22, unaspirated ζ appears in a number of words, some of which contrast with words with ζh , and some of which appear to have nasalization that somehow precludes whispery voice (Table 27).

| Acharêta': Whisperless ζ | | | | | | |
|--------------------------------|--------------------|----------------------|------------------------------------|-----------------------|----------|---------|
| Formula | Form | Gloss | OIA Form | OIA Gloss | Turner # | Source |
| -kş- > -ç- | <i>kaçaṭô'p</i> | haystack | <i>k'akşa-</i> | undergrowth | 2589 | OIA |
| | <i>juwâ'rk'âçu</i> | threshed maize stalk | <i>k'akşa-</i> | undergrowth | 2589 | OIA |
| | <i>šêlik'âçu</i> | threshed rice stalk | <i>k'akşa-</i> | undergrowth | 2589 | OIA |
| | <i>t'âç-</i> | hew | <i>t'akşa-ti</i> | hews; chisels | 5620 | OIA |
| | <i>t'êçi</i> | adze | <i>t'akşa-</i> | hew | | |
| | <i>mhâr'ôço</i> | mulberry | <i>mad^hura-vřkş'a-*</i> | tree with sweet fruit | 9796 | OIA |
| č...~Ç > ç...~Ç | <i>čanj'a</i> | torch | <i>čanž'a</i> | torch | | Khow |
| | <i>çô~ř-</i> | write | <i>çônř-</i> | write | | Shin.Ac |
| | <i>ç'ř~ř</i> | fart | | | | |
| -kş...n > -~ç | <i>'i~ç</i> | bear | <i>'řkşa-</i> | bear | 2445 | OIA |
| | <i>'i~çi</i> | she-bear | <i>'řkşa-</i> | bear | 2445 | OIA |
| | <i>lřç?'</i> | nit | <i>likş'a:-</i> | nit | 11045 | OIA |
| <i>nVç > ~ç</i> | <i>'â~çu</i> | raspberry | <i>ân'o-çuk</i> | wild strawberry | | Kmkt |

Table 27. Acharêta': No Whisper Arising from Sibilants or Nasals.

Almost all offset-accented vowels occur in final position. My initial hypothesis was that the origin of vowel-offset accent arose from the accent of a following OIA vowel. An examination of 233 Acharêta' words with accented tense vowels and accent-indicated reflexes in OIA showed that while 16% of OIA forms with accent not on the initial syllable resulted in vowel-offset accent in Acharêta', in 27% the accent had been anticipated to the initial syllable with vowel-onset accent (Table 28). The small percentage of the former type seems to rule out my initial hypothesis.

| n = 233 | | Accent in Acharêta' | |
|---------------------|--------------------|---------------------|--------------------|
| | | Vowel-Offset 'V' | Vowel-Onset 'V' |
| Accent in OIA | Non-Initial ' , | 16% n = 37 | 27% n = 63 |
| | Initial ' , ~ | 2% n = 4 | 55% n = 129 |

Table 28. Distribution of Accentual Location in OIA vs. Acharêta'.

As noted above, almost all forms have vowel-offset accent on the final syllable. An examination of 283 such forms showed that at least 180 of them (64%) were loanwords with final accent. A better hypothesis than my initial one would posit that the habit arose of pronouncing loanwords with vowel-offset accent, and that the habit extended to certain accented suffixes (*-â'*, *-ô'*, etc.) as well.

3.2 Descendant Languages without Inherited Posterior-Voiced Consonants

Languages without inherited posterior-voiced consonants may have tonal contrasts, as in the Šinâ' dialects of Gilgit and Kôhistân, Garv'i, Torwâli, Khow`ar, and Dâmiâ-bâša, or they may lack tone altogether, as do the languages of the Kunar Valley.

Kôhistâni Šinâ' (Schmidt and Kohistani 2008) exemplifies a language with default posterior phonation but no inherited whispery-voiced consonants. Tonal contrasts are positional on tense (long) vowels, as in Ačharêta'.

3.2.1 Khow`ar: Default Anterior Phonation, Anterior or Posterior Accent without Position: Tones

If a language does not retain posterior whispery-voiced consonants, then it may have retained the posteriority on the phonation of the following vowel, which if accented may contrast with an accented anterior-phonated vowel.

Data from Khow`ar come from my research on the dialect spoken in Nağar in southern Chitral (Strand 2004/2011, 2012).

The normal unaccented phonation of vowels in Khow`ar is produced with anterior phonation and a concomitant front tensing of the larynx. With many speakers the front tensing produces a somewhat high-pitched phonatory register with phonation that tenses into a slight creakiness before a voiceless consonant.

Accented phonation is produced with either tight anterior phonation or posterior phonation, concomitant with the oral articulation of a vowel. There are two levels of accent, primary and secondary, above the level of default phonation. The default accentual level is primary.

Primary accented phonation is indicated by an accent mark (` for anterior phonation or ´ for posterior phonation) written before the accented vowel. The pairs of words in Table 29 demonstrate the contrast between anterior and posterior accented phonation.

| | | | | | | | | | | |
|------------------|-------------------------|------------------------------|--------------------------------|-------------------------------|---------------------------------|------------------------|----------------------------------|----------------------------|---------------------------|-------------------------------|
| anterior | <i>g`o!</i> 'throat' | <i>d`aq</i> 'boy' | <i>d`af</i> 'frame drum' | <i>d`uk</i> 'lump' | <i>š`en</i> 'rough' | <i>d`on</i> 'tooth' | <i>ph`ox</i> 'slowly' | <i>b`as</i> 'overnight' | <i>b`ol</i> 'army' | <i>wez`enote</i> 'tonight' |
| posterior | <i>g`o!</i> 'gully' | <i>d`ak</i> 'hind leg' | <i>d`ap</i> 'level area' | <i>d`uk</i> 'side peak' | <i>š`en</i> 'grape arbor' | <i>d`on</i> 'ghee' | <i>ph`ox</i> 'soft; loose' | <i>b`as</i> 'flame' | <i>b`ol</i> 'Pleiades' | <i>wez`en</i> 'evening' |

Table 29. Accented Phonation Contrasts in Khow`ar.

The position of accent within words is distinctive. Accented phonation may occur on the penultimate or the final syllable in a simple, non-compounded word, as in the word-pair *b`e!u* 'straw bucket' vs. *be!`u* 'pipe; flute'.

A secondary level of accent appears in multi-word sequences. Secondary accent may be produced by either anterior or posterior phonation. It is indicated by a lighter-faced accent mark: ` or ´. Compared to the normal, primary accent described above, the pitch of secondary accent is not as high for anterior phonation and not as low for posterior phonation. In compound words secondary accent falls on the normally accented vowel of a constituent word.

In the majority of Khow`ar reflexes of OIA words with initial posterior whispery-voiced consonants, the whisper dropped and the posterior voicing remained as accented phonation on the following vowel (Table 30).

| Khow`ar: ^h - > ^h (posterior-phonated accent) | | | | |
|--|----------------------------------|-------------------------------|-------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>g'oŝ</i> | dough | <i>g^harŝa-</i> | friction | 4448 |
| <i>g'ol</i> | valley with stream | <i>g^hala-*</i> | stream | 4453 |
| <i>g'ol'oĝ</i> | stream water | <i>g^halodaka-</i> | river water | 14470 |
| <i>ž'al</i> | grove | <i>ž^halla-*</i> | bush | 5355 |
| <i>d'ap</i> | level area on mountain | <i>d^happ-*</i> | cover | 5579.1 |
| <i>d'uk</i> | side peak of mountain | <i>d^hokka-*</i> | rock | 5603.1 |
| <i>d'ol</i> | snare drum | <i>d^hola-</i> | large drum | 5608 |
| <i>d'an</i> | popcorn | <i>d^hân'a:-</i> | parched grain | 6777 |
| <i>g'omdan</i> | popped wheat | <i>d^hân'a:-</i> | parched grain | 6777 |
| <i>d'ey-</i> | run | <i>d^hâv'aya-ti</i> | makes run; drives | 6802.2 |
| <i>d'-</i> | drink from a teat | <i>d^hiya-te</i> | is suckled | 6816 |
| <i>dr'os</i> | Drosh | <i>d^hr'â-us*</i> | Drosh | |
| <i>b'ot</i> | dinner | <i>b^hakt'a-</i> | food; boiled rice | 9331 |
| <i>b'ong</i> | cannabis | <i>b^hang'a-</i> | hemp | 9354 |
| <i>b'os</i> | become!; you [sg.] should become | <i>b^hava-ti</i> | becomes | 9416 |
| <i>b'ard'oyu</i> | porter | <i>b^hârika-</i> | porter | 9464 |
| <i>b'ardrozak</i> | porter | <i>b^hârika-</i> | porter | 9464 |
| <i>b'as</i> | flame | <i>b^hâs'a-</i> | light | 9480 |
| <i>b'olm`uži</i> | earthquake | <i>b^hûmi-čala-</i> | earthquake | 9560 |
| <i>b'umbur</i> | hornet | <i>b^hramara-</i> | large black bee | 9651 |
| <i>b'um</i> | earth; ground | <i>b^hûmi-</i> | earth; ground | 9557 |
| <i>br'ar</i> | brother; male cousin | <i>b^hr'âtr-</i> | brother | 9661 |

Table 30. Khow`ar: Development of OIA Initial Whispery-Voiced Consonants.

The posterior whispery voicing of medial consonants also resulted in posterior-phonated accent on an adjacent or resulting vowel, with loss of the medial consonant (Table 31).

| Khow`ar: ^h - > ^h (posterior-voiced accent) | | | | |
|--|-----------------|-----------------------------------|----------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>ch'ui</i> | hunger | <i>kŝud^hika:-*</i> | hunger | 3716.2 |
| <i>ch'uy</i> | hungry | <i>kŝud^hin-</i> | hungry | 3716.3 |
| <i>gord'oĝ</i> | donkey | <i>gardab^haka-</i> | donkey | 4054 |
| <i>g'oĝ-m`ali</i> | worm hole | <i>gaved^huka-</i> | kind of snake | 4104 |
| <i>d'on</i> | ghee | <i>dad^han-v'ant-</i> | containing coagulated milk | 6144 |
| <i>žo'-</i> | copulate | <i>y'ab^ha-ti</i> | copulates | 10418 |
| <i>l'e-</i> | find; get; reap | <i>l'ab^ha-te</i> | catches; takes | 10948 |
| <i>g'an</i> | wind | <i>gând^ha-</i> | perfumed | 4131 |
| <i>girw'an</i> | collar | <i>grîva:-band^ha-*</i> | neck band | 4390 |
| <i>sin'oĝ</i> | river water | <i>s'ind^hu-</i> | river | 13415 |

Table 31. Khow`ar: Development of OIA Medial Whispery-Voiced Consonants.

In a couple of instances after a prefix a whispery posterior voiced consonant was reduced to [h], modern phonemic *h* (Table 32).

| Khow`ar: - ^h - > <i>h</i> | | | | |
|--------------------------------------|---------------|------------------------------|--------------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>h'o</i> | he became | <i>'a-b^hava-t</i> | became | 9416 |
| <i>h'anu</i> | cover; sheath | <i>â-d^hânaka-</i> | place in which something rests | 1163 |

Table 32. Khow`ar: Development of OIA Medial Whispery-Voiced Consonants after Prefixes.

The development of *h* ([h]) paralleled that of the other whispery posterior-voiced consonants, leaving *h'* initially and only posterior phonation (´) medially (Table 33).

| Khow`ar: <i>h</i> > <i>h'</i> (posterior-voiced accent) | | | | |
|---|------------------------|----------------------|-------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>h'on</i> | flood | <i>hanu-</i> | weapon; death | 13965 |
| <i>h'im</i> | snow | <i>him'a-</i> | cold; frost; snow | 14096 |
| <i>h'imr'oĝ</i> | water from melted snow | <i>himara-udaka-</i> | snow water | 14102 |
| <i>ž'ur</i> | daughter | <i>duhit'ṛ-</i> | daughter | 6481 |
| <i>b'ol</i> | Pleiades | <i>bahulâ-</i> | Pleiades | 9195 |
| <i>m'-</i> | urinate | <i>m'eha-ti</i> | pisses | 10338 |
| <i>l'-</i> | lick | <i>liha-ti</i> | licks | 11069.1 |

Table 33. Khow`ar: Development of OIA *h* ([h]).

In a significant minority (40%) of words posterior whispery-voicing of consonants was lost, replaced with anterior accent, after initial consonants (Table 34) or medially (Table 35).

| Khow`ar: ^h - > Ø | | | | |
|-----------------------------|---------------------------------|----------------------------------|------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>g`az</i> | grass | <i>g^hâs'a-</i> | food; pasture grass | 4471 |
| <i>gran`iš</i> | morning | <i>g^hraņišya-*</i> | sun's heat | 4530 |
| <i>g`or</i> | hopper | <i>d^hara- ?</i> | holding; supporting | 6740 ? |
| <i>dan`u</i> | coriander | <i>d^hânaka-</i> | coriander | 6776.1 |
| <i>by`oļi</i> | a community in <i>By`oļg`ol</i> | <i>b^hi'oṛi*</i> | Bhi'oṛi | |
| <i>b`it</i> | board (cut and trimmed) | <i>b^hitta-</i> | fragment; split timber | 9493 |
| <i>b`olm`uži</i> | earthquake | <i>b^hûmi-čala-</i> | earthquake | 9560 |
| <i>buļ`i</i> | birch | <i>b^hûrja-</i> | birch | 9570.1 |
| <i>bl`ac</i> | short [animate] | <i>b^hṛš-</i> | fall | |
| <i>brež`ayu</i> | sister-in-law | <i>b^hrâtur-jâya:-</i> | brother's wife | 9660 |
| <i>br`u</i> | eyebrow | <i>b^hr'u:-</i> | eyebrow | 9688.1 |

Table 34. Khow`ar: Loss of OIA Initial Whispery Voicing.

| Khow`ar: - ^h - > Ø | | | | |
|-------------------------------|-----------------------|--|--------------------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>af</i> | down | <i>ad^hah</i> | below; under | 246 |
| <i>ayh</i> | up | <i>'ad^hi</i> | up; above; on | 249 |
| <i>g`oğ</i> | worm; bug | <i>gaved^huka-</i> | kind of snake | 4104 |
| <i>duh`u kor-</i> | scold | <i>d'od^hant-</i> | fierce; violent | 6580 |
| <i>mr`aç</i> | mulberry | <i>mad^hura-vrk^ha-*</i> | tree with sweet fruit | 9796 |
| <i>n`af</i> | umbilical cord; navel | <i>n'âb^hi-</i> | navel | 7062.1 |
| <i>isk`ow</i> | peg | <i>skab^ha-*</i> | post; peg | 13638 |
| <i>ş`u</i> | porcupine | <i>şuvâvid^h-*</i> | porcupine | 12766.2 |
| <i>phord`u</i> | young plant | <i>pr'a-vrdd^ha-</i> | grown up | 8807 |
| <i>drağ`anz s`al</i> | famine | <i>daur-ârg^hya-*</i> | time of high prices | 6426.2 |
| <i>çetr`ar</i> | Chitral | <i>kşetra-'ard^ha-</i> | part; place; country; "half a field" | 643 |
| <i>bard`ox</i> | large ax | <i>vard^haka-</i> | cutting | 11374 |
| <i>bađ`ir</i> | sledgehammer | <i>vard^hira-</i> | axe; hammer | 11385 |
| <i>y`udur</i> | clear sky | <i>vid^hriya-*</i> | clear sky | 12051.3 |
| <i>dr`ung</i> | long; tall [animate] | <i>drang^ha-*</i> | long | 6616 |
| <i>gamb`uri</i> | flower | <i>gand^ha-pûrika:-</i> | flower | 4015 |
| <i>b`and</i> | joint | <i>band^ha-</i> | bond | 9136 |
| <i>s`in</i> | river | <i>s'ind^hu-</i> | river | 13415 |
| <i>m`už</i> | marrow; middle | <i>m'ad^hya-</i> | middle | 9804 |

Table 35. Khow`ar: Loss of OIA Medial Whispery Voicing.

Similarly, the posterior voicing of OIA *h* left no trace in some modern forms (Table 36).

| Khow`ar: <i>h</i> > Ø | | | | |
|-----------------------|-----------------|-------------------|--------------------------|----------|
| Form | Gloss | OIA Form | OIA Gloss | Turner # |
| <i>yom`un</i> | winter | <i>hem-ant'a-</i> | winter | 14164.1 |
| <i>aw`a</i> | l | <i>ah'am</i> | l | 992 |
| <i>b`olu</i> | group of people | <i>bañu-l'a-</i> | large; thick | 9194 |
| <i>ber`i</i> | out of | <i>bâhirika-</i> | external | 9227 |
| <i>gam`eş</i> | female buffalo | <i>mañiş'a-</i> | great; powerful; buffalo | 9964 |
| <i>l`ey</i> | blood | <i>loñi-</i> | *red; blood | 11164 |
| <i>an`us</i> | daytime; day | <i>añnasa-</i> | day | 993 |

Table 36. Khow`ar: Loss of OIA *h*.

In summary, Khow`ar either transformed the OIA posterior whispery voice of consonants into the posterior phonation of an adjacent vowel, or it lost it altogether.

3.2.2 Garv`i: Default Anterior Phonation, Anterior or Posterior Accent + Position: Tones

In Garv`i (Baart 1999, 2004) and Torwâli (Lunsford 2001) the pitch data allow inferences about their underlying physiology. Both languages have contrasting anterior and posterior accented phonation, which may be contrastively short, medium, or long. Default phonation is anterior, with posterior component. Its pitch is lower than accented anterior phonation. After accent is released, the pitch of subsequent default phonation falls.

The domain of the accent is the word. Accent starts at the onset of the word and continues until it is released, at which time phonation reverts to its default. The point of release is marked as described above: ` means “the anterior accentual tensing that started at the beginning of the word is now released”; likewise, ´ means “the posterior accentual tensing that started at the beginning of the word is now released.”

There are three positions for points of accentual release, corresponding to the three degrees of accentual length measured from the beginning of the accented word (Table 37).

The point of release for short accents is at the onset of the accented vowel; that is, the accentual tensing is instantaneous. Short accent is indicated here by an accent mark before the accented vowel (Bart’s “HL” and “LH” tones).

Medium accent (Bart’s “H(L)” tone) is indicated by the accent mark (˘) after the accented vowel. Immediately after the accented vowel, phonation returns to its default value, which post-tonically is progressively lower in pitch.

Long accent (Bart’s “H” and “L” tones) are indicated by an accent mark after the word, indicating that the accentual tensing continues through the word and onto a following syllable before relaxing to default phonation.

| | | Location of Accented Phonation | |
|---|--------|---|--|
| | | Anterior | Posterior |
| Duration of Accented Phonation from Beginning of Word | Short | “HL” (22.5%) <i>b`a:n</i> ‘excuse’ <i>š`a:k</i> ‘pieces of wood’ <i>b`o:r</i> ‘lions’ <i>b`ačo:r</i> ‘calf’ <i>aŋ`usir</i> ‘finger-ring’ | “LH” (20.9%) <i>g`o:r</i> ‘horse’ <i>d`atar</i> ‘fireplace’ <i>bub`ay</i> ‘apple’ <i>luk`uŋor</i> ‘children’ |
| | Medium | “H(L)” (25.8%) <i>ba:l</i> ‘hair’ <i>dâ:wâ:l</i> ‘wall’ | |
| | Long | “H” (22.9%) <i>dar`</i> ‘door’ <i>šâ:k`</i> ‘piece of wood’ <i>bo:r`</i> ‘lion’ <i>bire`</i> ‘girl’ | “L” (4.9%) <i>ba:n`</i> ‘utensils’ <i>bubay`</i> ‘apples’ |

Table 37. Accentual contrasts in Garv’i (after Baart 2004).

Only a few etymologies (Table 38) are available to me from Baart’s corpus of reliably marked accent (1999, 2004).

| Garv’i | | | | | | |
|---|----------------------|----------|-----------------|---------------------------|---------------------|----------|
| Formula | Accentual Type | Form | Gloss | OIA Form | OIA Gloss | Turner # |
| C ^h V- > C V | posterior short LH | g’o:r | horse | g ^h oṭa- | horse | 4516 |
| | posterior short LH | b’â:g | place | b ^h âga- | portion; fraction | 9430 |
| | posterior short LH | ǰ’a: | brother | b ^h r’âṭr- | brother | 9661 |
| | posterior short LH | d’arin | land | d ^h ar’ani:- | ground (f.) | 6744 |
| | posterior short LH | d’atar | fireplace | d ^h mâtra- | fireplace | 6888 |
| C ^h VC ^h V- > CVC V | posterior short LH | bob’ây | apple | b ^h abba:-* | apple | 9387 |
| -C ^h V- > -V | posterior short LH | luk’uṭor | children | lag ^h ukka- | light | 10896 |
| C ^h VCV > CV’ | posterior long L | gâ:’ | grass | g ^h âs’a- | food; pasture grass | 4471 |
| CVC ^h V > CVC’ | posterior long L | dut’ | lip | dudd ^h a-* | snout; beak; | 5853.27 |
| CVC ^h VCV > CVC’ | posterior long L | go:m’ | wheat | god ^h ’ûma- | wheat | 4287 |
| C ^h VCV > CVCV’ | posterior long L | bobây’ | apple (oblique) | b ^h abba:-* | apple | 9387 |
| C ^h VCV > CV’C | anterior medium H(L) | dâ:’g | back (of body) | d ^h âkka- * | back; waist | 5582 |
| CVCVC ^h VCV > C’VCVC | anterior short HL | p’a:ren | shirt | pari-d ^h ’âna- | garment | 7838 |
| CVCVC ^h V > C’VCV | anterior short HL | g’edâ | donkey | gardab ^h ’a- | donkey | 4054 |
| CVC ^h V > CVC’ | anterior long H | tâm` | tree | stamb ^h ’a- | pillar; post | 13682 |
| ? | | ga:n | big | g ^h an’a- | compact; dense | 4424.1 |

Table 38. Reflexes of OIA Whispery Voice in Garv’i.

In Garv’i the position of accent appears to have resulted from either the position of accent or of whispery-voiced consonants within the parent word, but the scanty data of Table 38 leave the details unexplained.

3.2.3 Languages with Anterior Accent Only: No Tones

In the dialects of the Kunaṛ Valley, including the Degân’o dialect of Eastern Paša’î and the languages now or formerly spoken in the tributary Peč Valley (G’õgali, Šumâšti, Gawâr-b’âti), whispery voicing has been completely lost. The result is a merging of the whispery-voiced consonants with the default-voiced ones, as in Irânian and Nûristânî. In those languages that I have examined (Degân’o and Gawâr-b’âti), default voicing is anterior with a slight posterior admixture.

3.3 Lingual Consequences of Phonatory Location

The backing of the tongue in Indo-Âryan probably arose out of the generalized Indo-Âryan posterior phonation. As stated above, posterior phonation tends to pull the tongue back. Through certain sound changes a series of tongue-backed (“retroflex”) consonants, which contrasted with dental ones, arose early in Indo-Âryan and became ubiquitous in OIA.

Much later ancient consonant clusters consisting of stop + *r* underwent distinctive changes in two groups of Far Northwestern IA languages. One group apparently formed in a western, Paša’î-speaking center and spread eastward to encompass languages of the Peč (Gawâr-b’âti, G’õgali, Šumâšti) and Panjkora (Garv’i). Another group centered among the Šinâ’ speakers of the Indus basin, spreading downriver to encompass the Indus Kôhîstânî

languages. The panoply of evolutionary outcomes of these ancient clusters in the modern dialects appears in Table 39.

In the first group fronted laminality has replaced backed apicality. This change, the “Western Fronting,” is consistent with a strongly fronted tongue, pressed behind the teeth of a prognathized lower jaw, that arises out of default anterior phonation in many of the region’s Irânian languages. The sequences of changes for voiceless clusters in, for example, Garv’i, would have been *tr* > *tł* > *ł*, *kr* > *kl* > *tł* > *ł*, and *pr* > *pš* > *tš* = *č*.

In the second group backed apicality is strengthened and anticipated in the clusters beginning with labials and apicals, producing backed apical affricates, while the backing of *r* becomes redundant and lost after the inherently backed velar consonants. Unlike the probable foreign (Irânian) origin of the Western Fronting, these changes, the “Indus Backing,” appear to amplify Indo-Âryan backing. Thus in Gilgit Šinâ’ the sequences of changes for voiceless clusters would have been *tr* > *tš* > *tš* = *č*, *pr* > *pš* > *tš* = *č*, and *kr* > *k*.

This “Indus Backing” must have happened after the migration of one group of early Šinâ’ speakers from Čil’âs to Acharê’t in the mid 1600’s AD (Strand 2001a), because Acharê’tâ’ retains ancient clusters with *-r* unchanged.

| | | | | | | | | | |
|---------------------|----------------------------------|-------------------|----------------|-----------------|-----------------|-------------|--------------|------------|-----------------------|
| [Indo-Āryan] | <i>tr</i> | <i>pr</i> | <i>kr</i> | <i>dr-</i> | <i>b/bhr</i> | <i>gr</i> | <i>mr</i> | <i>vr-</i> | <i>šr</i> |
| (Chitral) | | | | | | | | | |
| Khow`ar | <i>tr</i> | <i>pr</i> | <i>kr</i> | <i>dr</i> | <i>br/br'</i> | <i>gr</i> | <i>br-</i> | <i>br-</i> | <i>šr, ś</i> |
| Kal'aşa-mandr/mun | <i>tr</i> | <i>pr</i> | <i>kr</i> | <i>dr</i> | <i>b [?]</i> | <i>gr</i> | | | <i>ś, š, -s</i> |
| (Paśa'ī) | | | | | | | | | |
| Lauṛowān | <i>tr</i> | <i>l</i> | <i>l</i> | <i>dr</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>r-</i> | <i>ś-, -yr-</i> |
| Iskēn | <i>tr</i> | <i>l</i> | <i>l</i> | <i>dr</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>r-</i> | <i>ś-, -yr-</i> |
| Tagāw (Alasāi) | <i>tr</i> | <i>l</i> | <i>l</i> | <i>dr</i> | <i>l</i> | <i>l</i> | <i>mṛ</i> | <i>r-</i> | <i>ś-, -yr-</i> |
| Nijrāw (Pačagān) | <i>tr</i> | <i>pr</i> | <i>pr</i> | <i>dr</i> | <i>l</i> | <i>l</i> | <i>mṛ</i> | <i>r-</i> | <i>ś-, -yr-</i> |
| Parwān (Gulbahār) | <i>tr</i> | <i>pr</i> | <i>kr</i> | <i>dr</i> | <i>br</i> | | <i>mr</i> | <i>r-</i> | <i>ś-, -yr-</i> |
| Čugāni (Kuṛdar) | <i>tr</i> | <i>pl</i> | <i>pl</i> | <i>dr</i> | <i>bl</i> | <i>ḍl</i> | <i>bl</i> | <i>l</i> | <i>ś-, -yr-</i> |
| Ališang | <i>tr</i> | <i>ś</i> | <i>ś</i> | <i>dr</i> | <i>l</i> | <i>l</i> | | <i>r-</i> | <i>ś-, -yr-</i> |
| Alingar | <i>tr</i> | <i>s</i> | <i>s</i> | <i>dr</i> | | <i>l</i> | | <i>l</i> | <i>ś-, -yr-</i> |
| Laḡmān | <i>†</i> | <i>†</i> | <i>†</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>ś-, -yr-</i> |
| Čilas-Kuṛangal | <i>†</i> | <i>†</i> | <i>†</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>ś-, -yr-</i> |
| Degān'o (Gorayk) | <i>†</i> | <i>†</i> | <i>†</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>-mbr-</i> | <i>l</i> | <i>š, -r-</i> |
| (Peč) | | | | | | | | | |
| Šumāšti | <i>†</i> | <i>†</i> | <i>†</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>l</i> | <i>ś-, -yr-</i> |
| Gawār-b'āti | <i>†</i> | <i>pl</i> | <i>†</i> | <i>l</i> | <i>bl</i> | <i>†</i> | <i>bl</i> | <i>l</i> | <i>ś-, š-, -†-</i> |
| G'o`gali | <i>śl</i> | | <i>śl</i> | | | | | | |
| (Panjkora) | | | | | | | | | |
| Dāmiā-bāša | <i>tr</i> | <i>pr</i> | <i>kr</i> | <i>dr</i> | <i>br</i> | <i>gr</i> | <i>br</i> | <i>br</i> | <i>ś-, -š-, -štr-</i> |
| Garv'i | <i>†</i> | <i>tš = č</i> | <i>†</i> | <i>l</i> | <i>dž = j</i> | <i>l</i> | | | <i>ś, š</i> |
| (Kunar) | | | | | | | | | |
| Kaṭār-Qālāi | <i>†</i> | | <i>k</i> | <i>l</i> | <i>r</i> | <i>g</i> | | | <i>ś, š</i> |
| (Tirāhi) | | | | | | | | | |
| Tirāhi | <i>tr</i> | | <i>kr</i> | <i>dr</i> | <i>br</i> | <i>gr</i> | | | <i>x</i> |
| (Indus Kohistan) | | | | | | | | | |
| Torwāli | <i>tš = č</i> | <i>p</i> | <i>k</i> | <i>ɖz = ʃ</i> | <i>b</i> | <i>g</i> | | | <i>ś, š</i> |
| Chilisso | <i>tš = č</i> | <i>tš = č</i> | <i>k</i> | <i>z</i> | <i>z</i> | <i>g</i> | | | |
| Gowro | <i>tš = č</i> | <i>tš = č</i> | <i>k</i> | <i>z</i> | <i>z</i> | <i>g</i> | | | |
| Indus Kōhistāni | <i>tš = č</i> | <i>tš = č</i> | <i>k</i> | <i>z</i> | <i>z</i> | <i>g</i> | | | <i>ś</i> |
| Bhaṭ'esa | <i>tš- = č-, -tšh = -čh, či-</i> | <i>tšh = čh ?</i> | <i>k?</i> | <i>ɖz- = ʃ-</i> | <i>ɖzh = ʃh</i> | <i>g</i> | | | <i>ś</i> |
| (Šinā') | | | | | | | | | |
| Šinā' Kōhistān | <i>tš- = č-</i> | | <i>k-</i> | | <i>z-</i> | | | | |
| Šinā' Gilgit | <i>tš- = č-</i> | <i>tš = č</i> | <i>k-</i> | <i>ɖz</i> | <i>z-</i> | <i>g</i> | | | <i>ś</i> |
| Šinā' Tilel | | | <i>kr-</i> | | <i>z-</i> | | | | |
| Ušuj'u | <i>tš- = č-</i> | | <i>kr-</i> | | <i>z-</i> | | | | |
| Kalkoṭi | <i>tr-</i> | <i>tr-</i> | <i>kr-</i> | <i>dr-</i> | <i>dr-</i> | <i>dr-</i> | | | |
| Acharētā' (Palōlā') | <i>tr-, -tr-</i> | <i>pr-</i> | <i>kr-</i> | <i>dhr-</i> | <i>bhr</i> | <i>ghr-</i> | | | <i>ś</i> |
| (Kašmiri) | | | | | | | | | |
| Kāšur | <i>tr-</i> | <i>pr-, p-</i> | <i>k-, kr-</i> | <i>dr-, d-</i> | <i>br-, b-</i> | <i>g-</i> | | | <i>h-, -š-</i> |

Table 39. Development of Consonant Clusters with *-r*.

4 Conclusions

The data presented here lead to conclusions regarding phylogeny and tonogenesis in the far northwestern Indo-Âryan languages.

There are two geographic regions defined by default phonation: one of anterior phonation along the Indo-Irânian frontier and one of posterior phonation in the upper Indus Valley.

There are two sources of tonogenesis: one arising from a contrast between accented anterior vs. posterior phonation, and one arising from positional contrasts in the placement and duration of accented phonation.

4.1 Region of Default Anterior Phonation: Influence from Persian

What is striking is the adoption of anterior phonation as the unaccented default in those Indo-Âryan languages and dialects that lie along the Indo-Irânian Frontier, exposed to direct Irânian influence. The location of this frontier has fluctuated over generations, driven by the long-term expansion of Irânian speakers from west to east. A result of adopted anterior phonation is weakened or lost posterior phonation and loss of whispery-voiced consonants, except in Kal'âşa.

Even before the expansion of Pashto in the region began in the 1500's AD, direct Irânian influence had appeared in the form of Courtly Persian (*Fârsî-e Darî*), used administratively since the Ghaznavî Turks conquered the region in the 1000's AD. Irânian influence emanated from the Turkish-conquered ancient regions of Kâpisâ, Laghmân, Nangarhâr, Peshâwar, Bajawîr, and Swât.

Khow`ar had direct influence from the Persian of Badakhshân and the Irânian Pâmîr languages, as well as a tradition of Courtly Persian since Moghol times.

Likewise, influence from Badakhshân and Courtly Persian affected the region of Bajawîr, which in the late 1500's AD (16 generations before 1950 [Morgenstierne 1950]) was home to the ancestors of speakers of Gawâr-b'âti (and probably the other Peç Valley languages), Dâmiâ-bâşa, and Garv'i (at an unclear time). The language names Gawâr, Garv'i, and Gowro derive from Persian *gabr*, originally, 'Zoroastrian,' but later used with much the same contempt toward non-Muslims as Arabic *kâfir* 'infidel' is today. All these languages may have originated from a "*Gabaristân*" that once centered on modern Bajawîr.

The strong influence of Persian on Degân'o Paşa'î is probably more recent, since the imposition of Afghân rule in Laghmân and lower Kunar.

4.2 Region of Default Posterior Phonation

Speakers from the upper Indus Valley region (the Şinâ' dialects and Bhaṭ'esa) maintained strong posterior phonation. In the Şinâ' dialects Irânian influence manifested itself through the adoption of Persian word-final accent as vowel-offset accent.

4.3 Tonal Contrasts from Posterior-Voiced Consonants

All Indo-Irânian languages have anterior-phonated accent. When the posterior voicing of a consonant moves to an adjacent accented vowel, a tonal contrast arises between anterior- and posterior-accented vowels.

4.4 Tonal Contrasts from Accentual Position

In the Şinâ' dialects tonal contrasts apparently arose from loanwords with final-syllable accent, which was borrowed into Şinâ' in the vowel-offset position, in contrast with words with “normal” vowel-onset accent. In Garv'i and Torwâli the position of accent appears to have resulted from both the position of accent and of whispery-voiced consonants within the earlier OIA word.

5 Epilogue

Carla's field research and my own spanned a “golden age” (or opportunity) for linguists to build on the research of our predecessors (Biddulph, Leitner, Baily, Morgenstierne, Buddruss) and gain deeper insight into the languages that span the remote valleys of the Hindu-Kush and Karakoram ranges. The years from the late 1960's to the first few years of the 21st Century provided us foreign scholars with the opportunity for field research and publications; the ensuing years are for native-speaker scholars to edify their own linguistic heritages.

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