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Relative chronology of a series of phonetic changes in Old Indo-Aryan clusters based on data from the Kullui language[1]

In this study I attempt to reconstruct the relative chronology of phonetic changes affecting Old Indo-Aryan consonant clusters in the Kullui language (Himachali). Analysis confirms the preservation of archaic clusters like those with *r* and *kṣ*, the latter shifting to *tʃʰ* independently from the Southern Indo-Aryan languages. The relative sequence of changes including *-mr- > -mb-*, NT > ND, and (limited) ND > NN is examined. Bloch's replication (anticipation) theory for *r*-metathesis is supported over Morgenstierne's; the rule of assimilation of the second non-homorganic cluster is derived. Two potential chronological models for these shifts are proposed based on Kullui evidence.

Keywords: Kullui language; Indo-Aryan languages; relative chronology; metathesis.

1. Introduction

In a previous paper (Krylova 2024) I have addressed the problem of accent shift in the Kullui language, while also providing basic information about Kullui and the historical phonetics of the New Indo-Aryan (NIA) languages. In the present study, I would like to follow this research up by examining a series of changes in Old Indo-Aryan (OIA) consonant combinations, based on Kullui data. Since we will be dealing with phonetic changes dating to the Middle Indo-Aryan (MIA) period, we should first dwell in more detail on a number of specific archaisms in the historical development of the ancestor language of Kullui (an unattested hypothetical "Kullui Prakrit") during this period. It may be assumed that this "Kullui Prakrit" still preserved a number of OIA clusters, especially of the type "labial / velar / non-aspirated dental + *r*", as well as *rṣ, rś, ml, kṣ*. Furthermore, Kullui has preserved the distinction between two sibilants, since *ś, ṣ > ʃ,* while *s > s*. Let us consider the most important of these archaisms.

2. Preservation of *kṣ*

During the Middle Indo-Aryan period, the normal development of OIA *kṣ* in Central and Eastern Indo-Aryan languages was *kh-, -kkh-* (Masica 1991: 173; Oberlies 2001: 106), while the Western dialectal development became *-ch-*. In most Himachali dialects (Hendriksen 1986: 192) OIA *kṣ* yielded *kh*. However, in Kullui *kṣ* developed into an aspirated affricate, which, nevertheless, did not merge with Middle Indo-Aryan *ch*. Unfortunately, the size of our dictionary does not allow us to examine initial clusters separately, but the behavior of medial clusters suggests

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that initial ones behaved similarly, with the exception that medial clusters became geminates, and initial ones became single consonants.[2] OIA *kṣ* in Kullui generally corresponds to *tʃʰ*:

Kullui	OIA
tʃʰɔŋ 'moment'	*kṣaṇa-* 'moment'[3]
mɔtʃʰi 'fly'	*makṣikā-* 'fly, bee'
tʃʰar 'ashes'	*kṣāra-* 'alkali'
ɔtʃʰi 'eye'	*akṣi-* 'eye'
tʃʰɔpŋa 'to boil away'	*kṣapyate* 'is destroyed'
tʃʰura 'knife'	*kṣura-* 'razor'
titʃʰa 'sharp'	*tīkṣṇa-* 'sharp'
antʃʰa 'raspberry, blackberry'	*ākṣika-* 'Morinda tinctoria'
kutʃʰ 'menstrual blood, belly of a pregnant woman'	*kukṣi-* 'belly'

At the same time, OIA *ch*, both word-initially and medially, systematically corresponds to *tsʰ* in Kullui:

Kullui	OIA
putsʰŋa 'ask'	*pṛcchati* 'asks'
tsʰaũ 'shadow'	*chāyā-* 'shadow'
mutsʰŋa 'knead'	*mūrchayati* 'makes hard'
bətsʰaŋ 'bed'	**vicchādana-* 'covering'[4]
kɔɽtsʰi 'ladle'	**kaṭacchu-, kaḍacchaka-* 'ladle'[5]
tsʰelu 'kid'	**chagalla-* 'goat'[6]
tsʰati 'chest'	**chātti-* 'chest'[7]
mutsʰa 'moustache'	**mucchā-* 'moustache'[8]

[2] Hereafter, in cases where initial and medial clusters develop similarly, I combine the few available examples of both.

[3] Here and below, unless otherwise indicated, Old Indo-Aryan protoforms are given according to Turner 1966. Kullui lexicon is almost absent from Turner's data, but etymologies of Kullui forms, for the most part, are quite transparent. Accent markers as well as superfluous length markers above the vowels *e* and *o* have been removed. All the abbreviations in notes (language names, grammatical terms, etc.) are quoted directly from Turner's dictionary.

[4] Cf. Pa. *vicchādanā-* f. 'covering'. In R. L. Turner's dictionary, a significant number of entries are represented by asterisked forms, indicating reconstructions for which no Sanskrit or Vedic equivalents are recorded. When using such data, it is important to recognize that sometimes forms have only been reconstructed to the MIA level, especially those containing geminates. Geminated consonants are not very common in Sanskrit, but in the MIA period, most OIA consonant clusters shifted to geminates, and later were reduced to single consonants in the NIA languages. Because of this, it is generally impossible to determine, based solely on data from the NIA languages, which specific OIA consonant cluster serves as the origin of a given consonant. In such cases, when the reconstructed form obviously does not represent the OIA level, it would be more accurate to call it Common MIA, despite the fact that at the MIA stage, Common IA had already disintegrated. To mark these reconstructions as OIA entries would be a simplification. To enable the reader to assess the phonetic and semantic accuracy of the reconstructed forms, I hereafter provide in footnotes some Indo-Aryan cognates cited in Turner's dictionary.

[5] Pa. *kaṭacchu-* m. 'ladle, spoon'; Pk. *kaḍacchu-* f. 'ladle'.

[6] Pa. *chakala-* m. 'goat', NiDoc. *chaǵalaǵa*, Pk. *chagala-*.

[7] S. P. *chātī* f., Ku. N. B. Or. Mth. *chāti*; H. *chātī* f. 'chest'.

[8] S. *mucha* f. 'moustache', L. *mucch* f., P. *mucch* m., Ku.gng. *mũćh*, Or. *mucha*, H. *mūch* f., G. *mūch*, *mũch* f.

ots^{h}a ‘small’	**occha-* ‘small’ [9]
ts^{h}inda ‘hole in ear’	**chindati* ‘cuts, splits’ [10]
ts^{h}ilɽa ‘type of flatbread’	**chilla-* ‘skin, hide’ [11]
tsifla ‘slippery’ (with metathesis)	*picchala-* ‘slippery’
ts^{h}idzɳa ‘crack’	*chidyate* ‘is cut, split’
ts^{h}iɽəkɳa ‘sprinkle’	**chiṭ-* ‘sudden movement, flash, splash’ [12]

Moreover, other OIA clusters that yielded MIA *ch*, *cch* also yielded *ts^h* in Kullui, i.e., merged with OIA *ch*:

Kullui	OIA
pits^{h}e ‘behind’	**paśca-* ‘hinder part’ (contamination with *pr̥ṣṭha-* ‘back’) [13]
bits^{h}u ‘scorpion’	*vr̥ścika-* ‘scorpion’
mɔts^{h}i ‘fish’	*matsya-* ‘fish’
bɔts^{h}u ‘calf’	*vatsa-* ‘calf’

The shift of *kṣ* to an affricate which does not merge with the descendants of MIA *ch* unites Kullui only with Dardic languages, but not with such Southern and Western Indo-Aryan languages as Gujarati, Marathi, and Sinhalese, where such a merger with *ch* did occur. Thus, in Northern languages, the shift *kṣ* > *ʧ^h* occurred independently, as noted in Masica 1991: 460, Southworth 2005: 158, and, judging by my data, at quite a late date. It can be assumed that in Kullui, the combination *kṣ* was preserved as an archaism during the MIA period.

3. Preservation of a series of clusters with *r*

A specific archaism of the Himachali group and some other Northwestern Indo-Aryan languages is the preservation of OIA clusters of the type “velar or labial stop + *r*” (Hendriksen 1986: 196–197), and also, apparently, “dental non-aspirated stop + *r*”. The latter group of clusters later underwent a shift to palatal affricates in most Himachali idioms, including Kullui, but remained unchanged in Mandyali. Such combinations are also partially preserved in a number of other Northwestern idioms, such as Punjabi, Lahnda, and Sindhi, as well as in some Dardic idioms (Hendriksen 1986: 201) and in Romani (Turner 1985a: 183). At the same time, over the “mainstream” course of Indo-Aryan language development, *r* in these sequences underwent complete assimilation. However, in the modern Kullui lexicon, this archaism is not very consistently traceable; there are also quite numerous examples where *r* in such clusters was completely assimilated, and the source of borrowing is not always obvious.

[9] Pk. *uccha-* ‘low, mean’; S. *ocho* ‘paltry, mean’, L. (Shahpur) *ochā*, awāṇ. *hochā*; P. *ochā* ‘light, vain, absurd’; WPah. bhal. *hoccho* ‘mean, low’; Ku. *occho* ‘mean, contemptible, arrogant’; Or. *ocha* ‘small, mean, exhausted’; Bhoj. *ōch* ‘mean’; H. *ochā* ‘empty, small, silly’.

[10] *chinátti*, pl. *chindánti* ‘cuts off, splits’ RV. Pa. *chindati*, NiDoc. *chiṁnati*, pp. *chiṁnida*, Pk. *chiṁdaï*.

[11] S. *chila*, f. ‘peel, bark, skin, shell’, *chiluru* m. ‘fish scale, crust of bread’; L. *chill* f. ‘skin, bark, rind’, awāṇ. *chilluṛ* ‘skin, peel’, P. *chill*, *chillak* f., *chilkā* m.; WPah. bhal. *ċhil* f. ‘bark’; N. *chilko* ‘crust, rind, skin of milk’.

[12] K. *chirkāwun* ‘to sprinkle’, P. *chiṛkaṇā*; Mth. *chirab* ‘to be scattered’; OAw. *chirakaï* ‘sprinkles’; H. *chiṛaknā*, M. *śiḍakṇẽ*.

[13] Pk. *paccha-* n. ‘hinder part’.

Kullui	OIA
dzagra ‘night vigil by the sacred fire’	*jāgrat-* ‘vigil’
grə̃ ‘village’	*grāma-* ‘village’
grɔ ‘thin bamboo’	**grava-* ‘branch’ [14]
kriʃɳa ‘to smooth wood with a tool’	**kriśati, *kriśnāti* ‘presses’ [15]
tsukri ‘sty (on eye)’	*cukra-* ‘sour’
prehi ‘spleen’	**prīhan-* ‘spleen’ [16]
pɔrʃu ‘sweat’	**praśūta-* (past participle of **praśūyate* ‘swells’) [17]
bʰrahu-dzi ‘younger brother’s wife’	*bhrātr̥vadhū-* ‘brother’s wife’
bʰrũa ‘eyebrows’	**bhrumu-* ‘eyebrow’ [18]
bʰraru ‘siblings’	*bhrātaraḥ* ‘brothers’
dʒiʃa ‘morning’	*dr̥śīka-* ‘shining’ (preservation of the syllabic sonorant as *r* indicates an early Sanskritism)
ãdʒ ‘guts’	*āntra-* ‘intestines’
gatʃi ‘female belt’	*gātrikā-* ‘belt’
datʃi ‘sickle’	**dātrī-* ‘knife, sickle’ [19]
dʒatʃ ‘festival, fair’	*yātrā-* ‘journey, pilgrimage’
tʃuɽɳa ‘break (vi)’	*truṭyati* ‘breaks (vi)’
tʰatʃ ‘sheep pasture in the mountains’	*sthātra-* ‘place’
gontʃ ‘cow urine’	*gomūtra-* ‘cow urine’
gojntʃ ‘cow urine’	*gomitra-* ‘cow urine’
tʃoɽna ‘break (vt)’	*troṭayati* ‘breaks (vt)’
tʃʰɔtʃ ‘mushroom’	*chattra-* ‘parasol’
dʒəɽkaɳa ‘threaten’	**draṭ-* ‘press’ [20]
hɔwdʒ ‘turmeric’	*haridrā-* ‘turmeric’
kʰatʃ ‘pit’	*khātra-* ‘hole’
mutʃɳa ‘urinate’	*mūtrayati* ‘urinates’
pɔtʃa ‘leaf’	*pattra-* ‘leaf’
tʃeka ‘loin’	**trikka-* ‘hips’ [21]

In the NIA period, common MIA affricates shifted to the dental series in Kullui (*c, ch, j, jh* > *ts, tsʰ, dz, dzʰ*), while the clusters *tr, dr, kṣ* gave rise to a new series of palatal affricates: *tr* > *tʃ, dr* > *dʒ, kṣ* > *tʃʰ*.

Furthermore, it can be noted that *r* in the combinations *rṣ, rś* was also preserved in Kullui, although the number of examples is small:

[14] Wg. *grõ* ‘branch’, Paš. *lawə̃*.

[15] *kliśnāti* ‘torments’ MBh., *sáṁkliśnāti* ‘presses together’ ŚBr. WPah. roh. *kriśɳõ* ‘to comb’, Kal. rumb. *kriẓnim* ‘I knead, crush’.

[16] *plīhán* (later *plīhan-*) m. ‘spleen’ AV., *plīhā-* f. lex., *plihan-* m. Yājñ., Pr. *pštigë* ‘spleen’.

[17] Ku. *pasujaṇo* ‘to steam, get steamed, convert into vapour’.

[18] BHSk. *bhramu-* ‘eyebrow’, Pa. *bhamu-* f., Pk. *bhumā-*, °*mayā-*, *bhamayā-* f.; — Pa. *bhamuka-* m., *bhamukha-* (BHSk. *bhrumukha-*: infl. by *múkha-* ?), Pk. *bhamuha-* n. (cf. *muha-* n.), *bhamuhā-*, *bhaümhā-*, *bhaühā-* f., Ap. *bhōhā-* f.

[19] Pk. *dattiyā-* f. ‘little sickle’; Paš.ar. *drāᵉt*, chil. *lāit* ‘sickle’, K. *dröċᵘ* f., L. *ḍātrī* f., awāṇ. *dātrī* f. P. *dātrī, ḍātrī, darātī, darāṭī, dāt*(*t*)*ī* f., WPah.cur. cam. *drāṭī*, bhad. bhal. *ḍḷāti*, khaś. śeu. *lāṭī*, roh. *dace*.

[20] M. *daḍɳẽ* ‘to press down’, *daḍaṇ* f. n. ‘hiding place’, *daḍā* m. ‘plug’, *daḍakɳẽ, daḍapɳẽ* ‘to press down’.

[21] L. *tirik* ‘loins, hips’; P. *tikk* m. ‘waist, loins, body below waist’; — ext. *-la-*: Paš.ar. *trikaló*, dar. weg. *λekalî*, chil. *λexeló* ‘tripod’, Gaw. *λakala*; L. *trikkal* f. ‘back’, awāṇ. *trikkul* ‘neck’.

Kullui	OIA
arʃu ‘mirror’	*ādarśa-* ‘mirror’
bɔrʃ ‘year’	*varṣa-* ‘год’
bərʃoɽi ‘generation’	**varṣakoṭi-* ‘10 million years’[22]
prɔʃa ‘rib’	*parśu-* ‘rib’

Although the historical phonetics of Indo-Aryan languages has been relatively well studied (primarily by Ralph L. Turner in his numerous publications), fairly little attention has been paid to the relative chronology of individual phonetic changes. Below, I shall attempt to fill this gap by analyzing the relative chronology of changes in a number of OIA clusters during the MIA period. First of all, let us consider these phonetic changes separately.

4. Shift of dental + *y* clusters to affricates

As a result of the development of clusters *-ty-*, *-dy-*, *-dhy-*, new palatal affricates were formed in the ancestor language of Kullui, as in all MIA languages. In the NIA period, they shifted to the respective dental affricates in Kullui and a number of other Himachali languages:

Kullui	OIA
betsŋa ‘sell’	**vetyayati* ‘sets a price’[23]
nɔtsŋa ‘dance’	*nr̥tyati* ‘dances’
bidzʃi ‘lightning’	*vidyullatā-* ‘forked lightning’
badzŋa ‘sound (of a musical instrument)’	*vādyate* ‘sounds’
mindzu ‘brain’	*medya-* ‘fatty’
ɔdz ‘today’	*adya-* ‘today’
daz ‘dowry’	*dāyādya-* ‘inheritance’ (*dz* > *z* due to contamination with Class. Persian *jahāez* ‘dowry’)
budzʰŋa ‘know, care for’	*budhyate* ‘observes, understands’
edzŋa ‘come’	**adhiyeti/adhyeti* ‘approaches’[24] (vowel changed due to contamination with *eŋa* ‘come’)
mɔ̃dzʰe ‘between’	*madhya-* ‘middle’, *madhyena* (I.sg. from *madhya-*)
sɔndzʰ ‘evening’	*saṁdhyā-* ‘twilight’

5. Middle Indo-Aryan shift *-mr- > -mb-*

Although many phonetic changes are attested in MIA written records, it would be wrong to claim that the historical phonetics of this period is fully reflected in them. Thus, the shift *-mr- > -mb-* is a frequent (though not entirely regular) MIA phenomenon that requires additional scrutiny. Its result is already recorded in Pali (Masica 1991: 175–176, Oberlies 2001: 108–109):

[22] The protoform (cf. also Hindi *barsauṛī* ‘annual, annual rent’) is not attested in Turner 1966, and is proposed by the author of this article.

[23] Denom. from **vetyā-* ‘hire, price’ in (MIA.) *vecā-* (v.l. *vetā-*) f. ‘hire, wages’ lex. < **veccā-*, cf. *vetana-* n. ‘hire, wages’ MBh. (*vetanena krītaḥ* ‘hired’ Pāṇ.com.), ‘price’ Rājat. (*vikrīṇānō 'lpavetanaiḥ*): cf. *veti* ‘procures’ RV., √*vī* (J. C. W.).

[24] Cf. *ádhyeti* ‘turns the mind to’ RV. and *ádhigacchati* ‘approaches’.

OIA	Pali
tāmra- ‘copper’	*tamba-* ‘copper’
amra- ‘mango’	*amba-* ‘mango’

At the same time, both Turner (1985b: 367) and Morgenstierne (1973: 238) assume an intermediate stage for this shift: *-mr- > -mbr- > -mb-* (the loss of *r* in triconsonantal sequences is a common MIA development, see Masica 1991: 179). In this case, the chronology of the shift implies two stages preceding the period of MIA written records. An epenthetic *b* is also observed in Kullui in similar contexts before the suffix *-ɽ-*, for example, *tsɔmbɽa ~ tsɔmɽa* ‘skin’ from OIA *carman-* ‘skin’, *pʰembɽa* ‘kind of soup’, apparently from OIA *phena-* ‘foam’ with dissimilation *ɳɽ > mɽ* (cf. a similar dissimilation in **buɳɳi* ‘knitting’ > *bumɳi* ‘quilt pin’).

Based on Kullui data, the shift *-mr- > -mb-* is represented by the following examples:

Kullui	OIA
tamba ‘copper’	*tāmra-* ‘copper’
ʧambɽa ‘cauldron’	*tāmra-* ‘copper’
amb ‘mango’	*āmra-* ‘mango’
tɔmbu ‘'bamboo’	*tamra-* ‘darkening’[25]

Although the hypothesis of a two-stage shift *-mr- > -mbr- > -mb-* sounds quite plausible, one cannot forget that combinations of labials with *r* in Kullui and a number of other languages have been preserved in many cases. However, in the case of triconsonantal sequences of the type *CPr*, no such archaisms have been found. Apparently, in these cases, *r* was lost in the ancestor language of Kullui according to common MIA rules.

6. Combinations of nasals with stops (NT > ND, ND > NN)

It is rather difficult to date innovations for a language without a continuous written history. As indicated in Turner 1985c: 270 and Masica 1991: 203, the voicing of combinations of nasals with voiceless stops is already observed in Kharoṣṭhī documents, i.e., it belongs to the MIA period, but it is impossible to say exactly when it occurred in the ancestor language of Kullui. Currently, this isogloss widely covers the northwestern area – Punjabi, Sindhi, Himachali, Gojri, Romani, and some Dardic languages, including Kashmiri (Masica 1991: 203). In Kullui, it is represented quite extensively:

Kullui	OIA
ãdʒ ‘guts’	*āntra-* ‘intestines’
dɔnd ‘tooth’	*danta-* ‘tooth’
hjũnd ‘winter’	*hemanta-* ‘winter’
bɔɳɖɳa ‘share’	*vaṇṭati* ‘shares’
ɔɳɖɳa ‘walk’	**haṇṭ-* ‘move’[26]

[25] The protoform (cf. Skt. *tamāla* ‘having dark bark’, ‘bamboo bark’) is not attested in Turner 1966, and is proposed by the author of this article.

[26] D. *hanina* ‘to go about, proceed’; P.bhaṭ. *haɳḍɳā* ‘to walk’; WPah.pāḍ. *haɳḍaɳ* ‘to flow’, jaun. *hãḍɳõ* ‘to walk’; B. *hãṭā* ‘to walk’; Or. *hāɳṭibā* ‘to travel’.

gʰɔɳɖi ‘Adam’s apple’	**ghaṇṭa-* ‘throat’[27]
gʰuɳɖi ‘heel’	*ghuṇṭa-* ‘ankle’
gʰuɳɖu ‘scarf’	**ghuṇṭa-* ‘knot, tag’[28]
kɔɳɖa ‘thorn’	*kaṇṭa-* ‘thorn’
kʰuɳɖi ‘place for tethering cows’	**khuṇṭa-* ‘peg’[29]
ʃuɳɖʰ ‘dry ginger’	*śuṇṭhī-* ‘dry ginger’
tsuɳɖna ‘sway’	*cuṇṭati* ‘cuts, strikes’
tuɳɖla ‘armless’	**ṭuṇṭa-* ‘defective’[30]
ʈuɳɖu ‘hand’	**ṭuṇṭa-* ‘defective’[31]
kundzi ‘key’	*kuñcikā-* ‘key’
pɔndz ‘five’	*pañca-* ‘five’
pundza ‘claw’	**pahuñca-* ‘wrist, forearm’[32]
tsundz ‘beak’	**cuñca-* ‘beak’[33]
kring ‘shout’	pejorative prefix *ku-* + **riṅk-* ‘roar, cry’[34]
sungər ‘pig’	**sūṅkara-* ‘boar’[35]
-nd- imperfective suffix	*-nt-* present participle suffix[36]

While absolute dating is hard to come by in this case, relative dating is possible: there is another phonetic shift, the order of which relative to NT > ND can be established. This is the shift of OIA clusters of the type "nasal + voiced stop" to a nasal geminate (ND > NN), which has been mentioned in previous publications (Hendriksen 1986: 67; Kogan 2019: 216) alongside the aforementioned NT > ND shift for the same extensive group of languages (the latter author includes Iranian as well). It is important, however, to note that these are two different shifts, of which ND > NN must have preceded NT > ND, otherwise their outcomes would have coincided. In Kullui, there are two examples of this kind, and they are apparently explained by early (before ND > NN in Kullui) borrowing from a language where NT > ND occurred earlier than ND > NN in the ancestor language of Kullui: *kɔmŋa* ‘tremble’ < OIA *kampate* ‘trembles’ and *ʃlɔ̃* ‘centipede’ < **śalaṅka-* ‘grasshopper’[37]. At the same time, ND > NN is very limited in Kullui; it is absent in most consonant groups of the corresponding type:

[27] L. *ghaṇḍī* f. ‘Adam's apple’, awāṇ. also ‘soft palate’; P. *ghaṇḍ* m., *°ḍī* f. ‘Adam's apple’; A. *ghāṭ* ‘protuberance on snout of crocodile’; H. *ghāṭī* f. ‘throat, Adam's apple, uvula, soft palate’ (→ N. *ghāṭi* ‘throat’); G. *ghāṭɔ* m. ‘throat’, *°ṭī* f. ‘Adam's apple’; M. *ghāṭī* f. ‘throat, Adam's apple, larynx’.

[28] S. *ghuṇḍu* m. ‘frown’, *ghuṇḍī* f. ‘knot of thread, tangle’; P. *ghuṇḍī* f. ‘knot, knot of wheat chaff, button’ (→ H. *ghuṇḍī* f. ‘tag, button’); N. *ghũri* ‘tag or button to catch in a loop’; B. Or. *ghuṇṭi* ‘cloth button’; G. *ghũṭī* f. ‘entanglement’. WPah.kṭg. *ghʊ̀ṇḍi* f. ‘doll’ (altern. < **guḍḍa-*), *ghùṇḍu* m. ‘veil carried by the goddess’; J. *ghũḍ* m. ‘veil’.

[29] Pk. *khuṁṭa-*, *khoṁṭaya-* m. ‘peg, post’.

[30] Pk. *tuṁta-* ‘having the hands cut off’.

[31] P. *ṭuṇḍ* m. ‘handless arm, withered hand, bare trunk of tree’.

[32] L. *pôcā* m. ‘paw’, (Shahpur) *paucā* m. ‘paw, claw’; P. *pahũcā* m. ‘wrist, paw’; N. *paũjā* ‘paw’' OAw. *pahuṁcihi* obl. sg. f. ‘wrist’; H. *pahũcā* m. ‘forearm, wrist’; G. *pɔ̃hɔ̃cɔ* m. ‘wrist’, M. *pohãcī* f.

[33] Pk. *caṁcu-* f. *cuṁculi-* ‘beak’, P. *cuñj* f., WPah. bhal. *ċunċ* f.

[34] Woṭ. Bshk. *riṅg-* 'to weep, cry', Tor. *žiṅg-*, Sv. *riṅg-*; S. *riṅgha* f. ‘crying, fretting (of child)’; L. *riṅgaṇ* ‘to bellow, roar (of buffalo or she-camel)’; P. *riṅgṇā* ‘to low’.

[35] WPah.jaun. *sũgar* ‘pig’, Ku. *sũgar*; N. *sũgar*, *sũgur* ‘domesticated pig’, WPah.kṭg. *súṅgər*, kc. *suṅgur* m. ‘pig’, kṭg. *súṅgʈu* m. ‘pig’ (*gʈ* < *grṭ* Him.I 215).

[36] On this etymology, see Masica 1991: 203.

[37] *śalaka-* m. ‘spider’ lex., Paš.weg. *salāṅ* ‘grasshopper’.

Kullui	OIA
dzangɻi ‘lower (outer) edge of a terraced field’	*jāṅgala-* ‘arid, desert, wild’
dzɔng^{h} ‘leg’	*jaṅghā-* ‘shank’
gar ‘coal’	*aṅgāra-* ‘glowing coal’
guɻ^{h}a ‘thumb’	*aṅguṣṭha-* ‘thumb’
lingɻa ‘tail’	*liṅga-* ‘characteristic mark, penis’
mɔngəl ‘Tuesday’	*maṅgala-* ‘auspicious sign, Mars’
rɔngɳa ‘dye, paint’	**raṅgayati* ‘dyes’[38]
ʃing ‘horn’	*śṙṅga-* ‘horn’
ɻ^{h}unga ‘dull’	**ṭhuṅga-* ‘defective’[39]
ts^{h}ɾing ‘spark’	*sphuliṅga-* ‘spark’
aɳɖa ‘egg’	*āṇḍa-* ‘egg’
b^{h}aɳɖa ‘dishes’	*bhāṇḍa-* ‘dishes’
rɔɳɖ ‘widow’	*raṇḍa-* ‘widow’
gindu ‘ball’	*ginduka-* ‘ball’
ts^{h}inda ‘hole in ear’	**chindati* ‘cuts, splits’
sɔndz^{h} ‘evening’	*saṁdhyā-* ‘twilight’
t^{h}ɔmba ‘pillar’	*stambha-* ‘pillar’
tombɻa ‘light green squash’	*tumba-* ‘bottle gourd’
nimbu ‘lime, lemon’	*nimbū-* ‘lime’

The following list of examples shows that this shift in Kullui has affected only the clusters *ndh*/*ṁdh* and partially *mb, mbh*:

Kullui	OIA
bɔnɳa ‘bind’	*bandhati* ‘binds’
binɳa ‘pierce (ears, nose)’	**vindhati* ‘pierces’[40]
nhjara ‘darkness’	**andhīkāra-* ‘darkness’[41]
sɔnh ‘evening’	*saṁdhā-* ‘twilight’
kɔnh ‘shoulder’	*skandha-* ‘shoulder’
dzmai ‘yawn (noun)’	**jr̥mbhāyita-* ‘yawned, yawning’[42]
lɔma ‘long’	*lamba-* ‘hanging, long’
nim ‘neem tree’	*nimba-* ‘neem tree’
t^{h}ɔmɳa ‘be established’	*stambhate-* ‘supports, restrains’
k^{h}mar ‘potter’	*kumbhakāra-* ‘potter’

In the case of *mb* > *mm*, the assimilation is not entirely regular; there are three examples (*t^{h}ɔmba* ‘pillar’, *tombɻa* ‘light green squash’, and *nimbu* ‘lime, lemon’) in which, despite their general historical regularity, the shift *mb* > *mm* is not recorded. If we also consider examples

[38] Pk. *raṁgaï* ‘dyes’.

[39] Or. *ṭhuṅgā* ‘lopped off, pollard, naked, solitary’; H. *ṭhūgnā* ‘dwarfish’.

[40] Pk. *viṁdhaï* ‘pierces’.

[41] S. *ādheru* m. ‘tyranny’, L. *anhērā,* awāṇ. *hanērā*; P. *anher* ‘dark’, m. ‘darkness’, EP. *nherā;* bhaṭ. *nhērī* ‘storm’, WPah. paṅ. *nĕār*; sod. *nyāro* ‘darkness’.

[42] Pk. *jaṁbhāia-* n. ‘yawn’.

with other deviations from regular development, Kullui material provides two more examples of the *mb* > *mm* shift (*ama* 'mother' < OIA *ambā-* 'mother' with irregular compensatory lengthening of the first vowel and *ʈʰima* 'mountain' < OIA **stumba-* 'mound'[43] with an unexplained vowel change and cerebralization), as well as one example of the absence of such a shift (*tʰabʰɭa* 'stuttering' < OIA *stambhate* 'restrains' with irregular compensatory lengthening and loss of *m*). Thus, the shift *mb* > *mm* in Kullui must still be considered more regular than its absence. It can be noted that none of the examples on the shift *mr* > (*mbr* >) *mb* (namely, *tamba* 'copper', *ʧambɽa* 'cauldron', *amb* 'mango', *tɔmbu* 'bamboo') underwent the shift *mb* > *mm*, so it can be assumed that *mr* > (*mbr* >) *mb* occurred later than *mb* > *mm.*

Furthermore, judging by the correspondence of Kullui *sɔndzʰ* 'evening' to OIA *saṁdhyā-* 'twilight', it can also be assumed that the MIA shift *dhy* > *jh* occurred earlier than *ndh* > *nnh,* provided we can rely on this single example.

Obviously, for these four listed phonetic shifts in the historical phonetics of Kullui, two variants of relative chronology are possible:

1) *dhy* > *jh*; *mb*, *ndh* > *mm*, *nnh*; *NT* >*ND*; *mr* > *mb*

2) *dhy* > *jh*; *mb*, *ndh* > *mm*, *nnh*; *mr* > *mb*; *NT* > *ND*

7. Middle Indo-Aryan metathesis of *r*

Another example of a MIA shift not fully reflected in written sources is the so-called metathesis of *r* (Turner 1985c: 271, 1985d; Hendriksen 1986: 66). It is described as the disappearance of the consonant *r* in a non-initial consonant cluster and its reappearance after the initial consonant or consonant cluster. This phenomenon is examined in detail in a paper by G. Morgenstierne (1973, reprinted from 1947). Its first examples are noted already in Ashokan inscriptions: *pruva* < *pūrvaḥ*, *grabhagara* < *garbhāgāram*, *dhramma* < *dharmaḥ*, *draśana* < *darśanam* (Turner 1985c: 271). However, in considering this phonetic change, it is important to track at least two possible interpretations by researchers. The first one is associated with the works of J. Bloch (Bloch 1965: 89; first published in French in 1934) and Turner (1985d: 216, first published in 1924), suggesting that it is not metathesis in the proper sense. If *r* simply moved forward, the adjacent consonant (often a stop) would end up in an intervocalic position and would subsequently be subject to loss, which never happens in cases of this "metathesis". The corresponding consonants are later preserved just as they would have been preserved over the normal course of Indo-Aryan phonetic development. Both authors assume a process divided in several stages, beginning with a regressive *r*-replication ("anticipation", in their own terms), after which the second cluster assimilates according to the general rule: OIA *dīrgha-* > **drirgha* > MIA *driggha* > Sindhi *ḍrighō* (instead of **ḍrihō*). However, the actual stage of *r*-replication remains unrecorded in monuments, although Bloch cites two examples with doubled *r* from Kati: *drgr* and *trūtr* (from OIA *tantra*).

At the same time, Morgenstierne (1973: 239) and Turner, in a slightly later work (Turner 1985c: 271), propose a different interpretation of this phenomenon. In his paper, Turner interprets the chain of shifts precisely as a metathesis after the gemination of the adjacent consonant: *dīrghaḥ* > *dīrgghaḥ* > **drīgha-*. He restricts this innovation to the Northwestern area – Sindhi, Lahnda, Dardic, and Western Pahari (Himachali). G. Morgenstierne, whose work mainly concerns Dardic languages, divides the metathesis into two types: type I refers to the transfer

[43] N. *thum* 'ridge of a mountain, space round a hilltop'; H. *thūbā* m. 'lump of earth'; G. *thumṛũ* n. 'a collection of ears of corn'.

of *r* to the left from combinations of the type *rC*, while type II refers to *Cr* clusters. According to his assumptions, type I is earlier than type II. At the same time, he assumes that there was no stage of *r*-replication; actual metathesis did occur, and the further behavior of the second cluster is explained by the fact that consonants after *r* underwent gemination in the MIA period, as indicated in the Prātiśākhyas. Thus, his interpretation also assumes the chain OIA *dīrgha* > MIA *dirggha-* > MIA *driggha.* Triconsonantal sequences including *r* in the initial or final position lost this consonant according to common MIA rules, therefore such geminate clusters with *r* subsequently developed like ordinary geminates (Masica 1991: 179):

Sanskrit	Pali/Prakrit
loptra- 'loot'	*lotta-*/*lutta-* (Pkt)
utkramati 'ascends'	*ukkamati*
udgrahaṇa- 'taking out'	*uggahaṇa-*
ardra- 'wet'	*adda-*
vardhra- 'thong'	*vaddha-*
rāṣṭra- 'country'	*raṭṭha-*
vastra- 'clothes'	*vattha-*
pārśva- 'side'	*passa-*
vartman- 'wheel track'	*vaṭṭa-* (Pkt)
kartya- 'to be cut off'	*kacca-* (Pkt)

The advantage of this interpretation of *r*-metathesis is that we do not have to assume a special stage of *r*-replication unrecorded in written monuments; its disadvantage is that it does not explain the supposedly later type II. According to Morgenstierne, type I is regular for Dardic languages while type II is not.

This shift is recorded in the Northwestern languages of the region as an irregular phenomenon, and the list of such languages is not limited to Dardic and Nuristani, which Morgenstierne focuses on. It includes Sindhi, Lahnda, Himachali and Gujarati; Turner observes similar reflexes in Romani. Historically, this change may have been more widespread, but in modern languages its traces can only be observed in languages that have preserved OIA *Cr*-type clusters.

Taking into account the NIA shift *tr, dr* > *tʃ, dʒ*, this phenomenon is represented in Kullui by the following words:

Kullui	OIA
brag^h 'leopard'	*vyāghra-* 'tiger'
prat 'dish'	*pātra-* 'dish'
tʃambɽa 'cauldron'	*tāmra-* 'copper'
tʃɔkɳa 'rot'	*takra-* 'bitter'
dʒugli 'cave'	*durga-* 'impassable place'
dʒuba 'sacred durva grass'	*dūrvā-* 'sacred durva grass'
prɔʃa 'rib'	*parśu-* 'rib'

Let us consider both interpretations (actual metathesis and *r*-replication) based on Kullui data.

The version of Morgenstierne (and the later version of Turner) explains why none of the Kullui words that underwent metathesis include traces of the second cluster with *r*, even though many such clusters were preserved in Kullui:

Kullui	OIA
brag^{h} ‘leopard’ (instead of ***brag^{h}r*)	*vyāghra-* ‘tiger’
prat ‘dish’ (instead of ***pratʃ*)	*pātra-* ‘dish’
tʃɔkɳa ‘rot’ (instead of ***tʃɔkərɳa*)	*takra-* ‘bitter’
prɔʃa ‘rib’ (instead of ***prɔrʃa*)	*parśu-* ‘rib’

However, this version relies on the assumption that in “Kullui Prakrit”, triconsonantal OIA clusters with *r* developed with the loss of *r*, similar to ordinary geminates, as demonstrated by general MIA development. Meanwhile, Kullui has a number of examples contradicting this presumption, showing that *r* in combinations with MIA geminates developed in the same way as they did in combinations with single consonants:

Kullui	OIA
tʃ^{h}ɔtʃi ‘mushroom’	*chattrikā-* ‘umbrella’
pɔtʃa ‘leaf’	*pattra-* ‘leaf’
dʒotʃɳa ‘yoke’	*yoktrayati* ‘ties’

The version of Bloch and the early version of Turner, without resorting to the assumption of consonant gemination after or before *r*, could explain why the medial consonants did not undergo weakening, as intervocalic ones would have:

Kullui	OIA
brag^{h} ‘leopard’ (instead of ***brah*)	*vyāghra-* ‘tiger’
prat ‘dish’ (instead of ***pra*)	*pātra-* ‘dish’
tʃambɽa ‘cauldron’ (instead of ***tʃawɔ̃ɽa*)	*tāmra-* ‘copper’
tʃɔkɳa ‘rot’ (instead of ***tʃɔɳa*)	*takra-* ‘bitter’
dʒugli ‘cave’ (instead of ***dʒuli*)	*durga-* ‘impassable place’
dʒuba ‘sacred durva grass’(instead of ***dʒuwa*)	*dūrvā-* ‘sacred durva grass’

However, it does not explain why there are no cases of *r*-replication in which the medial cluster with *r* managed to survive, instead of developing similarly to ordinary MIA geminates. Based on the limited number of examples, one could explain this by the prohibition of affricates and clusters at the absolute end of words in Kullui, similar to Old Indo-Aryan. However, numerous examples listed above (*ãdʒ* ‘guts’; *dʒatʃ* ‘festival, fair’; *t^{h}atʃ* ‘sheep pasture in the mountains’; *kutʃ^{h}* ‘menstrual blood, belly of a pregnant woman’; *bɔrʃ* ‘year’, etc.) contradict this assumption. Consequently, we can postulate for the ancestor language of Kullui a rule concerning the period when most clusters had already undergone MIA assimilation:

— within one word, two clusters of non-homorganic consonants are impossible; in such a case, the second cluster undergoes complete assimilation according to common MIA rules.

Such a rule, in addition to the cases of “metathesis”, also explains the phonetic shape of the descendant of OIA *kṣetra* ‘field’ (let us recall that the sequence *kṣ* was apparently preserved until the late NIA period, when the old palatal affricates, together with the palatal affricates in Persian borrowings, shifted to dental affricates; Krylova 2024: 211):

Kullui	OIA
brag^{h} ‘leopard’ (instead of ***brag^{h}r*)	*vyāghra-* ‘tiger’
prat ‘dish’ (instead of ***pratʃ*)	*pātra-* ‘dish’
tʃɔkɳa ‘rot’ (instead of ***tʃɔkərna*)	*takra-* ‘bitter’
prɔʃa ‘rib’ (instead of ***prɔrʃa*)	*parśu-* ‘rib’
tʃ^{h}et ‘field’ (instead of ***tʃ^{h}etʃ*)	*kṣetra-* ‘field’

Thus, based on Kullui data, the interpretation of this phenomenon in terms of *r*-replication is still more likely. In this case, the shift implies two stages, the first of which (the appearance of *r* after the initial consonant) preceded the shift *mr* > *mb*, as demonstrated by the example *tʃambɽa* ‘cauldron’ < *tāmra-* ‘copper’. In the case of type I metathesis according to Morgenstierne (*dʒugli* ‘cave’ < *durga-* ‘impassable place’, *dʒuba* ‘sacred durva grass’ < *dūrvā-* ‘sacred durva grass’, *prɔʃa* ‘rib’ < *parśu-* ‘rib’) the first stage also occurred before the MIA shift of clusters with initial *r* to geminates. At the same time, based on Kullui data, no conclusions can be drawn about a fundamental difference between types I and II – both *r* preceding and following the medial consonant underwent metathesis irregularly (cf., *tɔkɭi* ‘spindle’ < *tarku-* ‘spindle’ and *datʃi* ‘sickle’ < *dātrī-* ‘knife, sickle’, not subjected to metathesis in “Kullui Prakrit” but subjected to it in other languages). Therefore, it is quite possible that these types of changes occurred simultaneously.

The matter is more complicated with the second stage. If the shift *mr* > *mb* and the shifts of *rC* clusters to geminates took place in the MIA period, then the clusters *g^{h}r*, *kr*, *tr* (and possibly also *rś*, see above) in Himachali and a number of other languages were preserved even in the NIA period; however, in available examples, all non-initial consonant clusters underwent assimilation.

To explain this point, I introduce a rule of assimilation for the second of two non-homorganic consonant clusters in a word. This rule obviously took place before the shifts of *kṣ*, *tr*, *dr* to palatal affricates, but it is not entirely clear whether it should be dated to the MIA period (and then the clusters turned into geminates, which later underwent further simplification) or in the NIA period (and then the clusters turned into single consonants, but according to a rule coinciding with the common MIA rules of cluster assimilation in other languages). Given the scarce likelihood of such a coincidence, as well as the fact that the stage with doubled *r* is not recorded in MIA texts, the first option seems to be more credible.

8. Conclusion

Analysis of the Kullui material allows us to reach the following conclusions with varying degrees of confidence:

1. The version of the shift *mr* > *mb* via an intermediate stage of *mbr* is typologically plausible but requires the assumption that the cluster *mbr* in the ancestor language of Kullui, unlike biconsonantal clusters with labials (represented in Kullui by cases of *b^{h}r*, *pr*), regularly underwent assimilation of *r*.
2. Bloch’s version of *r*-replication / metathesis of *r* is more plausible for Kullui data than Morgenstierne’s version, since *r* in three-element clusters of the type *CTr* in the ancestor language of Kullui did not undergo assimilation, but it requires us to assume assimilation of the second of two non-homorganic consonant clusters.
3. The *ND* > *NN* shift in the ancestor language of Kullui affected only the combinations *ndh*, *mb*, with the latter not being entirely regular.

4. For a series of cluster transformations (with a correction for the irregularity of *mb* > *mm*) the following variants of relative chronology are probable:
   a) *dhy* > *jh; mb, ndh* > *mm, nnh*; *NT* > *ND*; *mr* > *mb*
   b) *dhy* > *jh; mb, ndh* > *mm, nnh*; *mr* > *mb; NT* > *ND*
5. The first stage of *r*-metathesis / *r*-replication preceded the shift *mr* > *mb*, and the second stage most likely occurred in the MIA period parallel to the assimilation of other *r*-clusters.
6. It is interesting to compare the noted cluster changes with the MIA hierarchy of consonant dominance described in Oberlies 2001: 99: non-palatal occlusives (excluding palatalization of dentals before *y*) > nasals > palatals > sibilants > *l* > *v* > *y* > *r*. Although most clusters in Kullui Prakrit were modified according to MIA rules, the assimilation of stops by nasals in the corresponding clusters, as well as the change *kṣ* > *tʃʰ*, clearly contradicts the hierarchy of Pali. Also, retention of *r* in a number of clusters indicates its significant power of resistance, whereas the above hierarchy would place *r* in the last place.

References

Hendriksen, Hans. 1986. *Himachali studies III. Grammar.* København: Det Kongelige Danske Videnskabernes Selskab.

Kogan, A. I. 2019. *Problemy izuchenija jazyka kashmiri v sravnitel'no-istoricheskom aspekte (Problems in the Study of the Kashmiri Language from a Comparative-Historical Perspective).* Doctoral Dissertation: Institute of Oriental Studies, Moscow.

Krylova, Anastasia. 2024. Accent in the Indo-Aryan language Kullui and the relative chronology of phonetic changes. *Journal of Language Relationship* 22(3-4): 191–215.

Masica, Colin P. 1991. *The Indo-Aryan languages.* Cambridge University Press.

Morgenstierne, Georg. Metathesis of liquids in Dardic. 1973 (1947). In: Georg Morgenstierne: *Irano-Dardica*: 231–240. Wiesbaden: Reichert.

Oberlies, Thomas. 2001. *Pāli – A grammar of the language of the Theravāda Tipiṭaka. With a concordance to Pischel's Grammatik der Prakrit-Sprachen* [*Indian philology and South Asian studies 3*]. Berlin: Mouton de Gruyter.

Southworth, Franklin C. 2005. *Linguistic archaeology of South Asia*. London: Routledge.

Turner, Ralph L. 1966. *A comparative dictionary of Indo-Aryan languages.* Oxford University Press.

Turner, Ralph L. 1985a. Romani *traš* 'to frighten'. In: Ralph L. Turner. *Indo-Aryan Linguistics. Collected Papers, 1912–1973*: 181–185. Delhi: Disha Publications.

Turner, Ralph L. 1985b. Anticipation of normal sound-changes in Indo-Aryan. In: Ralph L. Turner. *Indo-Aryan Linguistics. Collected Papers, 1912-1973*: 357–367. Delhi: Disha Publications.

Turner, Ralph L. 1985c. The Position of Romani in Indo-Aryan. In: Ralph L. Turner. *Indo-Aryan Linguistics. Collected Papers, 1912–1973*: 251–290. Delhi: Disha Publications.

Turner, Ralph L. 1985d. Cerebralization in Sindhi. In: Ralph L. Turner. *Indo-Aryan Linguistics. Collected Papers, 1912–1973*: 206–227. Delhi: Disha Publications.

А. С. Крылова. Относительная хронология ряда фонетических изменений древнеиндийских кластеров на материале языка куллуи

В данном исследовании устанавливается относительная хронология фонетических изменений древнеиндийских кластеров в языке куллуи (химачали). Анализ подтверждает сохранение в среднеиндийский период ряда сочетаний с *r*, а также кластера *kṣ*, причем последний переходит в *tʃʰ* независимо от южных индоарийских языков. Рассматривается относительная последовательность изменений, в том числе *-mr-* > *-mb-*, *NT* > *ND* и *ND* > *NN*. Теория Блока о метатезе *r* как результате репликации (антисипации)

подтверждается в противовес теории Моргенстьерне. При этом требуется постулировать правило ассимиляции второго негоморганного кластера в слове. На основе данных по языку куллуи предлагаются две возможные хронологические последовательности этих сдвигов.

Ключевые слова: куллуи язык; индоарийские языки; относительная хронология; метатеза.