Handbook of Comparative and Historical Indo-European Linguistics

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Handbook of Comparative and Historical Indo-European Linguistics

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XVII. Indo-Iranian

110. The phonology of Proto-Indo-Iranian

1. Phoneme inventory

The Proto-Indo-Iranian phonological system can be represented as follows:

Vowels: a ā

Consonants

<table>
<thead>
<tr>
<th></th>
<th>voiceless</th>
<th>voiced / glottalic</th>
<th>voiced [aspirates]</th>
<th>sibilants</th>
<th>nasals</th>
<th>glides</th>
<th>liquids</th>
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<tbody>
<tr>
<td>Labial</td>
<td>p</td>
<td>[b]</td>
<td>bʰ</td>
<td></td>
<td>m</td>
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<tr>
<td>Dental</td>
<td>t</td>
<td>d</td>
<td>dʰ</td>
<td>s, [ʂ]</td>
<td>n</td>
<td>r, [ɭ]</td>
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<tr>
<td>Palato-alveolar</td>
<td>ě</td>
<td>j</td>
<td>jʰ</td>
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<tr>
<td>Palatal</td>
<td>ĉ</td>
<td>j</td>
<td>jʰ</td>
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<td>i</td>
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<tr>
<td>Velar</td>
<td>k</td>
<td>g</td>
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<td>Laryngeal</td>
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</tbody>
</table>

2. Vowels

PIIr. had only two vowels: a and ā. Most probably, they were distinguished not so much by length, but rather by timbre, a being more closed ([ə] or [ʌ]) than ā ([ɐ(ː)]), which is still the situation found in Sanskrit (Hoffmann 1976: 552–554; Cardona, this handbook). On a phonetic level, there also were [i] and [u], but these vowels were allophones of the phonemes /ɨ/ and /ʉ/, respectively, and their role in morphophonological alternations was very different.
2.1. PlIr. *a

2.1.1. PlIr. *a first of all reflects PIE *e (including *h₂e and *h₃e) in all positions and *o in closed and word-final syllables:

- PlIr. *daća ‘ten’ (Skt. dāśa, OAv. dasā) < PIE *dekʰ (Gr. δέκα, Lat. decem);
- PlIr. *marta- m. ‘mortal, man’ (Skt. márt-, OAv. marṭa- [< *martá-], MP mard) < PIE *mor-to- (Gr. [Kallimachos] μορτοί pl. ‘id.’);
- PlIr. *Hajra- (Skt. ājra- ‘field’) < PIE *h₂eɡʰ-ro- (Gr. ἀγρός, Lat. ager, Goth. akrs ‘field’);
- PlIr. *HastH(i)- (Skt. ásthi- n. ‘bone’, YAv. ast- n. ‘bone, body’) < PIE *h₃estH- (Hitt. /hastai-/).  

There is one exception: *m remains consonantal in word-initial position before resonants (#mnV-, #mrV-, etc.), cf. PlIr. *mlaHta- ‘softened, tanned (leather)’ (Skt. mlāta-; YAv. mrāta-) < PIE *mleh₂-to- (OIr. mláith ‘soft, weak’; Gr. μαλακός ‘id.’), Skt. mnā- ‘to mention’ < PIE mnēh₂- (Gr. μιμνῄσκω ‘I care for, make mention’).

The development of PIE *n̥, *m̥ to PlIr. *a went through a nasalized schwa [ə˜] (denasalized after the loss of intervocalic laryngeals, 6.4). The nasalization of [ə˜] was realized as oral occlusion if *n̥, *m̥ were followed by a resonant or a laryngeal, i.e. PIE *n̥R, *mR > PlIr. anR, amR (where R = a resonant or a laryngeal):

- PlIr. 3sg. middle *mani̯atai (Skt. mánvate ‘thinks, considers’, OAv. man̥iētē ‘understands’) < PIE *mn̥e- (Gr. μανίσκω ‘I am furious’);
- PlIr. *-tamHa- suff. of the superlative (Skt. -tama-, Av. -təma-) < PIE *-tmHo- (Lat. in-timus ‘inner’).

2.2. PlIr. *ā

2.2.1. PlIr. *ā reflects PIE *ē, *ō:

- PlIr. nom.sg. *maHtā f. ‘mother’ (Skt. mātā, Av. mātā) < PIE *meh₂tēr (Gr. μήτηρ, Lat. māter);
- PlIr. *yāks nom.sg. f. ‘speech, voice’ (Skt. vāk; OAv. vāxš) < PIE *yōk̑s (Lat. vōx).

2.2.2. Furthermore, PlIr. *ā reflects PIE *o in an open syllable, except for absolute auslaut. This development (PIE *o > PlIr. *ā /__CV) was first proposed by Karl Brugmann in 1876 and is known as Brugmann’s Law.
- PIIr. *jānu- (Skt. jānu-, YAv. zānu, MP d’nwg /dānūɡ/ ‘knee’) < PIE *gōnu- (Gr. γόνον ‘knee’);
- PIIr. *-tāram, acc.sg. of nomina agentis in -tar- (Skt. dātāram ‘giver’, OAv. dātārem ‘creator’) < PIE *-tor-m̥ (Gr. δώτορα) vs. *-taram, acc.sg. of kinship terms (Skt. pitāram, YAv. pitarəm ‘father’) < PIE *-ter-m̥ (Gr. πατέρα); the final *-m in these PIIr. forms is analogical after the acc.sg. of the o-stems.
- PIIr. 3sg.pf. *C1a-C1āC2-a (type Skt. jagā́ma ‘came’, YAv. daδāra ‘held’) < PIE *C1e-C1oC2-e (type Gr. μέμονε ‘has in mind’).
Final *-o remains unchanged:
- PIIr. *pra (Skt. prá ‘forward’; Av. frā is ambiguous) < PIE *pro (Gr. πρό), but possibly Skt. prā-tár adv. ‘early, in the morning’ < *pro-ter.
- PIIr. *sa demonstr. pron. (Skt. sá) < PIE *so (Gr. ὁ).

Hale (1999) has argued that the final *-o of particles could be lengthened if they formed an accental unity with the following word, cf. Skt. ghā (< PIE *gho) vs. Skt. ha (< PIE *ghe), but since ghā is an enclitic particle, this solution seems improbable (ghā can also reflect *ghoH).

Brugmann’s Law is one of the earliest Indo-Iranian developments. It evidently preceded the merger of short IE vowels *e and *o into IIr. *a. As demonstrated by Kuryłowicz (1927), it was also anterior to the loss of antevocalic laryngeals. In other words, the laryngeal in the sequence *oCHV closed the preceding syllable and the vowel remained short. The presence of a laryngeal accounts for the short vowel in the root of PIIr. 1sg.pf. (type Skt. jagā́ma < *gwe-gwom-h2e, cf. Gr. μέμονα) vs. long vowel in 3sg.pf. (type Skt. 3sg. jagā́ma < *gwe-gwom-e, OAv. nə̄nāsā < *ne-nok̑-e, cf. Gr. μέμονε), in the root of causatives like Skt. jaráyati ‘makes age’ (PIE *g̑ orh2-ei̯e-), janáyati ‘begets’ (PIE *g̑ onh1-ei̯e-), śamáyati ‘appeases’ (PIE *k̑ omh2-ei̯e-) vs. Skt. vāsá yati ‘clothes’ (PIE *u̯ os-ei̯e-), Skt. śrāváyati ‘makes heard’, Av. srāuaiaietti ‘announces’ (PIE *k̑ lou̯ -ei̯e-), etc. and in the root of the 3sg. passive aorist Skt. (á)jani ‘has been/is born’ (PIE *g̑ onh1-i) vs. Skt. śrā́vi, OAv. srāwuī ‘is known, heard’ (< PIE *k̑ lóu-i), etc.

Likewise, Brugmann’s Law was anterior to the loss of intervocalic laryngeals (see 6.4 and Lubotsky 1995: 220), as appears from the 3sg. pass. aor. Skt. (á)dāyi, (á)dhāyi, (á)jñāyi, ápāyi, āmāyi < *doh3-i, *d̊oh̊1-i, etc.

Brugmann’s Law further did not apply to PIE *h₂e (Lubotsky 1990), cf. PIIr. *Haṣi (Skt. āvī- m.f. ‘sheep’) < PIE *h₂eṇi (Gr. ὀ[ϝ]ις, Lat. ovis ‘sheep’); PIIr. *Hanas- (Skt. ánas- n. ‘cart’) < PIE *h₁en-es- (Lat. anus n. ‘burden’); PIIr. *Hapasi (Skt. āpas- n. ‘work’, YAv. huu-apah- adj. ‘doing good work’) < PIE *h₁ep-es- (Lat. opus n. ‘work’), and thus was anterior to the merger of the three laryngeals. This chronology is comprehensible, since the merger of laryngeals was triggered by the merger of the vowels.

There is only one development which seems to be anterior to Brugmann’s Law, i.e. vocalization of interconsonantal laryngeals in the final syllable (see also below, 6.3). From Skt. compounds like tvāpitāraḥ nom.pl. ‘having you as father’ < PIE *-ph₂stores (cf. Gr. -πατόρες), we know that the second members contained o-grade, cf. AiGr. II/1: 100 f. This fact may provide us with an explanation for the long vowel of Skt. bahuvrīhi compounds bhādra-jāni- ‘having a beautiful wife’, yūva-jāni- ‘having a young wife’, etc., which reflect PIE compounds in *-gʷonh₂ > *-gʷoni- > *gāni-, later analogically replaced by PIIr. *-jāni- after the simplex *fani- ‘wife’ (< *gʷen₂h₂-, cf. OIr. ben f. ‘woman’; OCS žena f. ‘woman’).
3. Resonants

The PIIr. phonemes /ɨ/, /u̯/, /r/ have vocalic and consonantal allophones, depending on their environment. In the position between two consonants (CRC) as well as in #RC and CR# they are vocalic [i], [u], [r]; otherwise they are as a rule consonantal [ɨ], [u̯], [r̥]. The same holds true for the unclear phoneme /l/, for which see below, 3.3. Combinations of the resonants give various results in the daughter languages: PIIr. *aiuV > Skt. evV (devá-), Av. aēuV (daēuua-); PIIr. *auV > Skt. ayyV (savyá-), Av. aoiV (haoiia-); PIIr. *Cur# > Skt. Cur (dhánur), Av. Cuuarə (θauuarə). The difference between the vocalization of /iu/ and /ui/ is also reflected in word-initial position: PIIr. *iua > Skt. iva, but PIIr. *uiaH- > Skt. vyā-, Av. viiā- ‘to envelop’. Also Sievers’ Law, which is responsible for the distribution of [ɨ], [u̯] after a light syllable (VC) vs. [ii], [uu] after a heavy syllable (V:C or VCC), was subphonemic in Indo-Iranian and was only phonemicized in the separate languages after the loss of the laryngeal in the sequence CIHV. In the following treatment I will write *ɨ, *u, and *r in Indo-Iranian reconstructions where these are unambiguously consonantal and *i, *u and *r (here eschewing a syllabification marker) in all other circumstances.

3.1. PIIr. *i and *u usually go back to PIE *i and *u, respectively.
   - PIIr. 3sg. *Haiti, ptc.pres. HıianJ- ‘go’ (Skt. éti, yánt-; OAv. aitī = ā + aēitī, YAv. aiaianJ- = *ā-iaianJ-, OP 3sg. aitiy) < PIE 3sg. *h1eiti, ptc. *h1iēiti- ‘go’ (Gr. ἔστι, ἵντεῖ);
   - PIIr. 1sg. pres.act. *yačmi, 1pl. *učmasi ‘wish’ (Skt. vásmi, usmāsi; OAv. vasomī, usomāhi /vasmi, usmahi) < PIE *uek-mi, uk-mes (Hitt. 1sg.pres.act. ú-e-ek-mi ‘I wish, desire’).

3.2. PIIr. *i can also reflect a PIE vocalized laryngeal in the final syllable (-CH[C]#), for which see 6.3.

3.3. The situation with the IIr. liquids /r/ and /l/ is complicated. Iranian has only *r. A few words with /l/ in modern Iranian languages like MoP āluftan ‘to rage, grow mad (with love)’ vs. Parth. pdrwb- ‘throw into confusion’ or MoP lištan, Wa. liḵ-, Par. liš-/lušt, Orm. las- ‘lick’ vs. Pahl. ls- /ris-/ (or /lis-/?) ‘lick’ constitute a notable exception, which has found no explanation. Sanskrit has both phonemes, albeit their distribution does not perfectly match that of the PIE phonemes. Nevertheless, Skt. /l/, which is relatively rare in the RV and becomes more prominent in later texts (e.g., RV áram, AV álam adv. ‘fittingly, accordingly, enough’ < PIE *h₂erom; RV reh-, AVP+ leh- ‘lick’ < PIE *leigʰ-; RV palitá- ‘grey’ < PIE *pelit-; RV+ prav-/plav- ‘swim’ < PIE *pley-; RV+ rep-/lep- ‘smear’ < PIE *leip-, etc.), for the most part corresponds to PIE *l. This suggests that PIIr. inherited this phoneme, but the distribution of /l/ and /r/ in Sanskrit remains an unsolved problem.

3.4. The PIIr. diphthongs *ai, *au, *aɨ, *āu must be considered combinations of *ā + i, u, respectively.
4. Stops

PIIr. had three series of stops: voiceless T, (voiced) glottalic ’D, and voiced (aspirated) Dh. As was argued by Kortlandt 2003: 259 and 2007a: 150, aspiration of the “aspirates” may be an Indic innovation; if so, the third series was simply voiced. The glottalic articulation follows from specific reflexes in laryngeal clusters (see below 6.1 and 6.2), from the distribution of the -na-participles in Sanskrit (see Lubotsky 2007) and from glottalic pronunciation of these stops in Sindhi (see Kortlandt 1981). In the following, however, I shall stick to the traditional notation.

In my opinion, PIIr. did not have a fourth series of voiceless aspirates Th. It is usually assumed that already in the PIIr. period, the combination of T + laryngeal yielded voiceless aspirates, which later developed into Skt. voiceless aspirates Th and Iranian voiceless spirants (*f, *g, *x). There are several arguments against this idea. First, T becomes a spirant before any consonant in Iranian (see Cantera, this handbook), and it is more economical to assume that this also happened before a laryngeal (e.g., *tHa > *gHa > PIr. *g̣a just like *tra > *g̣ra or *u̯a > *g̣u̯a). Second, Iranian sometimes shows paradigmatic alternation between *t and *g (Av. nom.sg. pantā < PIIr. *pantāHs, gen.sg. paštō < *patHas ‘way, path’; YAv. mitaiaitu /mitiiaitu/ < *mitaHja- < PIE *mityHje- ‘dwell’ belonging to the root mi̯g̣-), which suggests a relatively recent character of g. Third, if we assume a PIIr. system T Th D Dh, it is incomprehensible why Th yielded spirants in Iranian, whereas Dh yielded stops.

Bartholomae’s Law, which is most probably of IE date (see Mayrhofer 1986: 115 for an overview), was still operative in PIIr., so that PIIr. clusters Dh+T and Dh+s were voiced and aspirated (i.e. DhDh, DhsH, or DD, Dz, if aspiration is an Indic innovation; in Sanskrit, -z- in these clusters was later replaced by -s-, which yielded voiceless clusters ps, ts, ks.).

– PIIr. *Ha(H)ug̣hẓa, *Ha(H)ug̣hsdha 2,3sg.inj.med. ‘announce’ (OAv. pairiaoỵā, aog̣dā, in YAv. with a restored ending aoxta) < PIE *h₁e-h₁ug̣h₁ (Gr. eὐκτο 3sg.impf.med. ‘asked’, a reduplicated present to PIE *h₁eg̣h₁, Lat. voveo ‘I vow’, cf. Lindeman 1972: 167). In Iranian, the clusters were for the most part restored, except for a few non-transparent formations, like PIIr. *Hadhdā (Skt. addhā adv. ‘certainly, truly’) > OAv., OP azdā adv. ‘known’, Sogd. (Chr.) ‘zd’ ‘known, informed’.
– PIIr. *dhi[ḍh]bhzha-, desiderative to the root *dhabh- ‘deceive’ (Skt. dăpsati, OAv. di̯ẓḍi̯i̯ā inf.) < PIE *dhsḍh₁b₁h₁-se- (cf. Hitt. tepnu- ‘diminish, despise’).

Also the clusters where Dh and T are separated by s or a laryngeal (DhT, DhHT) undergo Bartholomae’s Law, cf. PIIr. *g̣hẓh₁ < PIE *g̣h₁st- (Skt. āpi gḍha 3sg.inj.med. ‘devours’ < PIE *g̣hs-to, sā-gdhi- f. ‘communal meal’ < PIE *sm-g̣s-ti- with subsequent loss of s in this position); PIIr. *ḍug̣Hḍ̣ar- ‘daughter’ < *ḍug̣Hṛar- (see 6.2) < PIE *ḍug̣h₂ter- (OAv. dug̣dara-). In Sanskrit, at a later stage, it was probably due to the intervening laryngeal that the cluster could be restored in the forms of the root dhā- (e.g. 3sg. mid. *ḍeḍh₁toi > PIIr. *ḍḍaḍHḍai (OAv. dazdē) >> Skt. dhattē).

It must be borne in mind that Bartholomae’s Law has always remained subphonemic in the sense that assimilation in voice (and aspiration, if any) in these clusters was automatic.

4.1. The PIIr. labials *p *b *h₁ (*b is extremely rare) continue PIE *p *b *h₁ and the PIIr. dentals *t *d *ḍh continue PIE *t *d *ḍh.
4.2. The PIIr. velars *k *g *gʰ continue various kinds of PIE velars, if they did not stand before /ē˘/ and /i/ (for palatalized velars see 4.3).

First, they continue the PIE labiovelars *kw *gw *gwh:

− PIIr. *kad (Skt. kād nom.acc.sg.n. interr. pron., YAv. kaṭ id.) < PIE *kw̄d (Lat. quod, OHG hwaz id.);
− PIIr. *gati- (Skt. gāti- f. ‘going, motion’, YAv. aiṭi.gaiti- f. ‘coming towards’) < PIE *gw̄nti (Gr. βάτης f. ‘step, basis’, Goth. gaqumþs f. ‘gathering’);
− PIIr. *ghnanti (Skt. ghnānti 3pl.pres. ‘they slay’) < PIE *gwhnenti (Hitt. ku-na-an-zi 3pl. ‘they kill’).

Second, they continue the late-PIE velars *k *g *gʰ, which primarily are the result of depalatalization of palatovelars in the position after *s (for which see below, 7) and of delabialization of labiovelars in the position after (and, possibly, also before) *u.

− PIIr. *lauk- (Skt. ruc- ‘shine’, lokā- m. ‘free space, light space, world’; YAv. ruc- ‘shine’) < PIE *leuk- (Gr. λευκός ‘light, white, bright’; Lat. lūx f. ‘light’);
− PIIr. *bhaug- / bhaǰ- (Skt. bhuj- ‘enjoy, consume’; OAv. būj- f. ‘atonement, expiation’) < PIE *bheug- (Lat. fungor ‘I enjoy, suffer, get rid of’);
− PIIr. *dhaugh- (Skt. dugh- ‘give milk’; NP dōxtan ‘to milk’; Sh. ɗūɣ ‘buttermilk’) < PIE *dheugh- (Gr. τυγχάνω ‘I reach a goal’, Goth. daug ‘is good for smth., fits’).

Third, they continue the PIE palatovelars *k̑ *g̑ *g̑ h which were depalatalized in Indo-Iranian in the position before consonantal r (Weise’s Law; for which, cf. Kloekhorst 2011). Most likely, this depalatalization is a common trait of all satəm languages, cf. Meillet 1894: 297f.

− PIIr. *kruH-ra- (Skt. krūrá-, Av. xrūra- ‘bloody, cruel’) < PIE *kruh₂-ro- (cf. Lat. crōr m. ‘raw, thick blood’, OPol. kry ‘blood’);
− PIIr. *krau̯ is- (Skt. kravīṣ- n. ‘raw, bloody meat’, YAv. xruuīšiant- adj. ‘blood-thirsty’) < PIE *kruh₂-s- (Gr. κρέας n. ‘meat’);
− PIIr. *gras- (Skt. gras- ‘devour, digest’; ?OAv. gṛhmō, gṛhmā PN) < PIE *g̑ res- (Gr. γράω, Cypr. γράς-ή 2sg.impv.act. ‘eat!, gnaw!’).

4.3. PIIr. palatal stops

PIIr. had two series of palatal stops: *č ǰ ǰʰ and *č ǰ ǰʰ. The former continue the PIE palatal stops *č ʝ ʝʰ, while the latter are the reflex of PIIr. palatalization of velars. The phonetic nature of these two series cannot be exactly determined, but it seems reasonably clear that *č ǰ ǰʰ were palatal stops, whereas *č ǰ ǰʰ must have been pronounced with the tongue in a position closer to the teeth, something like palato-alveolar [t’ d’ d’ʰ] = [t̥ d̥ d̥h]. When Indo-Iranian palatalization led to the rise of new palatal stops *č ʝ ʝʰ, the old palatals had to move more to the front in order to remain distinct (see Lubotsky 2001: 45 f. for a discussion).

Examples of the palato-alveolar stops:

− PIIr. *dača ‘ten’ (Skt. dāśa, OAv. dasā, OP *daθaᵲ, Bactr. λαςο) < PIE *dekm ‘ten’ (Goth. taihun, Gr. δέκα, Lat. decem);
− PIIr. *juš- (Skt. juś- ‘like, be pleased’; YAv. zuś- ‘like’; OP dauştar- m. ‘friend’) < PIE *ġus- (Gr. γεύσομαι ‘I taste’; Lat. gustus m. ‘taste, enjoyment’; Goth. kiusan ‘test’);
Examples of the palatal stops:
- PIIr. *čarman- n. ‘hide, skin’ (Skt. cárman-, YAv. carman-, OP carman-, Khot. tcárman-) < PIE *(s)ker-men- (OHG scirm ‘screen’; OPr. kērmens ‘body’);
- PIIr. *jani- f. ‘wife’ (Skt. jāni-; OAv. jñi-; Parth. jn) < PIE *gën̩h₂- (OIr. ben f. ‘woman’);
- PIIr. *jhanti 3sg.pres.act. ‘slays’ (Skt. hānti; YAv. jaiti; OP jaṭṭiy) < PIE *gʷhenti (Hitt. ku-[e-]en-zi).

5. Sibilants

PIIr. had only one sibilant phoneme /s/, which was retracted to š after *r, u, K, i (the so-called RUKI-rule). The retracted pronunciation of *s was a phonetic feature, probably common to the satəm group, which was phonemicized in the separate branches. This is the reason why, for instance, RUKI was operative in Indo-Iranian also after *i < *H or *r < *l, i.e. in the position after sounds which have only arisen as the result of specific Indo-Iranian sound changes, cf. PIE *kreuh₂-s- > Skt. kraviṣ- n. ‘raw meat’, OAv. touuiš- n. ‘violence’; PIE *kh₂s- > Skt. (a-)jishat 3sg.them.aor., OAv. sīśōi 3sg.opt.them.aor. ‘instruct, command’; PIE *kʷeš₂- > Skt. karṣ-, Av. karš- ‘draw furrows, plough’. Before voiced stops, PIIr. */s/ was realized as [z] or, in the RUKI context, as [z], but both [z] and [z] were allophones of the phoneme */s/.

In PIIr., /š/ presumably was a marginal phoneme, found word-initially only in *šyaćš ‘six’ (Skt. sā-, Av. xšuuaš), if the assimilation of the initial *š- in PIE *syekš was a common feature of the satam languages (cf. Lubotsky 2000), and possibly in the cluster *tš < PIE *kš (see 7 below).

6. Laryngeal

PIIr. had one laryngeal phoneme */H/, which is the result of the merger of the three Indo-European laryngeals. The phonetic nature of this phoneme is not absolutely assured, but, most probably, it was a glottal stop [ʔ]. The PIIr. laryngeal shows a variety of reflexes, which can be conveniently presented together (see Mayrhofer 2005 for a recent overview).

6.1. The laryngeal was dropped in the position before a cluster of a voiced unaspirated stop D plus any consonant (*H > Ø /_DC, cf. Lubotsky 1981), cf.
- PIIr. *pajra- vs. *paHjas- (Skt. pajrā- adj. ‘firm’ : Skt. pājas- n. ‘side, surface’, Oss. faz / fazæ ‘half, side; back, buttocks’) < PIE *peh₂g- (Gr. εὐ-πηγής ‘well-built’, etc.);
- PIIr. *syad- vs. *syaHd- (Skt. svādati ‘is sweet’; the short reflex is possibly due to the position before a consonant in the originally athematic verb *syad-ti < *sye₂H₂ti; in Skt. sam-sūde inf. ‘for pleasure’, the short reflex is either taken from the nom. *-suH₂d-s or is analogical after the present), OAv. hudzma- ‘sweetness’: Skt. svādate
is glad, tastes’, svādī- ‘sweet’, sūdāyati ‘makes acceptable’, havyasād- ‘sweetening the oblation’) < PIE *sye₃d₂d- (Gr. ἱδώς ‘sweet’, ἴδομαι ‘I am glad’, Toch.B swāre ‘sweet’);

− PIIr. *jaf- ‘worship’ (Skt. yājyu- ‘devout, pious’; yajñā- m. ‘worship’; Av. yasna- m. ‘worship’) < *(H)je₃h₂g- (Lat. iāiūnus ‘fasting’; Gr. ἁγνός ‘holy, pure’).

This development is only phonetically comprehensible if *H in IIR. was indeed a glottal stop, which disappeared before glottalized stops, i.e. ʔʔDC > ʔDC. In a series of articles (1996, 1999), de Lamberterie applied this Law also to Greek and Latin, arguing that this must have been an IE development. The number of examples is very limited, however, and they are not all equally convincing. Moreover, the phonetic justification given above then loses its explanatory power.

6.2. In the position after a voiced unaspirated stop D, the laryngeal causes “aspiration” of the preceding stop. Here is the evidence:

− PIIr. *Hajʰam (Skt. aham, Av. az̆m, OP adām ‘I’ < PIE *h₁eg̑H-om (OCS azъ, cf. Gr. ἐγώ, Lat. ego < *h₁eg̑-oH);

− PIIr. nom.sg.n. *majʰi, gen.sg. *majʰas (Skt. nom.sg. máhi, gen.sg. mahás ‘great’; OAv. gen.sg. maz̆, instr.pl. maz̆bī ‘big, spacious’) < PIE *meg̑₂ḥ₂, *meg̑₂ḥ₂-os (Gr. μεγά n. ‘big’; Hitt. mēk n. ‘much’);

− PIIr. *sadʰis- (Skt. sādiḥ- n. ‘seat, abode’, YAv. hādiḥ- ‘name of god of the dwelling place’; OP hādiḥ- n. ‘residence, palace’) < PIE *sedh₁-s (cf. Lat. sēdēs f. ‘seat, dwelling-place’);

− PIIr. *dʰujʰitar-/ dʰugʰdʰar- (Skt. duhitār- f., OAv. dugədar- f. ‘daughter’) < PIE *dʰugh₂ter- (Gr. ϑυγάτηρ ‘daughter’).

In the case of PIIr. *majʰi, *sadʰis-; *dʰujʰitar-, the laryngeal shows a double reflex: it is responsible for the aspiration of the preceding stop, on the one hand, and it is vocalized to *i, on the other (for the vocalization see 6.3). This means that the laryngeal was not lost in the process of aspiration, but was later vocalized. This problem, which was never explained, receives a straightforward explanation if we assume that aspiration is essentially the same development as the one dealt with in the preceding section, viz. the loss of glottalization. Whereas in the case of PIIr. *pajra-, etc., a glottal stop was lost before a glottalized stop (ʔʔDC > ʔDC), here we find a glottalized stop losing its glottalic feature before a glottal stop (ʔʔD? > D?) and thus merging with Dʰ. As pointed out above (4), aspiration of the so-called aspirated mediae Dʰ is likely to be an Indo-Aryan innovation.

6.3. Vocalization

In the final syllable between two consonants (and in absolute auslaut -CH#), the laryngeal was vocalized to *i (in Sanskrit, the interconsonantal laryngeal was later vocalized on a large scale, also to i, so that the Iranian evidence is decisive here):

− PIIr. *-i (ending n.pl. Skt. -i, Av. -i) < PIE *-h₂ (Gr. -a, Lat. -a);

− PIIr. *jani- (Skt. jani- f. ‘wife’, OAv. jaini- f. ‘id.’) < PIE *g̑ enh₂- (OIr. ben ‘wife’);

− PIIr. *madʰi, sec. ending 1pl.med. (Skt. -mahī, OAv. -maidī) < PIE *-medʰh₂ (Gr. -μεθα).
PIIr. *krau̯- (Skt. kravíṣ- n. ‘raw meat’, cf. OAv. təuuiš- n. ‘violence’ of the same type) < PIE *k̑ reu̯ h₂-s- (Gr. κρέας n. ‘meat’).

The same vocalization is also occasionally found in other positions, although the conditions are unclear. In a word-initial syllable, the vocalization took place in the following cases (for a discussion see also Beekes 1981a; Tichy 1985):

- PIIr. *p(i)tar- (Skt. pitár- m. ‘father’, OAv. nom.sg. [p]tā, acc.sg. patarəˉm /ptaram/, dat.sg. pi_soundre, fa_soundro, OP pitar- ‘id.’) < PIE *ph2-ter-;
- PIIr. *ćiša- them.aor. (Skt. aśiṣat 3sg., OAv. sīšōit̰ 3sg. opt. and sīša 2sg. impv. ‘instruct, command’) < PIE *k̑ h₂s- (zero-grade of *k̑ eh₂s-, Skt. śās-, Av. sāh-).

In a medial syllable, only the palatalized -h- of Skt. duhitár- ‘daughter’ (OAv. dugədar < PIE *dhugh₂-ter-) indicates that the laryngeal must have been vocalized to -i- already in PIIr., causing palatalization of *gh.

Kortlandt (apud Beekes 1981a: 282) suggested that the laryngeal was vocalized in a group of four consecutive consonants (cf. gen. sg. PIE *dhugh₂-tr-es). Normally, however, Iranian shows no vocalization in this position; cf. Skt. támisrā- f. ‘dark night’, but YAv. təqər- pl. ‘darkness’ < PIE *temHs-ro-. Cf. also an important article by Werba (2006).

### 6.4. Intervocalic laryngeal (Beekes 1981b; Lubotsky 1995)

In intervocalic position (i.e. aHa, aHi, aHu), the laryngeal was phonologically lost in PIIr., but if there was a transparent morpheme boundary, the laryngeal could be restored (since it was still extant in most other positions). As the meter of the Gāthās shows, this restored laryngeal is faithfully preserved in Avestan. In the Ṛgveda, however, we find hiatus only in a part of the cases, which indicates that the poets used the hiatus as a metrical device, while this laryngeal was again lost in their regular speech. Here are a few examples:

- No hiatus in Skt. dhenú- f. ‘cow’ < *dheh₁i-nu-;
- devár- m. ‘husband’s younger brother’ < *deh₂i-ur-;
- stená- m. ‘thief’ < *steh₂i-no-;
- revánt- adj. ‘rich’ < *Hreh₁i-u̯ ent-.

Occasional hiatus in the RV vs. constant hiatus in the Gāthās:

- PIIr. *-iaH-am 1sg. athem. opt. (Skt. deyám, dheyám, aṣyám, yāyám; OAv. dīiğm, ḡūm);
- PIIr. *-aH-am acc.sg., *-aH-as nom.pl., etc. of root-nouns in -aH- and of laryngeal stems (Skt. opám, opás ‘protecting’; gnám, gnás f. ‘lady’; pánthám, pánthās m. ‘way’;
- OAv. mazdəm, gen.sg. mazdā m. ‘Mazda’);
- PIIr. s-stems of the type *daH-as- n. ‘gift’ (Skt. dā́s- in dā́svant- and sudā́s-; OAv. dā́h-);
- PIIr. gen.pl. ending -aHam (Skt. -ām, OAv. -qm; cf. Kortlandt 1978, 2007b; Beekes 1982b: 58 f.);
- PIIr. appurtenance suffix *-Han- after a thematic vowel, e.g. *sauma-Hān-am > Skt. somā́nam acc.sg. ‘presser of Soma’; *mantra-Hā > OAv. nom.sg. maSoundrā ‘poet, mantra specialist’ (cf. Hoffmann 1955 = 1976: 378–383);
- PIIr. verbs in -aH- (Skt. 3pl. pres. pānti, 3sg. subj. pāt, 3pl. impv. pres. pāntu, nom.pl. ptc. pāntas < *paH-anti, *paH-a-t, etc.; OAv. subj. iṣāt, iṢānti).
There are two words with the same reflex, viz. *maHas- m. ‘moon’ (Skt. mā́s-, OAv. mā́) and *HuaHata- m. ‘wind’ (Skt. vā́ta-), where the second a goes back to a PIE nasal, *meh₁n̥s- and *h₂ueh₁nt-o-, respectively. Although here, too, there is a morpheme boundary between the root in -aH and the suffix beginning with n̥-, a model for restoration of the laryngeal is lacking. Both formations were not productive in Indo-Iranian, and if *meh₁n̥s- > *maHas- would have yielded *mā́s- and *h₂ueh₁nt-o- > *HuaHata- in Indo-Iranian already, the intervocalic laryngeal could hardly have been restored. We must therefore assume that the development of PIIr. *-aHn̥- was different from that of -aHa-: while in the latter sequence the laryngeal was lost, in the former it was retained. This means that at the time of the loss of intervocalic laryngeals, n̥ had not yet coincided with a.

6.5. Laryngeal metathesis

In the sequences CHiC and CHuC, the laryngeal swapped places with the resonant.
– PIIr. *piHta- ‘drunk’ (Skt. pītá-, MoP nabīd ‘wine, date-wine’ < PIIr. *ni-pīta-) < PIE *ph₁ti- (cf. Gr. ποτόν n. ‘drink, beverage’ < *ph₁-to- without i-extension);
– PIIr. *suHr n. ‘sun’ (Skt. svār, OAv. huuarā, cf. also Skt. sūrya- m. ‘deity of the sun’) < PIE *sh₂ul- (Gr. ἠέλιος < PGr. *hāu̯ el < *seh₂-u̯ el- m. ‘sun’);

In a similar way, *C₁iHuC₂ > *C₁i̯uHC₂ (C₂ ≠ i̯), cf. PIIr. *si̯uHta- ‘sewn’ (Skt. syūtá-, Oss. xwyd / xud) < *siHuto- (Skt. sī́vyati, Goth. siujan, Lith. siū́ti ‘to sew’). It is probable that this root is connected with PIE *seh₂- ‘to bind’, pres. *sh₂-ei-, so that the original order of the consonants was *sh₂i̯u-. For more examples of this kind, see Lubotsky 2011. The metathesis *C₁iHuC₂ > *C₁jūHC₂ did not occur in case of C₂ = i (cf. Skt. sī́vyati, dī́vyati) because u was consonantal before i, see 3. The rule must have been operative for a long time, as it is also responsible for the desiderative Skt. jújyūṣati (ŚB), derived from jī́vati ‘to live’.

7. Consonant clusters

The development of PIIr. clusters of stops is rather complicated in detail. Here I mention just a few of the most frequent clusters which have undergone some changes within PIIr.
– PIIr. *-ćt- [-*t-] > *-śt- (≠ -št-) > Iranian -(x)št-, Skt. *-ṣṭ- > -ṣṭ-. Kellens (1976: 60 ff.) has presented strong arguments in favor of the view that the reflex of PIIr. *ćt had not yet merged with št after RUKI in Proto-Iranian. While the reflex of the RUKI št is always št in Avestan, PIIr. *ćt also appears as xšt, e.g. paiti.fraxštar- ‘interrogator’ < PIIr. *prać-tar- (cf. Skt. praśtar-), yaxšti- ‘branch’ < PIIr. *jaćti- (cf. Skt. yaṣṭi-), spaxšti- ‘vision’ < PIIr. spać-ti-, etc. Since we find the same reflex in Sogdian and Bactrian, we must assume East Iranian dialectal preservation of the difference between *ćt and the RUKI št.
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− PIIr. *-ćs- [*-tś'-s-] > *-tś'-s- > *-tś- and then > Iranian *š, Skt. *-tś- > *-tś- > -kś-, cf. PIIr. *dačś-i-na- ‘right, southern’ (Skt. dákśina-, YAv. daśina-) < PIE *deks-i-no- (Lith. dėšinas, OCS desnъ ‘right’);
− PIIr. *-tć- [*-ttś'-] > *-tś'- > *-tś- > *-tś- (thus merging with the reflex of PIIr. *-ćs- < PIE *-k̑ s-), cf. PIIr. *tatćan- (Skt. tášan- m. ‘wood-cutter, carpenter’; Av. tašan- m. ‘creator (of cattle)’) < PIE *tetk̑ on- (Gr. τέκτων m. ‘carpenter, artist’).
− PIIr. *sč > *śč in word-initial position and after a vowel (Lubotsky 2001). This is essentially the same kind of development as, for instance, OCzech tiščen > Czech tiščen ‘pressed’. Cf. PIIr. *sčid- < *śčid- ‘to split, break’ (Skt. chid-; YAv. siδ-; M P wsstn’/wisistan’) < PIE *skid- (Gr. σχίζω ‘I split, cut’; Lat. scindō ‘I cut open’); PIIr. *ga-sća- < *ga-śča- pres.stem ‘go’ (Skt. gáchati, YAv. jasaiti 3sg.pres.) < PIE *gʷn-ške- (Gr. βάσκε 2sg.impv.act. ‘go!’). In the position after a stop, the development *śč > *śč did not take place, cf. PIIr. *uđscā ‘high, up’ (Skt. uccā, YAv. usca) < PIE *udsk(w)eh1 (Lat. āsque ‘up to’); PIIr. *Hubj̑ hā- (Skt. ubj̑ hānt- ptc.pres. ‘keeping under, subduing’, YAv. ubj̑ hātiē 3sg. pass. ‘is pressed down’) < PIE *h₁ubh-ske-, an sk-present to PIE *h₁uubh-ske- (Skt. vabh- ‘bind, fetter’; YAv. ubdaēna- adj. ‘of woven texture’; Gr. ὑφαίνω ‘I weave, undertake’; OHG weban ‘weave’).

8. Accent

Our knowledge about PIIr. accentuation is almost exclusively based on Vedic Sanskrit, since the Iranian evidence is scant, being limited to some indirect indications in Avestan (cf. Beekes 1988: 55−69; de Vaan 2003: 577−602). For apparent traces of Indo-European accentuation in Pashto and other modern Iranian languages, see Lubotsky 1988: 16ff.


The accent shift did not operate in two groups of roots with a medial laryngeal: those of the type *C(R)eHD- (for which see 6.1), e.g. īṣ-tī- f. ‘worship, sacrifice’, vájyu- ‘devout, pious’, and those of the type *CHUC- (for which see 6.5), e.g. bhū-mī- f. ‘earth’, bhū-rī- ‘abundant’. This means that the accent shift was posterior to the loss of the laryngeal in the first group, on the one hand, and anterior to laryngeal metathesis in the second group, on the other.

9. Relative chronology

We can establish the following relative chronology of the major phonological developments in Proto-Indo-Iranian:
Dialectal Indo-European (“satəm”):
A. RUKI-rule (only phonetically, phonemicization took place in the separate languages) (5)
B. Depalatalization of palatovelars in the position before *r (4.2)

Proto-Indo-Iranian:
1. Ir. vocalization of the laryngeals (6.3)
2. Brugmann’s Law (2.2.2) [POST 1, ANTE 4,9]
3. Palatalization of the velars (4.3)
4. *e,o > PIr. *a (2.1.1) [POST 2, ANTE 5] Note that palatalization as a phonemic process is simultaneous with the merger of e, o in PIr. *a [i.e. 3=4]. In other words, we cannot know when the phonetic palatalization started, but it became phonemic at the moment when the conditioning factor, i.e. the difference between *e and *o/*a, disappeared.
5. Merger of the three laryngeals in PIr. *? (6) [POST 4, ANTE 6]
6. ʔʔDC > ʔDC; ʔD > Dʔ (6.1, 6.2) [POST 5, ANTE 7]
7. Laryngeal accent shift (8) [POST 6, ANTE 8]
8. Laryngeal metathesis (6.5) [POST 7]
9. Loss of intervocalic laryngeals (6.4) [POST 2, ANTE 10]
10. η > a (2.1.2) [POST 9] The exact chronological position of developments 9 and 10 cannot be further specified. It seems attractive to assume that the loss of intervocalic laryngeals [9] was posterior to the merger of the three laryngeals [5].

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111. The morphology of Indo-Iranian

0. Preliminaries
1. Nouns
2. Adjectives
3. Numerals
4. Gendered pronouns
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6. Verbs
7. References

0. Preliminaries

Proto-Indo-Iranian (PII) morphology is easily reconstructible from the extant Old Indo-
Iranian languages, since the morphology of these languages is very similar (cf. Gotō
and Skjærvø [morphology], this handbook). In spite of (or perhaps because of) this

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