# Historical Phonology of Iranian

R. S. P. Beekes
*University of Leiden*
*The Netherlands*

## 0 Introduction
### 0.1 Avestan

Avestan consists of Gatha-Avestan and Late Avestan. The latter corpus is much later than Gathic and the texts are of very different dates and "auf dem Gebiet fast aller sprachlichen Erscheinungen" heterogeneous (Hoffmann 1958, 6). Also, there is no recent thorough treatment of Late Avestan. Therefore I shall base myself on Gathic. As the two forms of Avestan are almost if not completely identical (except of course for recent developments in Late Avestan), it is obvious to do so when reconstructing the development from Proto-Indo-European to Iranian.

The difficulties presented by Gathic are twofold. The first is that very often the interpretation of the text is uncertain. However, there is mostly agreement on the identification of the isolated forms. For the phonology, then, this point is not very serious.

The other difficulty is the notation. Our oldest Avestan manuscripts date from the 14th century. They go back to a text of the sixth century, when the text was first written down. Andreas' theory that there was an older text which did not note the vowels has now been almost generally abandoned. The problems this theory could explain can mostly be explained without it. For the few remaining problems it cannot be upheld. Thus *diwamna-* of our text must certainly have been /*dyumna-*/. Andreas' theory could explain this very simply as a wrong interpretation of DYWMN. If it is to be explained from the notation only, one could start from *\*diiumna-* (*y* was at some time realized [*iy*] and written *ii*) with some kind of mistake in reading *-iiu-*. (Perhaps the glide was determined by the following vowel, as is shown by *-uyē* representing old *\*-vai* > *\*-uvai* > *\*-uvē* > *-uyē*. Then *diiumna* would have become *\*diuumna-*

, which was then changed into *diuamna-*, perhaps under the influence of the participles in *-amna-*.)

The Avestan script was devised to render the sounds of the holy texts phonetically as precise as possible. It is farther removed from a phonemic notation than most writing systems. One point, then, is that we must reduce the notation to a phonemic transcription. Another problem is that the text may have been gradually modernized during the time oral tradition (which perhaps went on also after its first codification). This problem is more serious for Gathic than for Late Avestan, which dates from different periods anyhow. With few exceptions the overall impression is that the Gathas are given in a state of the language identical with the (older) Late Avestan texts, while we know from its morphology and from some phonological points that it represented a much older phase of the language. The problems may be illustrated by *dužazōbå* (most recently Kuiper 1978, 21 f., against the interpretation as \**duž-āzbāh*), which must stand for /*duž-zuHāh*/ 'speaking evil invocations'. This implies a development *zuH* > *zu* > *zu̯* > *zb*. Further the rise of a svarabhakti vowel between *ž* and *z*, which remained the neutral vowel. (It did not count as a vowel in the meter. The variant readings *dužzō.bå*, *duždō*(.)*bå*. suggest that this was a recent, facultative non-phonemic vowel.) And such a vowel between *z* and *b*, where the following labial colored it to *o* (*o* is mostly long in Gathic). And finally *āh* > *-å*. That the *ō* is not old is admitted by everybody. If the form was an *s*-stem adjective, the root must have had zero grade, which was *zuH-*. The development *zuH-* > *zb* (before vowel) was no doubt a real linguistic development, only it was later than the Gathas.

Then there was the interference with the texts of Zoroastrian scholars. E.g. they cut compounds into the component parts, but often quite wrongly: for *duž*(*a*)*zōbå* the text also gives *dužzō.bå* (the period indicating that the text has two words but that the editor thinks they were one word).

And finally, of course, there were all kinds of simple mistakes in the tradition after the texts were first written down.

Many minor changes are to my mind either non-phonemic or post-Gathic and are not presented here. They are discussed in full in my Gathic grammar (forthcoming).

I do not follow the transcription of *y*, *v* with *ii*, *uu*. This is what we find in the manuscripts, but there is little reason to adopt it in our transcription. *y* and *v* were really pronounced *iy*,

*uv* at one time, but this is due to much later influence of West
Iranian, where this was the normal development. Sometimes *y*,
*v* must be read *iy*, *uv* in Gathic, but this is the exception. So *ii*,
*uu* does not solve that problem. Only in anlaut there is a
difference between *y̨-* and *uu-*, but this regards two or three
words. The problem should be pointed out when discussing
these words. The notation *ii*, *uu* may have led to certain
mistakes in the manuscripts but that is no reason to use this
wearisome notation throughout.

## 0.2 Old Persian

Old Persian presents its own difficulties for historical
linguistics. It is a rather small corpus, so that we often do not
have the required forms. The other problem is the writing
system. The reading intended by the syllabic script can often be
established only through comparison with the related
languages, which means that Old Persian in those cases does
not present independent evidence. Most consonantal signs can
be read with or without following *a*, for some also a following *i*
is possible. Three ways can be followed to determine the
reading. 1) Comparison with the related languages, in the first
place Avestan and Sanskrit. For our purpose this means that
Old Persian gives no independent confirmation. 2) Later
Iranian forms. In this case, however, we must be certain that the
later form is a direct development of the Old Persian form and
not of another dialect. Thus NP *bala* 'height' would represent
OP *\*bardā,* but NP *burz* id. a Median form *\*brzā.* 3) The third
way is to use the transcription of the form in a contemporary
language, Elamite, Akkadian or Aramaic. Here again we must
be certain from which dialect these languages took the form.
Also, the interpretation of forms in these languages presents
problems of its own. Thus *k(a)-r(a)-t(a)* most probably was read
*/krta-/.* Here we decide on morphological grounds and on the
comparison with Avestan and Sanskrit. That the phoneme */r/*
could be used in intervocalic position (it is a variant of */r/,* not
a separate phoneme */ṛ/*), is shown by the Elamite transcription
of some forms with *ir* (which is in that script used to indicate *ṛ*).
Brandenstein's remark (HbAp 33) "K.Hoffmann 1958, p. 5
zeigt daß ṛ zunächst einen Vokalvorschlag bekommen hat,
woraus sich ein [ər] oder ['ṛ] entwickelt hat; daher im
Altpersischen die Umschreibung des ṛ mit *ar*" is not a very

happy formulation. Hoffmann only remarked "gesprochen etwa
ər". (His notation $^a r̥ta$ means /rta/ with 'bedeutungslose' a-.)
Also the reason why -ar- was written is that one could not
distinguish in the script between *CrC* and *CarC* (and *CraC* and
*CaraC*); it is, by the way, not fully correct to say that they wrote
-ar-.

I do not believe that we have any metrical passage in Old
Persian (the section HbAp 26 refutes itself), nor do I believe
that Aristophanes has any real Old Persian.

I shall use the signs $\theta$ and $x$ (not $\flat$ and $ḫ$), because they are
used for the corresponding sounds in Avestan. This I find of
paramount importance, nor is there any good reason to use
other signs. (Also $x$ is easier typographically than $ḫ$; $\flat$ is
typographically difficult, and awkward anyhow.)

## 0.3 Median

Median is known from a few words, belonging to the
administrative sphere, in the Old Persian texts. The results
agree with the dialectology of modern Iranian (the dialect of
Sivandi). The distinctive phonological traits we can ascertain
(of course there may have been more which we do not know)
can be given here as well:

| PIE | Av. | OP | Med. | |
|-----|-----|-----|------|---|
| $ḱ, ǵ$ | s, z | $\theta$, d | s, z | (vispa)-zana |
| $ḱu̯$ | sp | s | sp | vispa- |
| $ti̯$ | $\theta y$ | šiy | $\theta y$? | xšāyaθiya-? |
| tr | $\theta r$ | ç | $\theta r$ | Xšaθrita |
| su̯ | $x^v$- | uv- | f- | -farnah- |

($\theta y$ from $ti̯$ only if xšāyaθiya- 'king' had -θy-, which would have
become *šiy* in OP. If it had the suffix -iHa-, it could be real OP.)
That is all we can ascertain.

## 0.4 Middle Iranian

The later Iranian languages may provide i̶ ̶o̶r̶t̶ ̶t̶ information
for the oldest history of Iranian. See, e.g., R. Schmitt's review-
article "Die Bedeutung des Sakischen für Indogermanistik und
Iranistik", *Sprache* 17 (1971), 50-61. However, this is still largely
a matter of the future. Note, e.g., that for Khotan-Sakan, which

is the best studied and the most archaic of the middle Iranian languages, we need "eine phonologische und graphematische Beschreibung des Sakischen, denen dann eine möglichst detaillierte historische Lautlehre zu folgen hätte"; there is as yet "noch *kein* deskriptives Wörterbuch... geschweige denn ein historisch-vergleichendes" (Schmitt, p. 60). Since then Bailey's dictionary and Emmerich's articles on the phonology have appeared, but this is still only the beginning. Also, I think, the results will always remain, as far as PIE is concerned, just additions to Avestan, mostly regarding the vocabulary, hardly the morphology or the phonology. Despite his title, Schmitt remarks "selbst die Beurteilung allgemein-indogermanistischer Fragen wird vielleicht in dem einen oder anderen Fall mit den sakischen Gegebenheiten rechnen müssen." (p.57)

### 0.5 Names and the indirect evidence

The large material of proper names is being exploited to make good the scarceness of our old material. Just one example must suffice here. The royal name *Vištāspa-* has been compared with Vedic *viṣitāso áśvāḥ* 'unfettered (i.e. running freely) horses.' The conclusion is that the first element continues PII. *\*vi-sHta-* (cf. 7.2.2). Of course, the material must be used with extreme care, for the interpretation is mostly not so evident. And the results are limited, for either the linguistic part was already known (here: *H* disappears in interior syllable) or if it is not known, it is dangerous to rely on this evidence alone.

A large field of indirect evidence is provided by the Persian forms written in other languages like Elamite, Akkadian and Aramaic (the 'Nebenüberlieferung'). E.g., the form *vispa-zana-* in our OP texts must be Median (see 0.3). Here Elam. *mi-iš-šá-da-na* must transcribe real OP *\*visadana-*. This case seems very reliable as the treatment of both PIE *ḱu̯,* and *ǵ* is the one we expect in Median and Old Persian respectively. We already noted (0.2) that Elam. *ir /ṛ/* provides evidence for OP *ṛ* (not *ar* or *ra*). Of course, this evidence again must be used with extreme care.

### 0.6 The aim of this presentation

What I will do in the following pages is to present the developments leading from PIE to Gathic and Old Persian. All

developments are given, with the exception of a few minor, complicated cases. As I explained, I will limit myself in principle to Gathic, as Late Avestan provides nothing new for PIE. It may be said also that, in my view, Old Persian adds very little to what can be learned from Gathic. Though the Gathic corpus is small, it is just enough to document all historical developments (as well as all morphological categories). The importance of Gathic, then, can hardly be overestimated in this respect.

A short presentation of the developments may be useful as the treatment in Bartholomae's *Grundriss* is very difficult to use (an illustration is that the tables of contents are on pp. 3, 49, 162 and 188). This book, as well as Reichelt's *Elementarbuch*, uses many symbols now dated which make its use difficult. Also much attention is—necessarily—paid to writing problems which tend to obscure the linguistic developments (which are really rather simple; see section 10). Lastly we can now add a discussion of the PIE laryngeals.

The presentation is systematic, starting from the PIE forms. The detailed table of contents is meant as a survey of the developments. An indication of the chronology is given at the end.[1]

---

[1] I am indebted to my colleagues Kortlandt, Lubotsky and Weitenberg for their critical remarks. I remain solely responsible for errors and inconsistencies that may have remained.

## 0.7 The phonemic systems

**PIE**

| p | b | bʰ | |
|---|---|---|---|
| t | d | dʰ | |
| ḱ | ǵ | ǵʰ | |
| kʷ | gʷ | gʷh | |
| s | | | |
| h₁ | h₂ | h₃ | |
| r | l | | |
| m | n | | |
| i | u | | |
| e | o | ē | ō |

**PII**

| p | b | bʰ | | |
|---|---|---|---|---|
| t | d | dʰ | | |
| ć | j́ | j́ʰ | | |
| č | ǰ | ǰʰ | | |
| k | g | gʰ | | |
| s | z? | ṣ? | ẓ? | |
| H | | | | |
| r | l | | | |
| m | n | | | |
| i | u | ī | ū | |
| a | ā | | | |

**PIr**

| p | b | f | | |
|---|---|---|---|---|
| t | d | θ | | |
| k | g | x | | |
| č | ǰ | | | |
| ć | j́ | | | |
| s | z? | š? | ž? | |
| h | H | | | |
| | r | | | |
| m | n | | | |
| i | u | ī | ū | |
| a | ā | | | |

**GAv.**

| p | b | f | | |
|---|---|---|---|---|
| t | d | θ | | |
| k | g | x | | |
| c | j | (ś) | | |
| s | z | | | |
| š | ž | | | |
| h | H | | | |
| (ṣ) | r | | | |
| m | n | | | |
| i | u | ī | ū | |
| a | ā | | | |

**OP**

| p | b | f | |
|---|---|---|---|
| t | d | θ | |
| k | g | x | |
| c | j | | |
| s | z | | |
| š | ž | | |
| h | | | |
| ç | r | | |
| m | n | | |
| i | u | ī | ū |
| a | ā | | |

Note that phonemes are not always developments of the phonemes on the left hand side of the same line.
( ) automatic variants
? probably still automatic variants

## 1. The PIE stops

1.1 The PIE aspirated stops lost their aspiration. This innovation was shared with Balto-Slavic, Armenian, Albanian, Germanic and perhaps Tocharian and Celtic (Kortlandt, IF 83, 1978, 110-117), so it was probably dialectal Indo-European. The sounds did not, however, fall together with the (PIE) voiced stops, as these were preglottalized and kept their glottalization down to Balto-Slavic and Indo-Iranian (as appears from Lubotsky's law; see 7.3.2).

1.2 The development *tH* (etc.) > Skt. *th*, Ir. *θ* has been considered a common development of Indo-Iranian. This view has been challenged. One argument was that if PIE *bʰ* and *b* coincided in Iranin, one would expect that *pʰ* and *p* would also coincide (Kuryłowicz, *Prace filologiczne* 11, 1927, 205). This argument disappears if *bʰ* > *b* was dialectal Indo-European, i.e. ante-PII. Kortlandt arrived at the same conclusion as Kuryłowicz (l.c.). His first argument ("the loss of aspiration in *\*dh* yielded an occlusive whereas its voiceless counterpart became a fricative") disappears if his third one (*dh* > *d* must be dialectal IE) is granted, for then the development *tH* > *tʰ* would be much later (PII) than *dʰ* > *d*. The difficulty remains that IIr. *tʰ* (from *tH*) became a spirant in Iranian (*θ*), which would be a quite isolated development. Therefore, the solution of Kuryłowicz and Kortlandt (his second argument "PIE *\*t* yielded Iranian *θ* before a consonant. This development can hardly be separated from the rise of/in those cases where it correlates with Skt. *th*") seems the most probable one, i.e. that *tH* became *θH* > *θ* as part of the Iranian development in 1.5. (In PII the *H* had become voiceless after voiceless stop; this situation was essentially preserved in Sanskrit: *tH* > *th*.)

So we have: *pH tH kH* > *f θ x*
Av. *raθa-* 'chariot', OP *raθa-*, Skt. *rátha-*, *\*rotHo-*.
G. *huš.haxā* 'friendly', OP *Haxāmaniš*, Skt, *sákhā*, *\*sokʷH-*.

1.3 The PIE labio-velars lost their labial articulation, They coincided with the depalatized variants of the PIE palatals after *u* and *s*. The sequence *skʷi* coincided with *ski*.

1.4 The PIE palatals *ḱ ǵ ǵʰ* evolved in PII, and the velars *k g gʰ* (from 1.3) were palatalized before *ĕ ĭ i̯*. The two series did not coincide as they are still different in Iranian. The developments were:

| PIE | PII | Skt. | Iran. | |
|---|---|---|---|---|
| *ḱ ǵ ǵʰ* | *ć ȷ́ ȷ́ʰ* | *ś j h* | **Av.** *s z z,* | **OP** *θ d d* |
| *k g gʰ* | *č ǰ ǰʰ* | *c j h* | *c j j* | *c j j* |

The IIr. stage of the PIE palatals was earlier reconstructed as *ś ź źʰ* but 1) if Skt. *j* was an affricate, it is probable that they still had a stop segment; 2) in Kafiri they are still affricates; 3) OP *θ d* can be better explained from sounds with a stop segment

than from *ś ž*. (Thus Burrow, Skt. *Gramm.*, 73) I write *ĉ ĵ*, which may have been approximately [*ty, dy*]. This means that PIr. still had *ĉ ĵ* (because of point 3). The palatalized *k* will be noted *č*. It may have been a [*cy*].

1.5 Voiceless stops before a consonant became fricatives in PIr.

G. /*fra*/, OP *fra-*, Skt. *prá*.

A preceding *s* or *š* blocked the development (G. /*straHam* / 'star' gen. pl.; G. /*vaista*/ 'you know' < *-*tHa* which became /-*θa*/ elsewhere; G. *uštra-* 'camel' (in OP the normal development seems to have occurred, see 1.19).

The only exception is *pt*, which is found thus in Avestan (G. *haptaθa-*/ 'seventh'); NP *haft* may indicate that it became *ft* in OP. It is improbable that *ft* was changed back to *pt*, but otherwise the development must have been, at least in part, one of the separate languages, which is even less probable.

The development did not occur before syllabic resonants (G. *pərəsaitē*/*prsatai*/, OP *p-r-s-* [prs-] as against Av. *fras-*, OP *fraθ-* 'to ask') G. *tvạm* 'you' must therefore be /*tuHam*/, as against acc. *θβạm*, OP *θuvām*, which go back to *θu̯ < tu̯*. Thus *y* after a stop must have originated in -*iHa-* or in -*iya* according to Sievers' law (G. *naptya-*).

*Stops in clusters*

Here are treated those clusters in which the stop shows a deviant development.

*Stop + stop*

1.6 Dental + dental developed an intermediate *s*-sound, perhaps already in PIE. In Sanskrit this sibilant was lost, but in Iranian the first dental was absorbed by the sibilant; it is therefore the same development as in 1.9.

G. *cisti-* 'thought' from *\*cit-ti-*;
OP *pasti* 'footsoldier' from *pad-ti-*;

1.7 PIE *ḱ, ǵ*⁽ʰ⁾ + dental > *št, žd*

PII *ćt*, Skt. *ṣṭ*

G. /*vašti*/ 'he wants', *\*u̯eḱti.*
OP *frašta-* 'asked', *\*preḱ-to.*
OP *ḱn* > *šn* sub 1.12.

### 1.8 Labial + *ḱ* > Av. *fš*

G. *fšuyant-* 'cattle-breeder', *\*pḱu-.*

I know no instance of a voiced group. The development in OP is not known.

*Stop + s*
### 1.9 Dental + *s* > *s*
G. *drugvasu* < *\*-vat-su*, loc. pl.

### 1.10 *ḱ, ǵ* + s > *š*

Sanskrit has *kṣ*. The *s* had become *ṣ* > *š* according to 2.1; the preceding palatal was assimilated and the geminate reduced.

G. /*daišā*/ 1 sg. sub. *s*-aor. of *dis-* < *\*diḱ-.*
OP *niy-a-paišam* 'I have written', *\*peiḱ-s-m.*

There is no certain example of *ǵs*. On *ǵʰs* see 1.11.

### 1.11 Aspirate + voiceless stop or *s*; Bartholomae's law.

An aspirate lost its aspiration to a following stop and voiced this stop or a following *s*. The aspiration was lost in Iranian. The developments are complicated by other developments (dent.+ dent. > sibilant + dent. 1.6; *ǵd* > *žd* 1.7; *z* > *ž* after labial 2.3 and velar 1.10; *dz* > *z* 1.9). In Sanskrit, the development is not found before *s*, because Sanskrit had no phoneme *z* (or *ž*) ; the group became voiceless. The major developments are:

| PIE | PII | Skt. | Ir. | = | Av. |
|-----|-----|------|-----|---|-----|
| $b^h t$ | $bd^h$ | bdh | bd | | bd |
| $d^h t$ | $d^z d^h$ | ddh | zd | | zd |
| $\acute{g}^h t$ | $jd^h$ | $\d{d}^h$ | žd | | žd |
| $g^{wh} t$ | $gd^h$ | gdh | gd | | gd |
| $b^h s$ | bz | ps | bž | | bž |
| $d^h s$ | dz | ts | z | | z |
| $\acute{g}^h s$ | $j\check{z}$ | kṣ | ž | | ž |
| $g^{wh} s$ | $g\check{z}$ | kṣ | gž | | gž |

In LAv. and OP the forms were restored.

G. /*augda*/ 'he said' from \**aug$^h$- ta*; LAv. *aoxta.*
G. /*vrzda*/ 'complete, mature', *uṛd$^h$-to-*; Skt. *vṛddhá-.*
G. /*didrža-*/ 'to fasten', \**di-dṛǵ$^h$-sa-.*
OP *du-ru-x-t* /*druxta-*/ 'belied', Skt. *drugdhá-.*
OP *basta-* 'bound' for \**b$^h$nd$^h$to-*, Skt. *baddhá-.*

*Stop + resonant*
1.12 $\acute{k}$, $\acute{g}$ + $n$ > $\check{s}n$

G. /*rāšnaHam*/ gen. pl. of /*rāzar, rāzan-*/ 'pronouncement'.

Initial *šn-* got a prothetic *x-*:

OP *xšnā-sa-* 'to know', \**ǵneh₃-sḱe-*.

1.13 $\acute{k}$, $\acute{g}$ + $m$ > (sm,) zm
In Avestan this is the normal development of the palatals.

OP *asmānam* acc. sg. 'heaven', Av. *asman-*, Skt. *aśman-.*

1.14 $\acute{k}$, $\acute{g}$ + $u$ > Av. *sp*, *zb*, OP *s*, *z*.
The OP *s*, *z* instead of $\theta$, $d$ < $\acute{k}$, $\acute{g}$ must be due to the following $u$,
so there must have been an intermediate stage *su*. Cf. 5.3.

Av. *aspa-*, OP *asa-*, Skt. *áśva-.*
G. *vīspa-*, OP *visa-*, Med. *vispa-*, Skt. *víśva-*, \**uiḱuo-*.

The change is perhaps post-Gathic, as *zbaya-* was still /*zuHaya-*/, so that in this case at least the development *zu̯-* > *zb-* was post-Gathic. Median had *sp*, see 0.3.

**1.15** *k̂i̯* > Av. *sy*, OP *šy*?

The Avestan development is the normal one, that of OP is not quite certain; it depends on *Paišiyāuvādā*. (OP writes *šiy*. If it was pronounced thus, this was a later development.)

**1.16** *k̂* + *l* > Av. *sr*, OP *ç*

The normal development Avestan. OP has *ç* < *θr*, see on *tr* 1.19.

Av. *ni-srāray-* 'to give back', OP *niy-a-çārayam* 'I restored', with *-r-* for *-y-*, from *k̂li-*, *\*k̂loi-eie-* (?).

**1.17** *k^w i̯* > *k̂i̯* > Av. *śy*, *ś*, OP *šy*

Avestan has a special sign for the result of this development, which was an allophone of *š* before *y*. When the *y* disappeared, *ś* became a phoneme. It is usually transcribed *ś*. I simply this to *ś*.
*\*k^wieh₁tos* 'quiet', Av. *śyāta-*, OP *śiyāta-*.

(The development of the voiced stop is the normal one, *j̑y*.)

**1.18** *k^w m* > *k̂m* > Av. *xm*, OP *m*

*\*taukman-*, Skt. *tókman-*, Av. *taoxman-*, OP *taumā-* 'family, clan'.

**1.19** *tr*, *tl* > Ir. *θr*, Av. *θr*, OP *ç*

*θr* is the normal Iranian development (1.5), *ç* a special OP change. Kortlandt suggests that it was a sound like the Czech *ř*, rather than a voiceless *r*.

Av. *xšaθra*, OP *xšaça-*, Skt. *kṣatrá*.
GAv. *uštra-* 'camel', OP *uša* < *\*ušça-* (which form implies *tr* > *θr* also after *š*).

1.20 *tn* > Av. *θn*, OP *šn*
Again a special OP development.

\**aratni*- 'elbow', Av. *arəθni*-, OP *arašni*-.

1.21 *ti̯*- > Av. *θy*, OP *sy*
Again a special development of OP.

\**sn̥tió*- 'true', Skt. *satyá*-, Av. *haiθya*-, OP *hašiya*-.

*s + stop*
1.22 *s + k̑* > *s*
We have only the verbal suffix *ske*, which appears as *sa*-.

G. /*prsati*/ 'to ask', OP /*prsāmi*/ 'I punish'. Cf. 1.3 (*ske* to *sće*?)

*Resonant + stop*
1.23 *rt* > Av. *ṣ* (I simplify *ṣ̌* to *ṣ*.)
    In Avestan -*rt*- became *ṣ* if the syllable with the *r* was
stressed. It developed from a voiceless *r*, which is written *hr*
before *p* and *k*, where it became voiceless under the same
condition. The accent was probably essentially the same as that
of Vedic. Notable agreements are:

| | | |
|---|---|---|
| *vəhrka*- | Skt. | *vŕ̥ka*- |
| *mašya*- | | *mártya*- |
| *pəšana*- | | *pŕ̥tana* |
| *aməṣa*- | | *amŕ̥ta*- |

    There are also differences. The accent of the compounds is
very difficult to judge. The form *apərətō.tanū*- against *pəšō.tanū*-
strongly suggests that the forms had different accents. The same
holds for *aṣa*-: *də̄jīt.arəta*-.
    An added -*ca* drew the stress to the preceeding syllable:
LAv. *mahrka*- :G. *marəkaē-ca*.
    The forms just cited show that the voiceless form was still
automatic. That such an important word as *Aša* still occurs in a
compound as -*arəta*- confirms this. It means that the voiceless
forms were probably entirely dependent on the place of the
stress in Gathic (so that *ṣ* was not a phoneme).

1.24 The correspondence Skt. *kṣ*, Gr. *kt, khth, phth* goes, in part
at least, back to a cluster of a dental plus a velar. This was s
hown by Toch. *tkaṁ*, and Hitt. *tēkan* from *\*deǵʰ-*, as against
*kṣam-*, Gr. *khthōn-*. Further perhaps by Hitt. *hartagga-* if this is
/*hartka-*/, cognate with Skt. *ŕ̥kṣa-*, from *\*h₂r̥t-ḱo-*, and Gr. *phthánō*
< *dʷʰn̥uō* — cognate with Skt. *daghnóti*.

Such a cluster is confirmed by G. *də̄jīt̥.arəta-* /*djit-arta-*/
'destroying Arta' and *də̄jāmāspa-* /*djāma-Haspa-*/. /*dji-*/ is
clearly identical with the root of Skt. *kṣoṃóti*, Gr. *phthi-* in *ákṣita-*,
Prakrit *ajjhita-*, Gr. *áphthitos* and continues a group *\*dgʷʰi-*.
Schindler (*Sprache* 23, 1977, 27 n. 3) rejects this etymology,
because it shows a development different from that seen in
other Avestan forms. However, the etymology is evident and the
phonetic development is without problem. The etymology
connecting /*djāma-*/ with Skt. *kṣāma-*, Pali *jhāma-* 'burning' is
not evident because of its meaning ('with burnt = branded
horses'?; R.Schmitt, *Sprache* 21, 1975, 181f.), but the forms
agree so exactly that it can hardly be coincidental. (Nor is the
structure clear. -*om-* explains the long -*ā-* but then the palatal
must be analogical, which we must also assume if it represents
*\*dgʷʰnH-mo-*; otherwise it could be *\*dgʷʰeH-mo-* with
unexpected full grade.) Earlier it was assumed that *dj-* was just a
hypercorrect form for *j-*. This is improbable as it is found only
with these two words, and only in Gathic; LAv. has *jit.aša-* with
*dj-* simplified. Also the form -*arəta-* shows that this form is
archaic (cf. 1.23).

Along this line we would expect the following forms (in the
last column I add the other representations found; see below):

| | | | | | |
|---|---|---|---|---|---|
| *tkʷ* | **Av.** | *\*tk, \*tc > \*c* | or | *xš* | |
| *dgʷ* | | *\*dg, dj > j* | | *gž̌,* | **LAv.** | *γž* |
| *tḱ* | | *\*ts > \*s* | | *š* | |
| *dǵ* | | *\*dz > \*z* | | *\*ž̌* | |

In this way could be explained Av. *zam-* 'earth' from
*\*dǵʰom-*. Otherwise one would have to assume that (in *\*dǵʰǫm-*
os) the *d-* was lost early.

The same development must be assumed for the word for
'hundred'. The old theory that it originated from *\*dḱmtóm* has
now been proven because the preglottalization of the *d* explains
the -*e-* of Gr. *hekatón* (Kortlandt). In *\*dḱmtóm* the *d* became

voiceless. It would have given the development Skt. *kṣ* etc., but *'dkm-* may have becom *'km-*.

Here might also belong G. *ṭkaeša-* 'teacher, -ing'. The explanation as due to a false division in /*anyatkaiša-*/ (L. *anyō.ṭkaeša-*), 'having something else as faith', interpreted as 'having a different faith', is improbable. It would imply that *ciš-* stands for *\*tciš-*, which seems quite possible.

The *s* may be found in *saēna-* 'bird of prey', Skt. *śyená*, Gr. *iktînos*. Greek points to *tk̑-*; it has a prothetic *i-* as in *ikhthûs*. The Sanskrit development deviates from *kṣ*. If it lost the *t-*, the same could have happened in Avesta and the *s-* would not be relevant.

In Sanskrit *tk̑* first became *tć.* It coincided with the palatalized form of *tk^w-*, i.e. *tć* which was generalized. Then the *t* was assimilated to *k̑,* and the group developed into *kṣ* (note that *kṣ* and <u>*k̑ṣ* are impossible</u> in Sanskrit). In *g̑z* the *z* which is not a phoneme in Sanskrit, was replaced by *ṣ* and the preceding velar was unvoiced. The aspiration in *g̑z^h* had to disappear. So all forms became *kṣ* in Sanskrit.

The difficulty is that there seems to be another series of representations in Avestan (the last column of the table above). It is based on the following forms:

1. G. /*xšayati, xšaθra-*/, Skt. *kṣáyati, kṣatrá*, Gr. *ktáomai.*
2. G. /*a-g̑zanvamna-*/ 'undiminising', Sk. *kṣaṇuté?*
3. L. *γzaraiti* 'to flow', Skt. *kṣárati* (Gr. *phtheírō??*).
4. G. /*šaiti*/ 'to dwell', Skt. *kṣéti*, Gr. *ktízō.*
5. L. *arəša-* 'bear', Skt. *ŕkṣa-*, Gr. *árktos.*
6. G. /*tašan-*/ 'shaper', Skt. *takṣan-*, Gr. *téktōn.*
7. G. /*rašah-*/ 'damage', Skt. *rákṣas-* (not with Gr. *erékthō*).

The last forms cannot be cognate with Gr. *erékhthō* as this requires a voiced representation in Avestan. G. *aši-*, Skt. *akṣî* is quite problematic.

An easy solution would be to assume dialectal differences, but as most forms occur in Gathic where we find the representation *dj-*, this is improbable. We should look for another solution.

The only reliable form in OP is *xšaya-*. On other possible forms see HbAp 43f.

### 1.25 Survey of the clusters with a stop

Not mentioned are the general developments, only that of individual clusters. Forms in brackets are the normal Iranian developments according to these general rules. It is understood that the voiced sounds developed in a parallel way.

| PIE | ḱt | pḱ | ḱs | ḱl | ḱm | ḱn | ḱi̯ | ḱu̯ | sḱ |
|---|---|---|---|---|---|---|---|---|---|
| PII | ćt | pć | ćš | ćr | ćm | ćn | ći̯ | ću̯ | sć |
| PIr | št | fč | š | | sm | šn | ćy | su | s |
| Av. | št | fš | š | (sr) | (sm) | šn[1] | (sy) | sp | s |
| OP | št | | š | ç | sm | šn[1] | šy? | s | s |
| Skt. | ṣṭ | pś | kṣ | śr | śm | śn | śy | śv | (c)ch |

| PIE | | | | | kʷm | | kʷi̯ | | |
|---|---|---|---|---|---|---|---|---|---|
| PII | | | | | km | | čy | | |
| PIr | | | | | xm | | | | |
| Av. | | | | | (xm) | | śy[2] | | |
| OP | | | | | m | | šy[2] | | |
| Skt. | | | | | km | | cy | | |

| PIE | tt | pt | ts | tr | | tn | ti̯ | | |
|---|---|---|---|---|---|---|---|---|---|
| PII | tst | pt | ts | tr | | tn | ty | | |
| PIr | st | ft | t̷s | (θr) | | θn | θy | | |
| Av. | st | pt | s | (θr) | | (θn) | (θy) | | |
| OP | st | ft? | s | ç | | šn | šy | | |
| Skt. | tt | pt | ts | tr | | tn | ty | | |

1. also $\acute{g}^{(h)}n > šn$
2. but $g^{w(h)}i̯ > $ (normal) $jy$

### 2. PIE s

2.1 PIE *s* became *ṣ* after *i, u, r, k* already in dialectal PIE. In PIr. *ṣ* became *š*. (This is the development we expect on phonetic grounds, not first *š* and *š > ṣ* in Sanskrit.) In Avestan we have *-īš* from *-ins*, *-ūš* from *-uns* and *-r̥nš*. (In OP the relevant forms are unknown.) Note *-iš* from *-Hs* (/snaθiš/).

   The development is not shared by *s < ḱ* (*vispa-*), *s < ts* (*us < *uts*), *st < tt* (*cisti- < *cit-ti-*).

2.2 *ḱs > š* see 1.10 (*ks* see 2.1)

2.3 After labials *s* became *š* in Avestan.

G. *diβžaidyāi* from *\*di-dbʰ-sa-*.

The *s* < *k̂* followed this development, which shows that it is late and Avestan only (i.e. not OP, which has *θ* < *k̂*).

G. *fšuyant-* from *\*pk̂u-*.

2.4 *s* > *h* except in the cases 2.1 - 2.3, before stop or *n* (where *s* remained), and after dental (*ts* > *s*, 1.9). The *h* disappeared initially before *r*, and word-finally. In OP *h* disappeared also before *u* (before *m* we have *amiy* and *ahmiy* 'I am').

Av. *urvant-* 'streaming' < *\*ruvant-*, OP *rauta-*, PIE *\*sreu-*.
Av. *hu-* 'good', OP *u-*, Skt. *su-* .
   *su* became Av. *hv*, *xᵛ*, OP *uv*, Med. *f*.
Av. *xᵛa-* 'self ', OP *uva-*.
L. *xᵛarənah-* 'majesty', Med. *-farnah-*.

As to *hv* and *xᵛ*, Gathic has in inlaut *-hv-* with very few exceptions, in anlaut always *xᵛ-*. If *-hv-* was regular in inlaut, *xᵛ-* and *-hv-* are just allophones in Gathic. (GAv. *hv-* always notes / *huH-* /; but / *huH-* / is also noted with *xᵛ-*, which must be a later development as appears from the meter.)
The development of *h* to *ŋh* after *a* and before *a*, *r*, *v* in Avestan is probably post- Gathic.

## 3. - 5. The PIE resonants

3.1 *r* and *l* fell together in *r* in PII, except in the easternmost part.
Vocalic *r* remained unaltered, except before laryngeal (see 7.4). On the situation in OP see 0.2.
Final *-r̥* became *-ar*. Avestan has neuters in *-ar*, but none in *-r̥*; Sanskrit has *-ar* and *-r̥t*, *-r̥k*. They must represent PIE *-r̥* (there is no certain evidence for *-er*, *-or*; also such forms would have become *-ēr*, *-ōr* in PIE). The development, then, sees PII., but G. / *ātr̥m* / 'fire', acc. sg. of an old neuter *\*ātr̥*, and / *audr̥š* / 'cold' gen. sg., presuppose the existence of nominatives in *-r̥* not too long ago.

In LAv. -*r̥š*- became -*arš*-.

## 4.1 Consonantal *m* and *n* remained unchanged.

Vocalic *m* and *n* became *a*- but *am*, *an* before *i̯*, *u̯* (before laryngeal see 7.4).

G. /*jamyāt*/, OP -*jamiyā*, *\*$g^w$m̥-i̯eh₁-t*.

## 5.1 *i* and *u* remained unchanged

*i̯* and *u̯* between vowels remained unchanged. As Sievers' law no longer operated automatically in Gathic, *i* and *i̯* were both phonemes. In OP *y* and *v* became *iy*, *uv*, it seems in all positions.

The diphthongs became *ăi*, *ău*. Avestan had closed and open allophones (written *ōi* : *aē* and *ōu* : *ao*). In LAv. the differences became phoemic, Gathic it was probably still automatic. It has been assumed that *ai* and *au* had become *e*, *o* already in OP.

*u̯r*- became *urv*- in Avestan, but this was post-Gathic as is shown by the meter.

## 5.2 *du̯i* > Av. *dbi*

G. *daibitīm* /*dbitīyam*/ 'for the second time', OP *duvitīyam*, Skt. *dvitīyam*.
G. /*dbišya*-/ 'to hate'. In LAv. the *d*- was soon lost (it is written *t̚bi*-, *bi*-; the Gathic form is written *daibi*-, with emphatic pronunciation of *dbi*- as [*dəⁱbi´*-]).

## 5.3 *k̚u̯*- , *ǵu̯*- > Av. *sp*, *zb*, OP *s*, *z*. See 1.14.

## 5.4 *k̚i̯* > (Av. *sy*), OP *šy*? See 1.17.

## 5.5 *ti̯* > (Av. *θy*), OP *šy*. See 1.21.

## 5.6 *su̯* > Av. *hv*, *xᵛ*, op *uv*, Med. *f*. See 2.5.

## 6. *The PIE vowels*

6.1 PIE *e* and *o* fell together in a.

PIE *ē* and *ō* fell together in *ā*. In Avestan the length of the vowels in many cases does not agree with what we expect from PIE. The opposition *a* : *ā* is better preserved than *i* : *ī* and *u* : *ū*, but no rules have been found yet to explain what happened .

6.2 \**o* in open syllable resulted in long *ā* (Brugmann's law). This development is of PII date. Gathic has the development in the causatives, type / *mānaya-/* < \**moneie-*; in accusatives like *dātạrəm, urvānəm*; and in *āyạ̄-* < *h₂oiu*. OP has beside the causatives (*mānaya-*) and the accusatives (*asmānam, framātāram*) only *dāruv* 'wood'.

## 7. The PIE laryngeals

In PII the three laryngeals fell together, perhaps in a glottal stop, probably at the time when *e* and *o* merged into *a*.

For the organization of the treatment see the table of contents. Whereas the Gathic evidence is of unique importance for PIE, OP has hardly any relevant forms.

### 7.1 Word initial

7.1.1 HC-. The laryngeal was lost without trace. It may have remained until shortly before Vedic and Gathic. A form like G. *kammānar-* < \**kamnaHnar-* supposes that \**Hnar-* existed not too long ago (it is improbable that in all such cases the word as a whole existed since PIE). For the Sanskrit intensives of the type *varī-vart-* < \**Huer-Huert-* the same applies.

7.1.2 HV-. The laryngeal was preserved down to Gathic as is shown by reduplicated forms like /(H)i-Hṛ-dyāi/ 'to rise', which presupposes a full grade *Har-*; /ra-Hṛš-ya-/ 'to alienate'; and by the compounds, which, almost without exception, do not contract, e.g. / *djāma-Haspa-/* 'Djāmāspa'.

### 7.2 After consonant

7.2.1 -CH. In word final position the laryngeal behaves as in CHC; see 7.2.2.

7.2.2 CHC, between consonants.

The treatment differed according to the syllable. In final syllable the laryngeal became *i* in PII.

1 sg. med. G. *-i*, them. *-ai*, OP *-iy*, *-aiy*. neuters in *-iš:* G. / *snaθiš*/, OP *hadiš*.

In medial syllable the laryngeal disappeared in PIr., whereas it (mostly) became *i* in Sanskrit.

G. / *mrautu*/ 'speak', Skt. *bravīti*, *\*mleuH-*.
G. / *padbiš*/ 'path' instr. pl., Skt. *pathíbhiḥ*, *\*pntH-bhi*.
OP *kan-tanaiy* 'to dig', Skt. *kháni-tum*.

In initial syllable the situation is less clear. There is very little evidence, which is difficult to interpret. Best is the word for 'father', which is G. *ptā* , LAv. *pita*, OP *pitā*. This proves that the word had forms with and without *i* < H. So there must have been special factors that decided on vocalization. The Gathic forms / *ptā, ptaram*, dat. *piθrai* and *fθrai*/ suggest that the first three forms represent the old system. (If the nominative and accusative would have had *i*, they would never have lost it.) This is best interpreted thus that the laryngeal was vocalized only when before two consonants. This rule also explains L. *tūirya-* 'paternal uncle', Skt. *pitṛvyà-*, from *\*pHtṛuiHo-* (the syllabic *r* does not count as a consonant, of ~~ccerse~~, as in the dat. pl. *ptərəbyō-*). The development will be PII, for then Iranian did not vocalize laryngeals that were not vocalized in PII, whereas Sanskrit mostly vocalized the remaining laryngeals. (The word for 'daughter' will also have got *i* < *H* before *tr* in PII. Before *tăr* the laryngeal remained. It voiced the following *t* in Avestan, *dugHtar-* > *dug(H)dar-*. In Sanskrit *gH* became *gh* and caused *dh-* > *d-*.)

LAv. *hita-* 'bound' has been explained from *\*sHto-* (cf. *VištaHaspa-*, Skt. *viṣitāsó áśvāḥ* 'unbound, unfettered horses'), which would contradict this view. But it is extremely improbable that Ir. *\*\*pitā*, *\*\*pitaram*, *\*\* fθrah*, *\*\* fθrai* would have given G. *ptá* etc. Therefore *hita-* must have an old *i;* see Mayrhofer, *Etym. Wb.* 3, 550 and 803. (A form *\*sta-* was avoided.)

*ī < shₐi-*

7.2.2 CHC, between consonants.

The treatment differed according to the syllable. In final syllable the laryngeal became *i* in PII.

1 sg. med. G. *-i*, them. *-ai*, OP *-iy, -aiy*. neuters in *-iš:* G. / *snaθiš* /, OP *hadiš*.

In medial syllable the laryngeal disappeared in PIr., whereas it (mostly) became *i* in Sanskrit.

G. / *mrautu* / 'speak', Skt. *bravīti*, * *mleuH-*.
G. / *padbiš* / 'path' instr. pl., Skt. *pathíbhiḥ*, * *pntH-bhi*.
OP *kan-tanaiy* 'to dig', Skt. *kháni-tum*.

In initial syllable the situation is less clear. There is very little evidence, which is difficult to interpret. Best is the word for 'father', which is G. *ptā* , LAv. *pita*, OP *pitā*. This proves that the word had forms with and without *i* < H. So there must have been special factors that decided on vocalization. The Gathic forms / *ptā, ptaram*, dat. *piθrai* and *fθrai* / suggest that the first three forms represent the old system. (If the nominative and accusative would have had *i*, they would never have lost it.) This is best interpreted thus that the laryngeal was vocalized only when before two consonants. This rule also explains L. *tūirya-* 'paternal uncle', Skt. *pitṛvyà-*, from * *pHtṛuiHo-* (the syllabic *r* does not count as a consonant, of ~~ccerse~~, as in the dat. pl. *ptərəbyō-*). The development will be PII, for then Iranian did not vocalize laryngeals that were not vocalized in PII, whereas Sanskrit mostly vocalized the remaining laryngeals. (The word for 'daughter' will also have got *i* < H before *tr* in PII. Before *tăr* the laryngeal remained. It voiced the following *t* in Avestan, *dugHtar-* > *dug(H)dar-*. In Sanskrit *gH* became *gh* and caused *dh-* > *d-*.)

LAv. *hita-* 'bound' has been explained from * *sHto-* (cf. *VištaHaspa-*, Skt. *viṣitāsō áśvāḥ* 'unbound, unfettered horses'), which would contradict this view. But it is extremely improbable that Ir. ** *pitā*, ** *pitaram*, ** *fθrah*, ** *fθrai* would have given G. *ptá* etc. Therefore *hita-* must have an old *i*; see Mayrhofer, *Etym. Wb.* 3, 550 and 803. (A form * *sta-* was avoided.)

### 7.2.3 CHV, after consonant before vowel.

We have seen that the spirantization of a preceding voiceless stop was part of the Iranian spirantization of such stops before consonant (1.5).

*$HrotHo$-, Av. *ra$\theta$a-*, OP *ra$\theta$a-*, Skt. *rátha-*.

In 7.2.2 we saw that voiced stops were probably aspirated by a following laryngeal, even before consonant. Except in *dugdar-* there is no evidence, as voiced aspirates were not tolerated in Iranian.

### 7.3 Laryngeal after vowel

### 7.3.1 -VH, word final. The treatment was the same as in VHC, see 7.3.2.

### 7.3.2 VHC, after vowel before consonant. On the loss of the laryngeal the vowel was lengthened. This happened in the separate languages, as the laryngeal is continued by *h* before _s_ in Hittite, the shortening of final vowels in the Rigveda, and because of Lubotsky's law in Indo-Iranian (below). (In the OP script the length of *i* and *u* is not indicated. On Avestan see 6.1.)

G. /*dadāti*/, OP *dadātuv*; cf. G. /*daHas*/ 'gift' < *deh$_3$os*. Av. *būmī-*, OP *būmī-* 'earth', *$b^h uHmiH$-*.
1 sg. pres. ind. them. Av. *-ā, -āmi*, OP *-āmiy*, PIE *$-oH$*.

*Lubotsky's law.* Indo-Iranian sometimes presents a short vowel where we expect (zero grade with *i* or zero, or) a long vowel. This appears to happen before an unaspirated voiced stop. The explanation will be that the voiced stop was still preglottalized (*'g*) and that the laryngeal, which had become a glottal stop (*ʔ*) in PII, merged with the glottalic element before a second consonant:

*$peh_2\acute{g}$-* = *$peh_2$'$\acute{g}$* > PII *paʔ '$\acute{j}$-* > *pa'$\acute{j}rá$* > Skt. *pajrá-*;
G. /*bax$\check{s}$a-*/ 'to distribute' from *$b^h eh_2 g$-*.

7.3.3 VHV, intervocalic. Here Gathic preserved the laryngeal systematically, and it is the only language to do so; the Rigveda has only traces, OP nothing of the kind. That the laryngeal was still there is seen from the meter. The Gathic meter is (only) syllable counting. Though the number of syllables does not always exactly conform to the pattern, it cannot be a coincidence that the normal number is restored in dozens of lines by assuming a laryngeal in those places where the linguistic evidence requires them.

/daHah-, hudaHah-, mazdaH-, tanuH, hizuH-/ have the laryngeal in all forms.

Before vocalic resonant the laryngeal was also preserved:

/maHah/ 'month' < meh₁ns;
/vaHata-/ 'wind' < *h₂ueh₁nto-.
We mentioned already /ṛa-Hṛš-ya-/ and /Hi-Hṛ-dyāi/ (7.1.1)

   The laryngeal was newly introduced into some forms. Thus the genitive plural ending -aHam represents the PIE ending *-om after the stem suffix -aH- of the ā-stems (where -aH- replaced earlier single -H-). Thematic verbs have a subjunctive in -aHā, which must be a PII reshaping, for originally the thematic inflection itself had the function of a subjunctive. Both developments were certainly PII.
   There are a few problems, but not more then one always finds. In some paradigms there must have been reorganizations, cf. acc. sg.:

mazdaH-am but -ām (ā-stems)
tanuH-am/-īm (ī-stems)

   In his case it seems that the optatives /*dyaHam, *dyās, dyāt/ from *dyaH-m, *dyaH-s, *dyaH-t, prove that -aHam as the phonetic development, because **dyām would have been supported by the other forms of the paradigm. In the a-stem inflection there is no trace of the laryngeal (though in Indo-Iranian only the instr. sg. and the nom. acc. pl. are relevant). On the other hand the laryngeal must have been there when the gen. pl. -H-am was changed into -aH-am, see above. (In FS Kerns I tried to solve the complex by assuming that the

laryngeal was lost in PIE and reintroduced in some cases in PII or later. It seems better to assume that the laryngeal was mostly retained but lost in some special surroundings.)

### 7.4 ṚH, after vocalic resonant.

**7.4.1 ṚHC, before consonant.** $ṛH$ and $ḷH$ resulted in *ar*, $ṃH$, $ṇH$ in $ā$ in Iranian.

G. /*darga-*/ 'long', Skt. *dīrghá-*, *$dlHg^hó$-.
L. *zāta-* 'born', Skt. *jātá-*, $ǵnh_1$-*tó*-.

**7.4.2 ṚHV, before vowel.** Ṛ became *aR*.

L. *zaranya-* 'gold', OP *daraniya-*, Skt. *híranya-*, *$ǵ^hlH$-*en-io*-
G. /*tarah*/ 'through', OP *ta<ra>*, Skt. *tirás*.
G. /*paru-*/ 'much, many', OP *paru-*, Skt. *purú-*, -*$plb_1u$-.

### 7.5 Word final

**7.5.1 -VH** see 7.2.1.

**7.5.2. -CH** see 7.3.1.

### 8. *Word-final developments*

**8.1** -*t* was lost in Avestan after *s*, *š* and *n* in OP everywhere. -*nt* became -*n* in Avestan, it was completely lost in OP.

*$k^wid$, G. -*cit*, OP *ciy*.
3 pl. inj. pres. inf. G. /*dadan*/, OP *abara*.

**8.2** -*h* was lost in OP (I suppose that it was still preserved in Gathic. In LAv. it was lost, too.)

OP *asa* 'horse', G. /-*ah*/, L. -*ō*.

-*nh* (< -*ns*) disappeared in OP; in Gathic I assume that it was still there (/-*anh*/ gen. sg. of neuter *n*-stems , in LAv. -*anh* became -* āng*]

**8.3** -*ts* > -*s* > -*h* (nom. sg. ptc. *-*ṇts* >*-*as* > -*ō*).

Where we find s, it must have been restored (G. /harvatās/ <
*-tāt-s).

8.4 In Avestan final long vowels were shortened. In Gathic texts
all final vowels are written long, but this is due to the recitation.
    In OP final short vowels were lengthened, but not those
after which one or more consonants had disappeared (8.1, 8.2);
so the lengthening was anterior to the loss of these consonants.

8.5 In OP final -i, -u are written -iy, uv.

8.6 PII -āi- -ār lost their final consonant in PII. In some cases it
was restored (e.g. dat. sg. -āi, neuter plural ār).

*9. Accent*

Of the OP accent nothing is known.
    For Avestan there are two indications of the accent: rt > ṣ
when the syllable with the r was stressed, and hy > x́y when the
next syllable was stressed.
    On the first development see 1.23 .
    The Gathic evidence for x́y is limited. The optatives x́yə̄m,
x́yāṯ, sax́yāṯ will have had stressed -yā-. The ya-presents had
stressed -ya-: /yasax́ya-/ yasō.x́ya-. Other forms are less clear. So
here again we seem to have traces of the old Indo-Iranian
accentuation. As with -rt-, -ca drew the stress to the preceding
syllable: gen. sg. a-stems /-ahya/, but /-ax́ya-ca/. zax́yā-cā, which
was /zahiHa-ca/ in Gathic, shows that this development was
post-Gathic.
    For both developments, then, there are indications that
they are post-Gathic. The Indo-Iranian accent was therefore
probably retained in principle in Gathic (it must not have been
identical in all details).

## 10. *Chronology*

At present I am not able to go much further than to group the developments into a few periods.

### *Dialectal Indo-European*

a.   $s > ṣ$ after $i$, $u$, $r$, $k$; 2.1.
b.   Bartholomae's law $(D^h T > DD^h)$; 1.11.
c.   $b^h > b$, 1.1.

### *Proto-Indo-Iranian*

a.   $k^w > k$; 1.3.
b.   $k > č$ before $ĕ$, $ĭ$, $i̯$; 1.4.
c.   $ḱ > ć$; 1.4.
d.   $l > r$; 3.1.
e.   Brugmann's law; 6.2.
f.   $ĕ$, $ŏ$, $> ă$; 6.1.
g.   $h_1$, $h_2$, $h_3$, $> H$; 7.
h.   CHC > CiC in final syllables, and before consonant; 7.2.2.
i.   $ṇHC > āC$; 7.4.1.
j.   $ṇHV > anV$; 7.4.2.

### *Proto-Iranian*

a.   $tC > θC$; 1.5. (including $tH > θH$; 1.2.)
b.   $ts > s$; 1.9.
     $(tt >) tst > st$; 1.6.
c.   $(ḱt >) ćt > št$; 1.7.
d.   $(ḱs, ǵz >) ćš, ǰž > š, ž$; 1.10.
e.   $(ḱn, ǵn >) ćn, ǰn > šn$; 1.12.
f.   $(ḱm, ǵm >) ćm, ǰm > sm, zm$; 1.13.
g.   $(ḱu̯, ǵu̯ >) ću̯, ǰu̯ > su̯, zu̯$; 1.14.
h.   $(sḱ >) sć > s$; 1.22.
i.   ($s$ before $i$, $u$, $r$, $k$ >) $ṣ > š$
j.   $s > h$; 2.4.
k.   CHC > CC (everywhere where $H$ had not become $i$ in PII); 7.2.2.
l.   $r̥HC > arC$; 7.4.1.
m.   $r̥HV > arV$; 7.4.2.

*Avestan*

a.  $(\acute{k} >)$ $\acute{c} > s$
b.  *ps* (also $s < \acute{k}$) $> f\check{s}$ 1.8, 2.3.
c.  $(\acute{k}\underset{\cdot}{u} >)$ $s\underset{\cdot}{u} > sp;$
d.  $(k\underset{\cdot}{i} >)$ $\check{c}y > \acute{s}y;$ 1.17.
e.  $rt > \underset{\jmath}{\check{s}};$ 1.23. (Post-Gathic?)
f.  $d\underset{\cdot}{u}i > dbi;$ 5.2.

*Old Persian*

a.  $(\acute{k} >)$ $\acute{c} > \theta$
b.  $(\acute{k}\underset{\cdot}{u} >)s\underset{\cdot}{u} > s;$ 1.14.
c.  $(\acute{k}\underset{\cdot}{i} >)$ $\acute{c}y > \check{s}y;$ 1.15.
d.  $(\acute{k}r >)$ $\theta r > \varsigma;$ 1.16
   $(tr >)$ $\theta r > \varsigma;$ 1.19.
e.  $(k\underset{\cdot}{i} >)$ $\check{c}y > \check{s}y;$ 1.17.
f.  $(km >)$ $xm > m;$ 1.18.
g.  $(tn >)$ $\theta n > \check{s}n;$ 1.20.
h.  $(t\underset{\cdot}{i} >)$ $\theta y > \check{s}y;$ 1.21.
i.  $(s\underset{\cdot}{u} >)$ $h\underset{\cdot}{u} > uv;$ 2.4
j.  $VHV > \bar{V};$ 7.3.3.

## Bibliography/Abbreviations

Brandenstein, W. and Mayrhofer, M.
  1964  *Handbuch des Altpersischen.* Wiesbaden, .

HbAp see Brandenstein

Hoffmann 1958. Hoffmann, K. "Iranistik," in: *Handbuch der Orientalistik.*

Kuiper 1978. Kuiper, F.B.J. "On Zarathustra's Language." *MKNAW*, Nr. 41,4.

NOTE on 'Historical Phonology of Iranian', JIES 25 (1997), 1-26.

It may be noted that this article was written in 1983. It was meant for a collective volume with a short overview of the historical phonology of the IE languages. This volume never appeared. The article was now published, but I had not seen any proofs.

The article has several misprints. The following should be noted:

p3 (l)(ine)5, read: *v-* and *uu-*

p4 1.5 from below, important information

p5 1.5 from below, used

p7 (11.) 3, 5 and 8, read d$^h$, č, ẓ

p7 in GAv. and OP add: *y*, *v*

p8 1.17, rise of ϑ in

p10 1.4, for OP *kn* read: Cf. *kn*

p14 1. 6, read *dg$^{wh}$*

p15 ex. 3. read γžaraiti

p16 middle, for PIr *ts* read *s*

p21 1. 6, read 7.2.3

p21 1.12 from below, for of. read: cf.

p22 1.10 form below, read: but -*īm*; next line: In this case; next line: was the

p23 1.11 from below, read: and *n*, in

p26 1.6, *rt* > ṣ

<div align="right">R.S.P. Beekes</div>