B. Sound laws

B.1. Indo-European phonemes

B.1.1. Vowels

It is assumed that Indo-European had short and long vowels, five each:

short vowels	a	e	i	o	u
long vowels	$\bar{a}$	$\bar{e}$	$\bar{\imath}$	$\bar{o}$	$\bar{u}$

Remember the abbreviations

- ◇ V = vowels
- ◇ $\bar{V}$ = long vowels
- ◇ $\breve{V}$ = short vowels

B.1.2. Consonants

IE consonants (abbreviated by C) might be

- ◇ P = plosives like t, $ǵh$, or k^w
- ◇ L = liquids r, l
- ◇ N = nasals n, m
- ◇ R = resonants (L, N, SV), where semivowels (SV) are explained in the following subsection
- ◇ S = sibilants: voiceless s

The Indo-European plosives (P) can be depicted in a table, where voiceless is abbreviated by `-v` and voiced by `+v`. Similarly, `+asp` and `-asp` point to aspirated and unaspirated plosives, respectively.

	-v/-asp	+v/-asp	+v/+asp
velars	k	g	gh
palatals	$\acute{k}$	$\acute{g}$	$\acute{g}h$
dentals	t	d	dh
labials	p	b	bh
labio-velars	k^w	g^w	$g^w h$

◇ The table exhibits five rows, according to the place in the mouth where the sudden release of the stream of air originates.

◇ Note the labio-velar sounds. They are written as velars with w, for example g^w or $g^w h$. k^w might have been pronounced similar to w.-i. E *queen*.

◇ The IE palatal sounds were pronounced as k together with a y-sound. They are indicated by $\acute{k}$ etc.

◇ It is not quite clear whether the voiceless aspirated sounds (not present in the above table) existed in Indo-European. In any case, they were rather uncommon. Old Indic occurances of voiceless aspirated plosives are mostly explained by laryngeals (**Lar_*CH***) or by preceding s as in the OI root *chid* or in OI *sphira*.

B.1.3. Semivowels and syllabic nasals and liquids

i and u are vowels. But they are often called semivowels (SV) because they turn into consonants before vowels, written y and v, respectively.

Inversely, nasals and liquids are consonants. However, between consonants they become syllabic, already in Indo-European times. These syllabic versions of nasals and liquids are denoted by a circle below. The interplay of sounds that can become syllabic or consonantal is summarised in the following table:

	consonants	vowels
nasals	n	$\underset{\circ}{n}$
	m	$\underset{\circ}{m}$
liquids	r	$\underset{\circ}{r}$
	l	$\underset{\circ}{l}$
(semi)vowels	y	i
	v	u

B.1.4. Laryngeals

Now, the so-called laryngeals need to be addressed. Since laryngeal theory is very helpful for understanding and learning Sanskrit, it will be applied (most of the time). Laryngeals

are not covered above under the headings of "vowels" or "consonants" for two reasons. First, one does not really know how these sounds were pronounced. Second, the laryngeal development belongs to an early stage of Indo-European. In that early stage, Indo-European did not know the vowel *a*. Vowel *o* was only present as the result of qualitative ablaut (see section B.2.4). Beyond this instance of qualitative ablaut, vowels *a* and *o* developed from *e* under the influence of an appropriate laryngeal. Most historical linguists assume three laryngeals:

- ◇ h_1 (which would leave *e* unaffected),
- ◇ h_2 (which has an *a*-quality) and
- ◇ h_3 (under whose influence *e* turns into *o*).

German speakers may enjoy the only Indo-European joke on offer:

- ◇ h_1 is called the "Kehlkopflaut" (which is what laryngeal means),
- ◇ h_2 the "Kahlkopflaut", and
- ◇ h_3 the "Kohlkopflaut".

These developments will be summarised below by the sound laws beginning with **Lar.** The capital-letter *H* without any index is employed whenever the specific laryngeal is of no importance or not known.

Laryngeal theory needed a long time to get accepted. Nowadays, a great majority of Indo-European scholars work with laryngeal theory in one form or another.[6] The most convincing argument for claiming laryngeals in Indo-European is due to Ferdinand de Saussure and deals with the verbal classes in Sanskrit.

B.2. Vowel sound laws, laryngeal sound laws, and vowel gradation

B.2.1. Old Indic *a* and *ā*

Nowadays, Sanskrit is mostly written in the Devanagari writing or in the Latin transcription. Devanagari is based on consonant-plus-vowel signs, where each consonant ends in *a* unless a marker tells otherwise. Why *a* and not *e* or *o*? Simply because *a* is much more frequent in OI than any other sound. The reason for the preponderance of *a* is this: Indo-European *a, e,* or *o* (short or long) turn into Old Indic *a*, short and long, respectively:

aā	IE $a/e/o$	$\rightarrow$	OI a
	IE $\bar{a}/\bar{e}/\bar{o}$	$\rightarrow$	OI $\bar{a}$

[6] See the collection of articles in Bammesberger (1988), where some authors express their critical distance.

Note that bold-faced abbreviations refer to sound laws. See pp. 14. Examples for IE *e* abound:

◇ The Indo-European word for "honey" is

$$\text{IE } {}^*\textit{medhu} \quad \rightarrow \quad \begin{cases} \text{OI } \textit{madhu} \\ \text{OGr. } \textit{methu} \rightarrow \text{B } \textit{methane} \end{cases}$$

◇ The "middle one" is expressed by

$$\text{IE } {}^*\textit{medhyo} \quad \rightarrow \quad \begin{cases} \text{OI } \textit{madhya} \\ \text{OGr. B } \textit{Meso-potamia} \\ \text{Lat. } \textit{medius} \end{cases}$$

For IE *o*, one can point to

$$\text{IE } {}^*\textit{ovi/h}_3\textit{evi} \quad \rightarrow \quad \begin{cases} \text{OI } \textit{avi} \\ \text{Lat. } \textit{ovi} \end{cases}$$

As an example for long vowels, consider

$$\text{IE } {}^*\textit{r\=e\acute{g}} \quad \rightarrow \quad \begin{cases} \text{OI } \textit{r\=ajan} \\ \text{Lat. } \textit{r\=ex} \end{cases}$$

B.2.2. Semivowels

Along with the vowels *a, e,* and *o*, the Indo-European language as well as Sanskrit know the semivowels *i* and *u*. They obey the sound law:

SV

$$\begin{aligned} \text{IE } i \quad &\rightarrow \quad \text{OI} \begin{cases} i, & \text{before consonant} \\ y, & \text{before vowel} \end{cases} \\ \text{IE } u \quad &\rightarrow \quad \text{OI} \begin{cases} u, & \text{before consonant} \\ v, & \text{before vowel} \end{cases} \end{aligned}$$

In fact, the rules are a bit more complicated (see below), but ***SV*** in the present formulation is already very helpful. The hybrid nature of semivowels clearly shows in the sandhi rules:

◇ with *i*:

- *phalāni*, but *phalāny akhādat* ("he ate fruit")
- *gacchāmi*, but *gacchāmy aham* ("I go")

◇ with *u*:

- *bhavatu*, but *evam bhavatv iti* ("so let it be"), where *iti* stands for "end of quote"

- *jayatu*, but *jayatv āryaputraḥ* (“may my lord be victorious”)

SV also shows up in these examples:

◇ *anv-artha* (“appropriate”) ← *anu* (“along”) + *artha* (“purpose, sense, wealth”)

◇ *vy-artham* (“in vain”) ← *vi* (“apart, away”) + *artha* (“purpose, sense, wealth”)

◇ *āśv-aśva* (“to have fast horses”) ← *āśu* (“fast”) + *aśva* (“horse”)

The “same” happens with long *ī* and long *ū*, for example

◇ *nārī âikṣata* → *nāry âikṣata* (“the woman saw”)

◇ *bhv-ādi-gaṇa* (“*gaṇa* consisting of *bhū* etc.”) ← *bhū* (“to be”) + *ādi* (“beginning”) + *gaṇa* (“cohort, flock, word group”, see pp. 85)

Thus, one obtains the rules

$$\begin{array}{lcll} \text{IE } i/\bar{\imath} & \rightarrow & \text{OI} & \begin{cases} i/\bar{\imath}, & \text{bef. consonant} \\ y, & \text{bef. vowel} \end{cases} \\ \text{IE } u/\bar{u} & \rightarrow & \text{OI} & \begin{cases} u/\bar{u}, & \text{bef. consonant} \\ v, & \text{bef. vowel} \end{cases} \end{array}$$

Sometimes (the rules are not quite clear), IE *ī* and *ū* appear as a sequence of *iy* or *uv*, respectively. Examples are

◇ *dhī* f. (“intellect”) with acc. sg. *dhiy-a-m* (not u.at. alternative *dhyam*).

◇ *bhū* f. (“earth”) with acc. sg. *bhuv-a-m* (not u.at. *bhvam*).

This change (see the first two lines in the sound law below) prevents awkward vowel clusters:

				example
V+SV	*PīV*	→	*PiyV*	*dhiy-a-m*
	PūV	→	*PuvV*	*bhuv-a-m*
	CRiV	→	*CRiyV*	*mriy-a-tê*
	CRuV	→	*CRuvV*	*ā-pnuv-an-ti*

The last two lines may have a similar motivation. Note that 4. class verbs and passive forms are built with the *ya* suffix. An example for the third line is *mr-iy-a-tê* (“he dies”) which is a 4. class verb with root *mṛ* in contrast to the 4. class verb *kup-y-a-ti* (“he is angry”) with OI root *kup*. Passive forms provide further examples:

◇ *hr-iy-a-tê* (“he is taken”) ← 1. class verb *hṛ*, *har-a-ti*

◇ *sr-iy-a-tê* (“it is moved (by)”) ← 1. class verb *sṛ*, *sar-a-ti*

in contrast to *budh-y-a-tê* or *pat-y-a-tê.*

An example for the fourth line is given by *āp-nuv-an-ti,* where *u* cannot stand directly before a vowel and needs the semivowel *v* to stand in between. The comparison of *su-nv-an-ti* or *kur-v-an-ti* with *āp-nuv-an-ti* prompts us to revisit the sound laws ***SV*** and ***V+SV***:

				example
SV	*VRiV*	→	*VRyV*	*a-vy-aya*
	VRuV	→	*VRvV*	*anv-artha, kur-v-an-ti*
V+SV	*CRiV*	→	*CRiyV*	*mr-iy-a-tê*
	CRuV	→	*CRuvV*	*āp-nuv-an-ti*

In the examples of *gacch**ā**my aham* and *s**u**-nv-an-ti* or *k**u**r-v-an-ti* the clusters *RiV* or *RuV* are preceded by a (**bold**) vowel so that one obtains the corresponding semivowel. In contrast, ***m**r-iy-a-tê* and *ā**p**-nuv-an-ti* exhibit the same clusters *RiV* or *RuV*, but they follow a (**bold**) consonant. Therefore, one does not obtain sound law ***SV*** but ***V+SV***. Finally, note that ***V+SV*** is also applied if *RuV* occurs word-initial as in *nuv-an-ti* (p. 178).

B.2.3. Diphthongs

Remember that IE *a,* *e,* and *o* coalesce into OI *a.* Nevertheless, *e* and *o* exist also in Sanskrit, but they go back to Indo-European diphthongs:

a/e/o (short or long)
plus
i/u

See the following summary of the diphthong sound laws:

DIPH	IE *ai/ei/oi*	→	OI	*ê,*	bef. consonant
				ay,	bef. vowel
	IE *au/eu/ou*	→	OI	*ô,*	bef. consonant
				av,	bef. vowel
	IE *āi/ēi/ōi*	→	OI	*âi,*	bef. consonant
				āy,	bef. vowel
	IE *āu/ēu/ōu*	→	OI	*âu,*	bef. consonant
				āv,	bef. vowel

The reader notes that my transliteration of Sanskrit words does not always conform with the usual one:

normal writing	my writing
e	*ê*
o	*ô*
ai	*âi*
au	*âu*

I do this for three reasons. First, *ê* and *ô* are long vowels. Second, OI *ê* can be distinguished from IE *e*. Third, *âi* and *âu* go back to IE long diphthongs which helps to understand some sandhi rules.

Turning to the short diphthongs, sound law **DIPH** (the first two lines) is helpful to distinguish between *nêtar* ("leader") and *nayati* ("he leads"). Similarly, for the stem *gô* ("cow") compare instr. pl. *gôbhis* with instr. sg. *gavā*. Consider also

sarvê iti (without sandhi)
→ *sarvay iti* (**DIPH**)
and then mostly
→ *sarva iti* (*y* is weak and drops here between vowels)

With respect to long diphthongs, **DIPH** (the last two lines) explains why long *ā* results from the diphtongs *âi* and *âu*. Consider

tasmai adadāt (usual spelling without sandhi)
→ *tasmâi adadāt* (our spelling without sandhi)
→ *tasmāy adadāt* (**DIPH**)
and then mostly
→ *tasmā adadāt* (*y* is weak and drops here between vowels)

and

ubhau eva (usual spelling without sandhi)
→ *ubhâu êva* (our spelling without sandhi)
→ *ubhāv êva* (**DIPH**)

Finally, an extra rule for lengthened grade (not within a root) is needed. It concerns OI word-initial clusters *viV* or *niV*. One might be tempted to apply **DIPH** and would then obtain *vāyV* or *nāyV*, respectively. However, the rule for lengthened grade of the resonant+*y* cluster is as follows:

Lg__*Ry*	OI lengthened grade of *vyV*	→	OI *vâiyV*
	OI lengthened grade of *nyV*	→	OI *nâiyV*

Important examples for lengthened grades of these prepositional prefixes *vi* and *ni* are

◇ *vyākaraṇa* (“grammar”) versus *vâiyākaraṇa* (“relating to grammar”)

◇ *nyāya* (“rule, norm”, one of the six philosophical systems) versus *nâiyāyika* (“relating to *nyāya* philosophy”)

B.2.4. Vowel gradation (ablaut)

Indo-European vowel gradation

Many Sanskrit peculiarities turn out to be regular developments when seen from the point of view of Indo-European vowel gradation. Ablaut is the German word for vowel gradation, often used also in English texts.

First of all, Indo-European roots in full grade always contained the vowel *e* (that will become *a* in Sanskrit). Within Indo-European, this *e* can undergo two types of gradation (see also figure B.1):

◇ quantitative ablaut:
- *e* may be lost (zero grade).
- *e* itself is the normal grade (full grade).
- *e* may become *ē* (lengthened *e*-grade).

◇ qualitative ablaut:
- *e* may be become *o* (*o*-grade, full grade).
- Finally, the lengthened *o*-grade *ō* (which may also be considered a quantitative ablaut) sometimes occurs.

Vowel gradation in Sanskrit

In Sanskrit, *e*/*o* and *ē*/*ō* coalesce into *a* or *ā*, depending on whether they are short or long (sound law ***aā*,** p. 21). Therefore, the traditional Indian grammarians did not consider the qualitative ablaut. Instead, they taught the three-fold distinction:

◇ svara (this is our zero grade)

◇ guṇa (normal grade)

◇ vṛddhi (lengthened grade)

Roughly speaking, svara (zero grade) and guṇa (full grade) tend to go back to Indo-European, whereas many instances of the lengthened grade have developed within Old Indic, only.

Beautifully, vowel gradation is pretty transparent in Sanskrit. That is why a firm grasp of its workings is indispensable. Importantly (and true cum grano salis):

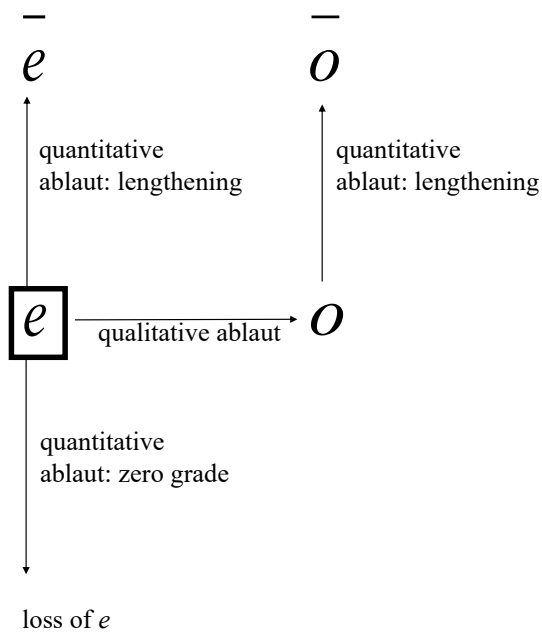

Figure B.1.: Indo-European Vowel Gradation (Ablaut)

◇ Strong forms (in the nominal declension as well as in the verbal conjugation, in particular the athematic classes) involve the full grade.

◇ The weak forms are based on the zero grade.

However, in contrast to the Sanskrit grammarians, it is best to begin with the normal or full grade. Let us consider a few examples. *budh, bôdhati* is Sanskrit for "to be awake". In Indo-European times, *ô* went back to *eu* before consonants (**DIPH**, p. 24). Also in Indo-European times, the *e* was dropped to obtain the zero grade *budh* (in fact, IE **bhudh* but that is another story). Certainly not *bvdh* because syllables need a vowel (p. 20).

A second example: "remember" in Sanskrit is

smṛ	the OI root in zero grade
smar-a-ti	the 3. pers. sg. pres. ind. in f.g. (see pp. 10)

In the zero grade, without *a* (representing IE *e*), one does not have *smar* but *smṛ*. For example, the past perfect participle (PPP) is normally formed from the zero grade, here *smṛ-ta* ("remembered"). The dot under the *r* indicates that *ṛ* is syllabic, i.e., it has vowel quality. Indo-European syllabic *r* is denoted by a larger circle: IE *r̥* (p. 20).

A last example concerns the nasals. OI *nam* ("to bow") is in the full grade. The PPP is *nata* which goes back to IE *nm̥to.* This points to an important sound law:

SY__N

IE $\underset{\circ}{n}C$	$\rightarrow$	OI aC
IE $\underset{\circ}{m}C$	$\rightarrow$	OI aC
IE $\underset{\circ}{n}V$	$\rightarrow$	OI anV
IE $\underset{\circ}{m}V$	$\rightarrow$	OI amV

The vowel-gradation table

IE and OI vowel gradations can now be summarised in one table:

	just e	semivowel y	semivowel v
z.g.	IE - $\rightarrow$ OI -	IE $i \rightarrow$ OI i	IE $u \rightarrow$ OI u
f.g.	IE $e \rightarrow$ OI a (***a ā***)	IE $ei \rightarrow$ OI $ê/ay$ (**DIPH**)	IE $eu \rightarrow$ OI $ô/av$ (**DIPH**)
l.g.	IE $ē \rightarrow$ OI $ā$ (***a ā***)	IE $ēi \rightarrow$ OI $âi/āy$ (**DIPH**)	IE $ēu \rightarrow$ OI $âu/āv$ (**DIPH**)

	r	n
z.g.	IE $\underset{\circ}{r} \rightarrow$ OI $\underset{\cdot}{r}$	IE $\underset{\circ}{n} \rightarrow$ OI a (**SY__N**)
f.g.	IE $er \rightarrow$ OI ar (***a ā***)	IE $en \rightarrow$ OI an (***a ā***)
l.g.	IE $ēr \rightarrow$ OI $ār$ (***a ā***)	IE $ēn \rightarrow$ OI $ān$ (***a ā***)

Look at a few other examples about ablaut laws:

◇ IE **es* ("to be") clearly shows in the full grade *as-ti* ("he is", compare Lat. *est*) and zero grade *s-anti* ("they are", compare Lat. *sunt*).

◇ OI *i* ("to go") has full grade *ê-ti* ("he goes", with *ê* before consonant according to **DIPH**) and zero grade *y-anti* ("they go", with consonant *y* before vowel).

◇ The vṛddhi form (lengthened form) of *budh* appears in *bâud-dha* ("concerning understanding, Buddhist").

◇ The Sanskrit term for lengthened grade vṛddhi goes back to *vṛdh, vardh-a-tê* ("to grow"). Funnily, *vṛd-dhi* is an example of the zero grade.

◇ Lat. *mens, mentis* (known from borrowed or foreign word *mental*) is cognate with Sanskrit zero grades *mati* ("thought, idea") and the past participle *mata*, where *a* stems from syllabic $\underset{\circ}{n}$ (**SY__N**). The full grade is represented by the neuter noun *manas*, while *māna* ("opinion, intent") shows the lengthened grade.

◇ English and German examples of ablaut are presented at pp. 71 below.

B.2.5. Sanskrit representation of IE syllabic nasals and liquids, without laryngeals

Indo-European knew syllabic nasals and liquids, probably both short and long. Restricting attention to short syllabic nasals and liquids, the rule for syllabic nasals can be written as

IE_SY_*N* IE $\underset{\circ}{n}/\underset{\circ}{m}$ → OI { *an/am* bef. vowel; *a/a* between consonants

Consider the OI examples *an-anta* ("without end") and *a-gatika* ("without way out"), respectively. For syllabic liquids, the sound law reads

IE_SY_*L* IE $\underset{\circ}{r}/\underset{\circ}{l}$ → OI { $\underset{\circ}{r}$ or $\underset{\circ}{l}$ (!) between cons.; *ur/ur* before vowels, after labials; *ir/ir* (?) before vowels, not after labials

Examples are presented on pp. 69. Laryngeals affeccted these developments in particular manners as can be seen on pp. 30.

B.2.6. Resolution of syllabic conflicts

Sometimes, it may be unclear which sound is to become syllabic. For example, 3. pers. pl. (!) pres. ind. *bi-bhy-a-ti* might be explained by

IE **bhi-bhiH-*$\underset{\circ}{n}$*-ti* (reduplication, zero grade)
bhi-bhī-$\underset{\circ}{n}$*-ti*
and then
→ *bi-bhī-n-ti* (second to last syllabifiable sound syllabic)
or
→ *bi-bhy-a-ti* (last syllabifiable sound syllabic)

Apparently, the following rule applies:

SY_Conf Make the last syllabifiable sound syllabic!

A second example is *karm-a-bhis* rather than u.at. *karanbhis* (p. 249).

This rule can be applied several times. Consider *yuv-a-ti* from (something like) IE *yuv-*$\underset{\circ}{n}$*-ti*, where, from right to left, the following development might be postulated:

IE **yuv-*$\underset{\circ}{n}$*-ti*
→ *yuv-a-ti (***SY_Conf** with respect to $\underset{\circ}{n}$)
→ *yu-v-ati (**SV*** with respect to *v)*
→ *y-u-vati (***SY_Conf** with respect to *u*)
→ *y-uvati (**SV*** with respect to *y)*

B.2.7. Laryngeal sound laws

The sound laws

Laryngeals did not survive in OI as such. But they left specific traces in three groups (a fourth one is covered under consonant sound laws). First, consider these laryngeal laws with respect to vowels and diphthongs:

Lar_*V*	IE $h_1e/h_2e/h_3e$	$\rightarrow$	IE $e/a/o$
	IE $iH/uH/eH/oH$	$\rightarrow$	$\bar{\imath}/\bar{u}/\bar{a}/\bar{a}$
	IE $eiH/euH/\bar{e}iH/\bar{e}uH$	$\rightarrow$	IE $ei/eu/\bar{e}i/\bar{e}u \rightarrow$ **DIPH**
	IE CHC	$\rightarrow$	CiC or CC (unclear conditions)

The first line is understandable from pp. 20. The second line says that laryngeals were lost under compensatory lengthening. The same may hold for the third line, but the diphthongs are long already.

Consider the instructive example of IE $^*bheuH$ ("to be"). One finds

- ◇ zero grade OI *bhū-ta* (long $\bar{u}$ is an instance of compensatory lengthening for the dropped laryngeal, **Lar_*V*** second line)
- ◇ full grade *bhav-a-ti* (the laryngeal is lost without effect between consonant and vowel, **Lar_*CH***)
- ◇ full grade *bhav-i-tum* (the laryngeal becomes *i* between consonants, **Lar_*V*** fourth line)

In contrast to the sound law IE $CHC \rightarrow CiC$, laryngeals are sometimes dropped without apparent trace, as in *da-dh-mas* ("we set") from IE $^*de\text{-}dhh_1\text{-}mes$. The conditioning factors are difficult to discern. Compare s.v. *dā* ("to bind") $\leftarrow$ IE $^*deH$ with the two zero grades

- ◇ *d-ya-ti* $\leftarrow$ IE $^*dH\text{-}ye\text{-}ti$ and
- ◇ *a-di-ti* $\leftarrow$ IE $^*\underset{\circ}{n}\text{-}dH\text{-}ti$

Second, when laryngeals follow syllabic nasals or liquids, one finds:

Lar_SY	IE $C\underset{\circ}{n}HC$	$\rightarrow$	$C\bar{a}C$
	IE $C\underset{\circ}{m}HC$	$\rightarrow$	$C\bar{a}mC$ (or $C\bar{a}C$)
	IE $C\underset{\circ}{m}HV$	$\rightarrow$	$CamV$
	IE $C^{\texttt{+lab}}\underset{\circ}{r}H$	$\rightarrow$	$C\bar{u}r$
	IE $C^{\texttt{-lab}}\underset{\circ}{r}H$	$\rightarrow$	$C\bar{\imath}r$

jan, jāyatê ("to be born") is often considered a very irregular verb, with the PPP *jāta* and the agent noun *janitar* ("creator, progenitor"). Compare

◇ long *ā* in zero grade (4. class verb with *ya,* PPP) and

◇ short *a* in full grade (agent noun).

Shouldn't it be the other way around? No. The Indo-European full grade of this verb is (to be reconstructed as) **ǵenH* so that one regularly obtains

◇ zero grade OI PPP *jā-ta* ← *ǵn̥H-to* according to sound law IE $C\underset{\circ}{n}H \rightarrow C\bar{a}$,

◇ zero grade OI *jā-ya-tê* ← *ǵn̥H-ye/o-tei,*

◇ full grade *jan-i-tar*, where the laryngeal turns into *i* between the consonants *n* and *t*.

The only "problem" may be the root *jan* itself. However, would you prefer to memorise *jā, jāyatê* instead of *jan, jāyatê*?

Third, a laryngeal metathesis apparently took place in some examples:

Lar_MTh	IE *CHiC*	→	*CiHC*
	IE *CHuC*	→	*CuHC*

The laryngeal vowel-gradation table

In line with the above sound laws, reconsider the table from pp. 28, but here with laryngeals:

	just *e*+*H*	semivowel *y*+*H*	semivowel *v*+*H*
zero gr.	IE *CHC* → OI *CiC* (also *CC*) IE *CHV* → OI *CV*	IE *iH* → OI *ī*	IE *uH* → OI *ū*
full gr.	IE *eH* → OI *ā*	IE *eiH* → OI *ê/ay*	IE *euH* → OI *ô/av*
length. gr.	IE *ēH* → OI *ā*	IE *ēiH* → OI *âi/āy*	IE *ēuH* → OI *âu/āv*

	r+*H*	*n*+*H*
zero gr.	IE $C^{\texttt{+lab}}\underset{\circ}{r}H \rightarrow$ OI *Cūr* IE $C^{\texttt{-lab}}\underset{\circ}{r}H \rightarrow$ OI *Cīr*	IE $C\underset{\circ}{n}H \rightarrow$ OI *Cā*
full gr.	IE *erH* → OI *ar*	IE *enH* → OI *an*
length. gr.	IE *ērH* → OI *ār*	IE *ēnH* → OI *ān*

In Sanskrit grammar books, one often encounters "*sêṭ* roots". The word *sêṭ* derives from

◇ OI *sa* (“with”) and

◇ *iṭ* (which is the usual manner in which traditional Indian grammarians refer to the vowel *i*)

together with a sandhi rule to be explained in the following subsection.

Many of the *sêṭ* roots ended in a laryngeal, like OI *bhū* or *jan*. In some grammatical forms, *i* is a reflex of the laryngeal (see the infinitives *bhav-i-tum* or *jan-i-tum*). Roots without *i* are “*an-iṭ* roots”, where *an-iṭ* ← *an* + *iṭ* uses the negating particle *a* or *an* (see *a* in the etymological dictionary). Some roots only sometimes exhibit the *i*. These are the “*vêṭ* roots”, with *vā* (“or”).

B.2.8. Vowel sandhi rules

In the previous subsections, a few sandhi rules could already be illuminated by referring to IE-OI sound laws. Some sandhi rules refer to developments within Old Indic. For these, the advantage of the modified transliteration will again be obvious:

VS	OI $\breve{V}/\bar{V}$ + $\breve{V}/\bar{V}/SV$	→	OI $\bar{V}$
	OI $a/\bar{a}$ + $i/\bar{\imath}$	→	OI $\hat{e}$
	OI $a/\bar{a}$ + $u/\bar{u}$	→	OI $\hat{o}$
	OI $a/\bar{a}$ + $\hat{e}$	→	OI $\hat{a}i$
	OI $a/\bar{a}$ + $\hat{o}$	→	OI $\hat{a}u$
	pret. augment a + $i/\bar{\imath}$	→	OI $\hat{a}i$
	pret. augment a + $u/\bar{u}$	→	OI $\hat{a}u$

VS rules partly contradict the IE-OI sound laws **DIPH** (p. 24). This is no problem because the latter refer to the development from Indo-European to Old Indic, while the former describe inner-Indic sound changes.

Consider the fourth line of **VS** and *atraiva* (as the standard spelling goes):

	atra êva (without vowel sandhi)
→	*atra aiva* (*ai* as short diphthong with *i*)
→	*atrâiva* (two short *a* have become one long $\bar{a}$)
=	*atraiva* (usual spelling)

or the fifth line of **VS** and *saudanam pacati* (again with the standard transliteration):

sā ôdanam pacati (without vowel sandhi)
→ *sā audanam pacati* (*au* as short diphthong with *u*)
→ *sâudanam pacati* (by $\bar{a} + a = \bar{a}$)
= *saudanam pacati* (usual spelling)

In a similar, fashion, the second and third lines of **VS** are unsurprising. Consider

êvam bhava iti vadati (without vowel sandhi)
→ *êvam bhavêti vadati* ($a + i = \hat{e}$)

or

ca iti (without vowel sandhi)
→ *cêti* ($a + i = \hat{e}$)

or

dêva-īśvara (compound, without vowel sandhi)
→ *dêvêśvara* ($a + \bar{\imath} = \hat{e}$)

or

mêgha-udakam (compound "cloud water → rain", without vowel sandhi)
→ *mêghôdakam* ($a + u = \hat{o}$)

or

a-va-uc-a-t (aorist "he spoke", without vowel sandhi)
→ *a-vôc-a-t* ($a + u = \hat{o}$)

Against the above rules, if the preterite augment short (!) *a* precedes *i/ī/u/ū*, one does not observe *ê* or *ô*, but *âi* and *âu*, respectively (see the last two lines of **VS**). Examples:

na īkṣatê ("he does not see", without vowel sandhi) → *nêkṣatê* (**VS** 2. line)
but *a-īkṣat* ("he did not see", without vowel sandhi) → *âikṣat* (**VS** 6. line)

or

têna uktam ("he said", without vowel sandhi) → *tênôktam* (**VS** 3. line)
but *a-uṣ-ma* ("we wished", without vowel sandhi) → *âuṣ-ma* (**VS** 7. line)

In some aorist forms, we observe the same phenomenon, as in *âiṣīt* ("he wished") from root *iṣ*.
For the first five lines of **VS**, many additional examples are easily found:

a/ā + *a/ā* → *ā* (VS 1. line)

◇ *jalāśaya* (“stay of water → lake”) ← *jala* (“water”) + *ā-śaya* (“stay, sojourn”)

◇ *vêdānta* (“end of Vedic literature”) ← *vêda* (“theological knowledge, Veda”) + *anta* (“end”)

◇ *vātāyanam* (“window”) ← *vāta* (“wind”) + *ayanam* (“going, motion, hallway”) ← *i*

◇ *rāmāyaṇa* (name of an Indian epic) ← *rāma* (“name of Indian hero”) + *ayanam* (“going, motion, hallway”)

◇ *sārtha* (“caravan”) ← *sa* (“together with”) + *artha* (“wealth”)

◇ *sānanda* (“he with delight”) ← *sa* (“together with”) + *ānanda* (“delight”)

◇ *bhūtārtha* (“fact, issue”) ← *bhūta* (PPP of *bhū*) + *artha* (“meaning, purpose”)

◇ *êkāgra* (“one-pointed, focussed”) ← *êka* (“one, single”) + *agra* (“top, summit, beginning”)

◇ *gatāsu* (“with life gone away, dead”) ← *gata* (PPP of *gam*) + *asu* (“life”)

i/ī + *i/ī* → *ī* (VS 1. line)

◇ *atīta* (“gone by”) ← *ati* + *i-ta* (PPP of *i*)

◇ *atīva* (“exceedingly, very”) ← *ati* + *iva*

◇ *vi-parīta* (“perverse, false”) ← *vi* + *pari* + *ita* (PPP of *i*)

u/ū + *u/ū* → *ū* (VS 1. line)

◇ *sūkta* (“well said”) ← *su* (“good”) + *ukta* (PPP of *vac*, “to say”)

◇ *bāhūtkṣêpam* (“having thrown up ones arms”) ← *bāhu* (“arm”) + *ud* (preposition, “up”) + full grade of *kṣip* (“to throw”) + gerund suffix *am* (pp. 114)

◇ from *yuv-an* m. (“youngster”) instr. sg. *yū-n-ā* ← *yuv-n-ā*

a/ā + *i/ī* → *ê* (VS 2. line)

◇ *sam-upêta* (“provided with”) ← *sam* + *upa* + *i-ta* (PPP of *i*)

◇ *sêṭ* (“with *i*”) ← *sa* (“together with”) + *iṭ* (traditional expression for OI *i*)

◇ *vêṭ* (“with or without *i*”) ← *vā* (“or”) + *iṭ* (traditional expression for OI *i*)

◇ *prêtyêha* (“in the hereafter and here”) ← *pra-i* (“to go forward, to die”) + *tya* (gerundive suffix) + *iha* (“here”)

a/ā + *u/ū* → *ô* (VS 3. line)

◇ *êkônaviṃśati* ("20-1 = 19") ← *êka* ("one, single") + *ūna* ("incomplete") + *viṃśati* ("twenty")

◇ *hitôpadêśa* (name of a fable collection, "instruction on well-being") ← *hita* ("well-being", PPP of *dhā*) + *upa-dêśa* ("teaching", see *diś*)

◇ *a-vôc-a-t* (aorist, 3. pers. sg. of *vac*, "he said") ← **a-va-uc-a-t*

a/ā + *ê* → *âi* (VS 4. line)

◇ *êkâikaśas* adv. ("one by one") ← *êka* ("one") + *êka* + *śas* (adverbial suffix)

a/ā + *ô* → *âu* (VS 5. line)

◇ *vanâukas* m. ("living in the forest, ascetic") ← *vana* ("forest") + *ôkas* n. ("living place, homeland")

◇ *divâukas* m. ("living in heaven, god") ← *diva* ("heaven") + *ôkas* n. ("living place, homeland")

◇ *uttamâujas* m. ("being of superior strength") ← *uttama* ("highest, best") + *ôjas* n. ("strength")

B.2.9. Lengthening of Indo-European *o* in open syllables (according to Brugmann)

A somewhat special law is due to the famous Leipzig scholar Karl Brugmann. It says

$$\textbf{L}o \qquad \text{IE } oCV \quad \rightarrow \quad \text{OI } \bar{a}CV$$

This law is rather complex:

◇ First, it is only IE *o*, but not IE *e* or *a* that are lengthened. From a purely Sanskrit point of view, it is difficult to know whether the law applies because IE vowels *a, e*, and *o* turn into OI *a*.

◇ Second, the syllable has to be open, i.e., IE *o* is followed by only one consonant plus a vowel:

- Sometimes, a second consonant in the form of a laryngeal may not be visible any more. Then, the law does not apply. See *janayati* below.
- If the word finishes with IE *o*, the syllable is open, but Brugmann does not apply. See *pra* below.
- If IE *o* goes back to h_3e, the law is also not applied. See *avi* in the dictionary.

Differently put, one obtains IE $o \rightarrow$ OI $\bar{a}$ unless the syllable is heavy already, i.e., heavy by the existence of two consonants after o. Consider four classes of examples: First, 1. pers. pl. forms like *bhar-ā-mas* ← IE **bher-o-mes* show the long $\bar{a}$ before m in an open syllable. (However, 1. pers. sg. forms like *bharāmi* do not fall under this heading because of Greek *pherō* and Latin *ferō*. Apparently, *mi* was added in Sanskrit after long $\bar{o}$ which already indicates the 1. pers. sg.)

Second, causatives (with causative marker IE o) do also sometimes show long $\bar{a}$, this time before the liquid r:

	IE **mor-ey-e-ti* ("he makes die, he kills")	→	*mār-ay-a-ti*
but	IE **ǵonH-ey-e-ti* ("she begets")	→	*jan-ay-a-ti*

In the second example, the laryngeal makes the syllable a closed one so that Brugmann's law does not apply.

Third, in the perfect tense, compare

	1. pers. sg.		3. pers. sg.	
√	IE	OI	IE	OI
kṛ	*ke-kor-h_2e*	*ca-kar-a*	*ke-kor-e*	*ca-kār-a*
gam	*g^we-g^wom-h_2e*	*ja-gam-a*	*g^we-g^wom-e*	*ja-gām-a*
tan	*te-ton-h_2e*	*ta-tan-a*	*te-ton-e*	*ta-tān-a*

In the 1. pers. sg., the syllable is not open because of the laryngeal. In the 3. pers. sg., the syllable is open and hence Brugmann's law applies. The 1. pers. sg. also has the Sanskrit alternatives *ja-gām-a, ta-tān-a*, or *ca-kār-a*, respectively. However, these **L*o*-**violating variants do not show up in the older Vedic language.

Fourth and finally, Brugmann does not apply in open syllables in absolute auslaut. See OI *pra* ← IE **pro* and OI *sa* ← IE **so.*

B.3. Consonants

B.3.1. Old Indic consonants

Most OI stops or plosives can be put into a matrix with five rows and four columns:

	`-v/-asp`	`-v/+asp`	`+v/-asp`	`+v/+asp`	nasals	sibilants
velars	*k*	*kh*	*g*	*gh*	*ṅ*	
palatals	*c*	*ch*	*j*	*jh*	*ñ*	*ś*
cerebrals	*ṭ*	*ṭh*	*ḍ*	*ḍh*	*ṇ*	*ṣ*
dentals	*t*	*th*	*d*	*dh*	*n*	*s*
labials	*p*	*ph*	*b*	*bh*	*m*	

In each of these rows, voiceless (abbreviation: `-v`) and voiced (`+v`) representatives, both aspirated (`+asp`) and unaspirated (`-asp`), are found. These sounds are stops or plosives because the air is stopped before it is finally released in an explosive manner. The fifth column hosts the corresponding nasals and the sixth column the sibilants.

B.3.2. Primary and secondary palatalisation

Reconsider a part of the IE table of plosives:

	`-v/-asp`	`+v/-asp`	`+v/+asp`
velars	*k* (**SPal**?)	*g* (**SPal**?)	*gh* (**SPal**?)
palatals	$\acute{k} \rightarrow$ OI *ś* (**PPal**)	$\acute{g} \rightarrow$ OI *j* (**PPal**)	$\acute{g}h \rightarrow$ OI *h* (**PPal**)
dentals	*t*	*d*	*dh*
labials	*p*	*b*	*bh*
labio-velars	k^w (**SPal**?)	g^w (**SPal**?)	$g^w h$ (**SPal**?)

Dentals and labials are basically unaffected by IE-OI sound changes. Both the IE table (see p. 20) and the OI table of plosives have palatals in their second rows. The development from IE palatals to OI ones is called primary palatalisation:

PPal	IE $\acute{k}V$	$\rightarrow$	OI *śV*
	IE $\acute{g}V$	$\rightarrow$	OI *jV*
	IE $\acute{g}hV$	$\rightarrow$	OI *hV*
but **SIB** (p. 45)	IE $\acute{k}s$/IE $\acute{g}s$	$\rightarrow$	OI $ks \rightarrow kṣ$ (***RUKI***)
	IE $s\acute{k}$	$\rightarrow$	OI *cch*
but **BA**	IE $\acute{k}D^{-\mathtt{v}}$	$\rightarrow$	OI $kD^{-\mathtt{v}}$
but ***sz***	IE $\acute{g}P^{+\mathtt{v}}$	$\rightarrow$	OI $zP^{+\mathtt{v}}$
	IE $\acute{g}P^{-\mathtt{v}}$	$\rightarrow$	OI $sP^{-\mathtt{v}}$

As examples for primary palatalisation, consider the word for "hundred"

$$\text{IE } \acute{k}\underset{\circ}{m}tóm \quad \rightarrow \quad \begin{cases} \text{OI } \acute{s}atám \\ \text{OGr. } he\text{-}katon \\ \text{Lat. } centum \\ \text{Gth. } hund \end{cases}$$

or the one for "*knee*":

$$\text{OI } jānu \quad \leftarrow \quad \text{IE } {}^*\acute{g}enu/\acute{g}onu \quad \rightarrow \quad \text{Lat. } genu \quad \sim \quad \text{E } knee$$

The following three verbs confirm the fifth line: OI *ch* (with *cch* within words after short vowels) goes back to IE $^*s\acute{k}$ as in

- ◇ *iṣ, icchati* ("to wish") ∼ E *ask* ∼ OHG *eiscōn* → NHG *er-heischen* ("to ask for, to demand")
- ◇ *gam, gacchati* ("to go") ∼ OGr. *baskō* ← IE $^*g^w\underset{\circ}{m}$-$s\acute{k}$
- ◇ *pracch, pṛcchati* ∼ NHG *forschen* ∼ Lat. *pōscere, pōscō* ("to claim, to demand") ← IE $^*p\underset{\circ}{r}\acute{k}$-$s\acute{k}$ (where **CCl** gets applied before IE $s\acute{k}$ → OI *cch*)

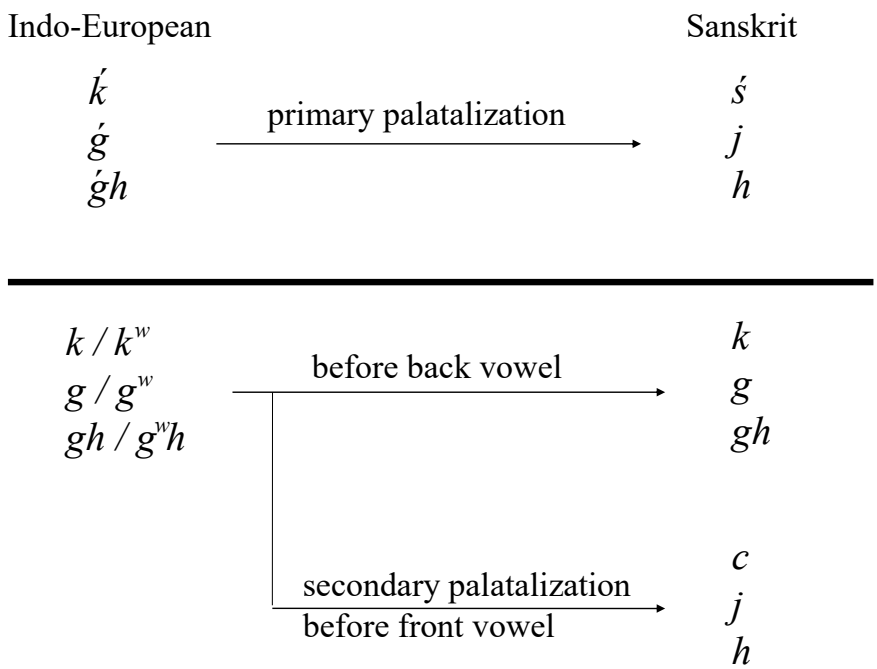

Figure B.2.: Primary and secondary palatalisation

Later on, within the Indo-Iranian language group, secondary palatalisation (**SPal**) set in. While **PPal** invariably occurs, **SPal** depends on whether an IE (!) front vowel (IE *e* or *i*) follows. Figure B.2 on p. 38 summarises the most important palatalisation laws. Secondary palatalisation is most clearly seen in reduplicated forms, for example in the reduplicated perfect:

	3. pers. sg.	
√	IE	OI
kṛ	*ke-kor-e*	*ca-kār-a*
gam	g^we-g^wom-*e*	*ja-gām-a*

Additional examples for secondary palatalisation are provided by

◇ OI *ca* ← IE $*k^we$ → Lat. *que*

◇ OI *jīva* ← IE $*g^wīvo$ (“living”) → Lat. *vīvus*

◇ OI *jahi* ← IE $*g^wh\underset{\circ}{n}$-*hi*, which is difficult (see p. 176)

B.3.3. Aspiration laws (due to Bartholomae, due to Grassmann)

Aspiration shift (ASh)

There exist two aspiration laws that explain changes from Indo-European to Indo-Iranian.

◇ Aspiration shift (Bartholomae’s law):

In consonant clusters, the aspiration shifts to the last consonant (if possible!).

◇ Aspiration dissimilation or deaspiration (Grassmann’s law):

If aspirated consonants occur in the beginning of two subsequent syllables, the first aspirated consonant loses its aspiration.

Let us consider the shift of aspiration due to Christian Bartholomae (who earned his Dr. phil. in Leipzig in 1877). The most frequent occurrences are

ASh	IE *gh-t*	→	OI *g-dh*
	IE *dh-t*	→	OI *d-dh*
	IE *bh-t*	→	OI *b-dh*
but	IE *gh-s/ǵh-s*	→	*g-s* → *k-s* (**BA**) → *k-ṣ* (**RUKI**)
	IE *dh-s/th-s*	→	*d-s/t-s* → OI *t-s* (**BA**)
	IE *bh-s*	→	*b-s* → OI *p-s* (**BA**)

Some PPPs exhibit both aspiration shift and forward assimilation (voiceless *t* becoming voiced *d* which is then aspirated):

◇ *bud-dha* ← *budh-ta*

◇ *lab-dha* ← *labh-ta*

The main rule seems to be that aspirated consonants are not admitted within consonant clusters. Assume, now, that *bh* is followed by the consonant *s* which is voiceless and unaspirated. Indeed, voiced or aspirated sibilants do not exist in Sanskrit. Therefore, two problems are encountered:

◇ While aspiraton can shift away from *b*, *s* cannot assume the aspiration.

◇ Voice cannot be forwarded to *s*.

As a consequence, backward assimilation (from voiceless *s* to voiced *b* sets in) and one obtains a form like future 3. pers. sg.

IE **lebh-sy-e-toi* (f.g. with future in *sy*)
→ *labh-sy-a-tê*
→ *lap-sy-a-tê* (**ASh**)

Deaspiration (DA)

The second aspiration law is named after Hermann Grassmann, a German mathematician and Indologist. (He was not the inventor, however. See the article by Romaschko (2000).) Imagine having two aspirated sounds. One should probably add that these aspirated sounds occur syllable-initial. However, levelling may have done its work in many cases where the second aspirated sound is not found at the beginning of a syllable. In any case, the first one becomes deaspirated:

DA IE $C^{+\mathrm{asp}}VC^{+\mathrm{asp}}(V)$ → OI $C^{-\mathrm{asp}}VC^{+\mathrm{asp}}(V)$

Reduplicated forms provide examples.

◇ From OI *bhū* ("to be"), one obtains the perfect *ba-bhūva* ("he was").

◇ Verbs of class 3 are reduplicated and provide examples such as *dhā, da-dhā-ti* ("to put")

Consider OI *budh, bôdhati* which goes back to IE **bheudh*. Interestingly, the word initial *bh* appears in the future form *bhôt-sy-ati*. Think about it this way:

◇ **ASh** is applied:

dh lost its aspiration in the consonant cluster and became voiceless before voiceless *s*. *sy* could not assume the aspiration.

◇ **DA** is not applied:

The second (originally aspirated) consonant *dh* is not aspirated any more. Therefore, deaspiration did not take place.

Finally, compare

◇ nom. *kāma-dhuk* f. (“wish fulfillment”) with

◇ acc. *kāma-duh-am*

IE **dheugh* means “to milk”. In accusative, *h* is followed by a vowel (apply **DA**). In nominative, *k* (**AFP**) is in word-final position (do not apply **DA**).

B.3.4. Assimilations

Introductory remark

All languages have assimilation rules. In the context of the Old Indic language, many assimilations are called sandhi rules. Most assimilations work backward, where a sound influences the preceeding one. Forward assimilation is also present, in particular with respect to cerebralisation. Interestingly, when a cerebral plosive (that would be inclined to make the following sound cerebral) is followed by a palatal or dental plosive (that would be inclined to palatalise or dentalise the preceding sound), a stalemate results: no assimilation takes place in *ṣaṭ-cakra* (“six chakras”) or *ṣaṭ-triṃśat* (“thirty-six”).

Backward assimilations

Let us begin with some important and rather obvious cases of backward assimilation:

BA

motivation	example
voicelessness	*yuk-ta* ← IE **yug-to* *tat kamalam* ← *tad* + *kamalam*
voice	*grāmād vanam* ← *grāmāt* + *vanam*
nasalising of dentals	*tan mitram* ← *tad* + *mitram* *un-mārga m.* (“a wrong or evil way”) ← *ud-mārga* *annam* ← *ad-nam* (OI root *ad*) *ṣaṇ-māsa m.* (“period of six months”) ← *ṣaṭ-māsa*
palatalisation	*tac chrutvā* ← *tad* + *śrutvā* *uccarati* ← *ud-carati*
dentalisation	PPP *śrānta* ← **śrāmta* ← IE **kr̥̊mH-to*

Less obvious sorts of backward assimilation are covered in the following subsections and sections.

Backward assimilation: *sz* soundlaw

For intermediate steps, three so-called ***sz*** laws are needed. *z* is a voiced sibilant. It can originate from voiceless *s* before voiced consonant. Alternatively, it can go back to IE *ǵ*, again before voiced consonants. These are the sound laws:

sz	IE *s* before vowel or voiced stop	→	**z*
	IE *ǵ* before voiced stop	→	**z*
	IE *ǵ* before voiceless stop	→	**s*

For examples concerning the first two sound laws, please, wait until pp. 50. An example for the third law, is provided by PPP *iṣ-ṭa* of OI *yaj* ("to sacrifice"):

	IE **iǵ-to* (z.g. with PPP marker *to*)
→	*is-ta* (***sz*** before voiceless cons.)
→	*iṣ-ta* (**RUKI**)
→	*iṣ-ṭa* (**Cer*D***)

Backward assimilation: insertion of sibilant after word-final *n*

If a word-final *n* stands before certain voiceless consonants, it is changed into anusvāra and an additional sibilant is inserted. This rule is best seen from a few examples:

a-bhar-an ca	→	*a-bhar-aṃ-ś ca* (***Ns***)
has-an ṭīkatê	→	*has-aṃ-ṣ ṭīkatê*
dêvān tatra	→	*dêvāṃ-s tatra*

This change might seem odd at first sight. Its explanation goes back to the acc. pl. (and maybe other forms) which is believed to have been IE **-o-ns* and hence OI *ān* in line with **CpL*s*** (p. 53). Apparently, the final consonant *s* was not dropped if standing right before the above consonants. Instead it was joined with, and assimilated to, these consonants.

Forward assimilations: overview

Forward assimilations are rarer than backward ones. Consider these main classes:

1. Aspiration shift **ASh** (p. 39):

   A prominent example is PPP *budh-ta*→ *bud-dha.* Both aspiration and voice go forward.

2. Cerebralisation:
   - ◇ of *s* after *i* and other sounds (**RUKI**, p. 43) as in loc. pl. *nadīṣu* of *nadī* ("river")
   - ◇ of dentals after *ś*, *ṣ,* or *ẓ* (**Cer*D***, p. 44), for example, PPP *dṛṣ-ṭa* of OI root *dṛś* ("to see")

◇ of *n* after *r* (**Cer*n***, p. 44) as in *maraṇam* (“death”)

3. Palatalisation of *n* after *j*:
   ◇ The stem for “king” is *rāj-an* and the instr. sg. is *rāj-ñ-ā.*
   ◇ The OI root *jñā* goes back to IE $^*ǵneh_3$ (“to know”).

Forward cerebralisation: RUKI

One famous cerebralisation law is called after the sounds that precede OI *s*, leading to cerebralisation. These sounds are

◇ OI *r*-sounds, such as *r* and *ṛ* with examples
   - *karṣa* (“ploughing”) and
   - *kṛṣṇa* (“black, dark”)

◇ OI *u*-sounds such as *u* and *ô* (see **DIPH**, p. 24) with example *gô-ṣṭham* (“cowshed”) ← stem *gô* (“cow”) + *sthā* (“to stand”)

◇ OI *k* with example loc. pl. *vākṣu* ← *vāc* (“word”)

◇ OI *i*-sounds such as *i* and *ê* with examples
   - *sthā, ti-ṣṭhati* (“to stand”) with *i*-reduplication
   - *dêva* (“god”) with loc. pl. *dêvêṣu*
   - *sad, ni-ṣīdati*

The first line of the **RUKI** sound law is a summary of the above developments:

RUKI	OI *r/ṛ/u/ô/k/i/ê* + *s/z* not w.f., not bef. P^{+v}	→	OI *r/ṛ/u/ô/k/i/ê* + *ṣ/ẓ*
	IE *ḱs*	→	OI *kṣ*
	OI *us/is* before voiced stop	→	OI *ur/ir*
	OI *is-r*	→	OI *is-r* (“no **RUKI**”)

The **RUKI** sound laws are not clearcut: The example of *duḥ-kham* (“misfortune”) does not fit the first line.

The second line seems clear from an example like *vaś* (“to wish”) with 2. pers. sg. pres. ind. *vak-ṣi* ← IE **veḱ-si.*

The third line is necessitated by the neuter noun *havis* (“oblation”)

◇ with instr. pl. *havir-bhis* before voiced consonant

◇ but loc. pl. *haviḥ-ṣu* before unvoiced consonant

The fourth line is exemplified by *tamisram* (“darkness”).

Forward cerebralisation: Cer*D*

Not only the dental sibilant, but also the dental plosives can undergo cerebralisation:

Cer*D*	OI *ṣ/ś* + *t/th*	→	OI *ṣ* + *ṭ/ṭh*
	OI *ẓ* + *d/dh*	→	OI *ẓ* + *ḍ/ḍh*

The first line shows up in these examples:

◇ PPP *dṛṣ-ṭa* of OI root *dṛś* (“to see”)

◇ OI *aṣṭā* ← IE *okt́ō* (“eight”)

Remember also PPP *iṣ-ṭa* of OI *yaj, yajatê* (“to sacrifice”):

	IE **iǵ-to* (z.g. with PPP marker *to*)
→	*is-ta* (***sz*** before voiceless cons.)
→	*iṣ-ta* (**RUKI**)
→	*iṣ-ṭa* (**Cer*D***)

For the second line consider

	IE **misdho*
→	*mizdha* (***sz*** before voiced cons.)
→	*miẓdha* (**RUKI**)
→	*miẓḍha* (**Cer*D***)
→	*mīḍha* (**CpL*z*** 2. line)

Forward cerebralisation: Cer*n*

The rules for the cerebralisation of *n* are complex. A rough summary is

Cer*n*	OI *n* after *r/ṛ/ṝ* not word-final	→	OI *ṇ*

Compare

◇ *jīvanam* (“life”) without *r*-sounds before *n* versus

◇ *maraṇam* (“death”), where the *r* cerebralises *n*.

Apparently, *r* sounds force the tip of the tongue into a back-bending position. Then, by way of forward assimilation, *n* is also to be pronounced in a back-bending, or cerebral, manner. If other sounds intervene between the *r* sounds and the *n*, cerebralisation may still occur. This is the case when the other sounds do not employ the tip of the tongue. Compare

◇ *rathêna* (instr. sg. of *ratha* (“carriage”)), where dental *th* forces the tip of the tongue forward very close to that position where dental *n* is to be pronounced, versus

◇ *brahmaṇā* (instr. sg. of *brahman* (“the absolute”)), where *h* and *m* do not involve the tip of the tongue

Assimilations for syllable-initials

Some assimilations and dissimilations do not concern immediately adjacent sounds, but syllable-initials in neighbouring syllables:

SI	OI *ś..s*	→	OI *ś..ś*
	OI *s..ś*	→	OI *ś..ś*
	OI *s..ṣ*	→	OI *ṣ..ṣ*

For the first line see IE **ḱasó* → u.at. *śasa* → *śaśa* ("hare"), by forward-assimilation. Backward assimilation is involved in the second line, where IE **sveḱuro* → u.at. *svaśura* → *śvaśura* ("father in law") provides an example. For the third line, see s.v. *ṣaṭ/ṣaṣ*.

Sibilant and palatal-sibilant clusters

A bewildering variety of sound laws concern sibilants and palatal-sibilants clusters. For reference purposes, all these sound laws are collected here:

SIB			IE *ss*	→	OI *ts*
			ṣs	→	OI *kṣ*
	PPal	←	IE *ḱ*, IE *ḱs*	→	OI *kṣ*
	SPal	←	IE k^w, IE $k^w s$	→	OI *kṣ*
	PPal, ***sz***	←	IE *ǵ*, IE *ǵs*	→	OI *kṣ*
			IE *tḱ*	→	OI *kṣ*
			IE *dhǵh*/$dhg^w h$	→	OI *kṣ*
			IE $k^w ḱ$	→	OI *kṣ*
	PPal	←	IE *ḱ*, IE *Vsḱ/Csḱ*	→	OI *Vcch/Cch*
			sḱ w.-i./*sk* w.-i.	→	*ch* w.-i.
			IE *r̥sr*	→	OI *r̥cch*

For the first five lines, refer to the following table:

√	translation	infinitive	future, 3. sg.
vas	to dwell	*vas-tum*	*vat-sy-a-ti*
tuṣ	to enjoy	*tôṣ-ṭum*	*tôk-ṣy-a-ti*
spṛś	to touch	*sparṣ-ṭum*, *spraṣ-ṭum*	*spark-ṣy-a-ti*, *sprak-ṣy-a-ti*
vac	to say	*vak-tum*	*vak-ṣy-a-ti*
yaj	to sacrifice	*yaṣ-ṭum*	*yak-ṣy-a-ti*

Now turn to the dental-palatal clusters IE *tḱ* and IE *dhǵh* in the 6. and 7. lines. By a series of regular, but not obvious sound laws, one obtains the two sound laws in the above table:

IE **tḱ*
→ *tś* (**PPal**)
→ *ṭṣ* (a backward version of **Cer*D***)
→ *kṣ*

and

IE **dhǵh*
→ *dhźh* (some version of ***sz***)
→ *dź* (**ASh**, *ź* cannot be aspirated)
→ *ṭṣ* (a backward version of **Cer*D***, but unclear loss of voice)
→ *kṣ*

They justify the derivations

IE **h*$_2$*r̥tḱo*
→ OI *ṛkṣa* ("bear"),

and

IE **dhǵhom*
→ Ved. *kṣam ("ground, earth")*

respectively. For *dhg*^{w}*h* → *kṣ*, see s.v. *dah*.

For the fourth line from the bottom, see s.v. *cakṣ*. For the third last one, see *iṣ, gam,* or *pracch* in subsection B.3.2. In these three examples, there is a vowel (*i*, *m̥*, or *r̥*) before IE *(k)sḱ*. The case of a preceding consonant is covered by *hūrchana* in the dictionary. *Chand* and *cand* provide examples for application and non-application of word-initial occurences (second-to-last line), respectively.

The last line is justified by the *ra*-adjective *kṛcch-ra* from the OI root *kṛṣ* (see p. 130).

B.3.5. Consonant clusters and word-final consonants

Simplification of consonant clusters (CCl)

Old Indic admits only a limited number of consecutive consonants. At the end of a word, the first consonant in a cluster remains. Within a word, the last two consonants are allowed:

CCl	OI VC_1C_2 word-final	→	OI VC_1
	OI $VC_1C_2C_3V$ word-interior	→	OI VC_2C_3V

Turning to word-final consonant clusters, consider these examples of cluster simplification:

◇ From an Indo-European perspective, *s* is often taken as the sign of nom. sg., both masculine and feminine, for example, in the thematic noun *dev-a-s* m. ("god"). In athematic nouns, *s* is directly attached to the stem so that u.at. *marut-s* is expected. Instead, one finds nom. sg. *marut* ("wind").

◇ Parasmâipada imperfect sg. of athematic verbs also present suitable examples:

√ han	1. pers. sg.	2. pers. sg.	3. pers. sg.
	a-han-am	*a-han* ← *a-han-s*	*a-han* ← *a-han-t*

For simplification of word-interior clusters, consider the desiderative *bhikṣu* ("beggar") which derives from

* *bhi-bhj-s-u*
→ *bhi-bj-s-u* (*s* cannot be aspirated)
→ *bhi-pk-s-u* (**BA** twice)
→ *bhi-k-s-u* (**CCl**)
→ *bhik-ṣ-u* (**RUKI**)

Admissable consonants in absolute final position (AFP)

In absolute final positions (at the end of sentences), palatals, voiced, or aspirated stops are not allowed. The following table shows how they are substituted in absolute final position:

AFP

	`-v/-asp`	`-v/+asp`	`+v/-asp`	`+v/+asp`	sibilants
velars	*k*	*kh* → *k*	*g* → *k*	*gh* → *k*	
palatals	*c* → *k/ṭ*	*ch* → *k/ṭ*	*j* → *k/ṭ*	*jh* → *k/ṭ*	*ś* → *k/ṭ*
cerebrals	*ṭ*	*ṭh* → *ṭ*	*ḍ* → *ṭ*	*ḍh* → *ṭ*	*kṣ* → *ṭ*, *ṣṭ* → *ṭ*
dentals	*t*	*th* → *t*	*d* → *t*	*dh* → *t*	*s* → *ḥ*
labials	*p*	*ph* → *p*	*b* → *p*	*bh* → *p*	

Root nouns (subsection C.4.1, pp. 115) provide examples:

OI stem	nom. sg.	translation
dṛś ← IE * *derḱ*	*dṛk* ← IE * *dr̥ḱ-s*	sight
bhuj	*bhuk*	enjoyment, utility
madhu-lih ← IE * *medhu* + IE * *leiǵh*	*madhu-liṭ* ← IE * *medhu-liǵh-s*	honey licker, bee
mṛd	*mṛt*	clay

OI stem	nom. sg.	translation
viś ← IE **veiḱ*	*viṭ* ← IE **viḱ-s*	settlement
yudh	*yut*	battle
sam-rāj	*sam-rāṭ*	ruler

The loss of voice and aspiration is not surprising. Furthermore, the palatals may turn into *k* or *ṭ*. From the point of view of **PPal** and **SPal** (see pp. 37), the change into *k* is the expected one because these palatals orginate from IE velar or IE palatals. Indeed, the palatalisation has probably not occured at all in absolute final position.

It seems that cerebral *ṭ* shows up if cerebrals are involved in the first place or after **RUKI**. Indeed, in view of *viṭ* and *madhu-liṭ*, the development might have been

IE **ḱ-s/ǵh-s*
→ *ḱ-s/ǵ-s* (**ASh**)
→ *k-s* (**BA**)
→ *k-ṣ* (**RUKI**)
→ *ṭ* (**AFP**)

Avoidance of consonant clusters with resonant

Consonant clusters are simplified by **CCl** (see above) or by metathesis:

MET_*rSP* OI *arSP* → OI *raSP*

For example, the infinitive of *dṛś* is not *darṣṭum,* but *draṣṭum.* In this manner, the cluster *rṣṭ* is avoided.

B.3.6. Minor sound laws

Dialectal confusion of *r* and *l*

IE *r* may lead to OI *r* or *l* and the same is true for IE *l*. Thus, in case of OI *r* or *l*, one cannot know without other evidence whether they go back to IE *r* or to IE *l*. This confusion results in pairs of Sanskrit words, one with *r*, the other with *l*:

◇ *car-a-ti* (“he wanders”) versus *cal-a-ti* (“he moves, he swings”)

◇ *rêkh-ā* (“line, strip, picture”) versus *lêkh-ā* (“line, strip, picture”), both of which are related to *likh-a-ti* (“he writes”)

This fact (although not a sound law) is indicated by ***rl***.

Roots with and without initial *s*

A number of IE roots come in two versions, with and without word-initial *s*, which is then called *s* mobile. See OI *kṛt*, *carman*, *paśyati*, *nāga*, *lih*, and *stan* in the dictionary chapter.

Root-initial *s* before a plosive may drop, but may occasionally lead to aspiration of this plosive. This sound law will be designated as ***sP(h)***. Examples are provided by *chid*, *chad*, or *sphira* (see dictionary).

Sprouting or deletion of sibilants between dentals

Furthermore, two odd rules for sibilants between dentals can be deduced. On the one hand, *z* (voiced sibilant) spontaneously emerges between voiced dentals (symbolised by D^{+v}). On the other hand, *s* (voiceless sibilant) is deleted between a plosive and a dental if at least one of them is not voiced:

D*z*D	IE $D^{+v}D^{+v}$	$\rightarrow$	OI $D^{+v}zD^{+v}$
	IE *PsD*	$\rightarrow$	OI *PD*

The first sound law (sprouting of *z* between voiced dentals) is exemplified on p. 52. The second one is obvious from the gerund *ut-thāya* from *ud-sthā*. It also has the support of the PPP *a-gdha* ("not eaten") from the alpha privativum *a-* and from the OI root *ghas* or the IE root *ghes*

	IE $^{*}\underset{\circ}{n}$*-ghs-to* (z.g. with PPP marker *to*)
$\rightarrow$	*a-gh-ta* (**SY_*N***, **D*z*D**)
$\rightarrow$	*a-gdha* (**ASh**)

The third example is the aorist *a-śap-dhvam* for u.at. *a-śap-s-dhvam* (p. 219).

anusvāra of *m* or *n* before *s*

Quite regularly, *m* or *n* before *s* turns into anusvāra:

Ns	OI *ms*	$\rightarrow$	OI *ṃs*
	OI *ns*	$\rightarrow$	OI *ṃs*

See the futures

- ◇ *raṃ-sy-a-tê* from root *ram* and
- ◇ *haṃ-sy-a-ti* from root *han*

Old Indic *h*

In contrast to the usual procedure (from IE to OI), consider the origins of Old Indic *h*. The following long list is somewhat disconcerting. OI *h* may regularly originate

◇ from IE palatal *ǵh* (**PPal**)

◇ from IE velar *gh* or from IE labiovelar g^wh (**SPal**)

It may also be dialectal from

◇ IE *dh* (see PPP *hita* of *dhā*) or

◇ IE *bh* (see OI *gṛh* besides OI *gṛbh*)

In a surprising manner (other IE languages do not show aspiration), OI *h* is seen in these examples:

◇ OI *hanu* "chin" versus Lat. *gena* ∼ NHG *Kinn*

◇ OI *hṛd* ("heart") versus Lat. *cor, cordis* , where *h* represents an IE palatal (IE $*\acute{k}erd$)

And, finally, see the laryngeal subsection for *aham, duhitar*, and *mahi* (pp. 55).

B.3.7. Compensatory lengthenings

B.3.7.1. Compensatory lengthening for suppression of *z*

DIPH shows how OI *ê* and *ô* go back to IE diphthongs. There is another source for *ê* and *ô*, compensatory lengthening for the suppression of (voiced) *z* (in intermediate steps). The latter originates from (voiceless) *s* before vowels or voiced consonants by ***sz*** (p. 42). Here is a long list of sound laws, not all of them involving compensatory lengthening:

CpL*z*	OI *as* + C^{+v}	→	OI	*ô*, w.-f. *ô*, not w.-f. *ê*, not w.-f., bef. *i* — C^{+v}
	OI *is* + C^{+v}	→	OI	*ir*, sandhi *ī*, not sandhi — C^{+v}
	OI *us* + C^{+v}	→	OI	*ur*, sandhi *ū*, not sandhi — C^{+v}
	OI *ās* + C^{+v}/V	→	OI *ā* + C^{+v}/V	
	OI *êz* or *ôz* not w.-f. + C^{+v}/V	→	OI *ê* or *ô* + C^{+v}/V	
	OI *as* + *a*	→	OI *ô* + ∅ (sec. w.-i. *a* is deleted)	
	OI *as* + *i*/*ī*/*u*/*ū*/*âi* etc.	→	OI *a* + *i*/*ī*/*u*/*ū*/*âi* etc.	

The first case ("at the end of words") of the first line is a common sandhi rule. For example, "the man runs" is

	naras dhāvati (without sandhi)
→	*naraz dhāvati* (***sz*** before voiced stop)
→	*narô dhāvati* (**CpL*z***)

Similarly (but internal sandhi), see the instr./dat./abl. dual of *manas* n.:

$$^{*}manas\text{-}bhyām \quad \rightarrow \quad manô\text{-}bhyām$$

and "thirteen" :

$$^{*}trayas\text{-}daśa \quad \rightarrow \quad trayô\text{-}daśa$$

And here are two more complicated examples: First, *ṣôḍaśa* ("sixteen") can be explained by

	ṣaṣ-daśa (without sandhi)
→	*ṣaẓ-daśa* (***sz*** before voiced stop)
→	*ṣaẓ-ḍaśa* (**Cer*D***)
→	*ṣô-ḍaśa* (**CpL*z***)

Second, the infinitive *vôḍhum* of *vah, vahati* results as follows:

	IE $^{*}veǵh\text{-}tum$ (full grade and infinitive marker *tum*)
→	*vaǵh-tum* (***aā***)
→	*vaǵ-dhum* (**ASh**)
→	*vaz-dhum* (***sz***)
→	*vô-dhum* (**CpL*z***)
→	*vô-ḍhum* (leveling with PPP *ūḍha*, see below)

Still within the first line, within a word before a consonant + *i*, one obtains the 2. sg. imper. of "to be"

$$^{*}as\text{-}dhi \quad \rightarrow \quad êdhi$$

Together with sound law **D*z*D**, consider par. imper. 2. pers. sg. of *dā* ("to give"):

	IE $^{*}da\text{-}dh_3\text{-}dhi$
→	*da-ddhi* (**Lar_*V***, p. 30)
→	*da-dzdhi* (**D*z*D**, p. 49)

→ *da-zdhi* (**CCl**, p. 46)
→ *daz-dhi*
→ *dê-dhi* (**CpL*z***)
→ *dê-hi* (analogy)

The sandhi rules in the second and third lines may also apply within words, as in *havir-bhis* (see p. 236) or *dur-ga* (s.v. *dus*). In an earlier word-formation stage, compensatory lengthening applies. Consider *sīdati* from the root *sad* ("to sit"):

si-sd-ati (reduplication with *i* and zero grade, without sandhi)
→ *si-zd-ati* (***sz*** law before voiced cons.)
→ *si-ẓd-ati* (**RUKI**)
→ *si-ẓḍ-ati* (**Cer*D***)
→ *sīḍ-ati* (**CpL*z***)
→ *sīd-ati* (leveling)

where leveling restores the dental:

	sīḍ-ati	
influenced by	*sa-sād-a* (perf. 3. pers. sg.) or other forms from *sad*	with dental
turns into	*sīd-ati*	with dental

For similar examples, consult the etymological dictionary for *nīḍam* or *mīḍham*.

Still with respect to the third line, consider this development that leads to the PPP of *vah* ← IE **veǵh*:

IE **vǵh-to* (z.g. with PPP marker *to*)
→ *uǵh-ta* (***SV***)
→ *uǵ-dha* (**ASh**)
→ *uz-dha* (***sz***)
→ *uẓ-dha* (**RUKI**)
→ *uẓ-ḍha* (**Cer*D***)
→ *ū-ḍha* (**CpL*z***)

According to a well-known sandhi rule, *s* is dropped from *ās* before voiced sounds. This is the fourth line of **CpL*z*** above and best understood as the result of two steps:

narās gacchanti (without sandhi)
→ *narāz gacchanti* (***sz***)
→ *narā gacchanti* (**CpL*z***, *ā* is already long)

A second example is provided by the 2. pl. pres. ind. of *ās* ("to sit"):

	ās-dhvê (without sandhi)
→	*āz-dhvê* (***sz***)
→	*ā-dhvê* (**CpL*z***, *ā* is already long)

Remember that this particular rule holds for vowels also, not just for voiced stops:

	narās īkṣantê (without sandhi)
→	*narāz īkṣantê* (***sz***)
→	*narā īkṣantê*(**CpL*z***, *ā* is already long)

The fifth line is seen in examples such as *lê-ḍhum* or *gô-ḍhum* (pp. 101).
As in the first line, OI *as* turns to *ô* also before OI *a* (sixth line), but the latter is then deleted as in

	naras atra (without sandhi)
→	*naraz atra* (***sz***)
→	*narô atra* (**CpL*z***)
→	*narô 'tra* (*a* of second word drops)

In the seventh line (similar to the fourth one), before vowels other than *a*, *s* simply vanishes, without any lengthening:

	naras īkṣatê (without sandhi)
→	*naraz īkṣatê* (***sz***)
→	*nara īkṣatê* (*z* drops)

B.3.7.2. Word-final compensatory lengthening

Apart from **CpL*z***, other types of compensatory lengthening occur:

CpL*r*	OI *Vr* + *r*	→	OI $\bar{V}$ + *r*
CpL*s*	OI *VCs*	→	OI $\bar{V}$ + *C*

The first line is exemplified by

**punar rāmaḥ*	→	OI *punā rāmaḥ*

and partly explains

**nêtar-s*	→	OI *nêtā*	pp. 251

The second line is present in

**bala-vant-s*	→	OI *bala-vān*	pp. 237
**su-manas-s*	→	OI *su-manās*	pp. 235
**gir-s*	→	OI *gīr*	
acc. pl. IE **deiv-o-ns*	→	*dêv-ān*	pp. 228
acc. pl. IE **nei-t̥r̥-ns*	→	*nê-tṝ-n*	pp. 251

Against **CpL*s***, observe nom. sg.

**bhar-ant-s*	→	OI *bhar-an* (**CCl**)	pp. 240
**rāj-an-s*	→	OI *rāj-ā*	pp. 245
**yôg-in-s*	→	OI *yôg-ī*	pp. 249
**nê-tar-s*	→	OI *nê-tā*	pp. 251
**pit-ar-s*	→	OI *pit-ā*	pp. 253

I do not have any explanation why *bhar-an* does not exhibit compensatory lengthening. Neither do I know why the nom. sg. *rāj-ā* through *pit-ā* lose the final consonants. This phenomenon is so evident that I suggest the label **CpL_*an-in-tar*** for it. After the suffixes mentioned, we witness compensatory lengthening in nominative singular, but also loss of the only remaining consont:

CpL_*an-in-ar* *an-s/in-s/ar-s* → *ā/ī/ā*

B.3.7.3. Compensatory lengthening for suppression of *d*

A rather special rule can be described as

CpL*dḱ* *Vdḱ* → *V̄* + *ḱ* → **PPal**

For examples, see the dictionary entries for OI desiderative root *dīkṣ* (s.v. *daśas*) and for *pañcāśat*.

B.3.8. Visarga rules

Most visarga rules are of the backward-assimilation type. Before voiceless sounds, some obvious backward-assimilation rules apply. Before voiced sounds, voiceless *s* turns into voiced *z* and then some particular developments ensue.

Visarga rules regularly apply to word final *s*, but sometimes also to *s* within words, in particular before endings or in compounds. Quite a few of the visarga rules have been dealt with before. The rules can easily be memorised by looking at examples (mostly provided by Goldman and Goldman, 2011):

◇ *s* following any vowel but *a* or *ā*

- absolute final position: *agnis* → *agniḥ*

- before non-voiced initial that is
  - ⊙ a palatal stop: *haris + calati → hariś calati* (**BA**)
  - ⊙ a cerebral stop: *haris + ṭīkāṃ karoti → hariṣ ṭīkāṃ karoti* (**BA**)
  - ⊙ a dental stop: *agnis + tīkṣṇaḥ → agnis tīkṣṇaḥ* (*s* is dental already)
  - ⊙ any other:
    - ▷ *haris + paśyati → hariḥ paśyati*
    - ▷ *haris + saṃharati → hariḥ saṃharati*
    - ▷ loc. pl. *manaḥ-su* besides *manas-su*
- before voiced initial:
  - ⊙ *agnis + iva → agnir iva*
  - ⊙ *gatis + nāsti → gatir nāsti* (**CpL*z*** 2. line)

◇ *s* following *a*

- absolute final position: *rāmas → rāmaḥ* (as after other vowels, see above)
- before non-voiced initial (just after other vowels, see above)
- before voiced sound that is
  - ⊙ a consonant: *rāmas + gacchati → rāmo gacchati* (**CpL*z*** 1. line)
  - ⊙ vowel *a*: *rāmas + ayam → rāmo 'yam* (**CpL*z*** 6. line)
  - ⊙ other vowels: *rāmas + uvāca → rāma uvāca* (**CpL*z*** 7. line)

◇ *s* following *ā*

- before voiced initial: *hatās + vīrās → hatā vīrāḥ* (**CpL*z*** 4. line)
- otherwise (absolute final position, before non-voiced initial): *āḥ*

These rules bear the designation **Vis**.

B.3.9. Laryngeal sound laws

Laryngeals were involved in modifying some consonants:

Lar_*CH*	in general:	IE *CHV*	→	*CV*
	special cases:	IE $P^{\texttt{+v-asp}}h_2$	→	$P^{\texttt{+v+asp}}$
		IE th_2/k^wh_2	→	*th/kh*
		IE ph_3	→	*b*

The laryngeal in the sequence *CHV* tends to be dropped without a trace. However, there are important exceptions. First, after voiced unaspirated plosives, the laryngeal h_2 effected aspiration as in

Lat./OGr. *egō*
← IE **h*$_1$*eǵoh*$_2$*/h*$_1$*eǵoh*$_2$*m*
→ *h*$_1$*eǵh*$_2$*om* (metathesis of *o* and h_2, similar to **Lar_MTh**)
→ *eǵhom* (**Lar_*V***, **Lar_*CH***)
→ *ehom* (**PPal**)
→ *aham* (***aā***)

and in the difficult cases of

IE **dhug-h*$_2$*ter*
→ *dhughiter* (**Lar_*CH***, **Lar_*V***, with two effects from one laryngeal)
→ *dughiter* (**DA**)
→ *dughitar* (***aā***)
→ *duhitar* (**SPal**)

and

OGr. *mega*
← IE **meǵh*$_2$*-os/meǵh*$_2$
→ *meǵhi* (**Lar_*CH***, **Lar_*V***, with two effects from one laryngeal)
→ *mehi* (**PPal**)
→ *mahi* (***aā***)

For the second to last line, see *sthā, tiṣṭhati* ("to stand") on p. 86 and *sakhi* in the dictionary. For the last line, see *pā, pi-ba-ti* ("to drink") on p. 86.

B.4. Middle and New Indic

B.4.1. Introductory remark

The sound laws that differentiate Middle Indic (MI) from Old Indic (OI) are complicated and differ between the Middle Indic languages. When looking for Middle Indic examples, Pali (Pa.) is mostly adduced, but sometimes also Prakrit (Pkt.). Classical Sanskrit is not a predecessor of Pali or of (a) Prakrit, but is more conservative than these Middle Indic languages in most respects. Counterexamples exists such as Pa. *idha* ("here") versus OI (even Ved.) *iha* which is "newer" (see the origins of OI *h* on p. 50). Or consider the thematic present tense participle OI and Ved. *a-māna* (see p. 154). While acknowledging

that Middle Indic is sometimes more conservative than Sanskrit, I still feel justified to use the arrow → in

$$\text{OI } ava \quad \rightarrow \quad \text{MI } o$$

or

$$\text{OI } dugdha \quad \rightarrow \quad \text{Pa. } duddha$$

In contrast to my usual procedure of citing neuter *a* nouns like *phalam* with the ending *m,* I just employ the stem form *phala* in the upcoming comparisons with Middle and New Indic.

B.4.2. Vowels and diphthongs

Different sources of *o* and *e*

The vowels OI *a, i,* and *u*, both short and long, are generally preserved as such. If, after loss of a consonant, *i* or *u* come to stand after another vowel, they are written as *ï* or *ü*, respectively.

OI *ê* and *ô* are also preserved. Remember that these OI vowels are long. In Middle Indic, one finds both short and long *e* and *o* that are here distinguished in writing by *ĕ* or *ē*, and *ŏ* or *ō*, respectively.

Now, MI *ē* and *ō* basically have three origins:

$$\begin{aligned} \text{OI } \hat{e}/\hat{a}i/aya \quad &\rightarrow \quad \text{MI } \bar{e} \\ \text{OI } \hat{o}/\hat{a}u/ava \quad &\rightarrow \quad \text{MI } \bar{o} \end{aligned}$$

They may be shortened due to the law of morae (see below). Consider the example of

$$\text{OI } t\hat{a}ila \text{ (“oil”)} \quad \rightarrow \quad \text{Pa. } t\bar{e}la \quad \sim \quad \text{Pkt. } t\check{e}lla$$

Since OI *p* may develop into MI *v*, the following corrollary to the above sound law results:

$$\text{OI } apa \quad \rightarrow \quad \text{MI } \bar{o}$$

MI *ē* has additional sources:

$$\text{OI } \bar{a}yi/ayi/avi \quad \rightarrow \quad \text{MI } \bar{e}$$

Thus, OI long diphthongs *âi* or *âu* are not preserved in Middle Indic.

The law of morae

The law of morae states that a syllable with a long vowel cannot be closed. If an OI word has a long vowel followed by two consonants, in Middle Indic either the long vowel has to be shortened or the double consonant simplified. This can be seen in OI *upêkṣā* which corresponds to both

◇ Pa. *upĕkkhā* (short vowel and double consonant) and

◇ Pa. *upēkhā* (long vowel and single consonant)

A variant of this law can be seen in the doubling of consonants:

◇ OI *êka* ("one") → Pkt. *ĕkka*

◇ OI *êvam* ("thus") → Pkt. *ĕvvaṃ*

◇ OI *tâila* ("oil") → Pkt. *tĕlla*

◇ OI *yâuvana* ("youth") → Pkt. *jŏvvaṇa*

In summary:

LawOfMorae	OI $\bar{V}CC$	→	MI $\breve{V}CC/\bar{V}C$
	OI $\bar{V}C$	→	MI $\breve{V}CC$

Anaptyxis or svarabhakti

An "inserted vowel" is regularly found between two consonants, one of which is a resonant (R), i.e., a nasal (N), a liquid (L), or a semivowel (SV). The inserted vowel is often *i:*

OI RC	→	MI RiC
OI CR	→	MI CiR

However, *u* can serve in this position in two cases:

◇ near semivowel *v* or

◇ near labials

This phenomenon is called anaptyxis or, in Sanskrit, svarabhakti. Consider these examples:

◇ OI *klinna* (PPP of *klid*, "to get wet") → Pkt. *kiliṇṇa* (see also p. 60)

◇ OI *varṣa* ("year") → Pkt. *varisa* (together with OI *ś/ṣ/s* → MI *s*)

◇ OI *padma* ("lotus") → Pa. *paduma* ∼ Pkt. *paüma*

◇ OI *śvas* ("tomorrow") → Pkt. *suvo* (near semivowel *v*)

◇ OI *smarati* ("he remembers") → Pa. *sarati* ∼ Pkt. *sumaradi* (near labial *m*)

◇ OI *harṣa* ("joy, delight") → Pkt. *harisa*

Vocalic *ṛ*

OI *ṛ* turns into *i*, *a*, or *u*:

$$\text{OI } ṛ \quad \rightarrow \quad \text{MI} \begin{cases} i, & \text{after or before light vowel} \\ u, & \text{after labial} \\ i/a, & \text{otherwise} \end{cases}$$

as can be seen in these examples:

◇ OI *ṛ* → MI *i* after or before front vowel

- OI *ṛṣi* ("seer") → Pa. *isi*
- OI *kṛmi* ("worm") → Pa. *kimi* (see also pp. 65)
- u.at. *śṛthra* ("loose", *ra*-adjective of *śrath* ("to loosen, to resolve")) → Pkt. *śithira* (in the Ṛgveda!), also a svarabhakti example

◇ OI *ṛ* → MI *u* after labial

- OI *pṛcchati* ("he asks") → Pa. *pucchati*

◇ OI *ṛ* → MI *i/a* otherwise

- OI *ṛṇa* ("debt") → Pa. *iṇa*
- OI *kṛta* (PPP of *kṛ*) → Pkt. *kida*
- OI *gṛha* ("house") → Pa. *gaha*
- OI *bhṛta* ("servant") → Pa. *bhata* (but *u* after labial expected)

B.4.3. Consonants

General rules

Turning to consonants, their development is often complicated and differs between Middle Indic languages. A rough outline of major phonetic changes is given, before turning to examples:

◇ *n* is typically cerebralised, *d* and *t* are often cerebralised near *r* or *ṛ*.

◇ The three sibilants are reduced to one, normally *s*.

◇ *s* before *p* or *k* may aspirate the plosive and vanish.

◇ Unvoiced plosives tend to become voiced.

◇ Final plosives are dropped.

◇ Intervocalic non-aspirated gutturals, palatals and dentals, both unvoiced and voiced, often disappear.

◇ In clusters,

- when two plosives meet, backward assimilation is applied;
- when different types of sounds meet, assimilation (backward or forward) occurs according to some hierarchy given below.

The following individual rules roughly follow the above order.

Cerebralisation

◇ Dentals often become cerebral:

- OI *patita* (PPP of *pat*, "to fall") → Pkt. *paḍida*
- OI *prathama* ("first, prior, principal") → Pkt. *paḍhama*

◇ *n* is often cerebralised as in

- OI *nayana* ("driving, eye") → Pkt. *ṇaaṇa*
- OI *bhôjana* ("eating, nutrition") → Pkt. *bhoaṇa*

Other cerebral peculiarities

Sometimes lenition occurs, as in

MI *ṭ/ṭh/th* → MI *ḍ/ḍh/dh*

This developement is best seen as one occuring within Middle Indic:

◇ Skt./Pkt. *kuṭumba* ("family") → Pkt. *kuḍumba*

◇ Skt./Pkt. *vaṭa* ("fig tree") → Pkt. *vaḍa*

ḍ is then sometimes changed into *ḷ* as in

◇ OI *krīḍā* ("game") → Pkt. *kīḷā*

Convergence of the three sibilants

The sound law according to which the three sibilants converge can be written as

OI *ś/ṣ/s* → MI *s*

Examples are

◇ OI *pra-viś-a-ti* ("he enters") → Pa. *pa-vis-a-ti*

◇ OI *bhāṣatê* ("he speaks") → Pa. *bhāsati*

◇ OI *śaśa* ("hare") → Pa. *sasa*

◇ OI *śiṣya* ("pupil") → Pa. *sissa* (see also pp. 65)

Aspiration, compensatory and otherwise

In some cases, *s* is dropped, but aspirates the accompanied plosive:

$$\begin{aligned} \text{OI } sp &\rightarrow \text{MI } ph \\ \text{OI } kṣ &\rightarrow \text{MI } kh \end{aligned}$$

Thus, ***sP(h)*** is best seen as a Middle Indic development. Here are some examples:

◇ OI *kṣatriya* ("warrior") → Pkt. *khattia*

◇ OI *kṣipta* (PPP of OI *kṣip*) → Pkt. *khitta*

◇ OI *spṛśati* ("touches") → Pa. *phusati* ∼ Pkt. *phusaï*

Alternatively, one finds *ch* rather than *kh*, as in

◇ OI *kṣatta* ("wounded") → Pa. *khatta* → Pkt. *chaya/khaya*

◇ OI *kṣetra* ("field") → Pa. *khětta* → Pkt. *chětta/khětta*

After a vowel, both compensatory aspiration for deleted *s* and compensatory doubling are witnessed:

◇ OI *akṣi* n. ("eye") → Pkt. *akkhi*

◇ OI *asti* ("he is") → Pkt. *atthi*

◇ OI *hasta* ("hand") → Pkt. *hattha*

Aspiration of both *k* and *ṭ* may sometimes occur without the presence of *s*:

◇ OI *kubja* ("crooked, bent") → Pkt. *khujja*

◇ Skt./Pkt. *vaṭa* ("fig tree") → u.at. *vaṭha* → Pkt. *vaḍha*

Intervocalic lenition or loss of non-aspirated plosives

Between vowels, observe

$$\begin{aligned} \text{OI } g/j/d &\rightarrow \text{MI } \varnothing \\ \text{OI } k/c/t &\rightarrow \text{MI } \varnothing \end{aligned}$$

Note that these plosives sometimes remain or that the unvoiced ones become voiced as in

$$\text{OI } t \rightarrow \text{MI } d$$

Examples:

◇ OI *avalôkita* ("looked at") → Pkt. *ōlōïa*

◇ OI *êti* ("he goes") →
- Śaurasenī Pkt. *ēdi*
- Māhārāṣṭrī Pkt. *ēi*

◇ OI *nakula* ("mongoose") → Pkt. *naüla*

◇ OI *nagara* ("town") → Pkt. *nayara* (where *y* occurs to avoid hiatus)

◇ OI *bhôjana* ("eating, nutrition") → Pkt. *bhoaṇa*

◇ OI *latā* ("creeper") →
- Śaurasenī Pkt. *ladā*
- Māhārāṣṭrī Pkt. *laā*

◇ OI *lôka* ("world") →
- Śaurasenī Pkt. *lōga*
- Māhārāṣṭrī Pkt. *lōa*

◇ OI *śâuca* ("cleanness") → Pkt. *sōa*

◇ OI *sakala* ("total, complete") → Pkt. *saala*

◇ OI *hita* (PPP of *dhā*) →
- Śaurasenī Pkt. *hida*
- Māhārāṣṭrī Pkt. *hia*

Examples for voiced consonants that replace unvoiced ones are

◇ OI *athiti* ("guest") → Pkt. *adhidi*

◇ OI *kṛta* (PPP of *kṛ*) → Pkt. *kida*

◇ OI *gata* (PPP of *gam*) → Pkt. *gada*

Intervocalic lenition or loss of aspirated plosives

In line with the above sound laws

$$\begin{array}{lcl} \text{OI } k/c/t & \rightarrow & \text{MI } \varnothing \\ \text{OI } g/j/d & \rightarrow & \text{MI } \varnothing \end{array}$$

the following corrollary results:

$$\begin{aligned} \text{OI } kh/gh &\rightarrow \text{MI } h \\ \text{OI } th/dh &\rightarrow \text{MI } h \\ \text{OI } ph/bh &\rightarrow \text{MI } h \end{aligned}$$

Consider these examples:

◇ OI *atha* ("and, now") →
- Śaurasenī Pkt. *adha*
- Māhārāṣṭrī Pkt. *aha*

◇ OI *katham* ("how? in what manner?") →
- Śaurasenī Pkt. *kadhaṃ*
- Māhārāṣṭrī Pkt. *kahaṃ*

◇ OI *nakha* ("finger nail") → Pkt. *ṇaha*

◇ OI *mukha* ("mouth") → Pkt. *muha*

◇ OI *mêgha* ("cloud") → Pkt. *mēha*

◇ OI *vadhū* ("bride") → Pkt. *vahū*

But *ph* may be retained at the beginning of a second member of a compound:

◇ OI *citra-phalaka* ("painting") → Pkt. *citta-phalaa*

In the OI root *bhū*, observe MI *h* for *bh*:

◇ OI and Pa. *bhav-a-ti* ("he is") versus Pkt. *hō-ti* or even *hō-ï*

◇ OI *bhav-i-ṣy-a-ti* ("he will be") → Pkt. *hav-i-ss-a-di* (see pp. 65)

Consonants: initial palatalisation

In the beginning of words, palatal sounds evolve in Middle Indic through different avenues. The sound law

$$\text{OI } y \rightarrow \text{MI } j$$

can readily be witnessed in

◇ OI *yathā* → Pkt. *jathā*

◇ OI *yuddha* ("battle") → Pkt. *juddha*

◇ OI *yôgī* → Pkt. *jōgī*

but see also (in non-initial position): OI *āryaputra* → Pkt. *ajjaütta*

Dentals together with *y* may also produce palatals:

OI *ty*	→	MI *c*
OI *dy*	→	MI *j*
OI *dhy*	→	MI *jh*

Consider these examples:

◇ OI *tyāga* ("abandonment") → Pa. *cāga*

◇ OI *dyūta* ("gambling") → Pa. *jūta*

◇ OI *dhyāna* ("meditation") → Pa. *jhāna*

Consonants: other peculiarities

OI *p* may develop into *v* or may be dropped:

◇ OI *rūpa* ("form, beauty") → Pkt. *rūa*

OI *y* tends to be dropped:

◇ OI *priya* ("dear, pleasant") → Pkt. *pia*

◇ OI *vi-yôga* ("disjunction, separation") → Pkt. *vi-ōa*

Clusters: Backward assimilation for non-palatal plosives

If two non-palatal plosives meet, the first is assimilated to the second as in the sound law

OI *pt*	→	MI *tt*

It is easy to find examples, such as

◇ OI *utkramati* ("he ascends") → Pa. *ukkamati*

◇ OI *dugdha* ("milk") → Pa. *duddha*

◇ OI *labdha* (PPP *labh*, "to obtain") → Pa. *laddha*

◇ OI *vāk-pati-rāja* ("king who is also a master of language") → Pkt. *vap-paï-rāa*

◇ OI *śabda* ("sound") → Pa. *sadda*

◇ OI *sakta* ("attached") → Pa. *satta*, as in OI **bodhisakta* ("who clings to enlightment") → *bodhisatta*

◇ OI *sapta* ("seven") → Pa. *satta*

Clusters: hierarchical assimilation

The case of clusters involving two non-palatal plosives has been considered above. It turns out that a hierarchy of sounds provides a generalisation of many different sound laws. This is the hierarchy:

$$P^{\texttt{-pal}} \;>\; S \;>\; N \;>\; P^{\texttt{+pal}} \;>\; l \;>\; v \;>\; y \;>\; r$$

The hierarchy rule states that the stronger sound influences the weaker one. Here, assimilation can be backward or forward. This hierarchy can also be applied in word-initial positions, but then only one consonant can remain.

Non-palatal plosives are strongest:

◇ OI *agni* ("fire") → Pa. *aggi*

◇ OI *ardha* ("half") → MI *addha/aḍḍha*

◇ OI *alpa* ("small ") → Pa. *appa*

◇ OI *kalpa* ("eon, ritual, rule") → Pa. *kappa*

◇ OI *tri-lôka* ("three worlds") → Pkt. *ti-lōa*

◇ OI *dur-bala* ("weak") → Pkt. *dub-bala*

◇ OI *dṛṣ-ṭi* ("sight") → Pkt. *diṭ-ṭhi*

◇ OI *dṛś-ya* ("visible") → Pkt. *das-sa*

◇ OI *dvi-ja* ("twice born") → Pa. *di-ja*

◇ OI *pakva* ("cooked, ripe") → Pa. *pakka*

◇ OI *bharta* → MI *bhatta*

◇ OI *yôg-yā* ("exercise") → Pa. *yŏg-gā* (law of morae)

◇ OI *rātri* ("night") → Pa. *ratti* (law of morae)

◇ OI *śak-nô-ti* ("he is able") → Pa. *sak-kō-ti*

Palatals are weaker than nasals:

◇ OI *ā-jñā-p-aya-ti* ("he orders") → Pkt. *ā-ṇā-v-ē-di*

◇ OI *yaj-ña* ("sacrifice") → Pkt. *jaṇ-ṇa*

Sibilants occupy second position in hierarchy:

◇ OI *īśvara* (“lord”) → Pa. *issara*

◇ OI *dṛś-ya* (“visible”) → Pkt. *das-sa*

◇ OI *varṣa* (“year”) → Pa. *vassa*

◇ OI *śyāma* (“dark”) → Pa. *sāma*

◇ OI *sahasra* (“thousand”) → Pa. *sahassa*

◇ OI *sravati* (“it flows”) → Pa. *savati*

***r* is weakest:**

◇ OI *argha* (“price”) → Pkt. *aggha*

◇ OI *ardha* (“half”) → Pkt. *addha*

◇ OI *ava-tīrṇa* (“come down”, PPP of *tr̄*, see p. 127) → Pkt. *ō-iṇṇa*

◇ OI *karṇa* (“ear”) → Pa. *kaṇṇa*

◇ OI *priya* (“dear, pleasant”) → Pa. *pia*

◇ OI *grāma* (“village”) → Pa. *gāma*

◇ OI *cakra* (“wheel”) → Pa. *cakka*

◇ OI *dur-labha* (“difficult to obtain”) → Pa. *dul-labha*

◇ OI *dharma* (“religion, duty”) → Pa. *dhamma*

◇ OI *putra* (“son”) → Pa. *putta*

◇ OI *mārga* (“path”) → Pkt. *magga*

◇ OI *vajra* (“thunderbold”) → Pkt. *vajja*

◇ OI *varga* (“class, tribe”) → Pa. *vagga*

◇ OI *vipra* (“Brahmin”) → Pa. *vippa*

◇ OI *vyagra* (“indifferent, undisturbed”) → Pa. *vagga*

◇ OI *vrīhi* (“rice”) → Pa. *vīhi*

Exceptions to the above hierarchy concern three groups:

1. Dental + *y* yields new palatals (where voice and aspiration remains):
   - ◇ OI *tyāga* ("abandonment") → Pa. *cāga*
   - ◇ OI *dyūta* ("gambling") → Pa. *jūta*
   - ◇ OI *dhyāna* ("meditation") → Pa. *jhāna*
2. Cluster *kṣ* may yield *kh* as in OI *kṣatriya* ("warrior") → Pkt. *khattia*
3. Nasals before plosives remain:
   - ◇ OI *aṅka* ("mark, sign") → Pa. *aṅka*
   - ◇ OI *kampa* ("tremble") → Pa. *kampa*
   - ◇ OI *danta* ("tooth") → Pa. *danta*
   - ◇ OI *pañca* ("five") → Pa. *pañca*
   - ◇ OI *mantra* ("spell") → Pa. *manta*

B.4.4. A few New Indic developments

Building on MI features, the modern Indic languages developed. With respect to Hindi (Hi.), three major developments occurred:

1. Middle Indic double consonants are simplified with two effects:
   a) The preceding vowel is lengthened (compensatory lengthening).
   b) In Hindi, this compensatory lengthening often (not always) occurs together with nasalisation.
2. A very similar development is witnessed for *NP* sequences:
   a) The consonant cluster is simplified and only the plosive remains.
   b) The preceding vowel is lengthened and nasalised.
3. In Apabhraṃśa, Middle Indic final long vowels are shortened. In New Indic, final short vowels are lost.

Together, these three developments clearly show in these examples.

◇ Double consonants simplified without nasalisation:
- OI *dug-dha* ("milk") → Pa. *dud-dha* → Hi. *dūdh*
- OI *rātri* ("night") → Pa. *ratti* → Hi. *rāt*
- OI *sapta* ("seven") → Pa. *satta* → Hi. *sāt*

◇ Double consonants simplified with nasalisation (where $\widetilde{a}$ stands for nasalised $\bar{a}$):
- OI *akṣi* n. ("eye") → Pkt. *akkhi* → Hi. $\widetilde{a}kh$

- OI *sarpa* (“serpent”) → Pa. *sappa* → Hi. *sã͡p*

◇ Nasal lost under nasalisation and compensatory lengthening:

- OI *aṅka* (“mark, sign”) → Pa. *aṅka* → Hi. *ā̃͡k*
- OI *kampa* (“tremble”) → Pa. *kampa* → Hi. *kā̃͡p*
- OI *danta* (“tooth”) → Pa. *danta* → Hi. *dā̃͡t*
- OI *pañca* (“five”) → Pa. *pañca* → Hi. *pā̃͡c*

B.5. Sound laws of other IE languages

Linking Sanskrit words to words in English or German, or to Latin and Old Greek foreign words is helpful in learning the abundant Sanskrit vocabulary. Therefore, a summary of the important sound laws involving these languages is in order. Many of the sound laws for Old Indic have already been considered in the previous sections.

B.5.1. Vowels and diphthongs

The most dramatic vowel change in the Indo-European language family concerns the Indo-Iranian shift towards *a* and *ā*. Sometimes one can reconstruct Indo-European words by taking the Sanskrit consonants and the Greek vowels. For example,

$$\text{IE } {}^*bher \quad \rightarrow \quad \begin{cases} \text{OI } bhar\text{-} \\ \text{OGr. } pher\text{-} \\ \text{Lat. } fer\text{-} \\ \text{E } bear \end{cases}$$

Concentrating on a few vowel changes, note, for Latin, the sound law:

LAT_V	IE *e* before *u* or *v*	→	Lat. *o*
	OLat. *ei*	→	Lat. *ī*

With respect to the first line, consider the example of IE **nevos* (“new”) → Lat. *novus* whence many foreign words such as *novice* or *re-novate*. In contrast the Greek-based foreign words show *e*, as in *neo-liberal* or *Neo-lithic*.

For the second line, consider Lat. *dīcere* (“to say”) that goes back to OLat. *deicere* with PPP in zero grade *dictum*. See *diś* in the dictionary.

For the benefit of German speakers, a few sound laws that will become important later on are explained. Germanic unstressed syllables tend to be dropped or turned into the “schwa”-sound (which is nicely called “Murmelvokal” in German). Examples are E *seven* versus NHG *sieben* and E *eat* versus NHG *essen*.

On top, consider these developments for New High German:

$$\begin{array}{lll} \textbf{NHG\_\_}\boldsymbol{V} & \text{IE } a/o & \rightarrow \text{ NHG } a \\ & \text{IE } \bar{a}/\bar{o} & \rightarrow \text{ NHG } \bar{u} \\ & \text{IE } e & \rightarrow \text{ NHG } i \end{array}$$

For the first line, consider

◇ IE **oktō* → Lat. *octō* ∼ NHG *acht*

◇ Lat. *toga* ∼ NHG *Dach*

◇ Lat. *mon*ere ∼ NHG *mahn*en

The second line finds some confirmation in the pronounced, not the written, German:

◇ Lat. *cārus* (“dear”, Fr. *cher*) ∼ E *whore* ∼ NHG *Hure*

◇ IE **bhrātēr* → Lat. *frāter* ∼ NHG *Bruder*

And here two examples for the third line:

◇ IE **bhendh* → OI *bandh* ∼ NHG *binden*

◇ IE **esti* → Lat. *est* ∼ OI *asti* ∼ NHG *ist*

B.5.2. Syllabic Indo-European nasals and liquids

Here come the sound laws for short syllabic nasals:

$$\textbf{IE\_\_SY\_\_}\boldsymbol{N} \qquad \text{IE } \underset{\circ}{n}/\underset{\circ}{m} \quad \rightarrow \quad \begin{cases} \text{OI} \begin{cases} an/am & \text{bef. vowel} \\ a/a & \text{otherwise} \end{cases} \\ \text{OGr.} \begin{cases} an/am & \text{bef. vowel} \\ a/a & \text{otherwise} \end{cases} \\ \text{Lat.} \begin{cases} in/im & \text{word-initial} \\ en/em & \text{otherwise} \end{cases} \\ \text{E } un/um \sim \text{NHG } un/um \end{cases}$$

A very instructive example is the negating prefix IE $\underset{\circ}{n}$.

◇ Sanskrit examples between consonants or word-initial before consonant: *a-gatika* (“without way out”), *a-putra* (“without son”)

◇ Sanskrit examples before vowel: *an-anta* (“without end”), *an-ātma-jña* (“not knowing oneself”)

◇ Germanic examples: NHG *un-gläubig*, E *un-happy*, E *un-believable*

◇ OGr. B English *a-theist*, *an-archy*

◇ Lat. B English *in-effective*, *im-perfect*

Sometimes, mixtures are encountered such as

◇ *a-social* (the first part Greek, the second Latin)

◇ German *un-effektiv* (German-Latin)

The past participle is built with the zero grade. Compare NHG *ge-bund-en* with OI *bad-dha*, both from IE $^*bh\underset{\circ}{n}dh$.

Syllabic liquids follow these sound laws:

$$\textbf{IE\_\_SY\_\_}\boldsymbol{L} \qquad \text{IE } \underset{\circ}{r}/\underset{\circ}{l} \quad \rightarrow \quad \begin{cases} \text{OI} \begin{cases} \underset{\cdot}{r} \text{ or } \underset{\cdot}{l}\ (!) & \text{between cons.} \\ ur/ur & \text{before vowels, after labials} \\ ir/ir\ (?) & \text{before vowels, not after labials} \end{cases} \\ \text{OGr.} \begin{cases} ar/al & \text{bef. vowel} \\ (ra,\ ar)/(la,\ al) & \text{otherwise} \end{cases} \\ \text{Lat.} \begin{cases} (or,\ ur)/(ol,\ ul) & \text{betw. cons.} \\ er/el & \text{otherwise} \end{cases} \\ \text{E } or/ol \sim \text{NHG } or/ol \end{cases}$$

Consider a few examples:

◇ IE $^*w\underset{\circ}{r}k^w \rightarrow$ OI $v\underset{\cdot}{r}ka \sim$ E *wolf* $\sim$ NHG *Wolf*

◇ IE $^*d\underset{\circ}{r}\acute{k} \rightarrow$ OI $d\underset{\cdot}{r}\acute{s}$

◇ IE $^*g^w\underset{\circ}{r}u \rightarrow$ OI *guru* $\sim$ OGr. *baru* as in the B *baro-meter*

◇ IE $^*p\underset{\circ}{l}h_1u \rightarrow$ OI *puru*

Note the remaining word-initial *m* before a resonant:

◇ OI *mlāta* (“faded, tanned (said of leather)”)

◇ OI $\sqrt{}$ *mnā* (“to mention”)

B.5.3. Ablaut in English and German

In English and German, weak and strong verbs are distinguished. An example of a weak verb is

	English	German
infinitive	to *love*	*lieb*en
imperfect	I *loved*	ich *lieb*te
perfect	I have *loved*	ich habe ge*lieb*t

where the root vowel does not change. In strong verbs, the root vowel changes due to vowel gradation (ablaut). Consider NHG *werden* with

full grade *er*:	*werden* ("to become")
o-grade *or*:	*ward* ("he became"), *a* as in IE $^*okt\bar{o} \rightarrow$ NHG *acht*
zero grade $\underset{\circ}{r}$:	*geworden* (PPP "become"), *o* as in NHG *Wolf* above

According to this pattern, the following forms might be due to sound laws or analogy:

◇ *werben, warb, geworben*

◇ *werfen, warf, geworfen*

◇ *bergen, barg, geborgen*

◇ *sterben, starb, gestorben*

◇ *helfen, half, geholfen*

With *n* instead of *r*, compare

full grade *en*:	*finden* ("to find")
o-grade *on*:	*fand* ("he found"), *a* as in IE $^*okt\bar{o} \rightarrow$ NHG *acht*
zero grade $\underset{\circ}{n}$:	*gefunden* (PPP "found")

The English language also shows this ablaut pattern:

	English	German
full grade	sing	singen
o-grade	sang	sang
zero grade	sung	gesungen

B.5.4. Consonants: From Indo-European to Greek, Latin, and Germanic

Non-aspirated consonants

$$\text{IE } p/t/k \quad \text{and} \quad \text{IE } b/d/g$$

remain the same in Greek and Latin as in Indo-European. That part is easy. Here are the more interesting sound laws:

OGR	IE *bh/dh/gh*	→	OGr. *ph/th/ch* (written)
	IE $k^w/g^w/g^wh$ before cons., *a*, *i*, or *o*	→	OGr. *p/b/ph* (written)
	IE $k^w/g^w/g^wh$ before *e*	→	OGr. *t/d/th* (written)
	IE $k^w/g^w/g^wh$ before or after nasal	→	OGr. *k/g/ch* (written)
	IE *v*	→	OGr. ∅
	IE *s*	→	OGr. *h*

The first line is responsible for the fact that Old Greek foreign words (B stands for borrowing) are recognisable by *ph/th/ch*:

◇ *ph*: B *philosophy, phobia*

◇ *th*: B *theology, theatre, mathematics*

◇ *ch*: B *chlorine, Christopher*

Lines 2 through 4 are concerned with IE labiovelars. While the velar element is lost, the result varies a lot depending on the environment. For example, g^wh before *e* finally turns into *th* as in OGr. B *thermic* (s.v. gharma).

For the fifth line of **OGR** compare

◇ Lat. *vox* with OGr. B *epic* (s.v. *vac*)

◇ Lat. B *vicinity* with OGr. B *economics*

◇ OI *kravis* with OGr. *kreas* ← IE $^*kreuh_2s$-

Turning to the sixth line, IE *s* is voiceless and is preserved in most IE languages. However, Greek is an interesting exception. The contrast of IE and Lat. *s* with Greek *h* clearly shows up in these examples:

Lat. *sex*	∼	OGr. *hex* (as in *hexagon*)
Lat. *septem*	∼	OGr. *hepta* (as in *heptagon*)
it. B *sal-to*	∼	OGr. *hal-ma* (also a board game)
E *same*	∼	OGr.-Lat. B *homo-sexual*

Lat. B *semi-final* ∼ OGr. B *hemi-sphere*
Lat. B *serpent* ∼ OGr. B *herpes* (a skin desease, spreading like a snake)

Similar to Sanskrit, but in an independent development, Grassmann's law applies also in Greek. The first of two aspirated sounds becomes deaspirated:

OGR_DA IE $C^{+\text{asp}}\,VC^{+\text{asp}} \rightarrow$ OI $C^{-\text{asp}}\,VC^{+\text{asp}}$

In Latin, the development IE *bh/dh/gh* is complicated. It pays to remember

LAT_*f* IE *bh/dh/gh* word-initial → Lat. *f*

For example, IE **bhreg* leads to the Lat. Bs *frag-ile* or *fraction*. Second, IE g^w lost the velar element:

LAT_*v* IE g^w word-initial → Lat. *v*

See Lat. B *vital* (s.v. *jīv*).

An IE *s* between vowels regularly turned into Lat. *r*, a process sometimes called rhotazism:

LAT_*sr* IE *s* intervocalic → Lat. *r*

See Lat. B *vīrus* (s.v. *viṣa*).

A final Latin sound law that is often applied concerns two dentals that come into contact. They are replaced by *ss*:

LAT_*DD* IE *DD* → Lat. *ss*

The consonantal development from Indo-European to Germanic is often called the "first consonant shift". Most Germanic consonants remain in English. The first consonant shift is governed by these sound laws:

GER
IE *p/t/k* → Germ. *f/þ/h*
IE *b/d/g* → Germ. *p/t/k*
IE *bh/dh/gh* → Germ. *b/d/g*

where *þ* (first line) represents the voiceless interdental spirant. In words:

◇ Voiceless unaspirated *p/t/k* turn into fricatives. See
- Lat. *pecus* ("cow") as in the B *pecuniary* ∼ E *fee*
- Latin based B *pedal* or *pedicure* ∼ E *foot*

◇ Voiced unaspirated plosives turn voiceless. This can be seen from
- Lat. *ego* ∼ Berlin Low German *icke*
- It. *gelato* ("ice") ∼ E *cold*

◇ Voiced aspirated sounds lose the aspiration as in IE **bhreg* → Lat. B *frag-ile* ∼ E *break*.

B.5.5. Consonants: From Germanic to New High German

The second consonant shift (NHG_C)

The so-called first consonant shift refers to developments from IE to Germ. The second consonant shift concerns changes from Germanic to High German. These changes are peculiar to German (and Swiss German), but do not occur in English, Danish, Swedish, Low German etc.:

NHG_C

Germ. *t*	→	NHG	*s/ss* after vowel *ts* (written *z*) otherwise
Germ. *k*	→	NHG	*ch* after vowel *k* otherwise
Germ. *p*	→	NHG	*f/ff* after vowel *pf* otherwise
Germ. *þ*	→	E *th* ∼ NHG *d*	
Germ. *d*	→	E *d* ∼ NHG *t*	

where *þ* (fourth line) represents the voiceless interdental spirant. Since English often preserves the Germanic consonants, English (rather than Germanic or Gothic) can be fruitfully compared with New High German. For the first line of **NHG_C**, consider these examples after a vowel:

E *eat* ∼ NHG *essen*	E *nettle* ∼ NHG *Brennnessel*
E *what* ∼ NHG *was*	E *let* ∼ NHG *lassen*
E *out* ∼ NHG *aus*	E *shoot* ∼ NHG *schießen*
E *white* ∼ NHG *weiß*	E *goat* ∼ NHG *Geiß*
E *hot* ∼ NHG *heiß*	E *sprout* ∼ NHG *sprießen*

"Otherwise" in the above rule means "not after vowel" and hence word-initial or after consonants as in these examples:

E *town* ∼ NHG *Zaun* ("fence")	E *timber* ∼ NHG *Zimmer* ("room")
E *tide* ∼ NHG *Zeit* ("time")	E *tongue* ∼ NHG *Zunge*
E *tear* ∼ NHG *zerren*	E *fif-ty* ∼ NHG *fünf-zig*
E *till* ∼ NHG *Ziel* ("aim")	E *ten* ∼ NHG *zehn*

The second line of **NHG_C** concerns Germ. *k*. A word-initial change is observed in Switzerland. For other High German speakers, a change occurs only "after vowel":

E *weak* ∼ NHG *weich* ("soft")	E *break* ∼ NHG *brechen*
E *duck* ∼ NHG *tauchen* ("to dive")	E *seek* ∼ NHG *suchen*
E *lock* ∼ NHG *Loch* ("hole")	E *spoke* ∼ NHG *Speiche*
Lat. *cocus* → B *cook* ∼ NHG *Koch*	Lat. *sīcilis* → B *sickle* ∼ NHG *Sichel*

A final interesting example is Lat. *sēcūrus* (← *sē cūrā*, "without worry, carefree") → NHG *sicher* ("safe").

Now turn to the remaining unvoiced unaspirated sound, *p*. Similar to *t*, there are changes "after vowel" and "otherwise":

E *path* ∼ NHG *Pfad*	E *hip* ∼ NHG *Hüfte*
E *leap* ∼ NHG *laufen*	E *heap* ∼ NHG *Haufen*
E *sleep* ∼ NHG *schlafen*	E *sheep* ∼ NHG *Schaf*

If a clear Latin-Germanic equation involving the second consonant shift exists, the borrowing occurred after the first consonant shift, but before the second consonant shift as in

◇ Lat. *planta* → B English *plant* ∼ NHG *Pflanze*

◇ Latin *piper* → B English *pepper* ∼ NHG *Pfeffer*

The developments for Germanic *p/t/k* are considered in the first three lines of **NHG_*C***. Voiced labials and velars do not undergo any further changes. However, with respect to dentals, observe the sound laws presented in the last two lines of **NHG_*C***. Examples for the fourth line are easy to find:

E *bath* ∼ NHG *Bad*	E *oath* ∼ NHG *Eid*
E *think* ∼ NHG *dünken* (mich *dünkt*)	E *path* ∼ NHG *Pfad*
E *brother* ∼ NHG *Bruder*	E *smith* ∼ NHG *Schmied*
E *earth* ∼ NHG *Erde*	E *that* ∼ NHG *das/dass*
E *three* ∼ NHG *drei*	E *thief* ∼ NHG *Dieb*
E *through* ∼ NHG *durch*	E *thing* ∼ NHG *Ding*
E *thorn* ∼ NHG *Dorn*	E *leather* ∼ NHG *Leder*
E *thirst* ∼ NHG *Durst*	

Finally, for Germanic and English *d* consider these examples:

E *bed* ∼ NHG *Bett* ("bed")	E *drink* ∼ NHG *trinken*
E *bed* ∼ NHG *Beet* ("bed, patch")	E *duck* ∼ NHG *tauchen* ("to dive")
E *board* ∼ NHG *Brett*	E *deer* ∼ NHG *Tier* ("animal")
E *ride* ∼ NHG *reiten*	E *lead* ∼ NHG *leiten*
E *day* ∼ NHG *Tag*	E *mood* ∼ NHG *Mut* ("courage")
E *deep* ∼ NHG *tief*	E *daughter* ∼ NHG *Tochter*

E *door* ∼ NHG *Tür*	E *tide* ∼ NHG *Zeit* (“time”)
E *do* ∼ NHG *tun*	E *under* ∼ NHG *unter*
E *spade* ∼ NHG *Spaten*	E *wide* ∼ NHG *weit*
E *good* ∼ NHG *gut*	E *widow* ∼ NHG *Witwe*
E *red* ∼ NHG *rot*	E *dear* ∼ NHG *teuer*
E *ladder* ∼ NHG *Leiter*	E *shoulder* ∼ NHG *Schulter*
E *dead* ∼ NHG *tot*	E *need* ∼ NHG *Not*
E *seed* ∼ NHG *Saat*	E *fold* ∼ NHG *falten*

Exceptions

Of course, no rules without exception (leading to new, refined rules):

1. Germ. *t* remains after *f, s,* or *ch*:
   - ◇ Lat. *captivus* ∼ NHG *Haft*
   - ◇ E *stone* ∼ NHG *Stein*, but not u.at. *stsein* (just you try!)
   - ◇ E *starve* ∼ NHG *sterben*
   - ◇ E *is* ∼ NHG *ist* ← IE **esti* → OI *asti* (where *s* prevented the shift of *t* in both the first and the second consonant shifts)
   - ◇ E to *fight* ∼ NHG *fechten* (“to fence”)
   - ◇ E *eight* ∼ NHG *acht*
2. Germ. *t* remains before *r*: E *tree*, *true* ∼ NHG *Treue* (“loyalty”), *Trost* (“consolation”) (*t* → *ts* is repressed—just try to pronounce u.at. *tsreue* or u.at. *tsrost*)
3. Germ. *d* remains after *n*: E *hound* ∼ NHG *Hund*
4. Germ. *k* or *t* are not shifted if *r* follows immediately
   - ◇ E *acre* ∼ NHG *Acker* (“field”)
   - ◇ E *bitter* ∼ NHG *bitter* in contrast to NHG *Biss*

New High German more conservative than English

English is closer to Germanic than New High German. However, sometimes, New High German is more conservative than English:

NHG_E	Germ. *b*	→	NHG *b*	∼	E *v/f*
	Germ. *ch* not w.-i.	→	NHG *ch*	∼	E ∅ (written *gh*)
	Germ. *g* not w.-i.	→	NHG *g*	∼	E ∅ (written *i* or *y*)
	Germ. *g* w.-i.	→	NHG *g*	∼	E *y*
	Germ. *k*	→	NHG *k*	∼	E *ch* (near OE *i* or *e*)
	Germ. *n/m*	→	NHG *n/m*	∼	E ∅ (before *f*, *th*, or *s*)

The first line of **NHG_E** is exemplified by

E *life* ∼ NHG *Leib* (“body”)	E *live* ∼ NHG *leben*
E *deaf* ∼ NHG *taub*	E *dove* ∼ NHG *Taube*
E *loaf* ∼ NHG *Laib*	E *leaf* ∼ NHG *Laub* (“foliage”)
E *have* ∼ NHG *haben*	E *seven* ∼ NHG *sieben*
E *love* ∼ NHG *lieben*	E *starve* ∼ NHG *sterben* (“to die”)
E *believe* ∼ NHG *glauben*	E *evil* ∼ NHG *übel*

The second and third lines of **NHG_E** show how velar sounds turn mute in English:

E to *fight* ∼ NHG *fechten* (“to fence”)	E *night* ∼ NHG *Nacht*
E *knight* ∼ NHG *Knecht* (“farmhand”)	E *weight* ∼ NHG Ge-*wicht*
E *plight* ∼ NHG *Pflicht* (“duty”)	E *eight* ∼ NHG *acht*

and

E *rain* ∼ *Regen*	E *way* ∼ *Weg*
E to *lie* ∼ *liegen*	E *many* ∼ *mannig*-faltig (“manifold”)
E to *lie* ∼ *lügen*	E to *say* ∼ *sagen*
E *day* ∼ *Tag*	E *nail* ∼ *Nagel*

While the third line concerns Germ. *g* within a word, the fourth line is about word-initial *g*:

◇ E *yellow* ∼ *gelb*

◇ E *yawn* ∼ *gähnen*

E *g* is also found in this position, like in E for*get* ∼ NHG ver*gessen*. This is an Old Nordic import into the English language.

The fifth line is justified by these examples:

◇ E *church* ← OE *cirice* ∼ NHG *Kirche*

◇ E *choose* ← OE *ceosan* ∼ NHG *kiesen* (old for "examine, choose")

◇ E *chin* ∼ *Kinn*

Finally (sixth line of **NHG_E**), the loss *n* or *m* in E can be observed:

E *five* ∼ NHG *fünf*	E *tooth* ∼ NHG *Zahn*
E *wish* ∼ NHG *wünschen*	E *other* ∼ NHG *anderer*
E *us* ∼ NHG *uns*	E *goose* ∼ NHG *Gans*

B.5.6. Consonants: From Indo-European to Germanic and English

The previous two subsections dealt with the first and the second consonant shift, respectively. Putting them together, one gets these examples:

◇ Lat. *trēs* ∼ E *three* ∼ NHG *drei*

◇ Lat. *tū* ∼ E *thou* (old form) ∼ NHG *du*

◇ OGr. B *cardiology* ∼ Fr. *cordialement* ∼ E *heart* ∼ NHG *Herz*

◇ Lat. B *dental* ∼ E *tooth* ∼ NHG *Zahn*

◇ *Dun* (Laoghaire) (Irish town near Dublin) ∼ E *town* ∼ NHG *Zaun*

◇ OGr. B *dermatology* ← IE **der* ("to tear (an animal's skin from the body)") → E *tear* ("zerren, reißen") ∼ NHG *zerren*

An important class of regular exceptions comes under the heading of Verner's law. If IE *p/t/k/s* (not word-initial) do not follow immediately the IE accent, one obtains

$$\begin{array}{ll} \textbf{VER} & \text{IE } p/t/k/s \text{ not word-initial, not immediately after IE accent} \\ \rightarrow & \text{Germ. } b^{\texttt{fric}}/d^{\texttt{fric}}/g^{\texttt{fric}}/r \\ \rightarrow & \left\{ \begin{array}{l} \text{E } v/th/g/r \\ \text{NHG } b/t/g/r \end{array} \right. \end{array}$$

where "fric" stands for fricative. These sounds are consonants produced by forcing air through a narrow channel. Sibilants (like OI *s* or *ś*) are special fricatives where the tongue directs the air over the edge of the teeth. That the Germanic sounds are fricative is not obvious from NHG *t* that goes back to either Germ. *d* or Germ. $d^{\texttt{fric}}$:

NHG_C	Germ. *d*	→	E *d* (example *red*)	∼	NHG *t* (ex. *rot*)
VER	Germ. $d^{\texttt{fric}}$	→	E *th* (ex. *father*)	∼	NHG *t* (ex. *Vater*)

The fricative nature shows more clearly in E words like *father*. Indeed, IE $^*ph_2t\acute{\bar{e}}r$ (where $\acute{\bar{e}}$ is both long and stressed) is a good example for Verner's law. The IE stress immediately follows t and hence Germ. $d^{\texttt{fric}}$ results.

Otherwise, observe the (more common) development

NHG_*C*		IE *p/t/k/s* word-initial or immediately after IE accent
	$\rightarrow$	Germ. *f/þ/h/s*
	$\rightarrow$	NHG *f/d/h/s*
	$\sim$	E *f/th/h/s*

where the example of IE $^*bhr\acute{\bar{a}}t\bar{e}r$ yields E *brother* $\sim$ NHG *Bruder*.