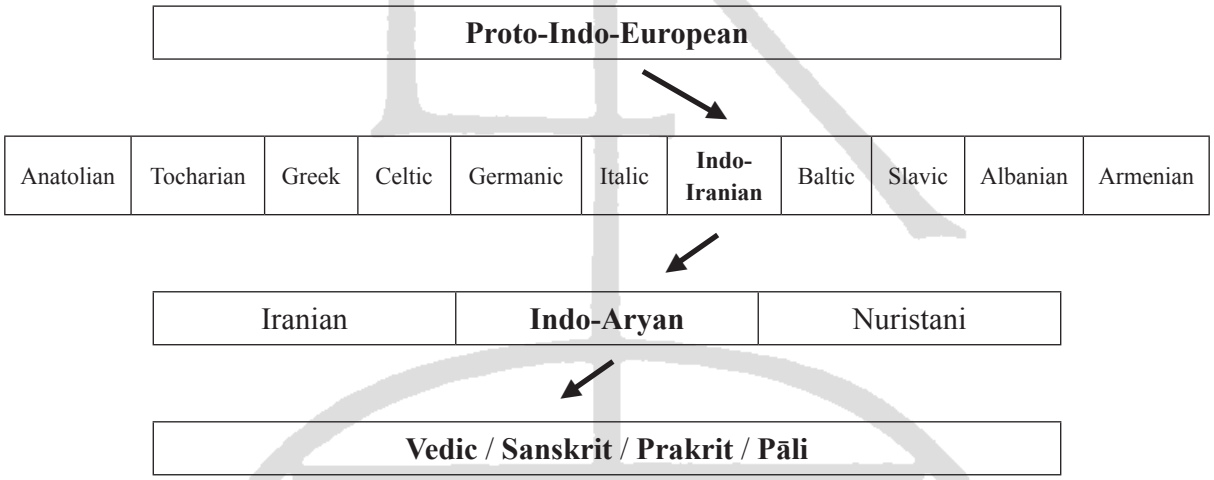
1 Sanskrit in Space and Time

In India, Sanskrit has the same significance as Latin, Greek and Hebrew have in Europe and it is extremely important for historical comparative linguistics because this language has been handed down to us with an enormous text corpus. The word Sanskrit means 'constructed, put together' and in a broader sense 'sophisticated, refined, highly elaborated'.

Classification of Sanskrit within the Indo-European languages

The Indo-European languages go back to Proto-Indo-European, a theoretical language which has been reconstructed through sound correspondences and of which we do not have written documents. One of the major branches of the Indo-European languages is Indo-Iranian, which itself is divided into Iranian, Indo-Aryan and Nuristani. Indo-Aryan is the ancestor of the varieties Vedic and Sanskrit (Old Indo-Aryan) and Prakrit/Pāli (Middle Indo-Aryan). The following classification is adapted from Kümmel 2007:37/38.



Loan words in Modern English

Some Sanskrit words have found their way as loan words into Modern English. Among these are *mantra*, *ashram*, *yoga*, *tantra*, *guru*, *karma*, *avatar*, *mandala* and also *swastika*, which is regarded as a lucky symbol in India. The self-designation of the Sanskrit speaking population was *arya-* 'Aryan', a word which was used wrongly as a designation of a superior human race especially during the Nazi era in Germany.

Varieties of Sanskrit / Language periods of Indic languages

Vedic: The four Vedas Rigveda, Samaveda, Yajurveda and Atharvaveda are the oldest holy writings of Hinduism. The oldest of these is the Rigveda with average datings between 1500–1300 BC. It is a collection of 1028 hymns and sacrificial poems which are directed at several different deities. The word Rigveda is composed of the Sanskrit words *ṛ́c-* 'song of praise, stanza, verse' and *véda-* 'knowledge' and can be translated with 'knowledge composed in hymns'. The Vedic language is richer in morphology compared to classical Sanskrit whereas their phonology is almost identical. The four Vedas, which are also called Samhitas, are the starting point of Indic literature and accompanied by further writings which are called Brahmanas, Upanishads and Aranyakas.

Lit.: Ziegler 5–8.

- **Sanskrit:** It was the grammarian Pāṇini who documented and in this way defined the rules of Sanskrit which was the standard language of science, theatre, jurisdiction and religion in ancient India. He presumably lived in the 5th or 4th century BC and wrote the oldest and most important Sanskrit grammar called *Aṣṭādhyāyī*. The grammar rules are formulated in aphorisms called *sūtras* which have the characteristic of being composed in a highly compact mnemotechnical verse language. Pāṇini made use of a complicated meta-language in order to describe all grammatical phenomena adequately. He arranged and defined the rules of Sanskrit grammar in such a way that Sanskrit could be used as a unified scientific and cultural language. While the upper classes spoke Sanskrit, the variety Prakrit had already started to emerge among the lower classes which is similar to the opposition of Classical Latin and Vulgar Latin. The Prakrit languages did not evolve out of Sanskrit directly but coexisted next to Sanskrit for a long time.

- **Prakrit (~ 300 BC until ~ 600/700 AD)**

  Prakrit and Pāli: Prakrit languages or Prakrits are the designations of several Middle Indo-Aryan languages which differ from Sanskrit in phonology and morphology. The term Prakrit is also used as a cover term for languages which deviate from Sanskrit in any manner. The most important liturgical language of these languages was Pāli which is regarded as the sacred literary language of Buddhism. The most important phonological differences from Sanskrit were the following: the assimilation of consonant clusters which created a great number of geminated consonants: *dugdha- > duddha-* 'milk', *karma- > kamma-* 'work', *utpāda- > uppāda-* 'birth', *pudgala- > puggala-* 'beautiful', *śabda- > sadda-* 'sound', *varṣa- > vassa-* 'rain', *kalpa- > kappa-* 'rule'. In the initial position, simple consonants arose: *prāṇa- > pāṇa-* 'breath', *grāma- > gāma-* 'village'. The formerly separated Sanskrit sibilants *ś*, *ṣ*, *s* merged into *s*: *śaraṇa- > saraṇa-* 'cottage, hut', *doṣa- > dosa-* 'mistake'. Sanskrit *r̥* became *a*, *i* or *u* depending on the phonological environment: *kr̥ta- > kata-* 'done', *r̥ṣi- > isi-* 'seer', *r̥ju- > uju-* 'straight'. Similar to the outcome in the Vedic dialect, we find Sanskrit *ḍ* and *ḍh* emerge as Pāli *ḷ* and *ḷh* between vowels: *rūḍha- > rūḷha-* 'grown' (SC 29.3) and also the sandhi rules s4.3 and s4.6 seem to be anticipated Middle Indo-Aryan developments because we find these regularly in Pāli, too: *bhavati > hoti* 'is', *dhārayati > dhārēti* 'he carries' (SC 21). Furthermore, we find palatalizations, e.g. *adya > ajja* 'today'.

  Lit.: Jain/Cardona 2007.

- **Apabhramsa (~ 700 AD until ~ 1500 AD) / Modern Indo-Aryan Languages (from ~ 1500 AD)**

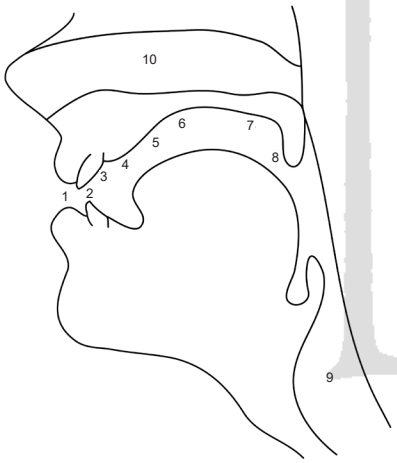
  The transition phase between Middle Indo-Aryan and Modern Indo-Aryan (also called New Indo-Aryan or Modern Indic) is called Apabhramsa. The old inflected system was lost nearly completely as it became supplanted by analytic forms. The loss of final vowels caused the emergence of many monosyllabic words, the vowels of which were often lengthened in the further development to Modern Indo-Aryan. What follows are some selected examples of language development from Sanskrit to Hindi: *dugdha- > duddha- > dūdh* 'milk', *karma- > kamma- > kām* 'work', *nāma- > nām* 'name', *adya > ajja > āj* 'today'. Many words also show nasalization: *grāma > gāma > gā̃v* 'village', *danta- > dā̃t* 'tooth'.

  The Modern Indo-Aryan languages are mainly spoken in the northern part of India, in Pakistan, Nepal and Bangladesh. One of the most important languages is Hindi which, together with English, is India's national language with around 200 million native speakers. There also exist several other official local languages.

2 Basics of Phonetics

The Sanskrit grammarians were the first to classify human speech sounds according to their place and manner of articulation, which was the reason for the arrangement of the Indic alphabet. Please compare the phonetic terms of the two following tables with the arrangement of the Devanāgarī alphabet on the next page.

Fundamental places of articulation



Place of Articulation		Description
1	**labial**	with the lips
2	**interdental**	between the teeth
3	**dental**	at the teeth
4	**alveolar**	at the alveolar ridge
5	**retroflex**	curled back tongue
6	**palatal**	at the hard palate
7	**velar**	at the soft palate
8	**uvular**	at the uvula
9	**glottal**	at the vocal folds
10	**nasal**	in the nasal cavity

Fundamental manners of articulation

Stop	The airflow stops completely due to an occlusion of the oral vocal tract. All languages have stop consonants, the most common are [p], [t], [k] and their voiced counterparts [b], [d], [g]. Sanskrit stops display a triple contrast of manner of articulation: voiceless (tenuis) vs. voiced (media) vs. aspirated.
Nasal	The airflow passes through the nose while there is an occlusion of the oral vocal tract which determines the resonant cavity of the consonant and therefore produces the sound of dental [n], labial [m] or velar [ŋ].
Fricative	A partial closure of the vocal tract causes the airflow to become turbulent which produces fricative consonants like [s], [f], [h]. Fricatives are also called spirants or stridents.
Approximant / Semivowel	The approximant consonants [w] and [j], which are also called semivowels, have an intermediate articulation between vowels and fricative consonants. The Sanskrit sounds *v* and *y* are classified as semivowels because they can be the non-syllabic variants of the vowels *u* and *i*. Sanskrit phonology also regards *r* and *l* as semivowels because they have the vocalic allophones *r̥* and *l̥*.
Vowel	Vowels are articulated with an open vocal tract. The airflow passes out of the mouth without constriction.
Diphthong	A diphthong is the combination of a vowel plus a semivowel. Sanskrit phonology also regards *e* and *o* as diphthongs although they were the plain long vowels *ē* and *ō* which originated out of diphthongs.
Aspirate	Aspirated consonants are pronounced with additional aspiration which is indicated by a postposed or superscript *h*.
Affricate	An affricate is the combination of a stop consonant plus homorganic fricative.
Lateral	During the articulation of the alveolar lateral /l/, the airflow escapes along the sides of the tongue while the tongue blocks the airflow in the middle. The sounds /l/ and /r/ are traditionally known as liquids.

Transliteration of the Devanāgarī-Alphabet

	Stop				Nasal	Fricative	Approxi-mant	Vowel		Diphthong	
	Tenuis		Media								
Guttural	क *ka*	ख *kha*	ग *ga*	घ *gha*	ङ *ṅa*	ह *h*		अ *a*	आ *ā*	-	-
Palatal	च *ca*	छ *cha*	ज *ja*	झ *jha*	ञ *ña*	श *ś*	य *ya*	इ *i*	ई *ī*	ए *e*	ऐ *ai*
Retroflex	ट *ṭa*	ठ *ṭha*	ड *ḍa*	ढ *ḍha*	ण *ṇa*	ष *ṣ*	र *ra*	ऋ *ṛ*	ॠ *ṝ*		
Dental	त *ta*	थ *tha*	द *da*	ध *dha*	न *na*	स *s*	ल *la*	ऌ *ḷ*	ॡ *ḹ*		
Labial	प *pa*	फ *pha*	ब *ba*	भ *bha*	म *ma*		व *va*	उ u	ऊ ū	ओ *o*	औ *au*

Sanskrit was written in the Devanāgarī script which can be literally translated as '(script of the) city of gods'. Even today this script is very common in India because it serves to write the modern Indic languages Hindi, Marāṭhī and Nepali amongst others. The Devanāgarī script goes back to the older Brahmi script and it is written from left to right below a horizontal line (नगर: *nagaraḥ* 'city', जन: *janaḥ* 'people') above which only vowel letters and the letter for *r* before consonant project. The frequent short vowel अ *a* is expressed within the consonantal sign (क *ka*, ख *kha*, ग *ga*, घ *gha*) and is only noted separately in the initial position (अनलि: *anilaḥ* 'wind'). The other vowel letters आ *ā*, इ *i*, ई *ī*, उ *u*, ऊ *ū*, ऋ *ṛ*, ॠ *ṝ* and ऌ *ḷ* are also written only in the initial position or within the word after another vowel, and they have another form if preceded by a consonant. Long आ *ā* is expressed by a vertical stroke (पा *pā*, दा *dā*, का *kā*), short *i* is written before the consonant (पि *pi*, दि *di*, कि *ki*) and long *ī* after the consonant (पी *pī*, दी *dī*, की *kī*). The letter *r* has a special form before consonants and is noted as a small semi circle above the horizontal line (कर्मन् *karman* 'deed, action'). If two or more consonants follow each other, their letters fuse together which is called ligature. For example the letters त *ta* and प *pa* fuse to तप *tpa*. The vowel combinations are given in the following table and lists of ligatures can be easily found on the internet.

ka	*kā*	*ki*	*kī*	*ku*	*kū*	*kṛ*	*kṝ*	*kḷ*	*ke*	*kai*	*ko*	*kau*
क	का	कि	की	कु	कू	कृ	कॄ	कॢ	के	कै	को	कौ

Further Devanāgarī symbols

Anusvāra [ं] is a superscript dot and transcribed as *ṃ* (पं *paṃ*, तं *taṃ*). It was used to indicate the nasalization of a preceding vowel if the consonant following was *y*, *r*, *l*, *v*, *ś*, *ṣ*, *s*, *h*. Therefore, *siṃhá-* सिंह 'lion' was pronounced [sīha]. Anusvāra was also used to write the sandhi variant of *m* in the absolute final position as well as a homorganic nasal before a consonant in the middle of the word e.g. संधि *saṃdhi* instead of सनधि *sandhi*.

Visarga [:] looks like a colon and is transcribed with *ḥ* e.g. स: *saḥ*, त: *taḥ*. It is the sandhi variant of *r* and *s* in the absolute final position e.g. देव: *devaḥ* 'god' for देवस् *devas*.

Virāma [्] below a consonant designates the absence of a consonant following e.g. तत् *tat*, पत् *pat*, which needs to be explicitly noted because the Devanāgarī consonant letters by default contain short *a*.

Avagraha ['] is an apostrophe which is used to describe the "loss" of initial *a* according to sandhi rule s6.3 e.g. in *kaḥ api* > *ko 'pi* को 'पि 'someone'.

Daṇḍa [।] is a separator which is used to separate sentences, paragraphs or hemistiches from each other.

Anunāsika [ँ] does not appear in words but only in sandhi rule s15.4. It is transcribed as *ṃl* in this book.

Lit.: Stiehl 300–304; Ziegler 2012:12–23; Lehmann 2013:1–15; Thumb 1905:34–38.

3 Basics of Historical Phonology

Phonemes and allophones

If phonetic sounds are used to differenciate words e.g. *m* and *p* in *tá**m**as-* ‘darkness’ and *tá**p**as-* ‘ascesis’, these sounds are called **phonemes** of that language. The total number of phonemes is called the **phoneme inventory** of the language. If different sounds are just positional variants and not used to differenciate words, they are called **allophones** which occur in Sanskrit mainly in sandhi variants, that is in changes of final sounds before initial sounds of the following word. The original etymological final consonant *s* of *devas* ‘god’ remains as in *devas_tatra* ‘the god over there’ only before the voiceless dental sounds *t* and *th*. Before a following labial sound e.g. *devaḥ_punaḥ* ‘the god again’ we find *ḥ* instead of *s*. But, as this phonetic difference *s* ~ *ḥ* in the final position of the word does not change the meaning of the word, the two sounds *s* and *ḥ* are classified as positional variants or allophones in the final position.
In some cases the phonemic status of a sound is not absolutely clear, for example if we only have very few words which can be adduced as examples of this sound. Sanskrit does have some minimal pairs like *anu* ‘along’ :: *aṇu-* ‘atom’ which support the phonemic status of the retroflex nasal *ṇ* but usually nasals were homorganic allophones before following stops and no individual phonemes. Examples of allophonic homorganic nasals are: *da**ṇḍ**a-* ‘stick’, *pa**ñ**ca* ‘five’, *a**ṅ**ga-* ‘limb’.

Sound changes and derivation chains

The phonemes of a language are not static but subject to permanant changes which is called sound change. A sound change is expressed in phonological derivations through the derivation operator “ > ”. The number in the round brackets refers to the index in the back of the book which numerically lists all sound changes which are relevant for Sanskrit historical phonology.

Example 1: **lijd́ʰá-* [liḏždhá] > (6.6) **liždhá-* > (23.2) **liẓdhá-* > (17.3) **liẓḍhá-* > (20.3) *līḍhá-* ‘licked’

This derivation states that the preform **lijd́ʰá-* with its phonetic representation [liḏždhá] became **liždhá-* by sound change 6.6. Instead of writing 6.6 we can also directly put in the sound change **jd́ʰ* [ḏždh] > **žd͡h* which can be found in the index at SC 6.6. The process continues with the sound changes 23.2, 17.3 and 20.3. The asterisk in front of the word indicates that it is a reconstructed word and not an attested one. The last word of the derivation is the attested Sanskrit form which is the result of all the sound changes applied to the preform on the left side. The result on the right side is not furnished with an asterisk because it is an attested form.

Example 2: **duis* > (8.1) **duiš* > (23.1) *dviṣ* ‘two times’ = **duis* > (c24) *dviṣ*

It makes sense to summarize sound changes into a single rule when they always occur in the same sequence and have the same result. This is done in the case of the so-called ruki rule which states that **s* followed by *r,ṛ,ŭ,k,ĭ* first becomes IIR **š* and afterwards SKR *ṣ*. The two sound changes PIE **s* > (8.1) IIR **š* and IIR **š* > (23.1) SKR *ṣ* are therefore expressed through the cover rule **s* > (c24) *ṣ*.

Consonants and Vowels

		Labial	Dental / Alveolar	Retroflex	Palatal	Velar	Glottal
Stop	**voiceless**	p	t	ṭ	c	k	
	voiceless aspirated	p^h	t^h	$ṭ^h$	c^h	k^h	
	voiced	b	d	ḍ	j	g	
	voiced aspirated	b^h	d^h	$ḍ^h$	(j^h)	g^h	
Fricative			s ~ *[z]	ṣ ~ *[ẓ]	ś		h / [ḥ]
Nasal		m	n	ṇ	[ñ]	ṅ	
Lateral			l ~ [l̥]				
Tap / Flap				r ~ [r̥]			
Approximant		u̯			i̯		

- The stops *p, t, ṭ, c, k*, *ph, th, ṭh, ch, kh* and the fricatives *s, ṣ, ś, ḥ* are voiceless. All the other sounds are voiced.
- The sound *jh* appears only once in the Rigveda (*jájhjhatīḥ*, which is an epithet of lightning) and is otherwise restricted to some onomatopoetic Sanskrit words like √*jhaṇ-* 'to sound', *jharjhara-* 'drum', *jharā-* 'waterfall'. It is therefore unlikely that *jh* was an actual phoneme in Sanskrit.
- The retroflex sounds originated through the combination of palatal and dental consonants. A substrate effect of the indigenous Dravidian languages, in which retroflex sounds are common, cannot be ruled out.
- *r* and *l* have the vocalic allophones [r̥] and [l̥] if they form the syllabic nucleus between consonants.
- The grammarians also registered long $\bar{l̥}$ but it does not appear in any word.
- Visarga *ḥ* is the allophone of *s* or *r* in the absolute final position and before *p, ph, k, kh*. The Vedic dialect also exhibits an additional allophone IPA [ɸ] called *upadhmānīya* before *p* and *ph* and an allophone IPA [x] called *jihvāmūlīya* before *k, kh*.
- The contemporary Sanskrit pronunciation in India repeats the vowel which precedes the visarga also after the visarga. Therefore, the standard pronunciation of *agniḥ* is *agnihi* and *devaha* is spoken for *devaḥ*. Visarga is pronounced as a voiced consonant.
- In phonological derivations the fricatives *s* and *ṣ* often become their voiced allophones *[z] and *[ẓ]. These sounds were very unstable and usually vanished with compensatory lengthening of the preceding vowel.

	Front		Mid		Back
Close	*i* / *ī*				*u* / *ū*
Close-Mid		*e* [ē]		*o* [ō]	
Open			*a* / *ā*		

- The exact phonetic value of *a* is unknown.
- The vowels *e* and *o* are in reality the long vowels [ē] and [ō] but their length traditionally does not appear in standard Sanskrit transcriptions. Sanskrit speakers regarded these sounds as diphthongs because historically they mostly go back to **ai̯* and **au̯*. Sanskrit also has the diphthongs *ai* < **āi̯* and *au* < **āu̯* which go back to the shortening of former long diphthongs.

Lit.: Allen 1953; Lehmann 2013:1–15; Mayrhofer 1978:15–17; Ziegler 2012:9–11; Stiehl 2007:307–308.

4 Sandhi / Roots / Word Stress

Pausa form / sandhi form / stem form / roots

Words are usually not spoken individually but in the context of sentences. If a word does occur individually and independently of other words, or it is spoken at the end of the sentence, this word is said to be in its pausa position or in the absolute final position.[1] This pausa form was taken as the default form by the ancient Indic grammarians and they used it as the starting point of their synchronic description of Sanskrit sandhi which in many cases did not match the diachronic development correctly. If a word is integrated into a sequence of words and not spoken individually, the initial sound of the word varies depending on the final sound of the preceding word which itself may also change. This process, which is very common in the world's languages, is called sandhi. The following examples show the changes of the example word *deva-* 'god', which changes its form depending on the initial sound of the following word.

The form	*devas*	stands before *t*, *th*.
The form	*devaḥ*	stands before *k*, *kh*, *p*, *ph*, *s*, *ś*, *ṣ*.
The form	*deva*	stands before a vowel except before short *a*.
The form	*devo*	stands before voiced consonants and before short *a*, which is omitted.

An English example for a sandhi process is the variant *an* of the indefinite article *a* before words with an initial vowel e.g. *an apple* or *an orange*. In this case, the variant *an* is indeed the older form, the final *n* of which corresponds to the *n* in MHG *ein* 'a'. Both words go back to Proto-Germanic **ainaz* < PIE **oi̯-no-s* which is related to SKR *eka-* 'one' < **aika-* < **oi̯-ko-*. Before words with an initial consonant, English *an* became *a* around the 12th century AD creating the present distribution of allomorphic *a/an*. This means that the sandhi form *an* preserves the historically older form and this is exactly what happened in Sanskrit in many cases e.g. SC s15.3 *devāṃs_tatra* 'the gods here' in which final **s* of the preform **devāns* remained in sandhi in contrast to its loss in the pausa form *devān* (cf. chapter 22).
Sandhi can lead to ambiguity e.g. *kāntān_na* in which the first word can theoretically be acc. pl. *kāntān*, abl. sg. *kāntāt* or acc. sg. *kāntām* of the word *kāntā-* 'spouse' because final *t*, *n* and *m* appear as *n* before *n*. The compound *mātāgacchat* could theoretically be translated as *mātā agacchat* 'the mother went' or as *mātā āgacchat* 'the mother came' because final vowels fuse with equal initial vowels in sandhi. In these cases, the correct translation can only be found through the context. You can find overview tables for all sandhi results in the appendix.
In order to have an unambiguous representation of the word, dictionaries list Sanskrit nouns according to their **stem form** e.g. *deva* which is an abstract representation of the word written with hyphen in linguistic notation *deva-* and often without hyphen in dictionaries. The ancient Indic grammarians also arranged words according to their underlying roots which are given in this book with the mathematical root sign √.

Lit.: Stiehl 2007:309; Ziegler 26–32; Mayrhofer 1978:26–32; Wackernagel 1896:301–343.

Differences and similarities between sandhi and morphological forms

The phonological rules of a language are in most cases valid for the junction of individual words (external sandhi) as well as for the junction of words with morphemes (internal sandhi). In Sanskrit, however, there is a crucial difference between these two. The rules of external sandhi do not apply to morphological formations before endings that start with a vowel, a semivowel or a nasal. Let us take a look at the example *marut-* 'wind' with the nom. sg. *marut* which is identical to the

1 In this position we usually only find vowels or one of the following eight consonants *k*, *ṅ*, *ṭ*, *t*, *n*, *p*, *m*, *ḥ*, and rarely *ṇ*, *y*, *l*, *v*. All the other consonants are not permitted in the absolute final position which causes their transformation into one of the before mentioned permitted consonants by deaspiration of aspirated consonants and devoicing of voiced consonants.

word stem. In external sandhi, we see voicing of final *t* before a vowel in e.g. *marut atra* > (s11.2) *marud_atra* 'the wind here'.
The other forms of the paradigm are acc. sg. *marut-am*, dat. sg. *marut-e*, instr. sg. *marut-ā* although we could expect *[x]marudam*, *[x]marude*, *[x]marudā* before the suffixes *-am*, *-e*, *-ā* which start with a vowel just like in external sandhi forms. But in order to avoid irregularities within the paradigm, the expected voiced allophone *d* was later analogically replaced by *t*.
Another example is root final *c* of the root √*vac-* 'to speak' which was preserved in the acc. sg. *vāc-am*, dat. sg. *vāc-e* of the word *vāc-* 'word' as voiceless *c* although we would expect voicing which we see e.g. in instr. pl. *vāgbhis*. But this form is a special case because the suffix *-bhi-* < *-*b*^{h}*i-* of the instr. pl. as well as its extended form *-bhyas* < *-*b*^{h}*i-os* of the dat. abl. pl. caused voicing of a preceding stops as we can see from instr. pl. **marut-bhiḥ* > *marud-bhiḥ*, instr. pl. *vāgbhis* and dat. abl. pl. *vāgbhyas*. This difference can be explained as follows: at the time when the morpheme *-*b*^{h}*i-* was added to the word, it had not yet become a proper suffix which could only occur bound to another word but it was still an independent adverb. Therefore, the rules of external sandhi, which governed the junction of individual words, were applied to the above forms *vāgbhis* and *vāgbhyas*. We can finally conclude that in morphological forms in Sanskrit, the rules of external sandhi do not apply. But if they appearently do, like in *marud-bhiḥ*, this is the result of a recent univerbation.
However, in some morphological forms we find assimilations which also apply to external sandhi. These are formations with *d* and *t* before *n* and *m* e.g. **adna-* > (22.3) *anna-* 'food' from the root √*ad-* 'to eat', or **vidyutmat* > *vidyunmat-* 'equipped with lightning' which is a derivation of *vidyút-* 'lightning' through the suffix *-mat*, as well as **mṛ̥d-máya-* > *mṛ̥nmáya-* 'earthen' which is a derivation of *mṛ̥d-* 'clay' through the suffix *-maya-*. For the corresponding external sandhi cf. chapter 10.

Lit.: Thumb 1905:135.

Accentuation of Vedic and Classical Sanskrit

For centuries, the Vedic texts had been handed down from one generation to the next by oral tradition only, which meant that the teacher spoke aloud to the student who repeated what he had heard. This technique was still in use after the Vedic language had become antiquated and was no longer in use. At some point in time, manuscript tradition began and the scholars found it necessary to introduce the stress marks *udātta* 'raised pitch', *anudātta* 'low pitch' and *svarita* 'high falling pitch' into the manuscripts in order to indicate pitches which were not longer in use. Therefore, we can assume that Vedic had a pitch accent which means that words were stressed through a change in pitch level and not through the intensification of breath.
In classical Sanskrit this accentuation then changed into a system in which the penultimate syllable was stressed if it was a long syllable, and the ante-penultimate syllable was stressed if the penultimate syllable was short. A long syllable needed to have a long vowel or a diphthong (*bhar**ā**maḥ* 'we carry') or it had to be a closed syllable (*bhar**a**nti* 'they carry'). A syllable was closed if its offset (which is the optional final consonant of a syllable) consisted of at least one consonant. In case of a short penultimate syllable, the ante-penultimate syllable was stressed (*bh**a**rati* 'he carries'). In case of both a short penultimate and a short ante-penultimate syllable the stress could also fall onto the fourth-to-last syllable if it was the root syllable (acc. sg. *d**u**hitaram* 'daughter'). This system is similar to the accentuation of Classical Latin with the exception that the accent could also fall onto the fourth-to-last syllable if the penultimate and ante-penultimate syllable were short which was not possible in Latin.

Remember
penultimate = second last / the last but one
ante-penultimate = third from last / last but two

Lit.: Mayrhofer 1978:26; Ziegler 24–25; Wackernagel 1896:278–300; Thumb 1905:43–45.

5 Vowel Changes

PIE *e and *o became SKR a and PIE *ē and *ō became SKR ā

The Sanskrit vowel *a* was very frequent because both PIE **e* and **o* merged into this sound whereas they regularly remained unchanged in Greek and Latin if they were not influenced by other developments. We can compare VED *dám-* 'house' < **dóm-* (GR *dómos*, LAT *domus*) as well as *jánas-* 'race' < **ǵenh₁os-* (GR *génos*, LAT *genus*) or *páti-* 'husband' < **póti-* (GR *pósis*, LAT *potis* 'mighty'). Similarly, we find the development of long **ē* and **ō* to *ā* in *āśu-* 'fast' < **ōḱu-* (GR *ōkús*) as well as in *dā́nam* 'gift' < **dṓnom* (LAT *dōnum*) or *rāṭ* 'king' < **rēǵ-s* (LAT *rēx*).

Lit.: Thumb 1959:49–52.

INFO: The sound changes 10.1 **e* > *a*, 10.2 **ē* > *ā*, 10.3 **o* > *a* und 10.4 **ō* > *ā* are highly frequent and affect nearly every word. Therefore, these sound changes are sometimes summarized as SC 10 in order to save space in this book.

Brugmann's law

Brugmann's law states that PIE **o* became SKR *ā* in open syllables before a resonant: *dā́ru-* 'wood' < **dóru-* (GR *dóru*) and *jānu-* 'knee' < **ǵónu-* (GR *gónu*). This sound change explains the difference between the stem formation of kinship terms in nom. pl. *pit**a**ras* < **ph₂teres* 'fathers' (GR *patéres*), *māt**a**ras* < **māteres* 'mothers' (GR *mētéres*) and *bhrāt**a**ras* < **breh₂teres* 'brothers' (GR *phrā́teres*) with short *a* < **e* in the suffix *-tar-* < **-ter-* in comparison to *svas**ā**ras* < **su̯es**o**res* 'sisters' (LAT *sorōres*) with long *ā* because word final *āras* goes back to **ores* whereas the other words go back to a formation with **eres*. However, this sound change occurs also in other contexts like **sod-éye-ti* > SKR *sādáyati* 'causes to sit' (GOT *satjan*) where we do not find a resonant next to **o*.

Monophthongization of IIR **aḭ* > e and **au̯* > o

The above described developments of PIE **e* and **o* to SKR *a* led to the merger of the originally separate diphthongs PIE **eḭ*, **oḭ*, **aḭ* > IIR **aḭ* as well as PIE **eu̯*, **ou̯*, **au̯* > IIR **au̯*. The vacant positions of **e* and **o* were filled again through the monophthongization of IIR **aḭ* > SKR *e* and IIR **au̯* > SKR *o*. Examples for **aḭ* > *e* are **h₂éḭdʰos-* > IIR **Háḭdhas-* > **áḭdhas-* > (11.1) *édhas-* 'firewood' (LAT *aedēs* 'house' < **'fireplace', GR *aíthos* 'fire'), as well as **toḭ* > (10.3) **taḭ* > (11.1) *te* 'these' (GR *toí*) and 3. sg. **u̯oḭde* > (10) **u̯aḭda* > (11.1) *veda* 'he knows' (GR *oîde*). Examples for **au̯* > *o* are **h₂éu̯ges-* > IIR **Háu̯jas-* > **áu̯jas-* > (11.2) *ójas-* 'vigor' which is related to LAT *augēre* 'to increase', as well as **h₁éu̯s-e-ti* > IIR **Háu̯šati* > **áu̯ṣati* > (11.2) *óṣati* 'he sears'. This sound change also occured in sandhi forms, which is described in the next chapter.

Shortening of long diphthongs

The monophthongization of **aḭ* > *e* and **au̯* > *o* created gaps in the phonological system which were filled again through the shortening of the original long diphthongs **āḭ* and **āu̯*, which in turn go back to PIE **ēḭ*, **ōḭ*, **āḭ* and **ēu̯*, **ōu̯*, **āḭ* respectively. The diphthongs of *gaús* < **gā́u̯s* < **gʷṓu̯s* 'cow' (LAT *bōs*) and *naús* < **nā́u̯s* 'ship' (LAT *nāvis*) can therefore be traced back to PIE long diphthongs as well as the ending *-au* of the loc. sg. of the *u*-stems like in *śatrau* < **śatrāu* 'at the enemy'. This rule also explains the forms of the *s*-aor. **é-i̯ēu̯g-s-m̥* > *áyaukṣam* 'I yoked (an animal)' in which case the former long diphthong **ēu̯* was shortened to *au*: **é-i̯ēu̯g-s-m̥* > (22.1) **é-i̯ēu̯k-s-m̥* > (c24) **é-i̯ēu̯k-ṣ-m̥* > (15.4) **é-i̯ēu̯k-ṣ-am* > (10) **á-i̯āu̯k-ṣ-am* > (11.2) *áyaukṣam* 'I yoked (an animal)'.

Lit.: Thumb 1905:55–57.

Exercises

The development of PIE **ĕ and *ŏ*

A LAT *novus* :: **néu̯o-* > (10.1) _____ > (10.3) _____ 'new' **B** LAT *lubet* :: **lubʰeti* > (10.3) _____ 'he longs for' **C** GR *treĩs* :: **tréi̯es* > (10.1) _____ 'three' **D** GR *beltíōn* :: **bélo-* > (10.1) _____ > (10.3) _____ 'strong' **E** AV *xᵘafna-* :: **su̯épno-* > (10) _____ 'sleep' **F** LAT *fert* :: **bʰéreti* > (10.1) _____ '(he) carries' **G** LAT *iugum* :: **i̯ugóm* > (10.3) _____ 'yoke' **H** GR *nephélē* :: **nébhos-* > (10.1) _____ > (10.3) _____ 'mist, fog' **I** GR *thūmós* :: **dhū́mo-* > (10.3) _____ 'smoke' **J** LAT *medius* :: **médhi̯o-* > (10.1) _____ > (10.3) _____ 'middle' **K** GR *eruthrós* :: **rudhiró-* > (10.3) _____ 'red' **L** LAT *augēre* 'to increase' :: **ugró-* > (10.3) _____ 'big' **M** GR *hēdús* :: **su̯ēdú-* > (10.2) _____ 'sweet' **N** GR *títhēmi* :: **dhé-dhē-mi* > (10) _____ > (27.1) _____ 'I put' **O** LAT *serpō* :: **sérpō-mi* > (10.1) _____ > (10.4) _____ 'I crawl' **P** GR *phérō* :: **bʰérō-mi* > (10.1) _____ > (10.4) _____ 'I carry' **Q** LAT *monēre* :: **monéi̯eti* > (10.1+10.5) _____ 'he honors' **R** GR *nõton* 'back (of the body)' :: **sónu-* > (10.5) _____ 'mountain's crest'

Monophthongization and shortening of long diphthongs

A O-LAT *loucos* :: **lou̯ko-* > (10.3) _____ > (11.2) _____ 'clearing' **B** dat. pl. GR *lukois* :: instr. pl. **u̯l̥kʷōi̯s* > (4.1) _____ > (9) _____ > (10.4) _____ > (12.1) _____ > (28.3) _____ **C** LAT *ūrō* :: **hₗéu̯s-e-ti* > (c1) _____ > (10.1) _____ > (c24) _____ > (11.2) _____ 'he/it burns' **D** *sūnú-* 'son' :: loc. sg. **sūnéu̯* > (10.2) _____ > (11.2) _____ **E** GR *Zeús* :: **di̯ēu̯s* > (10.2) _____ > (c24) _____ > (12.2) _____ 'sky' **F** LAT *octō* :: **ókt̑ōu̯* > (c13) _____ > (10) _____ > (12.2) _____ 'eight' **G** *leípō* 'I leave' :: **é-lēi̯kʷ-s-m̥* > (4.1) _____ > (9) _____ > (15.4) _____ > (c24) _____ > (10.2) _____ > (12.1) _____ 'I let (past tense)'

4.1: **kʷ* > **k*	**10.4:** **ō* > *ā*	**27.1:** *Cʰ...Cʰ* > *C...Cʰ*
9: **l̥* > *r̥*	**10.5:** **ó* > *ā́* / *_RV*	**28.3:** **s* > *h₁*
10: **e/o* > *a* and **ē/ō* > *ā*	**11.2:** **au̯* > *o*	**c1:** **hₗe* > *e*
10.1: **e* > *a*	**12.1:** **āi̯* > *ai̯*	**c13:** **ḱt* > *st̥*
10.2: **ē* > *ā*	**12.2:** **āu̯* > *au*	**c24:** **s* > *s̥*
10.3: **o* > *a*	**15.4:** **m̥* > *am*	