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The lexicography of Sanskrit

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Contents

Abstract

Sanskrit is one of the most ancient attested Indo-European languages, and it has one of the oldest lexicographic traditions in the world. This chapter is organized as follows. The Introduction offers basic information about the chronology of, and the main texts in, Sanskrit. The first section of the Description outlines the characteristics of Sanskrit relevant for lexicography: its phonology and writing systems; its systems of alternation and morphemic variability; and the lexicographic status of its verbal prefixes (preverbs), which are treated differently by different dictionaries. The chapter then offers a brief overview of the history of Sanskrit lexicography, from the most ancient documented works onwards, *nighaṇṭu* and *kośa*, up to the bilingual dictionaries compiled within the Western lexicographic tradition during more recent centuries. The final sections deal with the constantly increasing number of digital text corpora and dictionaries of Sanskrit, as well as with further perspectives on the development of Sanskrit lexicography and online tools, and the role of Sanskrit institutions in India in these processes.

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Introduction

Sanskrit is the most ancient language of the Indo-Aryan group, the easternmost branch of the Indo-European language family (except for the extinct Tocharian languages, which were spoken still further to the East). Sanskrit can be largely identified with the Old Indo-Aryan (OIA) linguistic period in the development of the Indo-Aryan languages, attested from the middle of the second millennium BC onwards. The OIA epoch starts with Vedic (or Vedic Sanskrit), which can be divided into at least two main periods, the first being 'early' Vedic (i.e., the language of the hymns addressed to the Vedic gods, mantras and magic spells). This oldest and most archaic layer of Vedic is attested in the language of the Ṛgveda (RV), which remains the main sacral text of the Hindus, followed by the second most ancient text, the Atharvaveda (AV), essentially contemporaneous with the language of the late RV. The second period, 'middle and late' Vedic (also called 'Vedic prose'), is attested in the Brāhmaṇas and Āraṇyakas as well as in the oldest Upaniṣads and Sūtras. The absolute chronology of these periods poses serious problems, so we can only suggest very rough approximations. The early Vedic period cannot be dated earlier than 1500 BC (and cannot have begun much later than 1200 BC); the middle Vedic period probably started after 800 BC. The term 'Sanskrit' is sometimes used as a cover term encompassing the idioms of both the Vedic and post-Vedic periods. Although the next chronological period, Middle Indo-Aryan (MIA), begins from the middle of the first millennium BC onwards (the time to which the oldest documented Middle Indic texts, in Pāli, can be dated), the Sanskrit tradition does not stop with the beginning of the MIA period, but continues in the rich Classical Sanskrit literature. Sanskrit, no longer a spoken language by that time and codified by the ancient grammatical tradition (foremost associated with Pāṇini), co-exists as a sacral language with Middle Indo-Aryan vernaculars. The post-Vedic period covers the younger Upaniṣads and Sūtras, as well as Epic Sanskrit (the language of the Mahābhārata and Rāmāyaṇa) and Classical Sanskrit. The enormous corpus of Classical Sanskrit texts includes a substantial amount of literature, poetry, drama, and narrative literature (e.g. Pañcatantra and Hitopadeśa, the two most important collections of fairy tales and fables); another genre of literary texts, *Purāṇas*, which contain a mixture of myths, legends, folklore, and some semi-historical chronicles; and numerous scholarly treatises on a variety of sciences, such as mathematics, astrology and astronomy, grammar, law, etc.

According to the 2011 Census of India, almost 25,000 Indians reported Sanskrit as their first language. Sanskrit is included in what is known as the Eighth Schedule to the Constitution of India, which lists the 22 languages that are considered official languages of India. The Sanskrit tradition thus continues uninterruptedly into modern times, as it remains in use nowadays for a number of purposes, which include not only the Hindu liturgy but also scholarly works, journals, newspapers, and even broadcasting. A few Indian villages, such as Jhirī (in Madhya Pradesh), are participating in a linguistic experiment aimed at re-introducing Sanskrit as the language of daily communication (McCartney 2017). There is also a peculiar (grammatically somewhat simplified) sub-variety of spoken Sanskrit, not infrequently used by

Sanskrit scholars, both inside and outside India. Sanskrit is also included as a second or third language choice in the curricula of many schools (for Classes V to VIII, i.e. for children aged roughly 9 to 13).

There are some (relatively minor) differences between the varieties of Sanskrit described as 'dialectal', but they are almost never consistently reported in dictionaries. More substantial (and better represented in dictionaries, though not always consistently) are the differences (both on grammatical and lexical levels) between the chronological stages of Sanskrit, from Vedic (early, middle, late) to post-Vedic (Epic, Classical).

Description

Lexical characteristics of Sanskrit

The standard writing system used by Sanskrit is Devanāgarī, an alphasyllabary (syllabic alphabet or *abugida*), ultimately going back to the Brāhmī script and known in its present form from approximately 1000 AD onwards. Devanāgarī is used by more than 100 Indian languages, among which are Hindi, Marathi, and Nepali. There are 33 letters for consonants, and 14 independent letters for vowels and diphthongs (which are used only when they form an independent syllable). In other (non-independent) positions, vowels are marked by diacritics added to the consonant letters. In addition to vocalic diacritics, there are a few consonant diacritics to mark some sounds or phonetic phenomena which have no phonemic status (weakened nasal, nasalization of the preceding vowel, and voiceless aspiration, marked by *anusvāra*, *anunāsika*, and *visarga*, respectively). Consonant clusters are written with complex letters, or ligatures, the rightmost part of which is usually the full form of the final letter of the consonant cluster, while the letters for the preceding consonants only manifest some of the elements of their full forms.[1]

Devanāgarī is essentially phonological in character, which means that (with only a few exceptions) it is based on a one-to-one correspondence between the letters and the phonemes. The alphabetic order of the letters is based on the articulatory classification of Sanskrit sounds (one of the achievements of the Ancient Indian linguistic tradition): vowels (each short vowel followed by its longer counterpart), then diphthongs, then consonants. The consonants are also ordered strictly in accordance with their place of articulation, from back to front, thus starting with the velars, followed by the palatals, then the retroflex, dental and labial groups of consonants, followed by four sonants (*y*, *r*, *l*, *v*), three sibilants (*ś*, *ṣ*, *s* = palatal, retroflex and dental) and the voiced fricative laryngeal *h*. Each homorganic group of consonants includes five sounds (most of which have phonological status) arranged according to the type of articulation: voiceless non-aspirated, voiceless aspirated, voiced non-aspirated, voiced aspirated, and nasal, e.g., for labials: *p*, *ph*, *b*, *bh*, *m*.

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[1]For a visualization of Devanāgarī as used for Sanskrit, see https://www.omniglot.com/writing/sanskrit.htm

Root morphemes may appear in one of the three alternation grades (also called 'ablaut' grades in the Western, Indo-Europeanist, tradition): (i) zero, or weak; (ii) full, or normal (labeled *guṇa* 'quality' in the Indian tradition); and (iii) long (*vṛddhi* 'increasing'). Thus, for the roots of the structure *CaC*, the alternation between the zero, full, and long grades will manifest as ø (i.e. no vowel) ~ *a* ~ *ā*, respectively (e.g. *pt-* ~ *pat-* ~ *pāt-* 'fall; fly'). The alternating vowel can be followed by a sonant (*i/y, u/v,* etc.), which can be realized in different ways, depending on the phonological context. Altogether, this results in a rich allomorphy of the type *i/y* ~ *e/ ay* ~ *ai/āy* (e.g. *ji-* ~ *je-/jay-* ~ *jai-/jāy-* 'win, conquer').

The main citation form of the lexical entry used in the standard European and modern Indian dictionaries of Sanskrit differs considerably from the citation forms employed in the dictionaries of both modern and ancient (Classical) European languages, which normally use as headword the nominative singular form for nouns, and the infinitive or first person singular form of the present tense (in Greek and Latin dictionaries) for verbs. In most Sanskrit dictionaries, the headword form for nouns is the stem (e.g. *devá-* 'god', *agní-* 'fire'), and for verbs the bare root form (usually written without even a hyphen). Verbal roots containing a sonant that has a vocalic pendant, phonologically identical with the consonantal allophone or only with weak phonemic status (i.e. *y/i, r/ṛ, l/ḷ, v/u*), are usually given in the zero grade (though some dictionaries, such as the Petersburg Dictionary of Sanskrit by Böhtlingk and Roth (1855–75), give the full grade for *r/ṛ* and *l/ḷ* roots), while other (*CaC*) roots are given in the full grade; e.g. *ji* 'win, conquer', *śru* 'hear', *kṛ* (or *kar*) 'make', *pat* 'fall, fly', *man* 'think'; see Böhtlingk ([1885](): 532–533) on this discrepancy. (From the last decades of the twentieth century onwards, there is a strong tendency to use full grades as the citation form for Sanskrit verbal roots in Indo-European studies and lexicons: *jay, śrav, kar* etc.) The headword in Sanskrit dictionaries is thus a linguistic construct, an abstraction based on grammatical analysis, *not* an actually existing word-form that may be found in texts, except for a few declension types, where one of the forms of the paradigm (nominative singular) is equal to the bare stem + zero ending, such as feminine types in *ī* (*devī́* 'goddess') and *ā,* and neuter types in *i* and *u*. This has become possible thanks to the well-developed character of the Ancient Indian linguistic tradition which, as early as the middle of the first millennium BC, had reached a very high level of grammatical abstractness.

Sanskrit is noted for its rich verbal system. The paradigmatic (inflectional) forms are grouped into three major tense systems: present, aorist and perfect (future tense forms become productive from the middle Vedic period onwards). In early Vedic, some verbs can include up to several hundred forms. The present tense systems, and to a lesser extent the aorist systems, consist of several stems, each serving as the base for extensive sub-paradigms. The traditional Indian classification (of present tense stems) lists as many as ten different types, although a more accurate and consistent classification would include no fewer than fifteen (see Kulikov [2017](): 245 for a brief overview). The Indian tradition normally ascribes only one class to most verbal roots, but in fact many roots can be attested in more than one (sometimes even four or five) present tense formations. As well as the extensive inflectional systems,

which include finite forms and participles, there are equally prodigious systems of derivative formations: secondary conjugations, such as causatives, desideratives, and intensives (each with its own inflectional paradigm); non-finite forms (converbs [traditionally labeled absolutives], infinitives, etc.); deverbal adjectives; and nouns. The derivational forms, together with the paradigmatic forms, constitute an astonishingly proliferative hierarchy of morphological forms and formations derived from the same root, sometimes called 'individual verbal system' or 'averbo' in modern studies.

An important issue that determines the two possible ways of arranging lexical entries in Sanskrit dictionaries is the lexicographic status of preverbs (verbal prefixes). This lexical class includes some twenty adverbial morphemes (well-attested in virtually all ancient Indo-European languages), such as *áti* 'beyond, over', *ádhi* 'above, over', *áva* 'down', *ā́* 'to(wards)', *úpa* 'to, near', *pári* 'around', *sám* 'together', etc., that can be used as free morphemes (by 'tmesis'), i.e. separated from the verbal form, in early Vedic. In middle and late Vedic, the autonomy of these preverbs constantly decreases, and by the end of the Vedic period tmesis becomes virtually impossible. There are therefore two possible strategies for listing such compound verbs (i.e. verbal roots associated with preverbs) in Sanskrit dictionaries: (i) all compound verbs can be grouped within one entry headed by the root (e.g., *kṛ*/ *kar* 'make' is followed within the same entry by *áti-kṛ* 'do more than necessary, overdo', *ádhi-kṛ* 'place at the head, appoint', etc.), or (ii) each compound verb receives a separate lexical entry, in accordance with the alphabetic order of the preverb: *áti-kṛ* and *ádhi-kṛ* under *a*, *kṛ* under *k*, etc. The first ('root-oriented') strategy is adopted in Böhtlingk and Roth (1855–75), while the latter ('preverb-oriented') principle is used by Monier-Williams (1899), Apte (1890), EDS (Ghatage et al. 1976–) and some other dictionaries.

History of Sanskrit lexicography

Comprehensive overviews of Sanskrit (and, more generally, Indian) lexicography are available in Zachariae (1883, 1897; now somewhat outdated), and in more recent publications by Vogel (1979), Patkar (1981), and Patyal (2000–2001); see also Ghatage et al. (1973).

The Indian linguistic tradition is one of the oldest in the world, having started at least two and half millennia ago, and is acknowledged for its sophisticated formal apparatus and methodology which anticipated many of the achievements of modern linguistics. The beginnings of Sanskrit lexicography can also be traced back to approximately the same period, i.e. to at least the middle of the first millennium BC. The first lexicographic works are called *nighaṇṭu* (etymologically probably **nir-granth(a)-* 'un-tying', i.e. 'explaining', or the like). These are glossaries, or thesauri, of difficult words from the Vedic texts, which are arranged thematically (by semantic classes) and intended primarily to assist Vedic students in interpreting the meaning of those texts. The earliest texts are actually handed down to us as quotations embedded within a text named the *Nirukta* (see Sarup 1921; lit.

'explained, defined, interpreted'; essentially a commentary on an earlier *nighaṇṭu*), which was compiled by Yāska, an ancient Indian lexicographer probably dating from c. the fifth century BC. On *Nirukta* and its 'semantic etymologies', see, in particular, Sköld (1926), Bhattacharya (1958), and Bronkhorst (2001).

The next and more developed genre of lexicographic texts, *kośa* or *koṣa* (lit. 'vessel, container'; later also 'treasury'), represent dictionaries (thesauri) of synonyms and homonyms that were arranged by semantic fields (not alphabetically) and composed in verse form. These texts also served as teaching tools in Sanskrit education, but their intended purpose was probably to help poets in composition, rather than students of linguistics or sacred scriptures. Not much is preserved from the earliest *kośa*, which are known mainly from quotations scattered in later texts. The authors whose names are known to us include in particular Kātya, Vyāḍi, Bhāguri and Vācaspati. The absolute chronology of these works poses various problems, but the earliest can tentatively be dated to the middle of the first millennium AD. The first extant, and most authoritative, *kośa* is the *Nāmaliṅgānuśāsana* by Amarasiṃha, often referred to simply as *Amarakośa* (from Middle Vedic on also *Amarakoṣa*); see Fig. 1.

The *Amarakośa* was probably compiled around the sixth century AD, and the authority of Amarasiṃha (a Buddhist scholar, claimed by tradition to have belonged to the court of King Vikramaditya) among other indigenous lexicographers is probably comparable to that of Pāṇini among the grammarians. The *Amarakośa* consists of three *kāṇḍas* ('sections'): the *svargādikāṇḍa*, which treats words relating to heaven (*svarga*) and divine beings (as well as some other less obviously connected fields, such as 'time, thought, sound, hell, and water'); the
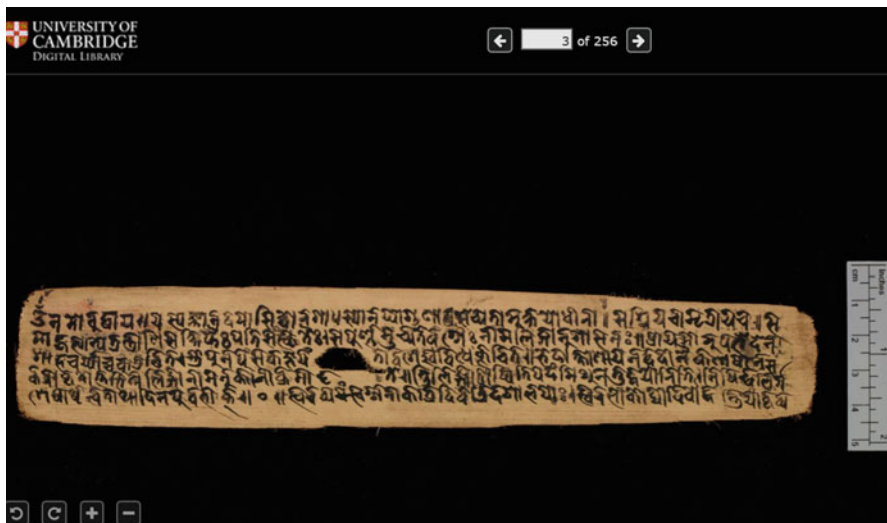

Fig. 1 A page from one of the earliest extant manuscripts of *Amarakośa* as found in the digital library of the University of Cambridge (MS Add.1488, end of the fourteenth century). (Source: https://cudl.lib.cam.ac.uk/view/MS-ADD-01488/3)

bhūmyādikāṇḍa, with words relating to the earth (*bhūmi*), including herbs, animals, man, etc.; and the *sāmānyakāṇḍa*, containing more grammatically determined words (*sāmānya* literally means 'common'), in particular: adjectives, homonyms, and indeclinable words. Many editions of the *Amarakośa* have been published, starting with the *editio princeps* by H.T. Colebrooke (1808), with English interpretations and annotations. Other editions, most of them published in India, include Durgâprasâd et al. (1889) and Haragovinda Śāstri (1937). On the content, structure and some other aspects of *Amarakośa* as well as its relationships with other Sanskrit texts, see, in particular, Renou (1956), Birwé (1976), Panda (1995), and Nair (2011).

Another important name in the history of indigenous Indian (Sanskrit) lexicography is Hemacandra Sūri (twelfth century AD), a mediaeval scholar who compiled four large *kośa*s: the *Abhidhānacintāmaṇināmamālā* (synonyms; edited with a German translation by Böhtlingk and Rieu in 1847), the *Anekārthasaṃgraha* (homonyms; edited by Zachariae in 1893), the *Deśīnāmamālā* (Prakrit words), and the *Nighaṇṭuśeṣa* (botanical terms). On Hemacandra and his contribution to lexicography, see, in particular, Bühler (1889).

An intermediary position between indigenous lexicographic works and grammatical studies is occupied by such auxiliary glossaries as the *Dhātupāṭha* and *Gaṇapāṭha*. The former represents a list of verbal roots arranged by classes of present tense stems (I to X) that can be derived from the corresponding roots. The latter is a list of the groups of nominal stems used in Pāṇini's grammar, the *Aṣṭādhyāyī*.

The earliest lexicographic works on Sanskrit (and the first bilingual Sanskrit dictionaries) within the Western (European) tradition date from the second half of the seventeenth century. These include preliminary studies for a complete Sanskrit-Latin dictionary by Heinrich Roth (1620–1668), a missionary and one of the pioneers of Sanskrit studies in Europe (see Vogel 1986), and the *Samskrutham-Portuguese nighandu = Dictionarium Samscredamico-Lusitanum* ('Sanskrit-Portuguese dictionary'), compiled by Johann Ernst Hanxleden (1681–1732), a German Jesuit priest working as a missionary in India, who was assisted by two other Jesuits, Anton Pimentel and Bernhard Bischopinck. In the eighteenth century, the most important indigenous Indian lexicographic work, the *Amarakośa*, was edited by Paulinus a Sancto Bartholomaeo (the first chapter, titled *Svargavarga*, was accompanied by its Latin translation; see Vogel (1999)).

The discovery of the Indo-European language family, with Sanskrit as one of its earliest and main representatives, was announced by William Jones at the end of the eighteenth century, and this boosted the lexicographic studies and work on Sanskrit dictionaries. Wilson (1819; with later revised and enlarged editions) is one of the earliest large bilingual dictionaries (heavily dependent on the Indian indigenous tradition); a revision and enlargement of Wilson's dictionary was planned by Theodor Goldstücker, but did not reach beyond the character *a* (Wilson/Goldstücker 1856). Another bilingual dictionary, widely used in the first half of the nineteenth century, was the Sanskrit-Latin dictionary, *Glossarium Sanscritum*, compiled by Franz Bopp, one of the founders of Indo-European linguistics (1830); in the next two editions (1847 and 1867), the lemmata were supplied with cognates from other

branches of Indo-European known at that time, which gave them some elements of an etymological dictionary. Both dictionaries were superseded during the first decades of the second half of the nineteenth century by the famous Sanskrit-German 'Great Petersburg Dictionary of Sanskrit' (1855–75; often abbreviated by Sanskrit scholars to PW, standing for *Petersburg Wörterbuch*), which was compiled by Otto Böhtlingk and Rudolf Roth and remains a true monument of Sanskrit lexicography and the most comprehensive dictionary of Sanskrit within the European tradition till now. Valuable materials documenting the history of its creation, consisting of letters from Böhtlingk to Roth, have recently been published (Böhtlingk 2008); see also Roth 1876, Vigasin 2003 (on the history of work on PW) as well as a detailed biography of Otto Böhtlingk in Stache-Weiske (2017) and a convenient summary of the academic evaluation of PW in Zgusta (1988). An abridged version of the dictionary (abbreviated to pw), omitting the examples from texts (and some other minor changes, as well as the addition of some new entries), was published later by Böhtlingk alone (1879–1889); it counts approximately 150,000 lexical entries. A few decades later, PW was supplemented by Richard Schmidt (1924–1928). Despite some lacunae, as several Vedic texts were unavailable or not yet critically edited, the PW offers the most complete coverage of the lexical material. Later dictionaries are largely dependent on this chef d'oeuvre, including the widely used and more compact one-volume Sanskrit-English dictionary compiled by Monier Monier-Williams (first edition 1872; a revised and now standard edition, prepared in collaboration with Ernst Leumann and Carl Cappeller, appeared in 1899).[2]

An ambitious lexicographic project that started in India in the 1940s at the initiative of Sumitra Mangesh Katre (see Katre 1946 for a description of the project) is *An Encyclopaedic Dictionary of Sanskrit on Historical Principles* (EDS), edited by Ghatage et al. (1976–). The first issues were published under the general guidance of A. M. Ghatage; from vol. 3 on, the supervisor of the project was S. D. Joshi; from vol. 8 on, V. P. Bhatta; from 2012 on, J. D. Sathe; from 2018 on, P. P. Joshi. EDS aims to update and replace the Petersburg Dictionary. However, this dictionary remains far from completion; it is still on the letter *A*.[3]

Another (more feasible) project, hosted by the Martin Luther University of Halle-Wittenberg (Seminary of Indology and the Institute of Computer Science) and Philipps University of Marburg (Department of Indology and Tibetology), is a cumulative dictionary of Sanskrit (*Kumulatives Nachtragswörterbuch des Sanskrit* = NWS) supplementing both O. Böhtlingk's dictionary (1879–1889) and the

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[2]In fact, Böhtlingk qualified this latter dictionary as plagiarism with regard to PW in his letter to R. Roth (as early as 1862, i.e. ten years before the first edition of Monier-Williams' dictionary appeared, see Böhtlingk (2008: 330–331); see also Böhtlingk (2008: 768) and Stache-Weiske (2017: 185–186)), though publicly only in 1883 (Böhtlingk 1879–1889: Vol. 4, II-III). In spite of several cases of copying from PW by Monier-Williams, Böhtlingk's claim should rather be taken as an overstatement; for details, see Zgusta (1988: 152–161). On the controversy Böhtlingk vs. Monier-Williams, see Zgusta (1986), Zgusta (1988) and Stache-Weiske (2015).

[3]The most recent volume I am aware of is vol. 35 published in 2019.

addenda made by R. Schmidt (1924–1928). The project lasted for three years (2013–2016) under the supervision of Jürgen Hanneder (Marburg) and Walter Slaje (Halle) and resulted in an online dictionary (see https://nws.uzi.uni-halle.de/) with more than 107,500 entries. New words and meanings were extracted from glossaries that accompany editions of Sanskrit texts, specialized dictionaries and secondary literature.

As well as these major lexicographic works of the last two centuries, there are a few less ambitious but quite popular dictionaries, such as *The Practical Sanskrit-English Dictionary* by Vāman Śivarām Apte (1890), which has been revised and enlarged several times (e.g. Apte 1957–1959), or quite a compact (only Roman transliteration is used) *Wörterbuch Sanskrit-Deutsch* compiled by Klaus Mylius (1975, and a few later editions).

Most bilingual Sanskrit dictionaries give the headwords (see above for a discussion of the citation forms) in Devanāgarī script, followed by standard Roman transliteration, but some dictionaries, such as Böhtlingk and Roth (1855–75) and Apte (1890), give all Sanskrit forms in Devanāgarī only. In the dictionary entries of Böhtlingk and Roth (1855–75) and Monier-Williams (1899), verbal root headwords are accompanied by a representative selection of forms (a few present, aorist and perfect forms as well as infinitives and some other derivatives), often as many as several dozen forms for some roots, each form usually provided with textual attestation(s). Verbal roots generating more than one present tense stem are split into two, or even three (in accordance with the Indian tradition), as in the case of the root *i* 'go' (from which class II present *éti* 'goes' is derived), separated from the roots *in* (from which the Indian tradition derives class VIII present *inóti* 'sends, drives') and *inv* (class VI present *ínvati* 'sends, drives'). In fact, both *in* and *inv* are artificial, 'secondary', roots extracted from causative forms derived from the original root *i*, the athematic present with the nasal suffix -*nó*-/-*nu*- (class V) and its thematicization

Fig. 2 Extracts from Monier-Williams (1899)

(see Kulikov 2017: 245, where this thematic type is labeled "I ← V"). This division of verbal roots into several secondary roots distinguished foremost by present classes which are derived from them is also adopted by some European dictionaries, such as Monier-Williams (1899), as can be seen in Fig. 2.

The bulk of every lexical entry consists, as one would expect, of a list of meanings and some remarks on syntax. Monier-Williams (1899) differs from Böhtlingk and Roth (1855–75) and some other dictionaries, in its general tendency to incorporate a maximum amount of information within one entry. In particular, all compound words starting with a particular headword are listed as sub-entries (printed in bold, but without indentation) of the main lemma. At the end of many lemmata, Monier-Williams also adds brief etymological information, citing cognates in other Indo-European languages.

In addition to bilingual (first of all, Sanskrit-English and Sanskrit-German) dictionaries, there are a number of specialist lexicographic works. Historical dictionaries, particularly important for a study of Sanskrit from an Indo-European perspective and indispensable for any Indo-Europeanist, include a number of etymological dictionaries. A detailed survey and critical evaluation of the Sanskrit etymological dictionaries (including preparatory materials) that appeared before the 1930s can be found in the extensive introductory part of Wüst's dictionary (1935: 14–27). The first among them was the unfinished (covering only the vowels) Julius Leumann's *Etymologisches Wörterbuch der Sanskrit-Sprache* (1893), based on his earlier dissertation. Fourteen years later it was supplemented and edited by his brother Ernst Leumann, still remaining incomplete and only reaching *jū* (Leumann E. & Leumann J. 1907). A few years after Leumann (1893), Christianus Uhlenbeck published the first complete etymological dictionary of Sanskrit, *Kurzgefasstes etymologisches Wörterbuch der altindischen Sprache* (1898–1899). Two etymological dictionaries started in the 1920s, by Ermenegildo La Terza (1924–1929) and Viśva Bandhu Śāstrī (1929), remained unfinished. The three issues (*Lieferungen*) of yet another etymological dictionary, published by Walther Wüst (1935), almost exclusively contain an outline of the main methodological principles and criticism (sometimes in quite an aggressive tone) of his predecessors, which are followed by as few as four entries *a-* (three of which are dedicated to bound morphemes): the stem of the demonstrative pronoun *a-*, the verbal augment (prefix) *a-*, the negation prefix *a(n)-*, and the interjection *a*. The most recent and up-to-date etymological dictionary is Manfred Mayrhofer's *Etymologisches Wörterbuch des Altindoarischen* [EWAia] in three volumes (1986–2001; see a detailed evaluation of the content of the IIIrd, post-Vedic, volume in Bodewitz 2000), which supplements Mayrhofer's earlier dictionary, *Kurzgefaßtes etymologisches Wörterbuch des Altindischen* [KEWA] in four volumes (1956–80). Both will probably soon be supplemented by a new dictionary by Alexander Lubotsky, currently being prepared within the framework of the Indo-European Etymological Dictionary (IEED), a research project of the Department of Comparative Indo-European Linguistics at Leiden University. A different historical perspective, tracing Old Indo-Aryan (Sanskrit) forms to their reflexes in later Indo-Aryan languages, is taken in Ralph Turner's *A Comparative Dictionary of the Indo-Aryan Languages* (1962–1966), later supplemented

with addenda and corrigenda published by J. C. Wright (as Turner and Wright 1985).[4]

The most complete reverse dictionary (i.e., alphabetized by the reversal of each entry, or thus arranged back to front) of Sanskrit is Schwarz and Pfeiffer (1978). There are also several concordances of Sanskrit texts (see Oguibénine 2008 for a brief overview), of which the most comprehensive (Vishva Bandhu 1935–1992) covers nearly all the Vedic texts, and locates all Vedic word-forms attested in the entire Vedic corpus (with relatively few lacunae; see for a detailed review of this work, Rau 1984). Concordances for the Ṛgveda alone include: Lubotsky (1997, word-forms without translations); Grassmann (1873, with translation, out-of-date in many respects but still an indispensable linguistic and philological tool for any scholar studying the Ṛgveda; see also the enlarged edition prepared by M. Kozianka in 1996); and Krisch et al. (2006– [RIVELEX], with translation, project aimed at replacing Grassmann, but unfinished due to lack of funding). Yet another lexicographic work focusing on the Ṛgveda, Walter Neisser's *Zum Wörterbuch des Ṛgveda*, intended as a philological and etymological running commentary on selected lexical entries found in the Ṛgveda, very rich and informative in its first two issues (Neisser 1924 and Neisser 1930) and still very useful for Vedic scholars, unfortunately remained unfinished, only covering the vowels and velars. There is a concordance for the Śaunakīya recension of the Atharvaveda (Whitney 1881, now somewhat outdated); and a preliminary online concordance for the Paippalāda recension of the Atharvaveda, compiled by Jeong-Soo Kim (2021). Maurice Bloomfield's *A Vedic Concordance* (1906), which offers all the verses attested in Vedic texts (but arranged in alphabetical sequence), was recently updated and enlarged by Franceschini (2008) and remains a valuable resource for Vedic philologists.

Given the rich character of the Sanskrit verb, with the enormous paradigms consisting of several subsystems (present, aorist, perfect, future as well as several "secondary derivatives": causative, desiderative, intensive) and including up to several hundreds of forms, of special importance are grammatical dictionaries of the Old Indian primary (non-denominative) verbs (verbal roots). The first such dictionary, Niels Ludvig Westergaard's *Radices linguae sanscritae* (1841), listing all roots (in retrograde alphabetic order, arranged by the final part of the root) with the main derivatives as well as attested combinations with preverbs, and accompanied by Dhātupāṭha, is out of date and was superseded already by Böhtlingk and Roth's PW. William Dwight Whitney's (1885) grammatical dictionary of the Old Indian primary (non-denominative) verbal roots conveniently assembles all the forms derived from each verbal root; see its review in Böhtlingk (1885). Although this dictionary has several lacunae and some of Whitney's grammatical interpretations are out-of-date and should be revized (in particular, some of Whitney's lemmata should be split into two or more (quasi-)homonymous roots), it remains an indispensable tool for any student of Sanskrit. The publication of the materials for

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[4] For a detailed review of the first volume of Turner (1962–1966), see F.B.J. Kuiper (1964).

a new grammatical dictionary of the Old Indian verbal roots, Toshifumi Gotō's *Materialien zu einer Liste altindischer Verbalformen* (1990, 1991, 1993, 1997), aims to replace Whitney (1885). Embodying the current level of our knowledge, they are extremely informative and nearly exhaustive, but unfortunately ceased after covering only 29 verbal roots. A dictionary of Old Indian verbs (Werba 1997, only one volume published so far) is also rich and informative, but uses highly cryptic notation and is more difficult for beginners; a detailed evaluation of its contents and format can be found in a review by Friedman (2000).

There are also special dictionaries of the sophisticated terminology developed within the Ancient Indian grammatical tradition, which forms, as a matter of fact, a separate science within the vast domain of Vedic and Sanskrit studies, Vyākaraṇa. These include Renou (1942) and Abhyankar (1961); see also a detailed review of the latter by Birwé (1963). S.M. Katre's *Dictionary of Pāṇini* (1968–1969) is a concordance of forms and nominal stems that occur in Pāṇini's grammar Aṣṭādhyāyī.

Lastly, there are also several other specialized and encyclopaedic dictionaries, such as Macdonell and Keith's (1912) *Vedic Index of Names and Subjects*, Sørensen et al.'s (1904) *An Index to the Names in the Mahābhārata*, dictionaries of the Vedic ritual by Louis Renou (1954), Chitrabhanu Sen (1978) and Klaus Mylius (1995), and a dictionary of Sanskrit law and statecraft terminology edited by P. Olivelle et al. (2015).

Electronic corpora and dictionaries of Sanskrit

There are several digital corpora of (Vedic and post-Vedic) Sanskrit texts. The most important websites that give access to a constantly increasing number of corpora include:

1. TITUS, the website of Thesaurus Indogermanischer Text- und Sprachmaterialien (see https://titus.fkidg1.uni-frankfurt.de/indexe.htm), founded by Jost Gippert (Universität Frankfurt), provides access to HTML versions of a large number of Vedic, Classical and Epic Sanskrit texts, many of which are also freely accessible by non-members.
2. The Sanskrit Library (see https://sanskritlibrary.org/textsList.html), founded and managed by Peter Scharf, gives access to XML versions of numerous Vedic and post-Vedic texts.
3. GRETIL – Göttingen Register of Electronic Texts in Indian Languages (see http://gretil.sub.uni-goettingen.de/gretil.html) provides access to many Vedic and post-Vedic texts in a number of encodings.
4. DCS – Digital Corpus of Sanskrit, created and maintained by Oliver Hellwig (Heinrich Heine University Düsseldorf), enables searches for lexical units (words) in a corpus of about 4,800,000 manually tagged words in selected Sanskrit texts (see http://www.sanskrit-linguistics.org/dcs/index.php).

There are also a few secondary websites providing links to existing online digital resources, such as INDOLOGY (see https://old.indology.info/etexts/), associated with the online discussion forum (since 1990) for Classical South Asian studies, organized by Dominik Wujastyk (University of Alberta).

The website of the Cologne Digital Sanskrit Dictionaries (CDSD), hosted by the University of Cologne (see https://www.sanskrit-lexicon.uni-koeln.de/), gives access to most of the important Sanskrit dictionaries, including Böhtlingk and Roth (1855–75), Monier-Williams (1899), Apte (1890), and Grassmann (1873), using a convenient interface (that allows, for instance, not only searching for exact words/lexical entries, but also for prefixes, suffixes and substrings), as well as to some specialized dictionaries, such as Macdonell and Keith (1912) and Sørensen et al. (1904).

Language planning institutions in India

There are several institutions that contribute to the popularization and propagation of Sanskrit. One such institution is the Sanskrit Academy Department, a new department of the Government of the National Capital Territory (NCT) of Delhi, which was carved out of the Education Department with its aims of propagation, promotion and development of languages, literature and culture.

There are also a number of academies and universities dedicated to the study and propagation of Sanskrit. The Government Sanskrit College at Varanasi was established during the period of British rule in 1791, on the initiative of Jonathan Duncan (the later Governor of Bombay from 1795 to 1811). It merged in 1958 with Sampurnanand Sanskrit Viśvavidyālaya [University] and is the oldest university still in operation in India (see https://www.ssvv.ac.in/). The Deccan College Post-Graduate and Research Institute in Pune was established in 1821 by the Bombay Presidency Government at the initiative of its Governor, Mountstuart Elphinstone, for the propagation of Sanskrit studies. It was incorporated by Poona University (now University of Pune) in 1948, contains the Department of Sanskrit and Lexicography, and employs specialists in various fields of Sanskrit studies such as Veda, Vedānta, Vyākaraṇa, and Dharmaśāstra, hosting the already mentioned project *An Encyclopaedic Dictionary of Sanskrit on Historical Principles* (EDS; see https://www.dcpune.ac.in/san_historydept.html and https://www.dcpune.ac.in/pdf/12.%20Publication%20(Dictionary%20Publication).pdf). The current coordinator of the project is the head of the Department, J.D. Sathe. At the same university, the Centre of Advanced Study in Sanskrit (CASS) was established in 1964 as an independent research department for training scholars and promoting studies in Sanskrit; it is the oldest Centre for the Study of Sanskrit in India (see http://www.unipune.ac.in/dept/fine_arts/centre_for_advanced_study_in_sanskrit/). Other academic institutions include, for instance, the Sanskrit Academy at Osmania University in Hyderabad (see https://www.osmania.ac.in/sanskritacademy/); the Karnataka Samskrit University in Bangalore (formed exclusively for promoting Sanskrit, see http://ksu.ac.in/en/); the Kavikulaguru Kalidas Sanskrit University (dedicated to the advanced learning of Sanskrit and named after the great Sanskrit poet Kālidāsa, see https://kksu.org/) – to name just a few.

On contemporary attempts to revitalize Sanskrit in a few Indian villages, see McCartney (2017).

Future prospects of Sanskrit lexicography

The most ambitious lexicographic endeavour in India, *An Encyclopaedic Dictionary of Sanskrit on Historical Principles* (EDS, Ghatage et al. (1976–)), is still far from completion. Another major lexicographic project are the Cologne Digital Sanskrit Dictionaries (CDSD) in Germany. The aim of the CDSD project is to digitize and merge the major bilingual Sanskrit dictionaries compiled in the nineteenth century. The project ultimately aims to contribute to the development of digital facilities that will give access to the digital versions of several important Vedic texts, and help to analyse Sanskrit texts. Other closely-related digitalization projects include The Sanskrit Heritage Site (see https://sanskrit.inria.fr/), a multi-purpose project which offers lexicographic support to the "informatization of Sanskrit". Oliver Hellwig, Gérard Huet, Amba Kulkarni, Peter Scharf, Sven Sellmer and several other scholars have greatly contributed to the digitalization of Sanskrit texts and, in particular, to the development of Sanskrit taggers able to tokenize and analyse unannotated Sanskrit texts (see, in particular, Huet 2004, 2006; Hellwig 2009; Goyal et al. 2012; Scharf and Hyman 2012). This digitalization activity proceeds in parallel with several other multi-year projects already mentioneded, such as TITUS and The Sanskrit Library, as well as work on several databases, such as the Indo-European Etymological Dictionary (IEED), which will include a new Indo-Iranian etymological database.

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