

22. The relationship between linguistics and other sciences in India

1. Introduction
2. The origin of grammar
3. Interaction with 'etymological explanation' (*nirukta*)
4. Influence from philosophy
5. Language and philosophy
6. Bhartṛhari
7. Understanding the meaning of a sentence
8. Conclusion
9. Bibliography

1. Introduction

Classical India has various language sciences. Three of the six traditional auxiliary sciences of the Veda (*vedāṅga*) – phonetics (*śikṣā*), etymological explanation (*nirukta*), grammar (*vyākaraṇa*) – deal with language. The various *Prātiśākhya*s – which precede the surviving treatises of *śikṣā* and are its authentic representatives according to Renou (1963: 167) – deal with Vedic phonetics. Vedic hermeneutics (*mīmāṃsā*), too, can be looked upon as a language science, and so can certain developments of Indian philosophical thought. But grammar was most widely studied. Grammar, according to the grammarian Patañjali (2nd century BCE), is the most important among the six auxiliary sciences. We will therefore confine our attention to grammar (*vyākaraṇa*) – and in particular to the oldest surviving, and most important, text of this genre: Pāṇini's *Aṣṭādhyāyī* – in its relationship to other sciences.

Grammar did not interact with mathematics and the natural sciences (astronomy and medicine), or at least not strongly. The suggestion that Pāṇini's 'linguistic zero' caused or influenced the introduction of zero in mathematics has no evidence to support it (see Ruegg 1978). Note however that the expression 'natural sciences' is apt to be mis-

leading in the classical Indian context: physics and part of chemistry have their closest parallels in what are commonly referred to as schools of Indian philosophy. Other Indian sciences, often without parallel in the modern world, include: etymological explanation (*nirukta*); ritual science (*kalpa*), like etymological explanation one of the auxiliary sciences of the Veda (Staal [1982: 1989: 349f.] argues for the scientific status of the 'science of ritual'); Vedic hermeneutics (*mīmāṃsā*); poetic science (*kāvyaśāstra*).

Two kinds of relationship between grammar and other sciences will be primarily considered: (1) another science influenced grammar, and (2) grammar influenced another science. In reality the interaction was often less unidirectional, and in some cases the bi-directional nature of the interaction will be mentioned. For the earliest period forms of 'knowledge' that had not yet been systematised into 'sciences' will have to be taken into consideration.

2. The origin of grammar

Grammar arose in circles connected with Vedic ritual. Does it preserve traces of this early connection? The classical publication is Louis Renou's "Les connexions entre le rituel et la grammaire" (1941–42), which is more circumspect in its formulations than are some more recent publications. It draws attention to various parallels between the two sciences, such as the shared aphoristic (*sūtra*) style (see also Renou 1963: 175f.), the presence in both of general interpretative rules (*paribhāṣā*) – sometimes similar ones –, and the elements of vocabulary which they have in common. However, as Renou himself admits, these parallels do only in certain cases allow us to

conclude that ritual influenced grammar rather than vice-versa. The influence considered is moreover limited to details, and hardly justifies the conclusion that grammar in India owes its existence, or its specific nature, to ritual science.

One of the less doubtful antecedents of grammar is the early preoccupation with the correct preservation of Vedic texts. The *Rgveda*, for example, has been preserved in many different forms of recitation, two of which are of particular interest here: the *padapāṭha* “word for word recitation” and the *saṃhitāpāṭha* “continuous recitation”. Neither of these two (nor indeed any of the other ones) represents the original form of the *Rgveda*. The *padapāṭha* separates the words (and certain components of words) of the text, the *saṃhitāpāṭha* joins them in sandhi (called *saṃhitā* in Vedic literature and Pāṇini’s grammar). The *padapāṭha* of the *Rgveda* is older than Pāṇini – he refers to it –, its *saṃhitāpāṭha* appears to be younger – it applies rules of sandhi which destroy the original meter, where Pāṇini’s rules preserve it – (see Bronkhorst 1981a; 1991: 75f.). The question as to how the *saṃhitāpāṭha* is formed on the basis of the *padapāṭha* is a central concern of the *Prātiśākhya*s, and early reflections of this nature contributed no doubt to the creation of grammar. Reflections about details of sandhi also gave rise to ‘mystical’ speculations (e.g., *Aitareya Āraṇyaka* 3.2.6; *Sāṅkhāyana Āraṇyaka* 8.11; *Rgveda Prātiśākhya* 1.2f.).

Other aspects of grammar arose for different reasons. The Sanskrit term for grammar, *vyākaraṇa*, provides a clue. This means literally “separation, distinction”, and this is often taken to refer to the fact that grammar distinguishes roots, suffixes, and prefixes (so e.g., Scharfe 1977: 83). Paul Thieme (1982: 11 [1178]) has however rightly pointed out that Pāṇini’s grammar does not analyse. This grammar rather presupposes constituent functional elements and shows how they are to be combined. Thieme proposes “[word-]formation” for *vyākaraṇa*, which is not convincing. He overlooks the fact that grammar, though not separating the constituent elements of words, does separate words and their meanings. This, at any rate, is a theme that recurs a number of times in Vedic literature, frequently in passages that use precisely the verb *vy-ā-kṛ-*, from which *vyākaraṇa* is derived. These passages speak about the separation of name (*nāman*) and shape (*rūpa*).

Brhadāranyaka Upaniṣad 1.4.7 – to cite but one example – states: “All this was unseparated (indistinguishable) (*avyākṛta*) [in the beginning of creation]. Then it became separated (distinguished) (*vyākriyata*) by name and shape [so it became possible to say]: ‘This particular one is of the name NN and of such and such a shape’. Therefore, even to-day distinction is made (*vyākriyate*) by name and shape: ‘This particular one is of the name NN [and] of such and such a shape’” [transl. Thieme]. Passages like this could be looked upon as the mythological counterpart of an important feature of Pāṇini’s grammar (and for the grammars that existed before him, we may assume): meanings are its ‘input’, which then give rise to word-forms (Bronkhorst 1979). Early thinkers about language, we are led to believe, were interested in the details of the separation of words and things reported in their mythology.

3. Interaction with “etymological explanation” (*nirukta*)

The background of another aspect of grammar is elucidated by its relationship with the Vedic auxiliary science of “etymological explanation” (*nirukta*). This science is presented in a systematised form in Yāska’s work called, precisely, *Nirukta* – a text which appears to belong to the period between Pāṇini (after 350 BCE; see Hinüber 1989; Falk 1993: 304) and Patañjali (around 150 BCE; see Cardona 1976: 263f.) –, but the practice of etymologizing is extremely common in the earlier Vedic Brāhmaṇas. These Vedic etymologies do not concern the histories of words – and cannot, therefore, be compared with modern linguistic etymologies –, but have altogether different aims. As a rule they reveal hidden connections with the mythological realm, which can be multiple. (In practice this means that one word can have several different ‘etymologies’). Knowing them brings advantages, as does knowing other hidden truths.

The ‘etymologies’ in Yāska’s *Nirukta* are their secularised descendants. ‘Etymologizing’ has here become a method for finding the meaning of unknown words. Two presuppositions underlie it: (1) The meaning of a word (primarily noun or adjective) is the result of a combination of the meanings of its parts. (2) The meanings of those parts are not assigned to them by convention, they intimately belong to them (Bronkhorst 1981b).

These same presuppositions appear to underlie Pāṇini's grammar. Here, as we have seen (§ 2), constituent functional elements of words are combined, and the meaning of the resulting word is considered to be the combination of the meanings attaching to (or, in view of the above: separated from) those elements. The complementary character of grammar and 'etymological explanation' is confirmed by Yāska, who describes 'etymological explanation' in his *Nirukta* (1.15) as the 'complement of grammar'. But whereas 'etymological explanation' concentrates on cases that resist analysis, grammar normally confines itself to words the relationship of which with other words seems obvious and regular (Bronkhorst 1984). The analytical aspect of grammar, the search for the constituents of words, we must conclude, derives from the preoccupation with 'etymological' connections characteristic of much of Vedic literature.

The interaction of grammar with 'etymological explanation' was not unidirectional. Yāska refers in his *Nirukta* to grammar, and it seems likely that Pāṇini's *Aṣṭādhyāyī* was known to him (Thieme 1935; Bronkhorst 1984: 8f.). He justifies the procedures of 'etymological explanation' – such as ignoring, modifying, or inverting sounds – by pointing at similar practices in grammar (*Nirukta* 2.1). It appears that 'etymological explanation', when it tried to attain the status of a science besides grammar, drew inspiration from the latter.

4. Influence from philosophy

Pāṇini's grammar shows the traces of Vedic religious thought, as we have seen. Philosophical systematic thought did not exist in India at his time, as far as we can tell. Influence from that side can be discerned in the two earliest surviving commentaries, Kātyāyana's *vārttikas* and Patañjali's *Mahābhāṣya*, especially the latter. A systematised world view was being developed at that time – for the first time in India, it seems – in the Buddhist school called Sarvāstivāda, which was deeply interested in questions of existence. For reasons connected with the historical development of Buddhism, a list of so-called *dharma*s came to be looked upon as the complete list of all there is. These *dharma*s were considered to be the ultimate constituents of persons and things. The persons and things

themselves, being collections of *dharma*s, were not believed to really exist. Sarvāstivāda introduced a number of *dharma*s whose function it was to solve certain theoretical difficulties. Most of these theoretically useful *dharma*s were given a place in the category of *dharma*s called "separated from mind" (*cittaviprayukta*). Three of these *dharma*s are of particular interest. They are *padakāya*, *nāmakāya* and *vañjanakāya*. This could be translated as "sentence", "word" and "phoneme" respectively, where it is to be kept in mind that these linguistic units are here conceived of as *dharma*s, i.e., as partless, ultimate, really existing entities. It seems likely that originally – i.e., around the time of Patañjali – only two of these three *dharma*s were recognised, the word and the phoneme.

Most probably influenced by Sarvāstivāda, Patañjali introduces two new notions into grammatical discourse, adapting them to their new Brahmanical environment: the word and the phoneme as single, independent entities. Both are eternal, contrasting in this respect with the momentary Buddhist *dharma*s. In connection with the phoneme Patañjali introduces a term which will play an important role in later linguistic speculation: *spṛṣṭa*. But, as in Sarvāstivāda, the word and the phoneme are unitary, indivisible entities, different from the sound that expresses them (Bronkhorst 1987). And where for Pāṇini morphemes were the basic units of language, Patañjali assigns them a derived meaning at best (cf. Bronkhorst 1998).

5. Language and philosophy

The role of grammar in Indian thought has regularly been emphasised. Louis Renou (1953: 86), for example, made the often cited statement "Adhérer à la pensée indienne, c'est d'abord penser en grammairien"; and again (1941–42: 164): "La pensée indienne a pour substructure des raisonnements d'ordre grammatical". Frits Staal (1960, 1963, 1965), following D. H. H. Ingalls (1954), has made the claim that Pāṇini's grammatical method is characteristic of much of Indian philosophy, just as Euclid's mathematical method is characteristic of much of Western philosophy. This is supposed to explain that scientific developments have taken different directions in India and the West. Bimal Krishna Matilal refers to the role of grammar in Indian philosophy, e.g., in the title of his book

Epistemology, Logic, and Grammar in Indian Philosophical Analysis (1971).

When it comes to substantiating these claims, one is disappointed. It is true that systematic abbreviations (a characteristic of Pāṇini's grammar) occur in mathematics, astronomy, and in other grammars; that the simplicity criterion and the algebraic *sūtra* style (both also typical of Pāṇini's grammar, but perhaps first used in ritual science) are used in many philosophical works. It is also true that grammar was part of the curriculum of every educated Indian, so that grammatical discussions are to be found in practically all commentaries, whatever the nature of the text they comment upon, and elsewhere (Filliozat 1988: 19ff.). But does this touch the heart of the matter? Does this interest in grammar go beyond the correct formation of words and sentences, and affect the contents of the treatises concerned? There are some, but not so many cases where grammatical analysis is used to reach a philosophical conclusion (for some examples see Torella 1987). The situation is complicated by the fact that many Indian authors looked upon the Sanskrit language as providing preferential access to reality, quite independently of any considerations of grammar. Something must be said about this.

Two phases are to be distinguished. During the first one language came to be considered, partly no doubt under Buddhist influence, as reflecting – or even creating/organising – phenomenal reality. Such a position has philosophical consequences, which were worked out in greatest detail in the Brahmanical system of philosophy called Vaiśeṣika. The conviction that there is a direct correspondence between words and things might be called an axiom of this system. It justifies the ontological conclusions based on verbal usage common in the writings of this school (Bronkhorst 1992, 1996a). But the influence of grammar on this school remains small. One may suspect such influence in its three main categories substance (*dravya*), quality (*guṇa*) and movement (*karman*), which correspond to nouns, adjectives and verbs respectively. But did the Vaiśeṣikas need grammar in order to arrive at this division of words? The triple division into nouns, adjectives and verbs is not fundamental in Pāṇini's grammar.

The second phase is characterised by what has been called the 'correspondence principle' (Bronkhorst 1996b: 1999), which can

approximately be formulated as follows: 'the words of a statement correspond, one by one, to the things that constitute the situation described by that statement'. The principle is plausible in the case of many, perhaps most, statements, but leads to serious difficulties in the case of certain others. Statements of the form 'he makes a pot' become problematic, because they do not describe a situation that contains a pot: the pot is still being made. These and related difficulties have been extensively discussed in Indian philosophical literature, and various solutions have been proposed and maintained by different authors and schools. Indeed, there are reasons to think that these discussions have led to several fundamental philosophical positions (such as the *satkāryavāda*, and the theory of denotation of certain schools), which are therefore based on certain views about language, not on grammar.

The correspondence principle is visible, perhaps for the first time, in a number of the contradictions presented by the Buddhist thinker Nāgārjuna in his important *Mūlamadhyamakakārikā* (2nd century CE?). Since some of these have been claimed to be based on grammar, they deserve some attention. Nāgārjuna claims that the statement "[The road] that is being travelled is being travelled" (*gamyamānaṃ gamyate*) implies that there must be two actions of travelling in the situation described. This is a direct consequence of the correspondence principle, given that the root *gam* "to travel" is used twice over in this statement. It is also a paradox, given that the statement does not describe a situation where there are two actions of travelling. A following verse adds that if there are two actions of travelling, there must be two travellers, another conclusion that is in contradiction with the intention of the initial statement.

These arguments can be satisfactorily explained with the help of the correspondence principle. K. Bhattacharya (most recently 1995) does not agree, and has argued in a number of articles that the argument of the second verse considered ("if there are two actions of travelling, there must be two travellers") is based on grammar. It is grammar which maintains that an action resides either in an agent or in an object and that the activity of travelling, more in particular, resides in its agent. This is true, but grammar does not specify that two actions cannot reside in one and the same agent. This is Nāgārjuna's own

conclusion. The link between his argument and grammar is therefore far less obvious than it is claimed to be. Indeed, the only possible influence from grammar in these arguments is that here, exceptionally, the correspondence principle is applied to verbal roots rather than to whole words.

6. Bhartṛhari

We turn to Bhartṛhari (5th century CE), the 'philosopher of grammar'. To what extent is his thought determined by grammar? We will not discuss the numerous passages where Bhartṛhari deals with grammatical issues, but try to determine what influence grammar has exerted on his philosophy as a whole (→ Art. 20).

This philosophy as a whole concerns the nature of reality, in which Bhartṛhari, contrary to the Buddhists, recognises the existence of composite objects. Or rather, composite objects are not really composite, they are indivisible entities that exist besides 'their' parts. More precisely again, the more encompassing a thing is, the more it is real. Highest reality, for Bhartṛhari, is the totality of all there is, has been, and will be. The words of language divide this reality into (not really existing) parts.

So far Bhartṛhari's philosophy is an interesting adaptation of the ideas described above: the objects of phenomenal reality correspond to the words of language. New is that these objects are considered to be less real than their totality. This way Bhartṛhari could do justice to some traditional Brahmanical points of view, which looked upon the absolute as being the totality of all there is. Influence from grammar is not obvious here.

It seems clear nevertheless that grammar has contributed to this vision of reality. Consider first that Bhartṛhari applies a similar reasoning to language: words are more real than the constituent morphemes (mainly stems and suffixes), sentences more real than the words they are made up of. More exactly, words are independent entities that are not constituted of morphemes, and sentences are not made up of words. It is only through artificial analysis of words that morphemes are invented by grammarians, and words on the basis of sentences.

It is clear that Bhartṛhari draws here inspiration from Patañjali's *Mahābhāṣya* which,

perhaps under the influence of Sarvāstivāda, had given ontological priority to words over stems and suffixes (see above). But Bhartṛhari goes further and establishes an ontological hierarchy: words are more real than their morphemes, sentences more real than their words, and the Veda as a whole more real than its sentences. Patañjali's argument concerning the higher ontological status of words with regard to their stems and suffixes, now extended, allows in this way to climb the ontological ladder, so as to arrive at the highest insight, which is beyond words, and which concerns undivided reality. This insight brings about liberation, and in this way grammar is "the door to liberation", as Bhartṛhari puts it (Bronkhorst 1995). Grammar has thus obtained its own philosophy, including an (in the Indian context important) liberating insight. But this philosophy is not based on the analysis of language implicit in Pāṇini's grammar, but quite on the contrary on the understanding that this analysis is not ultimately 'real'.

Bhartṛhari is especially remembered for his link with the *sphoṭa*, which in his case is primarily the indivisible word, different from the manifesting sounds. Later thinkers, both inside and outside the grammatical tradition, discuss and elaborate this concept. Modern scholars — foremost among them John Brough (1951) — see in the *sphoṭa* a concept of general linguistics, "simply the linguistic sign in its aspect of meaning-bearer (*Bedeutungsträger*)". In so doing they overlook the philosophical and ontological dimension of this concept, predominant in its original context.

7. Understanding the meaning of a sentence

There is an area of thought where Pāṇini's analysis of the Sanskrit language has exerted a clear and unmistakable influence. It is the attempted description of the knowledge which a listener derives from hearing a sentence, the so-called verbal cognition (*śābdabodha*), which came to occupy an important place in the three schools of thought called Mīmāṃsā (Vedic hermeneutics), Navya-Nyāya (the New Logic), and Vyākaraṇa (grammar as a school of philosophy) (for a general presentation see Rao [1969], especially chap. I; Matilal [1988: 1990: 53f.]; Coward & Kunjunni Raja [1990]: → Art. 20).

The self-imposed task of Mīmāṃsā was to interpret Vedic sentences. Its thinkers had come to think that injunctions are the crucial parts of Vedic texts. These injunctions do not however express the intention of their author, for they have none (and nor do any other Vedic sentences), because the Veda was believed to have no beginning in time. How, then, do Vedic injunctions enjoin? Reflections of this kind led the Mīmāṃsakas to interpret, and paraphrase, the injunctions in ways that suited their purposes (see Frauwallner 1938). Such paraphrases are already found in Śābara's *Mīmāṃsā Bhāṣya* (5th century?), but a connection with the Pāṇinian analysis of words makes its appearance in a commentary on this work, Kumārila's *Tantravārttika* (7th century). This connection remained however incomplete, as can be seen from the following example. Śābara paraphrases the injunction *svargakāmo yajeta* "he who wishes to attain heaven should sacrifice" as *yāgena svargam bhāvayet* "by means of the sacrifice he should effect [the attainment of] heaven", which deviates rather profoundly from the Pāṇinian assignment of meanings (Śābara on *Mīmāṃsā Sūtra* 2.1.1). Kumārila, presenting the position of the system (*śāstra*), assigns the general meaning "productive operation" (*bhāvanā*) to the verbal ending (*ta* in the case of *yajeta*). This deviates from the meanings assigned to the verbal ending by Pāṇini (primarily 'agent'), but takes the latter's formal analysis of the verb for granted. Pāṇini's formal analysis of the remainder of the sentence, on the other hand, does not play a role in Kumārila's discussions. It gains in importance in some of the subsequent refinements introduced in the school (cf. Bhatta 1994; Edgerton 1929). The constituent elements of a statement like *rāmaḥ odanaṃ pacati* "Rāma cooks rice" – *rāma* + *s* – *anna* + *am* – *pac* + *ti* – give rise to a paraphrase which gives each element its due, and which has the following (simplified) form:

"The productive operation (*bhāvanā*; meaning of *ti*) happening at present, which is done through the instrumentality of cooking that has rice as its object goal, and this efficient force is qualified by Rāma as its agent."

The Mīmāṃsā points of view were subsequently taken into consideration, but combated, by Gaṅgeśa, a key figure of Navya-Nyāya (14th century). For a description of the contents of his chapter on verbal testimony see Potter & Bhattacharya (1992: 239–

312; partly coinciding with Vidyabhusana [1920]). He and his followers, too, present a paraphrase of verbal cognition which remains close to the Pāṇinian analysis of the sentence. Indeed, the reality of Pāṇinian morphemes is so much taken for granted by this school, that they refer to them as "words" (*pada*). The main qualificand here is not the meaning of the verbal ending (as with the Mīmāṃsakas), but that of the word with the nominative ending. The meaning of the sentence *rāmaḥ pacati* "Rāma cooks" is here approximately paraphrased as: "Rāma who is qualified by the effort that is conducive to cooking." The verbal ending is given the meaning 'effort', which is, again, different from Pāṇini's meaning 'agent'.

Only the grammarians maintain the Pāṇinian meaning 'agent' for the (active) verbal ending. Following Bhartrhari (*Vākya-padīya* 3.8.40ff.; transl. Bandini [1980]), they look upon the meaning of the verbal root as the main qualificand. Kaunḍa Bhaṭṭa (17th century) – an important representative of this school – assigns the meaning 'activity conducive to the result' to verbal roots; the substratum of the activity is the agent, the substratum of the result the object. The sentence "Rāma cooks rice" (*rāmaḥ odanaṃ pacati*) is therefore to be paraphrased, in a simplified manner, as: "Present activity whose substratum is Rāma, which is conducive to the softening whose substratum is rice" (Joshi 1993: 1995, especially 22ff.).

In all these reflections and debates Pāṇini's analysis of the Sanskrit language is used as point of departure, even though the meanings assigned by him to the morphemes are only fully accepted by the grammatical philosophers.

8. Conclusion

The importance of grammar in Indian classical culture cannot be overestimated. The extent to which it has exerted a determining influence on the Indian sciences is less easy to estimate, and exaggerated assessments have become all too common. The search for the fundamental nature of the Indian sciences, or of Indian thought in general, as being based on the supposedly all-important influence of grammar, is not likely to lead beyond more or less attractive slogans. This does not mean that there has not been intensive interaction between grammar and the other sciences, nor

that this interaction has not left its traces. Bringing those traces to light will require continued detailed philological research.

9. Bibliography

- Bandini, Giovanni. 1980. *Die Erörterung der Wirklichkeit. Bhartṛhari's Kriyāsamuddeśa und Helārājas Prakāśa zum ersten Male aus dem Sanskrit übersetzt, mit einer Einführung und einem Glossar versehen.* (= *Beiträge zur Südasienforschung*, 61.) Wiesbaden: Steiner.
- Bhatta, V. P. 1994. *Maṇḍana Miśra's Distinction of the Activity: Bhāvanāviveka. With introduction, English translation with notes, and Sanskrit text.* Delhi: Eastern Book Linkers.
- Bhattacharya, Kamaleswar. 1995. "Back to Nāgārjuna and Grammar". *The Brahmavidyā, Adyar Library Bulletin* 59.178–189.
- Bronkhorst, Johannes. 1979 [1980]. "The Role of Meanings in Pāṇini's Grammar". *Indian Linguistics* 40.3. 146–157.
- . 1981a. "The Orthoepic Diaskeuasis of the R̥gveda and the Date of Pāṇini". *Indo-Iranian Journal* 23.83–95.
- . 1981b. "Nirukta and Aṣṭādhyāyī: Their shared presuppositions". *Indo-Iranian Journal* 23.1–14.
- . 1984. "Nirukta, Uṇādi Sūtra, and Aṣṭādhyāyī". *Indo-Iranian Journal* 27.1–15.
- . 1987. "The Mahābhāṣya and the Development of Indian Philosophy". *Three Problems Pertaining to the Mahābhāṣya*, 43–71. Poona: Bhandarkar Oriental Research Institute.
- . 1991. "Pāṇini and the Veda reconsidered". *Pāṇinian Studies. Professor S. D. Joshi Felicitation Volume* ed. by Madhav M. Deshpande & Saroja Bhate, 75–121. Ann Arbor: Center for South and Southeast Asian Studies, Univ. of Michigan.
- . 1992. "Quelques axiomes du Vaiśeṣika". *Les Cahiers de Philosophie* 14.95–110.
- . 1995 [1996]. "Studies on Bhartṛhari. 7. Grammar as the door to liberation". *Annals of the Bhandarkar Oriental Research Institute* 76.97–106.
- . 1996a. "Sanskrit and Reality: The Buddhist contribution". *Ideology and Status of Sanskrit: Contributions to the history of the Sanskrit language* ed. by Jan E. M. Houben, 109–135. Leiden: Brill.
- . 1996b. "The Correspondence Principle and its Impact on Indian Philosophy". *Indo-Shisōshi Kenkyū/Studies in the History of Indian Thought* (Kyoto) 8.1–19.
- . 1998. "Les éléments linguistiques porteurs de sens dans la tradition grammaticale du sanscrit." *Histoire Epistémologie Langage* 20: 1.29–38.
- . 1999. *Language et réalité: Sur un épisode de la pensée indienne.* Turnhout: Brepols.
- Brough, John. 1951. "Theories of General Linguistics in the Sanskrit Grammarians". *Transactions of the Philological Society* 27–46. (Repr., Staal 1972: 402–414.)
- Cardona, George. 1976. *Pāṇini: A survey of research.* (Repr., Delhi: Motilal Banarsidass, 1980.)
- Coward, Harold G. & K. Kunjunni Raja. 1990. "Śābdabodha". *Encyclopedia of Indian Philosophies*, vol. V: *The Philosophy of the Grammarians* ed. by Harold G. Coward & K. Kunjunni Raja. 93–97. Delhi: Motilal Banarsidass.
- Edgerton, Franklin. 1929. *The Mīmāṃsā Nyāya Prakāśa or Āpadevī: A treatise on the Mīmāṃsā system by Āpadeva. Translated into English, with an introduction, transliterated Sanskrit text, and glossarial index.* (Repr., Delhi: Sri Satguru Publications. 186.)
- Falk, Harry. 1993. *Schrift im alten Indien: Ein Forschungsbericht mit Anmerkungen.* Tübingen: Narr.
- Filliozat, Pierre-Sylvain. 1988. *Grammaire sanskrite pāṇinéenne.* Paris: Picard.
- Frauwallner, Erich. 1938. "Bhāvanā und Vidhi bei Maṇḍanamīśra". *Wiener Zeitschrift für die Kunde des Morgenlandes* 45.212–252. (Repr. in *Kleine Schriften*, 161–201. Wiesbaden & Stuttgart.)
- Hinüber, Oskar von. 1989. *Der Beginn der Schrift und frühe Schriftlichkeit in Indien.* Stuttgart: Steiner.
- Ingalls, Daniel H. H. 1954. "The Comparison of Indian and Western philosophy". *Journal of Oriental Research* 22.1–11.
- Joshi, Shivaram Dattatray. 1993. "Kaṇḍa Bhaṭṭa on the Meaning of Sanskrit Verbs. 1". *Nagoya Studies in Indian Culture and Buddhism, Saṃbhāṣā* 14.1–39.
- . 1995. "Kaṇḍa Bhaṭṭa on the Meaning of Sanskrit Verbs. 2". *Nagoya Studies in Indian Culture and Buddhism, Saṃbhāṣā* 16.1–66.
- Matilal, Bimal Krishna. 1971. *Epistemology, Logic and Grammar in Indian Philosophical Analysis.* The Hague & Paris: Mouton.
- . 1988. "Śābdabodha and the Problem of Knowledge-Representation in Sanskrit". *Journal of Indian Philosophy* 16.107–122.
- . 1990. *The Word and the World: India's contribution to the study of language.* Delhi: Oxford Univ. Press.
- Potter, Karl H. & Sibajiban Bhattacharyya, eds. 1992. *Encyclopedia of Indian Philosophies*, vol. VI: *Indian Philosophical Analysis. Nyāya-Vaiśeṣika from Gaṇeśa to Raghunātha Śiromaṇi.* Princeton, NJ: Princeton Univ. Press.
- Rao, Veluri Subba. 1969. *The Philosophy of a Sentence and its Parts.* New Delhi: Munshiram Manoharlal.
- Renou, Louis. 1941–42 [1942]. "Les connexions entre le rituel et la grammaire en sanskrit". *Journal Asiatique* 233.105–165. (Repr. in Staal 1972: 435–469.)

- , "L'érudition". *L'Inde classique*, vol. II ed. by Louis Renou & Jean Filliozat, 85–137. (Repr., Paris: Adrien-Maisonneuve, 1985.)
- , 1963. "Sur le genre du sūtra dans la littérature sanscrite". *Journal Asiatique* 251.165–216.
- Ruegg, D. Seyfort. 1978. "Mathematical and Linguistic Models in Indian Thought: The case of zero and *śūnyatā*". *Wiener Zeitschrift für die Kunde Südasiens* 22.171–181.
- Scharfe, Hartmut. 1977. *Grammatical Literature*. (= *A History of Indian Literature*, V: 2.) Wiesbaden: Harrassowitz.
- Staal, Frits. 1960. Review of D. S. Ruegg, *Contributions à l'histoire de la philosophie linguistique indienne*. *Philosophy East and West* 10.53–57.
- , 1963. "Euclides en Pāṇini: Twee methodische richtlijnen voor de filosofie". Amsterdam: Polak & Van Gennep. (Repr. in Staal 1986: 77–115.)
- , 1965. "Euclid and Pāṇini". *Philosophy East and West* 15.99–116. (Repr. in Staal 1988: 143–160.)
- , ed. 1972. *A Reader on the Sanskrit Grammarians*. Cambridge, Mass.: MIT Press.
- , 1982. *The Science of Ritual*. (= *Post-graduate and Research Department Series*, 15.) Poona: Bhandarkar Oriental Research Institute.
- , 1986. *Over zin en onzin in filosofie, religie en wetenschap*. Amsterdam: Meulenhof.
- , 1988. *Universals: Studies in Indian logic and linguistics*. Chicago: Univ. of Chicago Press.
- , 1989. *Rules Without Meaning: Ritual, mantras and the human sciences*. (= *Toronto Studies in Religion*, 4.) New York: Lang.
- Thieme, Paul. 1935. "Zur Datierung des Pāṇini". *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 89.*21*–*24*. (Repr. in *Kleine Schriften*, 528–531. Wiesbaden, 1971.)
- , 1982. "Meaning and Form of the 'grammar' of Pāṇini." *Studien zur Indologie und Iranistik* 8–9.1–34. (Repr. in *Kleine Schriften*, vol. II, 1170–1201. Wiesbaden, 1995.)
- Torella, Raffaele. 1987. "Examples of the Influence of Sanskrit Grammar on Indian Philosophy". *East and West* 37.151–164.
- Vidyabhusana, Satis Chandra. 1920. *A History of Indian Logic*. (Repr., Delhi: Motilal Banarsidass, 1978.)

Johannes Bronkhorst, Lausanne
(Switzerland)