A newly added appendix to the English edition was compiled by Wen Xin (pp. 97–101). The content of two Chinese documents from the Stein collection (S. 2589 and S. 389), edited and translated here, provide further additional information about the events mentioned in the well-preserved and detailed letter dealing with official affairs of state (document G), which shows a certain affiliation to the Christian community by the addressee. This interrelationship of documents in different languages provides further evidence that Chinese historical records, preserved in great variety, should form an integral part of the research in the field of the history of Central Asian peoples, whose own written sources are quite limited. In the comments to the document in question, attention is drawn to related information from Chinese, as well as Khotanese sources in the original French edition. A table at the end of the edition of the two Chinese documents presenting the timeline of the events described in the texts as well as the associated map are very useful means to enhance the understanding and dating of the affairs described in document G.

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Sanskrit Syntax: *Selected Papers Presented at the Seminar on Sanskrit Syntax and Discourse Structures, 13–15 June 2013, Université Paris Diderot, with an Updated and Revised Bibliography by* HANS HENRICH HOCK. Edited by PETER M. SCHARF. Providence, RI: THE SANSKRIT LIBRARY, 2015. Pp. xxx + 522. $60.

From the title, readers might imagine a comprehensive description of Sanskrit syntax like J. S. Speijer's *Sanskrit Syntax* (Leiden: Brill, 1886), or a collection of papers on syntax such as *Studies in Sanskrit Syntax* edited by Hans Henrich Hock (Delhi: Motilal Banarsidass, 1991). Unlike these works, however, the volume under review covers diverse topics, ranging from Pāṇinian grammar to the computational processing of Sanskrit. It contains selected papers from a seminar held in Paris in 2013, of which the main interest was the computational formalization of Sanskrit grammar, the parsing and tagging of Sanskrit texts, and the creation of Treebank corpora. In that respect, this volume continues the line of *Sanskrit Computational Linguistics*, edited by Gérard Huet, Amba Kulkarni, and Peter Scharf (Berlin: Springer, 2009).

Hans Henrich Hock ("Some issues in Sanskrit syntax," pp. 1–52) surveys works on syntax since 1991 with a special focus on his own contributions. Together with the seventy-two-page bibliography at the end of the volume (pp. 399–470), which updates Deshpande and Hock's bibliography in Hock 1991 (pp. 219–44), it provides a selective overview of syntactic topics currently at issue. On the first topic of how free Sanskrit word order is, the works cited agree that Sanskrit is a configurational language, i.e., has a hierarchical phrase structure, but differ on whether there is an unmarked word order and whether the syntactic tree has linear ordering of its constituents or not. Hock supports Schäufele's approach, which assumes a head-final basic word order, because it conforms well to the overall SOV typology Sanskrit shows. On the second topic of the relative-correlative clause structure, Hock reaffirms his own claim that the Sanskrit relative clause is conjoined to the main clause, citing cases where there is no clear relationship between the relative and correlative pronouns, such as relative clauses serving as conditional clauses, and relative clauses containing interrogation and imperative modality. In the section on gender agreement, Hock takes up what he calls "upside-down" agreement, in which pronominal subjects adopt the agreement features of their predicates and not of their antecedents. Hock finds its parallel in the agreement of the locative absolute construction, where the locative case is assigned to the participle and not to its subject as the subjectless impersonal locative absolute suggests. He applies Halle and Marantz's Distributed Morphology, which derives both sentences and complex words by syntax and hence helps to describe languages with complex morphology and relatively free word orders such as Sanskrit, to explain the process that the subject of a locative absolute assigns gender and number to the participle and the participle assigns

case to the subject. Another formal issue in agreement involves converbs and reflexives. While converbs (and reflexives) are in principle controlled by the *kartṛ* (agent) of the verb, there are known exceptions. Noting that genitive NPs and reflexive possessives often control the converb, Hock suggests that a "possessor" NP has a status close to the *kartṛ*.

George Cardona contributes two long articles on the Pāṇinian tradition. The first of them, "Derivation and interpretation" (pp. 53–107), contains the following topics: i) In the language of his grammar, Pāṇini presupposes that the students have native-speaker knowledge of common Sanskrit usage, and interpretation rules such as *Aṣṭādhyāyī* 1.1.49 *ṣaṣṭī sthāneyogā*, which provides the genitive with the technical meaning 'in place of', are invoked only when there is doubt in the relation the genitive case signifies. ii) Since the purpose of language use from a speaker's perspective is that another person understands the meaning the speaker wishes to convey, a speech unit should be caused by a meaning and not vice versa. This position bears on the question of structural ambiguity, whether a semantic contrast is present or not when the corresponding morphological distinction is impoverished and neutralized. For example, in the compound *rāja-puruṣa-* 'king's servant', in which *rājan-* 'king' can be singular, dual, or plural in the base string, Patañjali (*Mahābhāṣya* I.362.17–21) considers that the number distinction is unrecognizable because of semantic factors and not because of the form, i.e., the lack of an ending, for otherwise plural first members such as *varṣāsu-ja-* (kind of insect), which actually have singular meaning, should be taken literally as plurals. iii) Jan Houben (*Studien zur Indologie und Iranistik* 22 [1999] and elsewhere) argued that the most fundamental level in Pāṇini's derivational system is "provisional statement" or preliminary sentences containing substandard words, which are fine-tuned in later levels of derivation, and meaning is not the concrete starting point for a derivation. Citing Patañjali's well-known dictum that Pāṇini's grammar teaches only standard speech forms for economy (*Mahābhāṣya* I.5.20 *laghutvāc chabdapradeśaḥ*), Cardona criticizes Houben's view for its lack of factual basis.

Cardona's "Extension rules and the syntax of *Aṣṭādhyāyī* sūtras with -*vati*" (pp. 109–55) studies rules providing for extension (*atideśa*), some of which have terms with the suffix -*vati* (-*vat*) 'like' attached. He illustrates four major and three minor types of extension. For example, an operation (*kārya*) is extended by *Aṣṭādhyāyī* 1.1.56 *sthānivad ādeśo 'nal-vidhau*, which provides that a replacement is treated as though it were the original. By *Aṣṭādhyāyī* 2.1.2 *subāmantrite parāṅgavat svare*, the unit of the barytone vocative accentuation is extended to a noun before the vocative, thus extending the identity (*tādātmya*). Then he discusses the distinction between the two usages of the suffix -*vati*, i.e., i) two entities share an action in progress (*Aṣṭādhyāyī* 5.1.115 *tena tulyaṃ kriyā ced vatiḥ*), and ii) the compared entity is the locus or possessor of the shared action (*Aṣṭādhyāyī* 5.1.116 *tatra tasyeva*), and points out that interpretation of the extension rules crucially depends on this distinction.

Peter Scharf ("Interrogatives and word-order in Sanskrit," pp. 203–17) discusses the head directionality parameter of linguistic typology. This parameter generally agrees with the word orders of sequences such as object-verb, adjective-noun, noun-adposition, which are considered mutually correlated. Interrogatives either move or remain in situ depending on another parameter, the *wh*-parameter, and if a constituent moves, the movement is raising it to a higher position in the clause structure, the Spec-CP position in the case of interrogatives. Since Sanskrit is a predominantly head-final language, interrogatives are expected to move to the end of the clause, after the verb, if they move at all. Scharf analyzes the prose section of the *Viṣṇu-Purāṇa* and points out that the interrogative particle *api* usually occurs initially in the clause, and interrogatives never appear in the clause-final position. Considering that more than half *wh*-questions begin with interrogatives and that certain factors prevent the interrogatives from occurring in the clause-initial position, Scharf points out that interrogatives either occur in situ or move to the initial position. He argues that *wh*-interrogatives or relative pronouns occur at initial positions not by syntactic movement but by pragmatic factors like topic or focus. The functional perspective can also explain the paradoxical behavior of Sanskrit pronouns to move forward to the position before the verb or backward to the beginning of the clause.

Émilie Aussant ("To classify words: European and Indian grammatical approaches," pp. 219–35) compares the classification of parts of speech in computational linguistics and the Western grammatical

tradition, where parts of speech are classified according to their meaning, form, and relation to other parts of speech, with Indian classifications, which are based primarily on formal criteria.

Brendan S. Gillon ("Constituency and cotextual dependence in Classical Sanskrit," pp. 237–67) investigates what types of ellipsis are found in Sanskrit. He shows cases of sluicing, stripping, gapping, and ellipsis of a verb phrase, a copular complement, or a noun, and observes that interrogative ellipsis does not occur in indirect questions in Sanskrit and that constituents of a compound can undergo ellipsis or become the antecedent of a pro-form. These cases show that intermediate units between words and clauses, such as noun phrases, need to be recognized. Gillon goes on to show that Sanskrit also has verb phrases, prepositional phrases, and adjective phrases, for complements of their functional head are often non-omissible. Then he discusses the difference in the omissibility of complements between English and Sanskrit and concludes the discussion by pointing out that grammar needs specification of the *adicity* of each word, or what arguments a word takes, a notion broader than the *kāraka* (direct participants in verbal action).

"How free is 'free' word order in Sanskrit" (pp. 269–304) by Amba Kulkarni et al. addresses violability of word order, using formalized Mīmāṃsā notions of proximity (*sannidhi*) and expectancy (*ākāṅkṣā*). Kulkarni et al. draw on dependency grammar, a model created by Lucien Tesnière for describing syntactic structures by dependencies between words, representing them with graphs consisting of nodes, dependency edges, and projection lines. It is computationally implemented as parsers, and is used for building Treebanks of languages with relatively free word orders. To capture the distinction between "risen expectancy" (*utthita ākāṅkṣā*) and "potential expectancy" (*utthāpya ākāṅkṣā*) computationally, the authors introduce the "weak non-projectivity" or "planarity" principle, which bans crossing of the dependency edges only, thereby formalizing the *sannidhi* constraint. Then they run their parser on Gillon's prose corpus from Dharmakīrti and V. S. Apte's *The Student Guide to Sanskrit Composition* to evaluate *sannidhi* violation in them, and found that about 75% of the cases of violation are those of the adjective and the genitive. In the metrical *Bhagavadgītā* text, about two thirds of the 300 cases of *sannidhi* violation involve the adjective or the genitive, and most of the remaining cases have non-*kāraka* relations such as negation. In other words, most of the *sannidhi* violations are cases of *utthāpya ākāṅkṣā*.

In "Distinctive features of poetic syntax: Preliminary results" (pp. 305–24), Scharf et al. explore data collected from tagged prose and verse corpora; quantitatively analyze eight dependency pairs such as agent-verb, object-verb, adverb-verb, genitive-noun; and show that prose has unmarked orders in all types of pairs at a probability higher than 0.84, whereas the probability is at most 0.66 in verse, confirming that the word order in poetry is less restrained than in prose. Prasad Joshi ("On concord and government," pp. 347–60) studies Pāṇini's and early Pāṇinian discussion on the concord of a noun and its modifier or predicate, and government between a noun and a verb or an indeclinable. Dipesh Katira and Malhar Kulkarni's "Parse trees for erroneous sentences" (pp. 361–98) seeks to acquire directive rules for avoiding incorrect usages resulting from the transposition of vernacular grammar onto Sanskrit, with a view to contributing to the creation of more accurate machine translation systems. Citing ten sample sentences from Charudeva Shastri's textbooks, they analyze deviations such as the non-standard choice of nominal endings.

In the field of computational processing, "Voice, preverb, and transitivity restrictions in Sanskrit verb use" (pp. 157–201) by Scharf et al. discusses computational implementation of *Aṣṭādhyāyī* 1.3 and the *Dhātupāṭha*. Melnad, Goyal, and Scharf's "Meter identification of Sanskrit verse" (pp. 325–46) explains the authors' Web-based metrical analyzer.

This volume is very well produced by computer typesetting, even though it occasionally contains lapses such as headers on blank pages, wrong headers (pp. 327–43), and stray tags (p. 376, 2b). It is furnished with indexes of Pāṇini's rules, authors, and titles. Absence of a subject index is offset by the searchable PDF version of the volume available at sanskritlibrary.org.

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