J. F. STAAL

WORD ORDER IN SANSKRIT AND UNIVERSAL GRAMMAR

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To Saraswathy

nādasya kramajanmatvān na pūrvo na paraś ca saḥ
akramaḥ kramarūpeṇa bhedavān iva jāyate

'Though sound is produced in a fixed order
Speech itself has no earlier and later.
Itself without order, it is produced
As if divided by the appearance of order.'

Bhartṛhari, *Vākyapadīya* 1.48

Ist die Reihenfolge der Grundbestimmungen, nach deren Modell ein jeder Satz umgemodelt wird, nicht ebenso willkürlich, wie die der jeweils zu interpretierenden Satz? Hier ist zu antworten, dass das Vorangehen eines bestimmten Grundmomentes und das Folgen eines anderen nie aus dem Prinzip der Reihenfolge ableitbar ist. ... So kann etwa im Kreise unserer Sprachen als erstes Grundmittel erklärenden Verstehens das Subjekt angewendet werden, insofern sich das Subjekt tatsächlich öfter am Anfang des konkreten Satzes befindet. Das vom Subjekt geforderte Zweite, das Prädikat, aber steht in unseren Sprachen meistens hintenan, und hiermit zeigt sich die Innerlichkeit des Prinzips der Anordnung der grammatischen Interpretation: ihr fester Weg ist in seiner Festigkeit eben ein anderer als der empirisch wandelbare und von Fall zu Fall sich wandelnde Weg im Aufbau eines Satzes.

H. J. Pos, *Über den Aufbau der grammatischen Interpretation*, p. 303

PREFACE

This monograph owes its existence to certain puzzles in universal grammar and the theory of language which led the author to an investigation of word order in Sanskrit and its possible analyses and descriptions. Not unexpectedly, the raw material was found to be too vast for a first-hand treatment even to be attempted. Rather surprisingly, however, its interpretations by Indian and Western theorists and grammarians turned out to be so greatly at variance, that an analysis of these interpretations seemed rewarding. Accordingly, theoretical issues within the framework of generative grammar had to be faced anew, and alternative solutions suggested themselves. In this connexion the Sanskrit grammarians proved not only inspiring but positively helpful.

This book may invite the accusation that it wilfully mixes disciplines. There were alternatives: one could try to write a history of the subject; or construct a merely formal edifice, leaving it to others to test its adequacy; or else one could make the notorious attempt to stick to the facts, which is not only unilluminating but also bound to fail. Any such self-imposed restrictions seemed to conflict with the original intent. And so it was decided not only to make available the results of the investigation into Sanskrit word order; but also to introduce a theory of universal grammar to account for these and other results.

I should like to thank Professors C. E. Bazell, Noam Chomsky, Morris Halle, A. L. Vos, Dr. A. Kraak and Mr. P. G. E. Wesly for their suggestions, criticism and opposition. It will be obvious where I am indebted to them, and especially to Chomsky. Bibliographical information has been supplied by Professors S. A. Bonebakker, Barron Brainerd, A. L. Vos and by Dr. D. F. W. van Lennep, to whom I am also very grateful.

1966, Brighton-Amsterdam J. F. STAAL

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CHAPTER I

INTRODUCTION

Vāman Śivarām Āpte was among the most illustrious of those Sanskrit scholars who were at the same time Sanskrit speakers. His 'Student's Guide to Sanskrit Composition', first published in 1881, was re-edited and reprinted at least twenty-five times and continues to be used in high schools and colleges in India. In §§ 399–401 (from the second edition of 1885 onwards) of this remarkable treatise on Sanskrit syntax the following statements occur: "In Sanskrit every word (except adverbs and particles) is inflected, and the grammatical inflexion itself shows the relation in which one word stands to another. Thus *grammatically* speaking, there is no order as such that need be much attended to. ... But if there is no *grammatical* order, there is a sort of *logical* sequence of ideas, which must follow one another in a particular order. ... Words must be so arranged that the ideas will follow one another in their natural order, and the words in their natural connection. ..." (Āpte 1963, 263–4).

Though Āpte was, among other things, the superintendent of a New English School, and wrote his 'Guide' in English for Indian students, one need not be surprised at finding that these statements reflect distinctions current among Saṃskṛit grammarians at least from the time of Patañjali's *Mahābhāṣya*, i.e., for more than two millennia. The distinction which is relevant in the present context is that between *saṃbandha* 'the relation of one word to another within a sentence (as shown, e.g., by grammatical inflexion)' and *abhisaṃbandha, ānupūrvya* or *ānupūrvī* 'the order or arrangement of words (as occurring in actual utterances)'. This distinction could be specified within a general theory of language; in India it served to delimit the scope of the science of grammar or *vyākaraṇa* itself. For, though it is sometimes said that the Sanskrit grammarians were interested in grammar but not in syntax, it would be misleading to interpret this as asserting that they were interested in words (*pada*) and not in sentences (*vākya*) (cf. Renou 1960, 66; 1961, 129). It would however be correct to say that the Sanskrit grammarians were interested in *saṃbandha* and not in *abhisaṃbanda*, and accordingly in grammatical relations but not necessarily in word order.

The distinction between *abhisaṃbandha* and *saṃbandha* will here be used in order to study so-called 'free word order'. Despite appearences it might

be said, as we shall see, that the existence of this phenomenon is not clearly established and that its significance has not been adequately clarified. 'Free word order' itself (which would, if anywhere, obtain in a language like Sanskrit) will here be studied not only for its own sake but also because of its relevance to contemporary linguistic theory. This study will accordingly be prefaced with some remarks about recent developments in linguistics showing what place is occupied by considerations of word order. At the same time these remarks will provide the framework for the descriptions which follow.

The Greek word for order, τάξις, led not only to the formation of the term *syntax*, but also to the framing of the term *taxonomy*, which at present serves to characterize the main inadequacy of structural linguistics. Lees, who uses the term in this linguistic sense, described taxonomy as "the view that sentences are constructed from left to right, word for word, by the simple adjunction of successive constituents one to another" (Lees 1963[2], xix). Taxonomy, in this sense, corresponds to the Sanskrit *abhisaṃbandha*, and structural linguistics can in this sense be characterized by its insistence upon *abhisaṃbandha*. But structural linguistics may be judged not only by this emphasis on taxonomy, but also by the "idea of basing a taxonomy strictly and exclusively upon phonemic form" (*ibid.*, xxi). In general, taxonomic linguistics insists on confining its attention to the phonemic form, arrangement and intonation of utterances by classifying their elements in terms of simple labelled bracketing. The utterances thus analysed are collected from a fixed corpus. All this is postulated in order to confer on linguistics the status of an empirical science. Actually, such empiricism is misguided (cf. Chomsky 1964, as well as several studies by P. M. Postal). This misguided form of empiricism could easily combine with a behaviourist theory of language use and learning. At the same time it adhered to the idea of a discovery procedure by means of which a grammar is supposedly obtainable, by mechanical means, from the physical shape of the utterances obtained from a finite corpus (just as parts of botany are presumably obtainable, by mechanical means, from a stretch of jungle).

Just as structural linguistics may be characterized by its insistence upon taxonomy, the Sanskrit grammatical tradition may with reference to syntax be characterized by its insistence upon *saṃbandha* or grammatical relations. This has not been generally recognized; even Lees referred to "the Pāṇini, or Taxonomic approach" in connection with the treatment of compounds (Lees *ibid.*). This characterization may be due to the particular interpretations Pāṇini has undergone at the hands of some 19th-century Western linguists. Whitney, for example, was not only a Sanskrit scholar to some extent familiar with Pāṇini, but has also been quoted (by Chomsky) as one who

expressed most clearly the taxonomist point of view, namely, that "language in the concrete sense ... (is) ... the sum of words and phrases by which any man expresses his thoughts" (quoted Chomsky 1964, 22). The same Whitney expressed with regard to Pāṇini's grammar his disapproval of "the highly artful and difficult form of about four thousand algebraic formula-like rules in the statement and arrangement of which brevity alone is had in view, at the cost of distinctness and unambiguousness" (quoted from Whitney's grammar by Buiskool 1939, 2, who subsequently refutes this view).

The correct approach to the study of the Sanskrit grammarians was outlined by Faddegon, whose description in 1936 of "the Occidental linguists of the latter half of the nineteenth century" applies equally well to present-day taxonomists. It is clear, moreover, that Faddegon thought especially of Whitney in this connexion (cf. a phrase from the motto for his 1936 book: "Whitney has admirably attacked Pāṇini but for Pāṇini we forget Whitney"). Referring to the *kāraka* theory, Faddegon said: "Evidently Pāṇini tries in this analysis to separate the ideational aspect from the linguistic expression, an attempt which the Occidental linguists of the latter half of the nineteenth century have condemned, misled as they were by the hope of being able to understand language through the exclusive study of its phonal and morphological aspect, i.e. its articulative utterance and the association-system underlying declension and conjugation, as if the application and imitation of physics and a mechanistic psychology were the last word of moral science. And so besides the injustice done to a pioneer of grammar who lived about twenty-five centuries ago by associating with him results of modern grammar, it is even questionable whether Pāṇini has not something still to say to us" (Faddegon 1936, 18).

We shall repeatedly be in a position to observe that Pāṇini continues to have something relevant to say. But let us return to the framework of modern linguistics that will be adopted here. The development from structural linguistics to generative grammar or what could be called 'theoretical linguistics' can be most readily described by stating (1) that the generative grammarians discovered (or re-discovered: see below) the fundamental importance of *rules* for the statement of linguistic regularities; and (2) that for the generative grammarians, the observations of structural linguistics relate exclusively to the *surface structures* of sentences. This follows from the discovery (or re-discovery, to some extent: see Chomsky 1966a) that interpretations in terms of these surface structures are inadequate (e.g., in the simplest case, for describing constructional homonymy) and that assumptions have to be made (like *mutatis mutandis* in almost any other science) with regard to abstract structures underlying the surface structures. Such underlying structures constitute a *deep structure*, which directly deter-

mines the semantic interpretation of sentences. The deep structure is described with the help of a relatively simple kind of re-writing rules, which are said to generate the *base*; when formulating such rules, we shall make use of a single arrow (→). Rules of a different type, i.e., transformational rules, are needed to convert deep structure into the surface structures which determine the physical shape of actual utterances; when formulating such rules, we shall make use of a double arrow (⇒), which will also be used in formulating context-sensitive rules.

While natural languages differ greatly in their surface structure, the difference in deep structure is, to say the least, less obvious. This has led in turn to the further assumption that the deep structure, which determines the semantic interpretation which must to some extent be invariant under translation, largely incorporates what was to be a class of linguistic universals, i.e., universal structures valid for all natural languages, or structures of 'universal grammar'. This has linked these recent developments with traditional theories of universal grammar and with classical European rationalism (Chomsky 1966a), and at the same time has made for a much closer connection between linguistics, psychology and philosophy – itself again constituting a return to an earlier point of view (*ibid.*, 76, note 4).

In this sketchy survey of contemporary linguistic theory one important element has so far been omitted: the incorporation into linguistic theory of rules which are able to account for the fact that there are infinite possibilities of expression in every language. The main technical contribution of generative grammar in this respect is the introduction (from logic and mathematics) of *recursive* rules, which safeguard the possibility of deriving infinitely many expressions. After such rules had first been introduced into the transformational component of the syntactic part of generative grammar, they were subsequently confined to the base which expresses the deep structure. The simplest solution which is nowadays adopted is the incorporation of a single[1] recursive rule in the base component (excepting a rule schema required for conjunction). This rule is of the form:

$$A \rightarrow \ldots \frown S \frown \ldots$$

where S is the initial category symbol which occurs on the left of the arrow in the initial rule of each derivation, '$\frown$' expresses concatenation and A is a category symbol which is introduced by earlier rules of the derivation. The recurrence of S guarantees the possibility of derivation of infinitely many expressions. All this will be illustrated below.

It may be noted that the notion of *rule* corresponds to the notion of

[1] Actually, a pair of recursive rules: (3a) and (3b) on page 6 below. For a recent modification see Rosenbaum 1967.

sūtra as it occurred in Pāṇini.[2] His commentator Patañjali (traditionally placed in the 2nd century B.C.; cf. below, page 48 note 19) was explicit with regard to the fact that only a finite number of rules are required to account for infinitely many expressions.[3] The recursive character of such rules is implicit in the comparison made by the 5th-century philosopher-grammarian Bhartṛhari between the recognition of new sentences and counting.[4]

In what follows we shall adopt a simplified version of the rules of the base as given in Chomsky's *Aspects of the Theory of Syntax* (1965). This simplified version (in which sentence boundary marks, for example, will always be omitted) is clearly insufficient for the description of all sentences, e.g., of English, but it already provides for the description of infinitely many English sentences and it appears to possess all the characteristics of the system that will be required in the following discussion. Though this system is now accessible in a published form, its presentation in Chomsky 1965 is combined with other investigations. A relatively detailed explanation will therefore be given of the simplified version adopted here, so that precisely the framework which provides the background for the following discussion will become available. (The rules of the base of Chomsky 1965 have already undergone some modification in more recent work; cf. e.g. Rosenbaum 1967. But this is also inessential in the present context).

The re-writing rules of the base, which expresses the deep structure, are the following (cf. Chomsky 1965, 106–7):

$$S \rightarrow NP^{\frown}VP \qquad (1)$$

[2] See, e.g., Staal 1963; for *sūtra* in general see Renou 1963.

[3] *Mahābhāṣya*, ed. Kielhorn 5.23–6.3 (the original is quoted in Staal 1967b, note 1): "Now if grammatical expressions are taught, must this be done by the recitation of each particular word for the understanding of grammatical expressions – must, e.g., the grammatical expressions 'cow', 'horse', 'man', 'elephant', 'kite', 'deer', 'Brahman' be recited? No, says the author, this recitation of each particular word is not a means for the understanding of grammatical expressions. For there is the following tradition. Bṛhaspati addressed Indra during a thousand divine years going over the grammatical expressions by speaking each particular word, and still he did not attain the end. With Bṛhaspati as the instructor, Indra as the student and a thousand divine years as the period of study the end could not be attained, so what of the present day when he who lives a life entirely lives at most a hundred years? ... Therefore the recitation of each particular word is not a means for the understanding of grammatical expressions. – But then how are grammatical expressions acquired? Some work containing general rules and exceptions has to be composed. ..."

[4] Vākyapadīya 1.87: *yathādyasaṅkhyāgrahaṇam upāyaḥ pratipattaye saṅkhyāntarāṇām bhede'pi tathā śabdāntaraśrutiḥ* 'just as grasping the first numbers is a means for the understanding of other numbers, even when different, so is hearing other words'. The commentator Harivṛṣabha explains the last words as follows: *tathā devadattādiśabdāntaraśrutiparicchedopāyā vākyarūpapratipattiḥ* 'so a sentence is understood by means of analysis from hearing other words, such as *Devadatta*'.

$$VP \rightarrow V^{\frown}NP \qquad (2)$$

$$NP \rightarrow (Det)^{\frown}N^{\frown}(S). \qquad (3)$$

The parentheses in the third rule denote option, i.e., (3) stands for the following four rules:

$$NP \rightarrow Det^{\frown}N^{\frown}S \qquad (3a)$$

$$NP \rightarrow N^{\frown}S \qquad (3b)$$

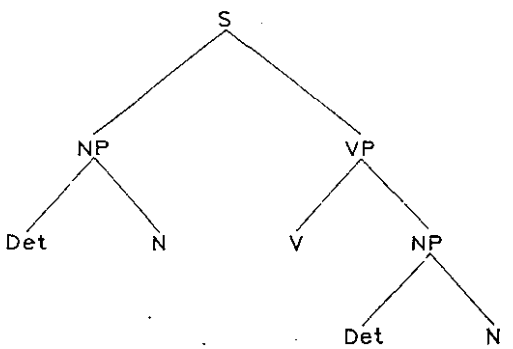
$$NP \rightarrow Det^{\frown}N \qquad (3c)$$

$$NP \rightarrow N. \qquad (3d)$$

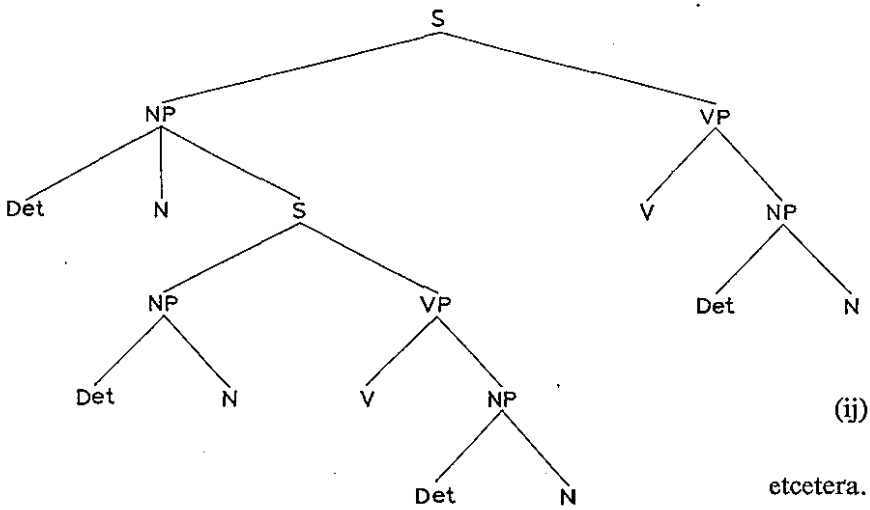
Thus (3a) and (3b) are the only rules which contribute recursiveness. The symbols may be read as follows:

S: 'Sentence'	V: 'Verb'	Det: 'Determiner'
NP: 'Noun Phrase'	VP: 'Verb Phrase'	N: 'Noun'.

These rules permit the construction of infinitely many *trees*, e.g.:



(i)



(ij)

etcetera.

We shall now, greatly simplifying Chomsky's conventions (1965, especially 79–111; cf. also Staal 1967a), adopt a dictionary consisting in the following *English* vocabulary:

(*book*, N)	(*student*, N)
(*enter*, V)	(*the*, Det)
(*own*, V)	(*university*, N).

Then, in accordance with Chomsky's conventions and adopting rules as illustrated by the tree (i), we can derive such strings as: 'the book enter the university', 'the student enter the university', 'the student own the book', 'the student own the university', 'the student enter the student', 'the university own the book', etc. Transformational rules will be required to introduce concord or government into these strings (the actual shape of some of these rules will be considered later) and, moreover, certain *transformational markers* will have to be introduced into the base. Thereby the following sentences can be derived: 'the student enters the university', 'the students enter the university', etc. Certain sentences may be eliminated provided restrictions of a semantic nature are built into the dictionary. Thus we may eliminate, e.g., 'the university enters the student', if so desired.

The tree (ij), on the other hand, symbolizes the derivation of strings that are more interesting, e.g.: 'the student the student own the book enter the university' or 'the university the university own the student own the book'. Other transformational rules are now required to derive sentences from these strings, e.g. (from the first) 'the student who owns the book enters the university' (but also: 'book owning students enter the university'), and (from the second) 'the university which owns the student owns the book' (and perhaps: 'the university which owns the student owns his book').

With the help of such derivations as symbolized by the trees (i) and (ij) a great many sentences, but not infinitely many, can be derived. By constructing trees on the basis of (1)–(3) in which (3a) and (3b) are introduced again and again, we can derive as many sentences as we wish.

In principle this is a remarkably simple and, as can be seen from the results, extremely powerful method of description. Though the form of many specific transformational rules, and also of transformational rules in general, remains for the time being a matter of some uncertainty or dispute, the overall structure of the system seems clear. Its appropriateness, in principle, for the generation of English sentences is partly based upon a specific feature which characterizes Chomskian generative grammar: i.e., the fact that order is not only a feature of the terminal strings and finally derived sentences (as certainly it should be), but also figures in the deep structures underlying them. The reason for this is that the re-writing rules of the base, e.g., (1)–(3), introduce ordered strings by making use of concatenation.

Accordingly, the trees have a fixed structure from left to right as well. At first sight, this incorporation of order into the deep structure may seem an unfortunate and even paradoxical inheritance from structural linguistics. For the taxonomy of structural linguistics was rejected exactly because of its adherence to surface structure, in which order plays a paramount role. So why preserve order in the deep structure? Indeed, if order were rejected, one could adopt instead of the rule (1), which introduces an ordered string, a rule (1′), which introduces an unordered set, i.e.:

$$S \rightarrow \{NP, VP\}, \qquad (1')$$

where {NP, VP} is defined as the set which contains the two elements NP and VP; hence {NP, VP} and {VP, NP} are different expressions denoting the same thing. With the help of (1′) one could, however, derive the following strings: 'own the university the student', 'enter the university the book', etc. In English, at least, this would lead to an entirely redundant proliferation of ungrammatical and unwanted strings.

It is obvious that order is often further determined by transformational rules. For example, we derive: 'the students who own books enter the university' as against 'the book owning students enter the university', and not: 'the who own books students enter the university' as against 'the students book owning enter the university'. It may therefore be asked whether there is any good reason for not selecting, to the right of the arrow in (3), another ordered string, i.e.:

$$NP \rightarrow (Det)^{\frown}(S)^{\frown}N. \qquad (3')$$

So far there is no criterion which enables us to choose between (3) and (3′), though, of course, the transformational rules required in addition will have to be formulated differently in the two cases.

On the whole, and excepting the case just mentioned, it seems justified to introduce the given order into the deep structure, at least for the purpose of deriving sentences in English and in other languages with a similar surface structure. This means, among other things, that the deep structure of Chomsky's generative grammars is not similar to what the Sanskrit grammarians called *saṃbandha* 'the relation of one word to another' (as shown, e.g., by grammatical inflexion), since these grammatical relations have nothing to do with surface order. There are however grammatical relations which can be derived on account of such trees as (i). Chomsky defined grammatical relations as ordered pairs in the following way (1965, 71):

Subject-of:	[NP, S]	(4)
Direct-Object-of:	[NP, VP]	(5)
Main-Verb-of:	[V, VP] etc.	(6)

It may be noticed that these relations can be defined in terms of the deep structure without making use of its ordering: (4)–(6) have just the same significance in a system by which differently ordered strings are introduced, e.g.:

$$S \rightarrow VP^{\frown}NP$$
$$VP \rightarrow NP^{\frown}V,$$

as they have in a system by which unordered sets such as (1′) are introduced. Moreover, the same grammatical relations could also be defined, if other constituents were to intervene in the ordered strings which are derived, e.g., if we would for other reasons want to adopt expressions such as:

$$S \rightarrow NP^{\frown}Adverbial^{\frown}VP.$$

The system of grammatical relations defined by (4)–(6) is much closer to the grammatical functions and relations which occur in traditional parsing in Western grammars, and is at the same time much closer to what the Sanskrit grammarians called *saṃbandha*.

In order to find out to what extent the deep structure reveals linguistic universals one might investigate what happens when the following (again greatly simplified) *Sanskrit* vocabulary is adopted in addition to the simplified base consisting of (1)–(3):

(*apaśyat*, V)
(*govinda*, N)
(*rāma*, N).

For the sake of simplicity the form *apaśyat* 'he saw' has been chosen as the representative form of the Sanskrit Verb for 'see'. With tree (i) we can now derive: *rāma apaśyat govinda* and *govinda apaśyat rāma*. Transformational rules introducing concord or government and *sandhi* will be required to derive from these two strings the sentences *rāmo 'paśyad govindam* 'Rāma saw Govinda' and *govinda 'paśyad rāmam* 'Govinda saw Rāma', respectively.

The derivation so far appears to be largely similar to the derivation of the English sentences 'the book enters the university' and 'the university enters the book'. But this similarity is somewhat misleading since it arises from our failing to correctly specify the required transformational rules. The English example could have been dealt with by adopting any transformational rule which effectuates the affixing of '-s' to 'enter-' on account of the fact that 'the book' is a Singular NP. This could, for example, be done by means of a context-sensitive rule of the form (9), following a base consisting of (1), (7), and (8)[5]:

$$S \rightarrow NP^{\frown}VP \qquad (1)$$

[5] Cf. Chomsky 1957, 28–9; Lees 1963², 45; Chomsky 1965, 175–6.

$$\mathrm{NP} \rightarrow (\mathrm{Det}) \frown (\mathrm{S}) \frown \mathrm{N} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix} \tag{7}$$

$$\mathrm{VP} \rightarrow \mathrm{NP} \frown \mathrm{V} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix} \tag{8}$$

$$\mathrm{N} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix} \frown \mathrm{VP} \Rightarrow \mathrm{N} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix} \frown \mathrm{NP} \frown \mathrm{V} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix}. \tag{9}$$

The braces in the rules denote alternatives, e.g., (9) stands for the following two rules:

$$\mathrm{N} \frown \mathrm{Sg} \frown \mathrm{VP} \Rightarrow \mathrm{N} \frown \mathrm{Sg} \frown \mathrm{NP} \frown \mathrm{V} \frown \mathrm{Sg} \tag{9a}$$

$$\mathrm{N} \frown \mathrm{Pl} \frown \mathrm{VP} \Rightarrow \mathrm{N} \frown \mathrm{Pl} \frown \mathrm{NP} \frown \mathrm{V} \frown \mathrm{Pl} \tag{9b}$$

where Sg and Pl denote Singular and Plural, respectively. In addition we shall require some transformational rules which effectuate:

$$\textit{book} \frown \mathrm{Sg} \Rightarrow \textit{book}$$
$$\textit{enter} \frown \mathrm{Sg} \Rightarrow \textit{enters}.$$

As for the Sanskrit examples, a similar though slightly more complicated solution would seem fit. First of all, any more general description must contain a rule which is analogous to (9). This has been avoided artificially in the present example by adopting *apaśyat* as the representative form of the Verb. But in addition, to take the first example, *rāma* requires a Nominative Case ending and *govinda* requires an Accusative Case ending. This could be achieved, e.g., by context-sensitive rules (12) and (13) following a base consisting of (1), (8), (10), and (11):

$$\mathrm{NP} \rightarrow (\mathrm{Det}) \frown (\mathrm{S}) \frown \mathrm{N} \frown \begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix} \frown \mathrm{Case} \tag{10}$$

$$\mathrm{Case} \rightarrow \begin{Bmatrix} \mathrm{Nom} \\ \mathrm{Acc} \\ \mathrm{Instr} \\ \mathrm{Dat} \\ \mathrm{Ablat} \\ \mathrm{Gen} \\ \mathrm{Loc} \\ \mathrm{Voc} \end{Bmatrix} \tag{11}[6]$$

[6] Note that (11) might have been incorporated into (10) in the same manner in which $\begin{Bmatrix} \mathrm{Sg} \\ \mathrm{Pl} \end{Bmatrix}$ is incorporated into (7)–(9).

$$N^{\frown}\begin{Bmatrix}Sg\\Pl\end{Bmatrix}^{\frown}Case^{\frown}VP \Rightarrow N^{\frown}\begin{Bmatrix}Sg\\Pl\end{Bmatrix}^{\frown}Nom^{\frown}VP \qquad (12)$$

$$N^{\frown}\begin{Bmatrix}Sg\\Pl\end{Bmatrix}^{\frown}Case^{\frown}V \Rightarrow N^{\frown}\begin{Bmatrix}Sg\\Pl\end{Bmatrix}^{\frown}Acc^{\frown}V. \qquad (13)$$

In addition we require transformational rules which will effectuate:

$$\textit{rāma}^{\frown}Sg^{\frown}Nom \Rightarrow \textit{rāmaḥ}$$
$$\textit{govinda}^{\frown}Sg^{\frown}Acc \Rightarrow \textit{govindam}.$$

This enables us to derive the string *rāmaḥ apaśyat govindam* and from this in turn, with the help of transformational *sandhi* rules, we derive the first sentence, i.e., *rāmo 'paśyad govindam*.

For the present purpose we need not enquire whether the above solution is the best possible (transformational rules might for example have to be used instead of context-sensitive rules); this solution merely serves to demonstrate that a solution can be found, which then turns out to be somewhat more complicated for the Sanskrit than it was for the English example. It is worth noticing, however, that the context-sensitive rules which have been utilized, though formulated in terms of ordered strings, are in fact based upon grammatical relations which do not depend on any ordering. As regards English, (9) expresses that the Number of the Verb of the VP is governed by the Number of the Subject of S; but nothing is presupposed with regard to the order of these elements. As regards Sanskrit, (12) expresses that the Subject of S has the Nominative Case ending, and (13) expresses that the Object of VP (or, equivalently, of S) has the Accusative Case ending; again, the order of elements is irrelevant. This implies that we introduce redundant information by introducing context-sensitive rules, which presuppose order, for expressing facts of concord or government which have nothing to do with order. The question arises whether this should, and how it could be avoided.

We shall return to this problem much later. However, it may be observed that the redundant information carried along by the context-sensitive rules is exactly the information required for establishing the proper word order in English. But it is precisely here that the apparent parallelism between English and Sanskrit breaks down; for in Sanskrit the situation is different. It seems difficult to question the fact that *rāmo 'paśyad govindam* is not the only Sanskrit sentence which means 'Rāma saw Govinda'. In this connection Āpte may once more be quoted. On the first page of his 'Guide' he says: "Take ... the English sentence 'Rāma saw Govind'. If the order of words, 'Rāma' and 'Govind' be changed, there will be a very great difference in the meaning; it will, in fact, be a different sentence altogether. Take, however,

the Sanskrit sentence for the same: *rāmo govindam apaśyat*. Here, even if the order of the words be changed, no difference occurs in the meaning: the sentences *rāmo govindam apaśyat*, *govindaṃ rāmo 'paśyat*, *apaśyad rāmo govindam* &c., all mean the same thing" (Āpte 1963, 1).

Since transformations do not change meaning (Katz & Postal 1964; cf. Staal 1965b) and are, at least in a generative grammar of English, in general used to re-arrange the order of words, it appears to stand to reason that transformational rules will be postulated to account for the required permutations. It might pay to be careful and first adopt a base which directly generates the sentence which Āpte quoted first, i.e. *rāmo govindam apaśyat*. This can be derived from:

$$S \rightarrow NP^{\frown}VP \quad (14)$$
$$VP \rightarrow NP^{\frown}V. \quad (15)$$

Subsequently three transformational rules will be added, which will be defined appropriately but in a simplified way (omitting the dominating constituents of the Phrase-marker) for the tree generated by (14)–(15), i.e.:

$$NP^{\frown}VP \Rightarrow VP^{\frown}NP \quad (16)$$
$$NP^{\frown}V \Rightarrow V^{\frown}NP \quad (17)$$
$$V^{\frown}NP \Rightarrow NP^{\frown}V. \quad (18)$$

These rules have to be optional, since, for example, (17) and (18) would otherwise cancel each other and neither (16) nor (17) should be applied in the derivation of *rāmo govindam apaśyat*. Then *govindaṃ rāmo 'paśyat* can be derived by applying consecutively (14), (16), (15) and (18); and *apaśyad rāmo govindam* can be derived by applying consecutively (14), (15), (17), and again (17). The three remaining possibilities (presumably hinted at by Āpte's '&c.') can be similarly derived.

It is obvious that these manipulations are far from elegant. Chomsky therefore has, with reference to stylistic inversion (which is superficially similar to the syntactic inversion described here), emphasized "that grammatical transformations do not seem to be an appropriate device for expressing the full range of possibilities" (1965, 126). But even if other rules, similar to (16)–(18), have to be adopted, this will not only greatly detract from the simplicity of the description, but also give preferential treatment to one of the six permutations (in the present description, the order generated by (14)–(15)) for which a specific syntactic justification will be needed.

Actually, the general situation is more complicated. Chomsky has suggested that "stylistic inversion of 'major constituents' (in some sense to be defined) is tolerated up to ambiguity" (1965, 127) – the excluded ambiguities

being of the type of Hirt's example from German "*Die Mutter sieht die Tochter*" (see, however, below, page 68). But unless V is included among major constituents, rules such as (17) and (18) will not be admitted and this would prevent us from accounting for the six permutations considered above. Moreover, the required permutations need not generally be confined to elements of substrings dominated by major constituents, as we shall see below (pages 34, 54). Furthermore, the objection that preferential treatment is given to one particular permutation remains valid also when some generalization about permutability is postulated. Generalizations about permutability, then, whether to account for stylistic or for syntactic inversion, seem to be quite complicated *ad hoc* hypotheses, necessitated by the earlier adherence to strings. If 'free word order' should constitute a basic linguistic fact, this state of affairs would therefore suggest a description in terms other than strings – at least to start with. Word order would, of course, have to be introduced, but at a later stage (e.g., after affixing Case terminations, but before applying external *sandhi* rules).

The connection between inflexion and free word order has long been known in the West, especially on account of the comparison of the vernacular languages with Latin, which in this respect is at least to some extent similar to Sanskrit. Chomsky has quoted statements about this connection from Du Marsais and from Adam Smith (1966, 45, 101). But even the view that word order does not belong to what is nowadays called the deep structure, has been maintained before. Du Marsais distinguished between '*construction*' and '*syntaxe*' (Chomsky 1966, 47). *Construction* is applied to "l'arrangement des mots dans le discours", *syntaxe* is applied to "les rapports que les mots ont entre eux". Chomsky noted that "the syntax of an expression is thus essentially what we have called its deep structure; its construction is what we have called its surface structure" (*ibid.*). In a footnote (88, on p. 103) he refers, however, to the discussion in *Aspects*, where, as we have seen, word order does essentially belong to the deep structure. We shall return to this question, but it may be noted here that the distinction Du Marsais made between *syntaxe* and *construction* corresponds to the distinction of the Sanskrit grammarians between *saṃbandha* and *abhisaṃbandha*.

Recently Curry (1961), Hiż[7] and the present writer (1965c, 178 note; 1966a, 192; 1966b, 251) have accepted free word order as a linguistic fact and have criticized generative grammar on this account. Curry has suggested that grammatical structure be studied in terms of *functors*. He proposes to call the level of grammar which studies grammatical structure: *tectogrammatics*, and the level of grammar which studies how grammatical structure is repre-

[7] In: *Structure of Language and its Mathematical Aspects*, Providence, R.I., 1961, 265.

sented in terms of expressions: *phenogrammatics*. These terms can now be shown to correspond to deep structure and surface structure, respectively, provided order is excluded from the deep structure. For, as Curry observes (1961, 65), "if phrase structure grammar means the building up of phrases by concatenation of adjacent phrases, then it has a phenogrammatical aspect". While it seems likely that many aspects of the deep structure can indeed be described in terms of functors, it is not clear what kind of rules and mechanisms would be needed in *phenogrammatics* in order to derive surface expressions from grammatical structure, unless familiar transformational rules are adapted for that purpose. The use of functors in tectogrammatics for the description of deep structure, however, deserves to be further explored.

The theories which have been worked out in much greater detail by Šaumjan and Soboleva[8] are at first sight similar. Šaumjan distinguishes between two levels of linguistic description, the genotype and the phenotype level. Word order is again excluded from the genotype level. But while it is again not clear how in a number of cases the transition from genotype to phenotype is made, Barbara Hall has in addition shown (Hall 1964) that Šaumjan's description of the genotype itself is unsatisfactory in several ways (e.g., the members of the well-known pair 'John is easy to please' and 'John is eager to please' – Chomsky 1964, 34–5, 60–5 – come out with the same grammatical structure). It stands to reason that Chomsky has therefore strongly objected to such alternatives (1965, 124–5) and has furthermore emphasized that the introduction of sets (as in (1')) instead of strings does not solve any difficulty and in fact creates new problems, since such sets will in turn have to be replaced by strings before actual sentences can be finally derived. The imperfections of existing alternatives to Chomsky's theory, however, do not invalidate the criticisms motivating them. It remains, for example, counter-intuitive to assume that rules of concord must be formulated in terms of strings, though concord itself has nothing to do with order. Moreover, even if order is introduced at a later stage, the rules which would precede this introduction might have a much wider scope and higher degree of generality. Such rules could in fact be more readily regarded as rules of a universal grammar.

It may be noticed that rules introducing sets, e.g.:

$$\begin{aligned} S &\rightarrow \{NP, VP\} \\ VP &\rightarrow \{NP, V\} \\ NP &\rightarrow \{Det, S, N\} \end{aligned}$$

[8] See Šaumjan 1965 and the literature mentioned *ibid.* 191–2, note 4.

not merely lead to the same system of grammatical relations as rules introducing ordered strings do, but can also very well combine with such trees as (i) and (ij), provided these trees are interpreted in a different manner, i.e., without postulating that the branches branch off in a specific order. We may accordingly consider *wild trees*[9] as configurations of points such that there is one point at the top and each other point is connected with one and only one point above it. *Trimmed trees*, on the other hand, are wild trees with their branches branching off in a specific order, i.e. trees of the type now familiar in the literature on generative grammar. In wild trees the points dominated by a node constitute a set; in trimmed trees the points dominated by a node constitute an ordered sequence. As noted before, grammatical relations (and also *saṃbandha*) can be defined for wild trees as well as for trimmed trees. On the other hand, since wild trees are especially appropriate for symbolizing rules which introduce sets, context-sensitive rules cannot be defined for wild trees. But again there is no difficulty in defining the corresponding rules for sets, which could be called *company-sensitive* rules.

There is no point in introducing wild trees, company-sensitive rules and other concepts which are unfamiliar to linguists unless it is fairly probable that there is such a thing as free word order to account for. Moreover, this phenomenon itself, once found and analysed, may suggest specific methods for its adequate description. The following investigation into free word order will be mainly confined to Sanskrit. This has the additional advantage that Sanskrit has not only been the object of Western linguistic and philological scholarship for at least one century, but has also been the object of Sanskrit scholarship for at least two millennia. In the second section, Sanskrit word order will accordingly be considered as it has been studied by the Sanskrit grammarians and theorists of language. The third section will consider the same topic as studied by Western Sanskritists. The fourth and last section will give a summary and formulate conclusions from the preceding two sections, which at first sight seem strangely incompatible; it will seek to study methods of linguistic description that can deal adequately with the material studied; and finally it will seek to contribute to the solution of some of the general problems mentioned in the present Introduction.

[9] Note that what are here called 'wild trees' are a variety studied by mathematicians: see Berge 1958, chap. 16, and Ore 1962, chap. 4 (I owe these references to Barron Brainerd).

CHAPTER II

INDIAN THEORISTS ON WORD ORDER IN SANSKRIT

The term 'Sanskrit grammarians' is generally used to refer to the adherents of the science of *vyākaraṇa* (literally, 'analysis'). They may be grouped into several schools, the most important of which is the school of Pāṇini. The present problem however requires us to make some excursions beyond the confines of *vyākaraṇa* proper into the linguistic speculations first of the Vedic ritualists and second of the ritualist philosophers of the Mīmāṃsā. Members of any of these three groups will be referred to as 'Indian theorists' or 'Sanskrit theorists'. Some attention must now be devoted to each of these three groups, to the sources that will be quoted later, and to the background of these sources. The three groups will be referred to as (a) Vedic ritualists, (b) grammarians, and (c) Mīmāṃsā philosophers.

(a) The Vedic ritualists evolved the *sūtra* style which constitutes a unique, and at the same time one of the most characteristic manifestations of Sanskrit literature (for an excellent survey of this style see Renou 1963). The term *sūtra* or 'thread' denotes a rule or aphorism, or a text which consists of rules or aphorisms; in the latter sense the term is generally written with a capital, as Sūtra. These rules are often formulated in a very concise manner. This is, for example, the case in Pāṇini's grammar, where the *sūtras* come to resemble algebraic formulas (as noted already by Whitney, quoted above, page 3; for further details see Staal 1965a). The odd combinations that may result from such concision are referred to in the following pun on the double meaning of *sūtra* (quoted by Staal 1963a, 32 = 1965d, 115):

> 'No wonder that the girl strings together glass, gems, and gold on one thread.
> Even Pāṇini, who ought to have known better, combined dog, youth and king of the Gods in one rule.'

The earliest *sūtras* were the ritual *sūtras*. The authors of the still earlier Brāhmaṇa literature had engaged in interpretations of the Vedic ritual and in related speculations which developed further in a metaphysical direction, e.g., in the Upaniṣads. The authors of the ritual *sūtras*, on the other hand, confine themselves to minute and painstaking descriptions of the details of

the ritual. One of the most important features of Vedic ritual is the recitation or chanting of Vedic texts; this had become almost as complicated as the ritual itself (see e.g. Staal 1961). Special *sūtra* texts were therefore composed to deal with the recitation of the Veda. The resulting literature is called the Prātiśākhya literature, and consists of a number of texts, in principle one for each of the Vedic schools (as the name derived from *śākhā* 'school' indicates). The Prātiśākhya literature may be placed in the period 500–150 B.C. The probably earliest treatise is that of the Ṛgveda, and is therefore called the *Ṛkprātiśākhya*. It is written in verse but possesses *sūtra* characteristics and is referred to as such (see Renou 1963, 201, note 9). Apart from the *Ṛkprātiśākhya*, important Prātiśākhya texts are attached to the Black and White Yajurveda. Similar texts, partly overlapping, belong to the Atharvaveda. The Sāmaveda, which consists in part of verses of the Ṛgveda set to music, possesses a number of related texts which deal e.g. with the correlations between verse and melody and the connected correlations between accents and tones. – The existence of other Prātiśākhya texts may be assumed.

The Prātiśākhya literature deals primarily with the rules of euphonic combination (*sandhi*). Their phonological content is described e.g. in Varma 1929 and Allen 1953. Special attention is paid in the Prātiśākhya literature to the analysis of syllables, accents, compounds, and the boundaries of words and sentences. From these texts Indian linguistics developed. When it is said that the study of language in India "was undertaken in the first place primarily to meet the needs of Vedic ritual and the text material required by it" (Brough 1953, 161, and cf. Emeneau 1955, 151) it is mainly the Prātiśākhya literature that is had in mind.

It is important to observe that the object of study of the Prātiśākhya literature was the corpus of Vedic texts, which was transmitted orally. This implies that the authors of these texts were not interested in the Vedic language as such, but in the utterances handed down in the Vedic corpus and in particular in the Vedic school to which they belonged.

We shall quote from the probably earliest and most important *Ṛkprātiśākhya*, which was commented upon by Uvaṭa (of uncertain date). We shall also quote from the *Nirukta*, a work dealing primarily with Vedic etymology, which may be assigned to an early date within the same period as that of the Prātiśākhya texts. The *Nirukta* was commented upon by Durga (13th century?[1]). A later work which provides a list of Vedic deities but also contains a grammatical section, the *Bṛhaddevatā*, partly depends on the *Nirukta*.

[1] According to Sarup 1920, 50.

(b) The grammatical tradition antedates Pāṇini, but Pāṇini's grammar (which refers to several of its lost predecessors) is the oldest extant, and continues to be the most important and complete Sanskrit grammar. It consists of eight chapters or *adhyāya* and is therefore generally called the *Aṣṭādhyāyī*. The chapters consist in all of about 4000 short rules called *sūtra*. Each chapter consists, moreover, of four quarters or *pāda*, and the rules are numbered consecutively from the beginning of each *pāda*. It is therefore customary to refer to each rule with the help of three numerals, the first denoting the chapter, the second the quarter of that chapter, and the third the *sūtra* of that quarter (e.g., 1.4.80 for the 80th *sūtra* of the fourth *pāda* of the first *adhyāya*).

The object of Pāṇini's grammar was the complete description of Sanskrit as the spoken language (*bhāṣā*) of his time and, possibly to a more limited extent, of the Vedic language (*chandas*) (Renou 1967,). The date of Pāṇini is quite uncertain, though he is often placed in the 4th or 5th century B.C.[2] It has been a matter of some dispute whether the grammar of Pāṇini was earlier or later than the *Ṛkprātiśākhya* (cf. below, page 21).

Whereas the question in how far the Vedic language (*chandas*) is dealt with in Pāṇini's grammar has also been much discussed, no special attention seems so far to have been given to another fundamental difference between the Prātiśākhya literature and the grammatical tradition. Whereas the authors of the former are, as we have seen, mainly interested in the corpus of the Vedic texts, the grammarians were interested in the language itself, whether Vedic or contemporary ('spoken'). The phonetic treatises belonging to the Atharvaveda may in this respect form a kind of transition between the other Prātiśākhya texts and the works of the grammarians (cf. Renou 1947, 82–3, 224–5). The general difference in outlook and method between Vedic ritualists and grammarians implies that the former were mainly interested in *utterances*, the latter in *sentences*. We have already had occasion to observe that the grammarians stressed the infinity of the expressions of language (above, page 5, and note 3). We shall furthermore see that they did not hesitate to construct even Vedic sentences which were not known from the corpus of utterances. The Vedic ritualists were not interested in such constructions. (Incidentally, it may be noted that their lack of interest was better motivated than that of those modern linguists who defend a similar point of view on account of a certain misguided form of empiricism.)

Pāṇini's main commentator was Patañjali in his *Mahābhāṣya*, a voluminous

[2] The literature on the subject is referred to by Renou 1967, and in other works by the same author, quoted there.

work which is the main source for our interpretation of Pāṇini and for our knowledge of early Indian linguistics and theories of language. The *Mahābhāṣya* may be assigned to the second century B.C.[3] Patañjali also comments upon Pāṇini's successor Kātyāyana, whose 'rules of interpretation' (*vārttikā*) are only known from the *Mahābhāṣya* itself.[4] The Pāṇinian tradition continued in India – though not uninterrruptedly – with an impressive lineage of commentators, often original scholars themselves (e.g., Nāgojī – or Nāgeśa – Bhaṭṭa in the 18th century) and has remained alive to the present day.

This is not the place to give a description even of the main features of Pāṇini's grammatical system. This system will be frequently drawn upon and illustrated in the following pages. It may be sufficient to state that Pāṇini utilized a variety of technical terms and special elements of an artificially introduced meta-language, carefully distinguished from elements of the object-language; that the economy criterion (cf. the often quoted maxim "grammarians rejoice over the saving of the length of half a short vowel as over the birth of a son") led him to adopt numerous special devices, including *anuvṛtti* 'recurrence' (of elements of earlier rules in later rules, where they need not be mentioned explicitly) and, accordingly, a specific ordering of the rules; and that special meta-rules (*paribhāṣā*) occur among the *sūtras*, the task of which is to lay down how the rules are to be applied and how apparent inconsistencies are eliminated. It may be re-emphasized that Pāṇini's grammar is not confined to the phonology and morphology of Sanskrit (as has been suggested), but includes syntax, and that with reference to the latter it does not adopt a taxonomic outlook (as has been suggested). We shall return to this below (pages 36 and following).

We shall quote from Pāṇini and Patañjali, and also from the 17th-century *Siddhāntakaumudī* by Bhaṭṭojī Dīkṣita.

(c) The Mīmāṃsā constitutes a later development. In the Vedic literature, the Brāhmaṇas and the Upaniṣads may be said to deal to some extent with ritual interpretation *cum* speculation, and general metaphysical speculation, respectively. Two of the later systems of philosophy continue these two trends in a more systematic and rationalistic way: the *pūrva-mīmāṃsā* 'prior investigation', *karma-mīmāṃsā* 'investigation into (ritual) activity' or, briefly, Mīmāṃsā on the one hand, and the *uttara-mīmāṃsā* 'posterior investigation' or Vedānta on the other hand. Whereas the Vedānta and its extensive developments have attracted relatively much attention in the West

[3] See Renou 1967, and below, note 19.

[4] The relationship between Kātyāyana and Patañjali has been studied in exemplary fashion by Kielhorn (1876).

and continue to have a certain appeal, the seemingly arid prior Mīmāṃsā contains in many respects more interesting and original ideas – ideas, moreover, for which it would not be easy to find counterparts outside the Indian tradition. It has been realized that the Vedānta itself cannot be adequately understood without a knowledge of the Mīmāṃsā ("Śaṅkara est tout pénétré de Mīmāṃsā": Renou 1951, III). – For good introductions to the Mīmāṃsā system see e.g. Jha 1942, Hiriyanna 1932, chapter XII, and cf. Edgerton 1929 and Kunhan Raja 1952.

The Mīmāṃsā has most probably developed from the ritual Sūtras and especially from the rules of interpretation (*paribhāṣā-sūtra*) attached to some of these Sūtras. But the Mīmāṃsā investigation is more general and theoretical than the investigations of the ritual Sūtras. It was originally realistic in outlook and technical in execution, and only later developed into a full-fledged philosophical system. It combines trends which seem paradoxical at first sight, e.g. an almost excessive concern with *orthopraxy* 'right activity' (as distinct from *orthodoxy*: 'right opinion') with a frankly atheistic outlook. This is apparent e.g. from the doctrine that the deities invoked in the course of the sacrifices are essentially grammatical datives. – We shall see that the Mīmāṃsā philosophers often return to the themes which were discussed by the earlier Vedic ritualists.

Given the importance of the Vedic texts for the Vedic ritual, it stands to reason that the Mīmāṃsā philosophers devoted much speculation to the linguistic phenomena of the Veda. Their relation to the grammatical tradition deserves special comment. Though these philosophers, like their predecessors, dealt with Vedic utterances rather than with the sentences of classical or spoken Sanskrit, their researches were motivated by a very original theory about the nature of these utterances (cf. Edgerton 1928, Staal 1962). Because of this and especially in the field of syntax, Mīmāṃsā was in a position to supplement the investigations of the grammarians. Renou has characterized the difference between *vyākaraṇa* and Mīmāṃsā as that between *padamīmāṃsā* 'investigation of words' and *vākyamīmāṃsā* 'investigation of sentences' (1960, 66; 1961, 129). It is true that the grammarians were not interested in the surface arrangements of words in sentences; but they were interested in external *sandhi* on the one hand, and in the abstract underlying structures of sentences called *saṃbandha* on the other. While external *sandhi* is a secondary phenomenon in many other languages, 'syntax' has in the study of modern languages come to denote the study of the superficial arrangements of words, as indeed the etymology of the term 'syntax' itself suggests. And so it is no more than correct to say that the Sanskrit grammarians were not interested in sentences in as far as sentences are considered merely as arrangements of words. But it would not be

correct to say that they were not interested in sentence construction.[5]

The philosophers of the *Mīmāṃsā* look upon the *Mīmāṃsā-sūtra* attributed to Jaimini as their oldest source; beyond assigning this work to the period 300 B.C. – 300 A.D., determination of its date seems hazardous. The first commentator was Śabara, whose *Mīmāṃsāsūtrabhāṣya* is sometimes assigned to the 5th century A.D. It is in turn commented upon by many others, including the 8th-century scholar Kumārila Bhaṭṭa in his *Tantravārttika* as well as in other works.

As may be seen from this short survey the chronological and historical relations between these three groups are sometimes hard to ascertain. Though the third group is in some respects a continuation of the first, or rather of the purely ritual sūtras which accompany works of the first, the first group deals on the whole with older material than the second. Accordingly many scholars place Pāṇini after the *Ṛkprātiśākhya* and the *Nirukta*, though Thieme has argued that Pāṇini must be earlier (Thieme 1935). It must be emphasized, finally, that many other important sources (e.g., non-Pāṇinian works) have not been mentioned because they will not be quoted below. It may also be worth noting that while we are often dealing with the work of commentators, this does not imply that no important original thought may be found in it.

Word order will now be studied as dealt with in these works, and under three headings: (A) *Ṛkprātiśākhya, Nirukta, Bṛhaddevatā*; (B) Pāṇini and Patañjali; (C) Jaimini, Śabara and Kumārila Bhaṭṭa.

A. *ṚKPRĀTIŚĀKHYA, NIRUKTA, BṚHADDEVATĀ*

Most of the Vedic texts have been handed down orally in two traditional forms: the *saṃhitāpāṭha* 'continuous recitation' and the *padapāṭha* 'word for word recitation'. The composition of the *padapāṭha* at a very early date constitutes the first of a series of extraordinary precautions taken to preserve the sacred text from loss or corruption. The *saṃhitāpāṭha* and the *padapāṭha* differ from each other principally with respect to external *sandhi*, nominal composition and accentuation. An example from the Ṛgveda (10.127.2) is the following:

Saṃhitāpāṭha: / *órvaprā ámartyā nivāto devý udvátaḥ* /
Padapāṭha: / *á* / *urú* / *aprāḥ* / *ámartyā* / *nivátaḥ* / *devī́* / *ut'vátaḥ* /
'the immortal goddess has pervaded the wide space, the depths, and the heights'.

[5] Cf. Āpte 1963[25], 1: "'Syntax' in English deals with the mode of arranging words in sentences, and lays down rules for the proper and correct arrangement of words. In Sanskrit and other languages that are rich in inflexions, *Syntax* has not this definite scope."

The initial task of the Prātiśākhya literature is to teach how the *saṃhitāpāṭha* may be established from the *padapāṭha*. The given order of words is explicitly recognized as the point of departure, e.g., in *Ṛkprātiśākhya* 2.7 which states: *ānupūrvyeṇa sandhīn* '(one should make) the *sandhi* combination according to the word order'.

In oral recitation it is easy to forget one or two words from the *padapāṭha*. The *Ṛkprātiśākhya* therefore described another mnemonic device, called *kramapāṭha* 'serial recitation'. If the *padapāṭha* be written: / a / b / c / d /..., the *kramapāṭha* becomes:

/ a b / b c / c d /...

For example, the above line yields:

Kramapāṭha: / *órú* / *urvaprāḥ* / *aprā ámartyā* / *ámartyā nivátaḥ* / *niváto devī́* / *devý udvátaḥ* /

The *kramapāṭha* is the latest modification recognised at the time of the *Ṛkprātiśākhya*.[6] But other modifications (*vikṛti*) were developed later (e.g., *jaṭā*: / a b / b a / a b // b c / c b / b c // c d / d c / c d //), and many continue to be recited in different parts of India up to the present day (Staal 1961).

Special devices were introduced to mark a compound word or the end of a sentence. In its eleventh chapter the *Ṛkprātiśākhya* gives rules for the construction of the *kramapāṭha* from the *saṃhitāpāṭha*. In a few cases special problems arise on account of the order of words. In Ṛgveda 5.2.7, where a reference occurs to the famous myth of Śunaḥśepa (literally 'dog penis'), who was bought as a sacrificial victim at the price of a thousand cows, the two traditional versions are at variance:

Saṃhitāpāṭha: / *śúnaścicchépaṃ níditaṃ sahásrād yūpād amuñco áśamiṣṭa hi ṣaḥ* / *evásmád agne vi mumugdhi pā́śān* .../

Padapāṭha: / *śúnaḥśépam* / *cit* / *ní'ditam* / *sahásrāt* / *yūpā́t* / *amuñcaḥ* / *áśamiṣṭa* / *hi* / *saḥ* / *evá* / *asmát* / *agne* / *vi* / *mumugdhi* / *pā́śān* /...

'Even Śunaḥśepa, who was tied for a thousand, you have released from the sacrificial post, for he was arrested; so release us too from our fetters, o Agni ... .'

If the *kramapāṭha* were constructed from the *padapāṭha* according to the rules, the result would be:

/ *śúnaḥśépaṃcit* / *cid níditam* / *níditaṃ sahásrāt* /...

[6] The *Ṛkprātiśākhya* asserts (11.66) that the *krama* "does not accomplish anything else" (*anyasādhako na*); this may indicate that other *vikṛtis* were already current, though not officially recognized at the time. These *vikṛtis* and other specimens of Vedic recitation are available on two LP records 'The Four Vedas' (Ethnic Folkways Library).

But from this result the order of words of the *saṃhitāpāṭha* could never be derived. *Ṛkprātiśākhya* 11.13 proposes the following solution: *ānānupūrvye padasandhyadarśanāt / padavyavetaṃ ca padaṃ vyavāyi ca* 'if the word order is not in accordance (with the *padapāṭha*), the word divided by another and the dividing word are passed over, since otherwise the *sandhi* of the words (of the *saṃhitāpāṭha*) is not shown' (the word *atīyante* 'are passed over' has to be supplied from 11.3, which has *atīyate* 'is passed over': a technique well known from Pāṇini[7]). That is to say, both *śúnaḥśépam* and *cit* are omitted from the *kramapāṭha*, which therefore merely states: / *śūnaścicchépaṃ níditam* / and then continues with / *níditaṃ sahásrāt* / etc.

The *Ṛkprātiśākhya* also mentions an alternative (11.14), which according to the commentator Uvaṭa results in:

/ *śúnaścit* / *cicchépam* / *śépannídítam* / etc.

In other words, here the *kramapāṭha* is established from a hypothetical *padapāṭha*, derived from the *saṃhitāpāṭha*.

The question arises what should happen if other words precede such a variant recitation. An example occurs in Ṛgveda 9.86.42, a chant in praise of Soma:

Saṃhitāpāṭha: / *dvá jánā yātáyann antár īyate nárā ca śáṃsam dáivyaṃ ca dhartári* /

Padapāṭha: / *dvá* / *jánā* / *yātáyan* / *antáḥ* / *īyate* / *náraśáṃsam* / *ca* / *dáivyam* / *ca* / *dhartári* /

'Joining the two kinds of beings [i.e., human and divine], he enters between human and divine invocation, to support them'.

Here again the correct word order of the *saṃhitāpāṭha* could not be derived from a regularly constructed *kramapāṭha*. This problem is solved as follows in *Ṛkprātiśākhya* 11.15: *padānupūrvyeṇa sapūrva ā tatas tato vyavetaṃ ca saha·vyavāyi ca* 'if it is preceded by other words, these are recited in accordance with word order, and subsequently the divided and the dividing word together (with the preceding and the following words)'.

Uvaṭa explains this by specifying that for the above example the preceding and the following words are / *īyate* / and / *dáivyam* /. Thus the *kramapāṭha* becomes:

/ *dvá jánā* / *jánā yātáyan* / *yātáyann antáḥ* / *antár īyate* / *īyate nárā ca śáṃsaṃ dáivyam* / *dáivyaṃ ca* / *ca dhartári* /

[7] *anuvṛtti*: see e.g. Renou 1957, *s.v.*

The term *anānupūrvyasaṃhitā* was used for these rare sequences of the *saṃhitāpāṭha* where the word order is not in accordance with that of the *padapāṭha*. Elsewhere the *saṃhitā* may be referred to as *ānupūrvyasaṃhitā*.

What is to be retained from these discussions is that the Vedic ritualists paid great attention to the fixed word order of the two traditional recensions of the Vedic text. In the few cases where these two were at variance, special precautions had to be taken so that in neither version the correct word order was lost. This leads to a conclusion which may startle those Vedic philologists who study the Veda in order to arrive at a description of the Vedic language. For the Vedic ritualists of the *Prātiśākhya* period the Vedic language was an object of study only in as far as it was embodied in the Vedic tradition. Accordingly they regarded the order of words in the Vedic language as fixed. (We need not here consider another matter, viz., that also historically speaking it might be said that the word order in Vedic is less free than it is in classical Sanskrit.) This also applies to the Mīmāṃsā.

All this illustrates that from the time of the Prātiśākhya literature the Vedic language, apart from its embodiment in the Vedic texts, was hardly known. The texts were learned by heart, applied in the ritual and handed down by oral tradition. Moreover, the meaning of many Vedic passages must already at that time have been lost. The ritualists-linguists were interested, accordingly, in the utterances of the Vedic texts, not in the sentences of the Vedic language.

This entire development explains an otherwise very curious controversy which since the *Nirukta* is known as 'the controversy of Kautsa'. Kautsa may have been one of the earliest sceptics known, for his main thesis was that the Veda was without meaning: *anarthakā mantrāḥ* 'the Vedic mantras are meaningless'. Apart from scepticism, however, other factors may have been involved. Renou has drawn attention to the fact that one of the *Prātiśākhyas* of the Atharvaveda is also attributed to Kautsa (Renou 1960, 68). The Atharvaveda is largely a repository of magical practices. It is therefore not surprising that those ritualists who treated the mantras as charms, were hardly in a position to regard them at the same time as linguistically meaningful utterances. Katre, on the other hand, regarded Kautsa as a ritualist who wanted to provide a rational foundation for the ritual (*ibid.*; cf. also Thieme 1931, 27).

The *Nirukta* strongly objected to Kautsa's revolutionary doctrines and attempted to refute his arguments. One of these is significant in the present context. Kautsa supported his thesis by reasoning from the premiss that the Vedic words are fixed and that their order is fixed: *niyatavāco yuktayo niyatānupurvyā* (*mantrāḥ*) *bhavanti* 'the mantras are joined with fixed sound and fixed order' (*Nirukta* 1.15). The implicit argument is that *if* the mantras

were meaningful, their words could be replaced by synonyms, i.e., other words with the same meaning, and the order could be changed at will, *just as in ordinary speech.* The *Nirukta* commentator Durga makes this quite clear. Consider for example, he says, the mantra Ṛgveda 6.16.10 (= Sāmaveda 1.1): *ágna á yāhi vītáye* 'O Agni, come to the feast'. This is not the same as: *vibhāvaso āgaccha pānāya* 'O fire god, proceed to the drinking'. Nor is part of this expression the same as: *á yāhy ágne.* But in ordinary speech (*loke*) such conversions are met with. There are many synonyms for *go*; moreover, we have *goṇīm abhyāja* and *abhyāja goṇīm* 'drive the cow near'; *āhara pātram* and *pātram āhara* 'fetch the bowl'. This is not so in mantras. Since we see that they differ from ordinary speech, the mantras must be meaningless.

This controversy shows that many considered word order in ordinary speech as free. The author of the *Nirukta*, however, does not agree with this, for he replies (*Nirukta* 1.16): *laukikeṣv apy etad yathendrāgnī pitāputrāv iti* 'this [fixed word order occurs] also in expressions of ordinary language, e.g. *indrāgnī* "Indra and Agni", *pitāputrau* "father and son".'

It is not known whether Kautsa had followers who replied to this. We could easily do so, for both of the *Nirukta*'s counter-examples are nominal compounds, in which the order of the members is indeed fixed. In *indrāgnī* the order is fixed because in *dvandva* compounds the member which begins with a vowel and ends in a short *a* should precede (this rule is given by Pāṇini 2.2.33). In *pitāputrau* the order is fixed because in *dvandva* compounds the member which refers to what is more worthy of respect should precede (this is stated by a *vārttika* following Pāṇini 2.2.34).

We shall see that these discussions are taken up afresh by the philosophers of the Mīmāṃsā. They also recur in Sāyaṇa's commentary on the Ṛgveda.[8]

The *Bṛhaddevatā* begins with the statement that its author will list the Vedic deities as they occur *samāmnāyānupūrvaśaḥ* 'in the sequence of the traditional text' (1.1). This expression is adopted from the *Bṛhaddevatā* by the *Ṛgvidhāna* (1.2), where it is used with regard to ritual rules (transl. Gonda, 10). In the grammatical section of the *Bṛhaddevatā* some remarks are given about the grammatical, syntactic and semantic interpretations of the Vedic text. The only passage which deals exclusively with syntactic matters, contains a reference to word order (2.100):

> *atiriktaṃ padaṃ tyājaṃ hīnaṃ vākye niveśayet / viprakṛṣṭaṃ ca saṃdadhyād ānupūrvīṃ ca kalpayet //*

'A redundant word should be rejected, while one that is lacking one should

[8] See below, page 48.

introduce into the sentence; and one that is far removed one should bring into juxtaposition, and should [then] arrange the regular sequence [of the words]' (Macdonell's translation).

Since the construction of a specific arrangement is here insisted upon, it seems that this passage, at least for the language of the Vedas, presupposes a regular word order. This is explained most satisfactorily by assuming once more that the ritualists-linguists were interested not in the sentences of the Vedic language, but in the utterances of the Vedic corpus. We shall study other supporting evidence for this view.

B. PĀṆINI AND PATAÑJALI

When entering the domain of *vyākaraṇa* proper we are no longer concerned with ritualists interested in preserving the Vedic tradition, but with linguists studying both the spoken language (*bhāṣā*) and, possibly to a more limited extent, the Vedic language (*chandas*) (Renou 1967).

A few remarks may first be made about the word order in Pāṇini's metalanguage, i.e. in the *Aṣṭādhyāyī* itself. Many rules of the grammar prescribe a substitution. As we have noted elsewhere (Staal 1965a) Pāṇini uses the case terminations in a technical metalinguistic sense for expressing what is substituted for what, and in what context. Utilizing context-sensitive rules, substitution of the type Pāṇini is interested in may be expressed as:

$$a[b \rightarrow c]\, d \tag{19}$$

where c is the substitute for b, when preceded by a and followed by d. Pāṇini expresses this by:

a + Abl. ending b + Gen. ending c + Nom. ending d + Loc. ending. (20)

As in uninflected languages in general, the order of the elements in the artificial expression (19) is fixed, since their function depends on their place in the expression. The order of the elements in (20), on the other hand, is free, since their function is fully determined by the respective case terminations.

It has been noted that in Pāṇini's grammar in general the order of words is relatively free. Even the order of members of the *dvandva* compounds (which yielded the counter-examples provided by the *Nirukta*) is not fixed and sometimes deviates from that prescribed by the grammatical rules themselves. Renou, who has devoted a short study to the word order of the *Aṣṭādhyāyī* (Renou 1955) states that "l'ordre des mots chez P., d'une manière générale, est déroutant. Il y a des tendances précises, mais rarement

sans exceptions, et les exceptions sont loin de se réduire à des lois cohérentes". After studying a few special terms (*chandasi*, *vibhāṣā*, *nityam*) and a few general cases (e.g., introduction or definition of an *anubandha* or other technical term), Renou concluded that "l'ordre des mots chez P., au moins dans certaines amples catégories, comportait une part de liberté".

A rather celebrated case deserves a somewhat more detailed treatment; on this occasion the commentator Patañjali becomes quite explicit. The first *sūtra* of the grammar, *vṛddhir ādaic* (1.1.1), defines the technical term *vṛddhi*.[9] The commentators accept as usual practice in such cases that a newly defined technical term is put at the end of its definition. This does indeed obtain in the next rule, *adeṅ guṇaḥ* (1.1.2), which introduces the technical term *guṇa*. The general convention is that the technical 'defining' term (*saṃjñā*) which is the subject introduced by the *sūtra* and the grammatical subject of the *sūtra*, *follows* what it denotes, i.e., the *saṃjñin* or 'defined term' which is the predicate of the *sūtra* (*Mahābhāṣya*, *ad loc.*).[10] (Note that what holds for the object language need not be laid down for the metalanguage of grammar: *na yathā loke tathā vyākaraṇe* 'it is not so that what applies to ordinary speech applies to grammar itself' (ed. Kielhorn, I, 39 line 10).)

After suggesting various solutions for this puzzle Patañjali gives as a final answer: *etad ekam ācāryasya maṅgalārthaṃ mṛṣyatām* 'let the teacher be forgiven for this once on account of auspiciousness'. From this passage, the expression *maṅgalārtham* 'on account of auspiciousness' acquired a certain fame. This must be explained as follows. The word *vṛddhi* is not only a technical term but also a common word of the object language, meaning 'growth', 'success'. So Patañjali continues: *māṅgalika ācāryo mahataḥ śāstraughasya maṅgalārthaṃ vṛddhiśabdamāditaḥ prayuṅkte / maṅgalādīni hi śāstrāṇi prathante vīrapuruṣakāṇi bhavanty āyuṣmat puruṣakāṇi cādhyetāraś ca vṛddhiyuktā yathā syur iti* 'the teacher, intent on auspiciousness, uses the word *vṛddhi* at the beginning of his great compilation of science for the sake of auspiciousness. For only such works as have auspiciousness at the beginning thrive well and make mankind strong, long-lived and prosperous' (ed. Kielhorn, I, 40 lines 6–9).

This discussion makes clear that the Sanskrit grammarians needed a

[9] Cardona (1966, 311), whilst largely adopting the methods introduced in Staal 1965a, has criticised the formalisation of the definition of *vṛddhi* (*ibid.*, 66). This formalisation seems justified, however, in view of 1.1.3 *iko guṇavṛddhī* '*guṇa* and *vṛddhi* occur in the place of *i*, *u*, *ṛ* and *ḷ*' and of 1.3.10 *yathāsaṃkhyam anudeśaḥ samānām*, which specifies (in Cardona's own terms: p. 309) 'that when items of a subsequent enumeration in a rule of replacement have the same number as items previously enumerated in the rule, they are related in order'.

[10] See also Scharfe 1961, 21 *sq.*, which however has to be used with caution (Staal 1963b).

special convention for the meta-language in order to determine the word order in a case where ambiguity might result; we shall return to this (below, page 68). It is not quite clear whether either or both of the following are ambiguous: what are the subject and predicate of the sentence, or what are its topic and comment (for the distinction cf. Staal 1967a); this is irrelevant in the present context. But it is important to see what Patañjali has further to say about this subject in general.

In the course of the discussion Patañjali has considered another argument, which does not seem to be taken quite seriously in the grammatical context though it is stated as valid for the spoken language (cf. again the maxim just quoted: *na yathā loke tathā vyākaraṇe* 'it is not so that what applies to ordinary speech applies to grammar itself'). We need not pay attention to the word order in the *sūtra*, says Patañjali, because: *neha prayoganiyama ārabhyate* 'restrictions on usage are not here clung to'.[11] This he explains as follows: *saṃskṛtya saṃskṛtya padāny utsṛjyante teṣāṃ yatheṣṭam abhisaṃbandho bhavati | tad yathā āhara pātraṃ pātram āhareti* 'words are generated in accordance with grammatical rules, but their order [*abhisaṃbandha*] is free, as in *āhara pātram* and *pātram āhara* "fetch the bowl"' (ed. Kielhorn, I, 39, lines 18–9).

The example we met with in the commentary on the *Nirukta* is used again here to illustrate the free order of words in ordinary language.[12] Patañjali refers to the freedom of word order by using the term *yatheṣṭam* 'according to wish, as you wish'. In similar contexts this is also referred to by such terms as *kāmacāra*, *yathākāmam* 'according to desire'. In this passage, then, Patañjali clearly regards word order as free. Which particular order is used in a given utterance is a matter of 'usage' (*prayoga*).

Before studying additional evidence in this respect from the *Mahābhāṣya*, we shall return to Pāṇini and see whether he has anything to say about word order in the Sanskrit object-language. First, it strikes us that the terms met with before, *ānupūrvya* and *ānupūrvī*, are used in a different sense. The grammarians generally use *ānupūrvī*, not to refer to word order but to denote the order in which the grammatical rules are applied (Renou 1957, *s.v.*). The order in which the grammatical rules are actually given is in fact much more important than has even recently been claimed (see Staal 1966c in

[11] Subrahmanya Sastri (1960, 145 note 3), erroneously identifying usage with syntax, concludes that "Pāṇini does not deal with Syntax but only with Phonology and Morphology". For *niyama* cf. also Thieme 1931, 30.

[12] Note that the examples with the Imperative *āhara* 'fetch!' cannot be explained from Patañjali's context, but are natural in the context of the commentary on the *Nirukta*, where a Vedic imperative (*ā yāhi* 'come!') had just been quoted. This suggests that Patañjali quoted from the Nairuktas, and not *vice versa* (it is well known that Patañjali does sometimes quote from the *Nirukta* itself; see, e.g., Sköld 1926, ch. V).

reply to Fowler 1965). Pāṇini himself (2.1.6) uses *ānupūrvya* (Boehtlingk: 'ein Nacheinander') differently again, i.e., as a kind of semantic marker introduced to describe the meaning of a class of first members of indeclinable (*avyayībhāva*) compounds such as *anujyeṣṭham* 'beginning with the oldest' or 'in order of age (?)' (from *jyeṣṭha* 'eldest').

Secondly, Pāṇini gives many rules for the order of parts of words (e.g., stem, suffix) and for the order of members of compounds, which are also parts of words since nominal compounds are treated as nouns (Staal 1966a, 168–9). He nowhere seems to give any rule for the *order* of words in the sentence. But this does not imply, as we shall see, that he gives no rules for the *relation* of words in the sentence.

The commentators have noted this and have discussed the apparent counter-examples. When commenting upon the word order of the meta-language used in the first *sūtra*, such scholars as Kaiyaṭa in his *Pradīpa* (11th century) and Haradatta in his *Padamañjarī* (not earlier than the 13th century) state that Pāṇini never discusses the order of independent (*svatantra*) words (Ojihara and Renou 1960, 3–4, upon which the following discussion is partly based). This is shown by refuting the apparent counter-examples, i.e., Paṇini 3.1.2, 2.2.30–31, 1.4.80, 3.1.40–41. The *sūtra* 3.1.2 (*paraś ca*) lays down that suffixes follow stems, but neither of these are independent words. 2.2.30 (*upasarjanaṃ pūrvam*) and 2.2.31 (*rājadantādiṣu param*) deal with the order of members of nominal compounds, and the same holds for 2.2.31–38 (not mentioned in this connexion).

The *sūtra* 1.4.80 (*te prāg dhātoḥ*) says that preverbs and certain other elements precede verbal roots. This is more interesting, since preverbs, which by Pāṇini's time behave as prefixes, could to some extent be considered independent words since they behaved as such in Vedic. Pāṇini knew this, and the next *sūtra* 1.4.81 (*chandasi pare'pi*) states that in the Veda they may also follow the verbal root. The commentators provide the examples: for classical Sanskrit, the former rule enables us to derive *niyāti hastinā* 'he comes along with his elephant'; the latter rule provides for Vedic *yāti ni hastinā*. (This is not a Vedic quotation: note that the Sanskrit grammarians describe the Vedic language and are no longer exclusively interested in the Vedic corpus.)

The *sūtra* 1.4.80, then, describes a certain stage in the development of the language where elements that earlier used to move more freely, have been given a fixed position and have been attached to other forms. In the last apparent counter-example the reverse obtains. Here Pāṇini describes a relation between certain elements in terms of a kind of suffixation, while in the later development of the language these so-called suffixes started to move about more freely. Since these suffixes are themselves verbal forms, Western linguists in their diachronistic tradition describe them as such.

Pāṇini on the other hand, finding these elements after verbal forms only, in his synchronistic manner described them as suffixes. In Western grammars this grammatical structure is known as the periphrastic perfect.[13] Pāṇini's *sūtras* 3.1.40 (*kṛñ cānu pra yujyate liṭi*) and 3.1.41 (*vidāṃ kurvantv ity anyatarasyām*) describe the formation for the elements derived from the verbal root *kṛ* 'do'. Patañjali added *as* and *bhū* "be", which in fact rarely entered into this formation in the language of the later Vedic period (Renou 1956, 72; cf. also Thieme 1956, 22). While the second *sūtra* introduces a rather special and optional form, the first yields the general case exemplified by *pacayāṃ cakāra* 'he did cooking', i.e., 'he cooked'. Patañjali's additional observations yield *pacayām āsa* and *pacayāṃ babhūva* 'he was cooking'. Note that the rule excludes the order *cakāra pacayām*, *āsa pacayām*, etc.

That the later commentators considered this rule as a possible, though apparent, counter-example to their view that Pāṇini nowhere treats word order, may show that at that time the word character of these forms was to some extent recognized. That Pāṇini specified the order (thereby excluding *cakāra pācayām* or the intervention of other words) shows, however, that he regarded this process as a kind of suffixation. The commentators were accordingly right in claiming that also in this case Pāṇini was not discussing the order of words.

If it be then accepted that Pāṇini nowhere discussed the order of words, the question arises whether he considered word order as free. One need not expect an explicit statement of Pāṇini to this effect: he is always content to enumerate rules, mostly abiding by the economy criterion, and hardly indulges in loose talk. So we shall have to turn to the commentators again, in this case to the *vārttikakāra*, Kātyāyana. We shall also see, however, that Pāṇini himself gives many rules about the *relations* between words in the sentence. This will clearly show that he was interested in syntactic or grammatical relations, which are quite independent of word order. At the same time it will become more apparent that the view that Pāṇini did not study syntax is at least partly a myth, based upon the assumption that syntax is the study of word order. This assumption results from neglecting the distinction between the *relation* of words in a sentence (*saṃbandha*), which certainly belongs to the deep structure, and the *order* of words of a sentence (*abhisaṃbandha*), which may belong to the surface structure.

It has already been noted that Patañjali regarded word order as free. That this was also the view of Kātyāyana follows from an explicit statement in a *vārttika*, which Patañjali quotes with approval and which he applies in order to solve a rather complicated Pāṇinian problem.

[13] Partly similar observations with regard to the periphrastic future occur in Rocher 1965.

The background is quite general, the subsequent discussion rather technical. When certain forms are substituted for others, the question arises whether rules which apply to the *sounds* of the original should also apply to the *sounds* of the substitute. The answer is in the negative: Pāṇini 1.1.56 says *sthānivad ādeśo'nal vidhau* 'the substitute [*ādeśa*] is like the original [*sthānin*] with reference to a rule, excepting its sounds [*al*]'. The following is an example for the added clause, which is what interests us here. In 7.1.84 a simple substitution is described: the original *v* in *div* is replaced by the substitute *au*, yielding *diau* and subsequently *dyau*. Now 6.1.68 says that under certain circumstances a final sound disappears: for example, *rājan* looses its final *n* and is replaced by *rāja*. This would apply to the original *div* in the above situation, yielding *di*, but not to its substitute *dyau* where the conditions of 6.1.68 are not fulfilled. If it were to apply to the substitute *dyau* merely because it is a substitute for *div*, *au* itself would disappear and we would once more be left with just *di*. Thus the entire effect of the substitution would be lost.

After enunciating this very general principle with its qualifying clause, Pāṇini gives an exception to the qualifying clause in the next *sūtra*, 1.1.57: *acaḥ parasmin pūrvavidhau* 'the substitute for a vowel is like the original with reference to a rule regarding a preceding sound'. This, then, is an exception to the exception expressed by the qualifying clause. The following is an example. In *paṭaya* the rule 7.2.116, applying to the second occurrence of *a*, in fact concerns a preceding sound (i.e., the first occurrence of *a*) since the result of its application would be *pāṭaya*. Now *pāṭaya* is ungrammatical. The form *paṭaya* itself is derived from *paṭu-aya*, where *u* is the original and *zero* is the subsitute. It is only the virtual presence of the original *u* which prevents the application of 7.2.116 and thereby prevents the generation of the ungrammatical form *pāṭaya*. Summarising: 7.2.116 is a rule which applies to a preceding sound; the preceding sound is *zero*, for *zero* is substituted for an original *u*; according to 1.1.57, the rule 7.2.116 should apply to the original of the preceding sound, i.e., to *u*; but *u* does not fulfil the conditions required for the application of 7.2.116 (the 'analyzability' condition); hence there is no scope for 7.2.116 to apply, and the ungrammatical form *pāṭaya* is not generated. This is just what is wanted.

The next rule, 1.1.58, enumerates exceptions to this exception to the exception expressed by the qualifying clause of 1.1.56. Rule 1.1.58 says: *na padāntadvirvacanavareyalopasvarasavarṇānusvāradīrghajaścarvidiṣu*. This means that in a number of cases, i.e., *padānta*, *dvirvacana*, *vareyalopa*, *svara*, *savarṇa*, *anusvāra*, *dīrgha*, *jaś*, and *car*, the sound substitute is again *unlike* the original with reference to a rule regarding a preceding sound. We shall not analyse and illustrate all these cases but single out *dīrgha*, a

long vowel substituted for a short original, as in the following example. In *dīvna* the rule 8.2.77 regards the preceding sound *ī* and prescribes that it be lengthened, with the result that *dīvna* is produced. This is the grammatical form which is required. But *dīvna* itself, according to 6.3.134, results from *divaṇa*, with *a* as the original and *zero* as the substitute. However, 8.2.77 does not apply to *divana*, since the conditions for its applicability are not fulfilled. Hence we do not want the substitute *zero* to be treated like the original *a*, for in that case we would not be able to derive the grammatical form *dīvna*.

What has happened so far? The rule 1.1.56 says that there is *sthānivadbhāva* '[the substitute's] being like the original' in general, but not with regard to its sounds. The next rule, 1.1.57, says that there is *sthānivadbhāva* also with reference to sounds, provided the substitution rules regard preceding sounds. The following rule, 1.1.58, says that there is again no *sthānivadbhāva* in a certain number of cases, even though the substitution rules regard preceding sounds.

At this point Patañjali, who guides us through such tangles[14], says that with reference to a rule the substitute zero (*lopa*) in *dīvna* is not like the original (*na sthānivad*). This is not, however, formulated in precisely these terms in 1.1.58, and he therefore stages an opponent who objects that it should have been mentioned explicitly. But no, replies Patañjali, there is no need. For all the words which would be required to formulate this explicitly already occur in this rule and in previous rules. They merely need to be arranged in such a way that the required statement is obtained. At this point he quotes in support Kātyāyana's *vārttikā* which enables us to return from this long excursus to our proper subject: *ānupūrvyeṇa saṃniviṣṭānāṃ yatheṣṭam abhisaṃbandhaḥ śakyate kartum* 'any desired order may be established between words arranged in a particular succession' (ed. Kielhorn, I, 152, lines 24–5; quoted Renou 1957, 57).

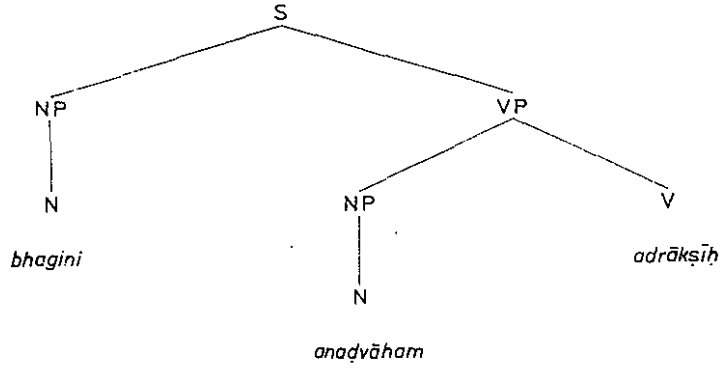
The opponent raises a further objection: *na caitāny ānupūrvyeṇa saṃniviṣṭāni* 'but these are not arranged in a particular succession'. To which the reply is: *anānupūrvyeṇāpi saṃniviṣṭānāṃ yatheṣṭam abhisaṃbandho bhavati* 'free word order may also be established between words not arranged in a particular succession'.

The term *ānupūrvya* is here used to refer to a given particular succession of words; the term *abhisaṃbandha* for word order in general, and the term *yatheṣṭam* for 'according to wish' or 'free'. Patañjali rounds off this discussion with the following example: *anaḍvāham udahāri yā tvaṃ harasi śirasā kumbhaṃ bhagini sācīnam abhidhāvantam adrākṣīḥ* may also be arranged as:

[14] However, the example for 1.1.57 has been taken from Renou's translation of the *Aṣṭādhyāyī*; it is based upon the *Kāśikā*.

udahāri bhagini yā tvaṃ kumbhaṃ harasi śirasā anaḍvāhaṃ sācīnam abhidhāvantam adrākṣīḥ 'O water-carrying sister, you who carry the pot on your head, saw the bull running across' (ed. Kielhorn, I, 152 line 26 – 153 line 3).

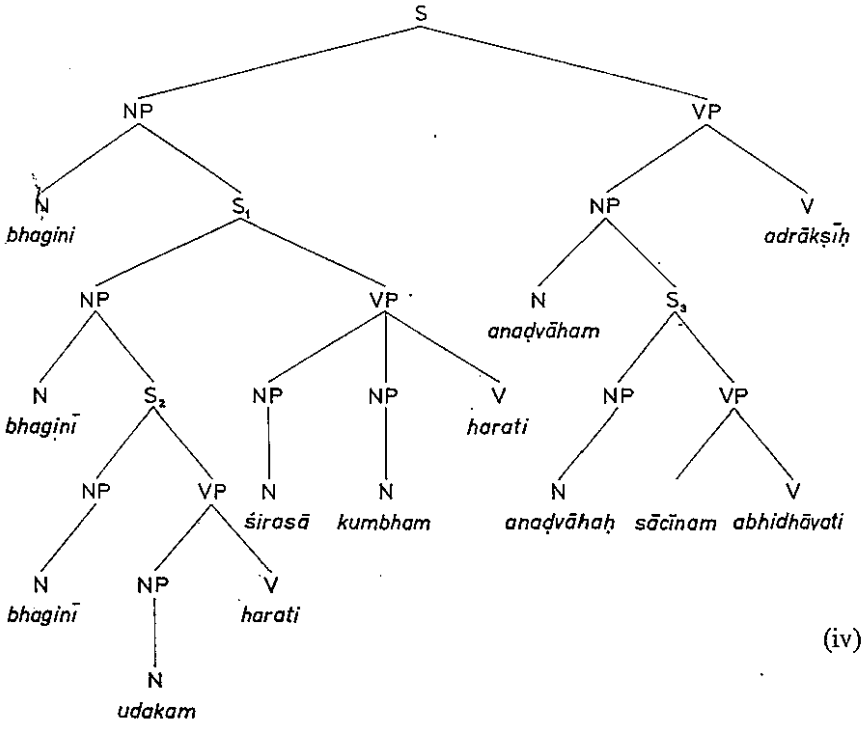
In order to see what such a re-arrangement amounts to we shall analyse this sentence in terms of the system of Chomsky's *Aspects*. The basic sentence can be represented by the following (already simplified) tree (note that the order VP→NP^V has been adopted), (corresponding to the sentence) *bhaginy anaḍvāham adrākṣīḥ* 'O sister you saw the bull':



(iij)

The recursive rule (3) can now be utilized to embed three trees into (iij), corresponding to the sentences: *bhaginī śirasā kumbhaṃ harati* 'the sister carries the pot on her head' (S_1); *bhaginy udakaṃ harati* 'the sister carries water' (S_2) and: *anaḍvāhaḥ sācīnam abhidhāvati* 'the bull runs across' (S_3). This results in the following tree (note that the Instrumental *śirasā* 'upon the head' and the Adverb *sācīnam* 'across' have been added without explicitly formulating the required rules) (see diagram iv, p. 34).

If (iv) is interpreted in the usual way as what has been called (above, p. 15) a trimmed tree, it would produce the following string: *bhagini bhaginī bhaginī udakam harati śirasā kumbham harati anaḍvāham anaḍvāhaḥ sācīnam abhidhāvati adrākṣīḥ*. Presupposing that we have the required transformational rules at our disposal, it may be assumed that this can be transformed into the sentence: *bhagini yā tvam udahāri śirasā kumbhaṃ harasi anaḍvāhaṃ sācīnam abhidhāvantam adrākṣīḥ* (21). Another arrangement could be derived by reversing the order of embedding of S_1 and S_2 into (iij). This would result in the string: *bhagini bhaginī bhaginī śirasā kumbham harati udakam harati anaḍvāham anaḍvāhaḥ sācīnam abhidhāvati adrākṣīḥ*. This, presumably, could be transformed into the sentence: *bhagini yā tvaṃ śirasā kumbhaṃ harasy udahāry anaḍvāhaṃ sācīnam abhidhāvantam adrākṣīḥ* (22). Still other arrangements could be obtained by changing the order in some of the re-writing rules utilized to set up (iv).



(iv)

Unfortunately, neither (21) nor (22) coincides with either of Patañjali's arrangements. Sentences derived with the help of differently ordered re-writing rules would deviate even more. If one should wish to derive Patañjali's sentences from (21) or (22), this could only be done by adopting another array of transformational rules. The resulting description would make use of rules like (16)–(18), quoted above (p. 12) in connection with Rāma's looking at Govinda, but it should be clear that the description here required would turn out to be *much* more complicated than the one given earlier.

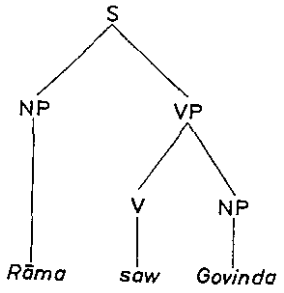
If we look a little more closely, it will become apparent that these problems cannot be solved even if re-writing rules in terms of sets and wild trees are adopted. In wild trees, as observed before, the points dominated by a single node constitute a set. They can accordingly be arranged in any desired order. But in order to derive Patañjali's sentences from (iv), whether or not interpreted as a wild tree, or from any similarly constructed tree, re-arrangements are required which go beyond the confines of single constituents or elements dominated by a single node or category symbol.

This may be shown, e.g., by adapting the method of labelled bracketing to wild trees. It is known that for trimmed trees, an equivalent structure in terms of labelled bracketing can always be given, and *vice versa* (Chomsky &

Miller, 1963, 288). For wild trees this can be done analogously, using braces instead of brackets and replacing concatenation signs (which, however, are often omitted in labelled bracketing) by commas. The difference between the two methods may be illustrated by the following example. Application of the rules:

$$S \rightarrow NP^{\frown}VP$$
$$VP \rightarrow V^{\frown}NP$$

can be expressed by the trimmed tree:



(v)

or equivalently by labelled bracketing, as follows:

((*Rāma*) ((*saw*) (*Govinda*))).
S NP NP VP V V NP NP VP S

Analogously, application of the rules:

$$S \rightarrow \{NP, VP\}$$
$$VP \rightarrow \{V, NP\}$$

can be expressed by a wild tree which looks exactly like (v), or equivalently by the following labelled and stratified set:

{ { *Rāma* } , { { *saw* } , { *Govinda* } } }.
S NP NP VP V V NP NP VP S

Applying this to (iv), interpreted as a wild tree, and omitting innermost braces, one derives:

{ { *bhagini*, { { *bhaginī*, { *bhaginī*, { *udakam*, *harati* } } } ,
S NP S_1 NP S_2 VP VP S_2 NP
, { *śirasā*, *kumbham*, *harati* } } } , { { *anaḍvāham*,
VP VP S_1 NP VP NP
, { *anaḍvāhaḥ*, { *sācīnam*, *abhidhāvati* } } } , *adrākṣīḥ* } }.
S_3 VP VP S_3 NP VP S

Assuming again that the various transformational rules have been applied, one may omit labels, simplify rather liberally and arrive at the following stratified set:

{{*bhagini, yā, tvam, udāhari, śirasā, kumbham, harasi*}, {*anaḍvāham, śācīnam, abhidhāvantam*}, *adrākṣīḥ*}.

Having thus reduced hierarchical complexity, one is left with a set containing three elements, two of which are subsets. If we adhere to the simple principle that the elements of a set can be arranged at will, it has now become clear to what extent the order may be re-arranged: the seven words beginning with *bhagini* may be arranged in any order; the three words beginning with *anaḍvāham* may be arranged in any order; and the two subsets themselves along with *adrākṣīḥ* may be arranged in any order. To obtain a sentence we finally drop all braces and apply *sandhi* rules to the resulting string.

This leads to the conclusion that even if we use sets and wild trees and allow for considerable simplification, we still cannot derive the first of Patañjali's sentences – the simple reason being that *anaḍvāham* 'bull' cannot be taken out of its subset and placed elsewhere. One might object to this long analysis by claiming that the example is far-fetched and that bulls by nature cannot be kept within narrow confines. But this is not so. Anyone who wishes to find precise rules for word order in Sanskrit, will constantly meet with similar problems, provided the sentences he studies are not uncommonly short.

So it need cause no surprise that Pāṇini did not provide rules for word order in Sanskrit. In fact the Sanskrit grammarians assumed, as we have seen before, not that such rules are beyond the scope of grammar, but that there are no such rules, since word order or *abhisaṃbandha* is free. But if they neither studied word order nor neglected syntax, what then are the grammatical relations (*saṃbandha*) which the Sanskrit grammarians did study and by means of which they analysed the construction of sentences?

To answer this problem in full a considerable number of Pāṇini's rules would have to be analysed. Since this seems to be beyond the scope of the present investigation, which primarily deals with word order, we shall only consider the topic which in this respect is fundamental, i.e., the theory of the relations which Pāṇini called *kāraka*. Out of the seven *kāraka* relations which are enumerated, we shall single out *karman* for particular scrutiny. Even with these restrictions it will be possible to show that the problem of word order is not only affected, but is indeed placed in its proper perspective by the *kāraka* theory.

The theory of *kāraka* has been studied ever since Western scholars

started dealing with Pāṇini's grammar. The relevant literature includes contributions by Whitney, Faddegon, and Thieme; the translators of the grammar, Boehtlingk and Renou, had to face its many intricacies; and most recently the topic has again been taken up by Rosane Rocher (1964a). Almost all these scholars, with the possible exception of Faddegon, have approached the problem in such a way that certain basic ideas have remained unclear. Still, the questions to which the *kāraka* theory formulates an answer, are very pertinent ones. They emerge as soon as one realizes that something important was missing in the preceding analysis of Patañjali's sentences. This analysis was inadequate in many respects, but in particular because it failed to explain why certain declensional and conjugational terminations occur in certain places. Why did for example *bhagini* have the Vocative ending, *bhaginī* the Nominative, *kumbham*, *anaḍvāham* and *abhidhāvantam* the Accusative, and why were *harasi* and *adrākṣīḥ* in the Singular? Can such questions indeed be meaningfully asked *after* attempts have been made to establish some order between words that themselves still lack determination? The *kāraka* theory formulates a solution to precisely such problems.

Though Faddegon's formulations are sometimes weird[15] and his analysis of the notion of *kāraka* is sketchy and somewhat obscured by the fact that he treats other problems alongside it, his general point of departure (as quoted above, page 3) was sound and correct. His interpretation of *kāraka* is formulated as follows: "By *kārakas* Pāṇini understands the logical or ideational relations between a noun and a verb, or more precisely between an object or anything conceived after the analogy of an object and an action or anything conceived after the analogy of an action" (1936, 18).

In this passage Faddegon seeks to find an adequate expression for certain grammatical relations of the deep structure. If scholars had by 1936 rediscovered the importance of deep structure not only for logic and philosophy, but also for linguistics, Faddegon would have had an adequate theory and terminology at his disposal for handling Pāṇini's theory. The *kāraka* theory can in fact be understood from the purely semantic interpretation of the deep structure. Alternatively and equivalently, it can be understood by studying the various sentences of the surface structure, in which identical grammatical relations of the deep structure are expressed.

An example may make this clear. Let us consider the *kāraka* relation of *karman*, which expressed the direct object. A simple sentence which may be immediately generated from the base is:

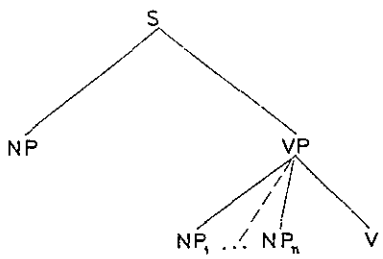
kumbhān karoti 'he makes pots'. (23)

[15] Cf. Renou 1940, 10 note 1: "ouvrage un peu fantasque, mais séduisant".

Here the *kāraka* relation *karman* obtains between the Verb *karoti* and the direct object *kumbhān*. This relation could be expressed in Chomskian terms as [NP, VP]. In the particular sentence (23), it is expressed by the Accusative ending *-ān* which is attached to the Nominal stem *kumbh-*.

The *kāraka* relations may in general be symbolized by [NP, VP]. They do not generally include the Subject (in fact there seems to be some inconsistency here) and accordingly may not be symbolized by [NP, S]. Direct relations between the denotations of two nouns are also excluded. This is again interesting in the context of generative grammar, since such relations (as sometimes manifested, e.g., by the Genitive case) do not belong to base Phrase-markers but are introduced by embedding Phrase-markers into each other, i.e., by applying a rule like: NP→Det⌢N⌢S.

Since the Subject and what is expressed by the Genitive (but not the Objective Genitive: see below, page 40) are excluded from the *kāraka* relations, we are left with the relations between the verb and the different noun phrases of the verb phrase. In terms of the tree:



(vi)

we can state that *kāraka* relations are $[NP_1, VP], \ldots, [NP_n, VP]$. These relations would of course have to be further determined. But first let us return to Pāṇini.

Before showing how *kāraka* relationships are manifested in basic sentences and, equivalently, in transformationally derived sentences, Pāṇini gives semantic characterizations. These could be translated variously; their precise interpretation and translation continue to raise problems and will determine the interpretation and translation of later rules. We shall provisionally interpret them as follows, mainly following Faddegon (1936, 18) and Renou's translation of the *Aṣṭādhyāyī*. The *kāraka* relations are denoted by the following terms: *apadāna, saṃpradāna, karaṇa, adhikaraṇa, karman, kartar*, and *hetu*. The term *apadāna* denotes the relation of movement away from a fixed point (1.4.24); *saṃpradāna* denotes the relation with whom or what one has in view, when giving something (1.4.32); *karaṇa* denotes the relation with the most effective means (1.4.42); *adhikaraṇa* denotes the relation with the locus (1.4.45); *karman* denotes the relation

with what is primarily desired by the agent (1.4.49); *kartar* denotes the independent (agent) (1.4.54); *hetu*, finally, denotes what prompts the agent (1.4.55).

This is made more precise in syntactical terms, when we are told how most of these relationships are expressed in sentences immediately derived from a base Phrase-marker: *apadāna* is expressed by the Ablative (2.3.28) e.g., *grāmād āgacchati* 'he arrives from the village'; *saṃpradāna* is expressed by the Dative (2.3.13), e.g., *viprāya gāṃ dadāti* 'he gives a cow to the Brahman'; *karaṇa* is expressed by the Instrumental (2.3.18: but see below), e.g., *paraśunā vṛkṣaṃ chinatti* 'he cuts the tree with an axe'[16]; *adhikaraṇa* is expressed by the Locative (2.3.36), e.g., *kaṭa āste* 'he sits on a mat'; *karman* is expressed by the Accusative (2.3.2), e.g., *kumbhān karoti* 'he makes pots'; *kartar* is expressed again by the Instrumental (2.3.18: see above and below), e.g., *vipreṇa pacyate* 'it is cooked by the Brahman'; *hetu*, finally, is expressed as the Subject of a Causative verb (1.4.55), e.g., *kārayati Devadattaḥ* 'Devadatta causes [someone else] to make'.

In the first five cases we are shown how *kāraka* relationships are expressed in sentences immediately derived from a base Phrase-marker; in the two remaining cases we are shown how they are expressed in transformationally derived sentences (i.e., Passive and Causative). This apparent exception is due to the fact that in this system the Nominative occupies a very special place, which we cannot discuss here (see Thieme 1956).[17]

Most Western interpreters have been puzzled by the fact that, in addition to straightforward cases and their superficial expression by means of case terminations, Pāṇini seems to have required for his *kāraka* relations something vaguely semantic. This is due to the fact that they assumed that Pāṇini was only interested in surface morphology, for which cases and case endings seem to be quite sufficient at first sight. But Pāṇini was also interested in syntax and sentence construction, or in what is nowadays called deep structure. In order to appreciate how this system works syntactically we shall need to look at the construction of transformationally derived sentences. It will then be seen that we cannot establish *any* result

[16] Matilal (1961) has reported on interesting discussions between grammarians and logicians with regard to the view, that *karaṇa* expresses the cause: since in such sentences as 'he sees with his eyes' the *karaṇa* is expressed by the word 'eye', this would lead to the undesirable conclusion that the eye causes the visual object. – Such confusions could provide the background for subjective idealism. It would however be premature to characterize Indian philosophy in similar terms (Renou-Filliozat 1953,7: "Les organes des sens ne sont pas des récepteurs passifs d'excitations, ce sont des 'forces' (*indriya*) qui agrippent au passage et parfois vont chercher (c'est le cas de la vue) les objets extérieurs").

[17] Moreover, the commentator's views on *hetu*, adopted here, have been challenged by Rocher (1964b), mainly because the agent of the Causative verb, too, seems to have been regarded by Pāṇini as expressing *kartar*.

without some such notion as *kāraka*. This will be shown in a somewhat simplified manner, mainly with respect to *karman*, and without giving a complete analysis of the many rules which are involved.

As we have seen, Pāṇini (2.3.2) says that in sentences immediately derived from a base Phrase-marker, the *karman* relationship is expressed by the Accusative:

kumbhān karoti 'he makes pots'. (23)

But if we derive the Passive:

(*tena*) *kumbhāḥ kriyante* 'pots are made (by him)' (24)

the same *karman* is now denoted by the Nominative ending in combination with a Passive marker attached to the Verb. This follows from 3.4.79, which introduces Passive markers, and 3.4.69 and 1.3.13, which state that Passive markers serve to express *karman*. Similarly the Perfect Passive Participle occurs in:

kumbhāḥ kṛtāḥ 'pots (are) made'. (25)

Here again the same *karman* is expressed on account of 3.4.70. But also in the Objective Genitive of:

kumbhānāṃ kartā 'maker of pots' (26)

this *karman* occurs, on account of 2.3.65. It appears once more in the nominal compound:

kumbhakāra 'pot-maker, potter'. (27)

If anywhere, the term 'transformation' is applicable here: (24)–(27) are all transformationally related to (23). Pāṇini expresses this by saying that *karman* is the one *kāraka* relationship which is present in each of these expressions. The expressions are, moreover, synonymous, since transformations do not change meaning: there is, as the commentators say, *sāmarthya* 'sameness of meaning' (with certain qualifications, some of them mentioned below).

In order to establish that according to Pāṇini one relationship occurs in many different linguistic expressions, rules have to be quoted from different parts of the grammar. Students of Pāṇini are familiar with this device, for the order of the rules is based upon other considerations such as *lāghava* 'simplicity' and *anuvṛtti* 'recurrence' (see e.g. Renou 1957, *s.v.*; cf. Fowler 1965, Staal 1966c). We have already had examples of this (pages 31–2). Lest it be thought, however, that we want to present Pāṇini as the discoverer of transformations by making use of far-fetched or even forced interpretations made possible by this device, we must show that both modern and ancient

commentators were aware of such connexions as exist between (23)–(27).

Rosane Rocher, who interprets Pāṇini without any reference to problems of contemporary linguistics, is as explicit as one could desire: "Pour Pāṇini, un fait quelconque – celui, par exemple, qu'un personnage fabrique des pots – peut s'exprimer par une construction active *kumbhān karoti*, une tournure passive *tena kumbhāḥ kriyante*, par un nom d'action accompagné d'un génitif objectif *kumbhānāṃ kartṛ*, ou encore un composé *kumbhakāra*" (Rocher 1964a, 52).

Patañjali provides examples of the same *kāraka* relationship, though from different underlying sentences of the base. This choice of examples slightly obscures the issue, but may explain that the importance of this passage (and of similar later passages) has generally been overlooked. Having stated that the *kāraka* relationships are invariant in a variety of linguistic expressions, an opponent says that then *pariganananaṃ kartavyam* 'an inventory [of these expressions] should be made'. Patañjali replies with a *vārttika* which enumerates various technical terms whose function will be clear from the examples which follow: *tiṅkṛttaddhitasamāsaiḥ parisaṅkhyānam* 'the enumeration is given by means of *tiṅ* [verbal termination], *kṛt* [a class of primary affixes], *taddhita* [a class of secondary affixes] and *samāsa* [nominal compounds]'. He comments upon this *vārttika* in the usual manner, quoting it again, and subsequently provides the examples: '*tiṅ* as in *kriyate kaṭaḥ* "the mat is made"; *kṛt* as in *kṛtaḥ kaṭaḥ* "the made mat"; *taddhita* as in *aupagavaḥ* "descendant of Upagu" or *kāpaṭavaḥ* "descendant of Kāpaṭu"; and *samāsa* as in *citraguḥ* "possessing brindled cows" or *śabalaguḥ* "possessing mottled cows"' (ed. Kielhorn, I, 441, lines 19–22).

These examples may be explained as follows. In *kriyate kaṭaḥ* 'the mat is made' the *tiṅ* or verbal termination *-te* indicates that the *kāraka* relation is *karman*; the sentence is therefore synonymous, e.g., with *kaṭaṃ karoti* 'he makes the mat'. In *kṛtaḥ kaṭaḥ* 'the made mat' the *kṛt* or primary affix *-ta(ḥ)* indicates that the *kāraka* relation is also *karman*; the phrase is therefore semantically related e.g. to the same sentence, *kaṭaṃ karoti* 'he makes the mat'. In *aupagavaḥ* 'descendant of Upagu' the *taddhita* or secondary affix, technically called *aṇ*, indicates that the *kāraka* relation is *apadāna*; the phrase is therefore synonymous with *upagor apatyam* 'descendant of Upagu'. Similarly for *kāpaṭavaḥ*. In *citraguḥ* 'possessing brindled cows', which is a *samāsa* or nominal compound of the *bahuvrīhi* variety, the *kāraka* relation is *karman*; the phrase is therefore synonymous with *citragomān* 'possessing brindled cows' or *yasya citragāvaḥ saḥ* '(he) who possesses brindled cows'. Similarly for *śabalaguḥ*.

We see from these examples that the Indian grammarians not only

considered transformational relations, but a great variety of such relations. In some of these the contemporary maxim 'transformations do not change meaning' (cf. Katz and Postal 1964; Staal 1965b) is adhered to. In others, closely related semantic relations are envisaged. These various semantic relations are carefully distinguished (a list of some of these occurs in Renou 1957, *s.v.* '*taddhita*') and it may well be asked whether contemporary transformational theory will not have to consider such relations in due course.

In the passage commenting upon *sūtra* 2.3.2 in Bhaṭṭojī Dīkṣita's *Siddhāntakaumudī*, a rather similar discussion occurs: *anukte karmaṇi dvitīyā syāt / hariṃ bhajati / abhihite tu karmaṇi prātipadikārthamātra iti prathamaiva / abhidhānaṃ tu prāyaṇa tiṅkṛttadhitasamāsaḥ / tiṅ hariḥ sevyate / kṛt lakṣmyā sevitaḥ / taddhitaḥ śatena krītaḥ śatyaḥ / samāsaḥ prāpta ānando yaṃ sa prāptānandaḥ* 'If the *karman* relationship is not expressed otherwise it is expressed by the Accusative, as in *hariṃ bhajati* "he worships Hari". If, however, it is expressed by the Verb, it is in the Nominative. The meaning is generally introduced by either *tiṅ*, *kṛt*, *taddhita* or *samāsa*: *tiṅ* as in *hari sevyate* "Hari is served"; *kṛt* as in *lakṣmyā sevitaḥ* "served by *Lakṣmī*"; *taddhita* as in *śatya* from *śatena krītaḥ* "bought with a hundred"; and *samāsa* as in *prāptānandaḥ* "blissful" from *prāpta ānando yaṃ saḥ* "he whom bliss has reached".'

The examples here given by Bhaṭṭojī may be explained along similar lines, though there is at least one significant extension. In *hari sevyate* 'Hari is served' the *tiṅ* or verbal ending *-te* again indicates the *karman* relation; but if it is true that this sentence is considered synonymous with *hariṃ bhajati* 'he worships Hari', as indicated, this is particularly interesting, since it establishes a semantic relationship between verbs, which are related in the manner in which in English *please* and *like*, *buy* and *sell*, etc., are related (for mechanisms and devices which might deal with such relations, see Staal 1967a). In *lakṣmyā sevitaḥ* 'served by Lakṣmī' the *kṛt* or primary affix *-ta(ḥ)* indicates that the *kāraka* relation is *kartar*; this phrase is therefore semantically related to *sevate lakṣmīḥ* 'Lakṣmī serves' (notice that this analysis is in fact determined by the Instrumental ending, which, however, is a *sup* or nominal termination, not a *kṛt*; if this be rejected, the interpretation given to Patañjali's *kṛtaḥ kaṭaḥ* may be resorted to). In *śatya* the *taddhita* or secondary affix *-ya* indicates that the *kāraka* relation is *karaṇa*; the phrase is therefore synonymous with *śatena krītaḥ* 'bought with a hundred'. In *prāptānandaḥ* 'blissful', lastly, the *kāraka* relation is *karman* again and the synonymous expression is given.

These passages may be sufficient to demonstrate that the Sanskrit grammarians needed the *kāraka* theory for establishing relations that we would nowadays call 'tranformational'. The related expressions may be sentences

or noun phrases. In the former case nothing is said with regard to word order; in the latter case the order of the elements may be fixed, as in the case of the *taddhita* suffixes. In such cases as *kṛt*, the order of noun and verb is free, but the order of stem and suffix is determined. The case of nominal compounds is especially interesting, since the fixation of order of the members is postponed to a later stage than we might expect. For it seems reasonable to assume, that a description in terms of strings and based upon considerations of order, though perhaps inadequate for sentences which may be ordered 'freely', is particularly appropriate for nominal compounds. This was also more or less assumed in the cases given by the *Nirukta* as counter-examples (above, page 25). However, as we have shown elsewhere (Staal 1966a, 171–2), Pāṇini first introduces the distinction between main (*pradhāna*) and subordinate (*upasarjana*) members of compounds, which is determined by their grammatical relationship only. Order is introduced much later. In other words, compounds, though ultimately described as strings of elements, are primarily accounted for in terms of relationships between these elements which need not be manifest in or derivable from the order of the elements or their physical shape. This is in fact the main characteristic of all these relationships. The principle underlying this practice with regard to the analysis of nominal composition, is succinctly expressed in the following *vārttikā*: *saṃbandhād etad gantavyaṃ yaṃ prati yad apradhānaṃ taṃ prati tad upasarjanaṃ bhavati* 'from the grammatical relation [*saṃbandha*] it has to be inferred that a word in relation to which a term is of secondary importance is that in relation to which the term subordinate (*upasarjana*) is used' (ed. Kielhorn, I, 215 lines 10–1, quoted Renou 1957, 326).

The *kāraka* theory was not merely adopted as a general theory to be tested by carefully selected examples. Its application to questions of detail raised by problems of grammatical description, was also carefully studied. At the same time the general background and significance of the theory were the object of research and speculation. An example will now be given of each of these two approaches before we conclude this section with a general description of these relationships. Both examples are taken from Patañjali's long discussion following *sūtra* 2.3.1.

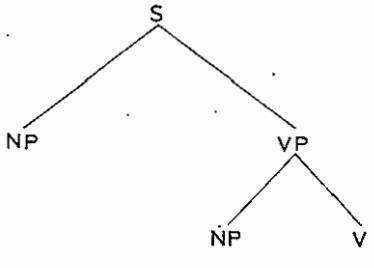
The question is considered what should happen if more than one word seems to occupy the same place in a *kāraka* relationship. In such sentences as *kaṭaṃ karoti bhīṣmam* 'he makes a dreadful mat', *kaṭaṃ karoty udāram* 'he makes an excellent mat', *kaṭaṃ karoti śobhanam* 'he makes a beautiful mat', *kaṭaṃ karoti darśanīyam* 'he makes a handsome mat', the rule explains why *kaṭam* 'mat' has the Accusative ending. But what about *bhīṣmam*, etc.? Patañjali discusses various suggestions, which will be merely mentioned here. The Genitive, which often takes care of the remaining relationships,

might in some sense be used. Or else the rule which introduces the Accusative for *kaṭam* is somehow construed as also applying to *bhīṣmam*, etc. Or lastly, *bhīṣmam* etc. follow *kaṭam*, 'since they occupy the same position' (*sāmānādhikaraṇyāt*) (ed. Kielhorn, I, 441 line 23 – 442 line 5).

Elsewhere the relation between *kāraka* and the ontological categories is briefly touched upon.[18] Nowhere in this connection does Patañjali evince the philosophical obtuseness of which he has recently been accused (Frauwallner 1960, 107). His statement, on the contrary, is forceful and clear. In addition it is linguistically interesting because it takes into account the fact that sentences occur in a wider context of discourse.

The idea is entertained that *kāraka* relations perhaps always refer to the same categories, e.g., *dravya* 'substance'. But it is easily discarded by just listening to the following conversation: *kva devadattaḥ* 'Where is Devadatta?' – *asau vṛkṣe* 'On that tree'. – *katarasmin* 'On which of the two?' – *yā tiṣṭhati* 'That which stands'. This receives the comment: *sa vṛkṣo'dhikaraṇaṃ bhūtvā anyena śabdenābhisaṃbadhyamānaḥ kartā saṃpadyate* 'that tree which was *adhikaraṇa* becomes *kartar* as soon as it is combined with another word' (ed. Kielhorn, I, 442 lines 24–5).

The *kāraka* relationships, then, are semantic, not ontological relationships. In semantical terms this means, moreover, that the *kāraka* relations deal with meaning, not with reference. They could be called 'logical' in the sense in which Chomsky used the term when speaking about logical subject, logical object, etc. (1965, 70). In the familiar tree:



(vij)

we may define [NP, VP] as the grammatical Object-of. But in a sentence which is transformationally derived from (vij), the NP determined by [NP, VP] may occupy the position of the grammatical Subject. It continues how-

[18] Attention may be drawn to the fact that the ontological categories of the Vaiśeṣika system, which were adopted by the Indian logicians, were based upon categories of language, as were Aristotle's categories (cf. Staal 1963a, 18–21 = 1965d, 106). Faddegon, who most probably was the first Western scholar to point this out, constructed a 'semasiological classification' to explain the relation between Noun and Verb, which at the same time was to serve as a basis for the discussion of the Vaiśeṣika categories (Faddegon 1918, 108–11).

ever to be the logical object provided this is defined as the grammatical object of the underlying sentence. By means of simple definitions of this type one obtains exactly those relations which Pāṇini called *kāraka*. It need scarcely be added, finally, that such definitions can be given in terms of wild trees and, following Pāṇini, without taking order into account.

C. JAIMINI, ŚABARA, AND KUMĀRILA BHAṬṬA

The philosophers of the Mīmāṃsā have been correctly characterized as *vākyamīmāṃsakas* 'investigators of the sentence' (Renou, quoted above, pages 1 and 20). Still, there is little in their teaching with respect to word order that would not by now be familiar to the reader. They mainly revert to discussions of the Kautsa-controversy and their entire approach is very similar to that which was found in the *Nirukta* (above, p. 24–5). Some of their principal statements pertinent to our context will now be referred to, first, in order to show the continuity of these discussions for more than a millennium, secondly because there are clear indications that some results of the grammarians have been taken into account. An additional reason is that in the course of these discussions a few points are stated rather clearly and an important new distinction is introduced.

In Jaimini's *Mīmāṃsāsūtra* and in Śabara's commentary we meet again with opponents who maintain Kautsa's thesis that the Vedic mantras are meaningless. Many reasons are adduced: so often the mantras appear simply absurd; they speak of things that do not exist (e.g., something with four horns, three feet, two heads and seven hands); they address inanimate objects (e.g., herbs and stones); they are self-contradictory and often redundant; there is a tradition for them to be learnt by heart, but no corresponding teaching of their meaning; etc. (*Mīmāṃsāsūtra* 1.2.4, *sutras* 34–8; cf. Renou 1960, 68 *sq.*). Again the familiar reason is given: *vākyaniyamāt* 'because the order of words (in mantras) is fixed' (1.2.4, *sūtra* 32).

Śabara describes the opponents' view in the following terms: *niyatapadakramā hi mantrā bhavanti / agnir mūrdhā diva iti na viparyayeṇa / yady arthapratyāyanārthā viparyayeṇāpy arthaḥ pratīyata iti niyamo'narthakaḥ syāt / athoccāraṇaviśeṣārthā viparyaye'nyad uccāraṇam iti niyama āśrīyate tena yatarasmin pakṣe niyamo'rthavān sa nūnaṃ pakṣa iti / nanv arthavatsv api niyamo dṛśyate / yathendrāgnī iti / yuktaṃ tatra tat / viparyaye'rthapratyayābhāvāt* 'For mantras have the order [*krama*] of words fixed [*niyata*]. For example, *agnir mūrdhā diva*, and not the reverse. If meanings were meant to be expressed, the meaning would also be expressed by the reverse order, and so fixing the order would be pointless. If it be argued that a particular utterance [*uccāraṇa*] is intended and that that utterance, when

reversed, would be another one, so that fixed order has for that reason been established – then, on the second of the views mentioned, fixing the order would indeed be significant. Further, with regard to meaningful expressions fixed order is also observed, for example in *indrāgnī* "Indra and Agni". In this case it is correct, for the reversal would not express any meaning' (ed. Ānandāśrama, 146).

The most interesting observation here made by the opponent is that word order is fixed in *utterances*, even if it be not fixed in *sentences*. And this much is granted by the author. The distinction is indeed relevant for the Mīmāṃsā, which studied, as we have seen, the Vedic language in as far as it was embodied in the Vedic tradition (above, p. 24). By the time of Śabara the distinction between sentence and utterance is known (it could be most easily derived from the distinction between type and token, cf. Staal 1966d), and Śabara realises that his investigations are concerned with utterances, studied as such and not as utterance tokens of sentence types. This might perhaps be interpreted as saying, that the Mīmāṃsā is interested in language from the point of view of performance, but not of competence (Chomsky 1964, Ch. I, and cf. Levin 1965); in fact Mīmāṃsā pays no attention to the deep structure which represents competence and which was studied so intensively by the grammarians. It is clear, at any rate, that the view according to which the word order of utterances is fixed, is not primarily relevant to a linguistic investigation into the properties of sentences.

Kumārila Bhaṭṭa in the *Tantravārttikā* gives better examples when commenting upon this passage and also introduces an additional distinction between different kinds of semantic anomalies: *agnir mūrdhā iti yo'rthaḥ pratīyate sa mūrdhāgnir ity anenāpīty anarthako niyamaḥ* 'the meaning of *agnir mūrdhā* is the same as that of *mūrdhā agniḥ*, hence fixing the order is pointless'. However, the determination of order is meaningful 'in the case of stems, affixes and compounds' (*prakṛtipratyayasamāseṣu*), for example *indrāgnī* 'Indra and Agni', *rājapuruṣa* 'king's man' and *niṣkauśāmbiḥ* 'one who has left Kauśāmbī'. He continues: *yuktaṃ tatra viparyaye'paśabdārthānyatvānarthakyaprasaṅgāt* 'here it is reasonable, since, if the order is reversed, an incorrect form [*apaśabda*], a different meaning [*arthānyatva*] or no meaning at all [*ānarthakya*] would result'. Examples follow: because of Pāṇini 2.2.33 (see above, page 25) *agnīndrāv ity asādhutvam* '*agnīndrau* is not well-formed'. Furthermore, *puruṣarāja ity arthānyatvaṃ kauśāmbinir ity anarthakatvam* '*puruṣarāja* would have a different meaning [i.e., "man's king"] and *kauśāmbiniḥ* no meaning at all'. (Note that a difference is made between the first and the third form, though both are ungrammatical; it is felt, apparently, that to the first, but not to the last, some meaning could be ascribed.)

These are the Mīmāṃsā renderings and first reactions with regard to the unorthodox views of the followers of Kautsa. The final answer to the fixed-order argument is given in a later *sūtra* of the *Mīmāṃsāsūtra* (1.2.4, *sūtra* 44). It is a little disappointing, but quite commonsensical: *aviruddhaṃ param* 'the opponent's view is not inconsistent [i.e., with our own view that mantras are meaningful]'. Śabara explains this further: *kāmam anarthako niyamo na dṛṣṭam apramāṇam* 'perhaps the fixed order is pointless; at any rate what is observed [i.e., that the words *do* convey meaning in whatever order they occur] cannot be rejected' (ed. Ānandāśrama, 155).

Śabara also hints that the mantras with their fixed order may establish the unseen result which according to the Mīmāṃsā philosophers is the fruit of correctly performed ritual activities. Kumārila Bhaṭṭa developes this further: *satsv apy upāyāntareṣu viśiṣṭānupūrvikamantraviśeṣāmnānād upāyāntaranivṛttau niyatādṛṣṭamātrakalpanayā siddham arthābhidhānam* 'even if there are other means [to express the same meaning], only what possesses a particular word order [*viśiṣṭānupūrvika*] is recognised as a mantra. When the other means are discarded the fixed unseen result may be reached. Therefore it is established that mantras convey meaning'.

Later in his work Kumārila returns to the same topic (1.3.9). He reports a controversy between an opponent, who claims that the Vedic language is different from ordinary (*laukika*) language, and the author himself, who considers both languages as identical. The opponent enumerates points of difference, including the fact that 'words and sentences' (*padavākya*) have a fixed order (*niyata*) in the Veda but a free order (*aniyata*) in ordinary language. Kumārila argues against this that the two are identical, among other reasons, because sentences are only constructed differently but the words and sounds are not different (*vākyatatsamūhamātranibandhanāpannapadavarṇaviṣayatvavyapadeśāvibhāgāt*) (ed. Ānandāśrama, 291).

These discussions show that, even if there is some uncertainty with regard to word order in the utterances of the Veda, the Mīmāṃsā philosophers agree unanimously that word order in ordinary language is free. The distinction between the fixed word order of Vedic utterances and the free word order of the spoken language is most probably related to a much broader distinction between the general fixedness of Vedic utterances and the freedom of ordinary speech. This view is formulated for example in the following quotation, attributed to Vardhamāna and found in the chapter on grammatical philosophy of a 14th-century survey of philosophical doctrines:

> *laukikavyavahāreṣu yatheṣṭaṃ ceṣṭatāṃ janaḥ*
> *vaidikeṣu tu mārgeṣu viśeṣoktiḥ pravartatām*
>
> (*Sarvadarśanasaṃgraha* 1951, 291)

'In ordinary speech men may proceed according to wish,
But in Vedic paths precise enunciation must be employed.'
(cf. transl. Cowell, 205).

The later speculations of the Mīmāṃsā philosophers and their controversies with other schools (Buddhists, grammarians, logicians) display a variety of viewpoints and doctrines with regard to sentences and their meaning. These will not, however, be referred to here (cf. e.g. Staal 1967b). Though this literature is now becoming better known and understood, it would still be premature to state that it nowhere deals with word order. From what we know at present, however, it seems unlikely that any extensive discussions of this topic occur. Syntactic relations or mutual expectancy (*ākāṅkṣā*) are often referred to, but they are always independent of word order; they are concerned with *saṃbandha*. 'Proximity' (*saṃnidhi*), which is another condition for sentencehood, does not refer to word order but to the requirement that words, if they are to convey any meaning, should not be uttered at long intervals (e.g. Kunjunni Raja 1963, 166–9). According to the *Mānameyodaya*, a late work on Mīmāṃsā epistemology, the rival Mīmāṃsā philosopher Prabhākara Guru did not even understand this requirement, which should be interpreted as referring to sounds or words (*śabdasaṃnidhi*); he merely considered 'proximity of understanding' (*buddhisaṃnidhi*) (ed. Kunhan Raja & Suryanarayana Sastri, 100).

There were many discussions, finally, regarding the order of *sounds* in an utterance, as well as speculations about the question how sentences are understood as a unity after the phonemes have been heard in linear sequence. But this again is a different topic from word order.

That the Kautsa controversy continued to be regarded as a topic worthy of discussion even as late as the 14th century, appears from Sāyaṇa's commentary on the Ṛgveda (see above, p. 25). Since Sāyaṇa's treatment is again similar to that of the *Nirukta* and of the philosophers of the Mīmāṃsā, it may be sufficient to refer to Oertel's work for a translation of the text (Oertel 1930, 58–60). Sāyaṇa represents the opponent as saying that mantras are recited in a fixed order, though their meaning could also be expressed by a different arrangement of the words. However, it is not the meaning of mantras that counts, but their correct recitation leading to the required results. Sāyaṇa states in reply, that he nowhere disagrees with this contention. He merely claims that mantras, in addition to having certain effects, also have meaning.[19]

[19] The passages discussed in this section from the *Mahābhāṣya* and from Mīmāṃsā do not throw any light on Frauwallner's suggestion of a later date for Patañjali (Frauwallner 1960). From the facts dealt with here it may be inferred that Patañjali, who certainly

Summarizing, we may conclude that the Indian theorists agreed almost unanimously that word order in Sanskrit is free. That the Vedic ritualists regarded the order of words in specified utterances from the Vedic corpus as fixed is not very surprising, since it is due to the fact that their interest was mainly textual and, in a sense, philological. This could at most lead to a certain limited development of phonetics, and this indeed has taken place. No general linguistic theory can, however, be evolved when utterances are adhered to and theoretical construction, which leads away from utterances to the constitution of sentences, is repudiated. The study of grammar could not develop exclusively from the limited assumptions regarding the nature of language which characterize the speculation of the Vedic ritualists and Mīmāṃsā philosophers. For linguistics to originate, a new impetus was needed. This impulse was provided by the grammatical tradition, which stressed the importance not only of common usage (*loka*) but also of the infinity of the expressions of language. This new development was carried to perfection by Pāṇini and his followers.

The difference between the two approaches may be once more illustrated with the help of a quotation from Patañjali's *Mahābhāṣya*. The issue which is being discussed is the eternality of the Veda, accepted of course by Patañjali himself. "Is it not said", he says, "that the Vedas were not composed, but are eternal? – Quite so, but it is their sense that is so, not the order of the syllables in them."[20]

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knew the *Nirukta* (see above, note 12), was not familiar with the development of the *Mīmāṃsāsūtra*; for whilst he was both interested and versed in ritual matters (see e.g. Puri 1957, 166–79), he does not show familiarity with the Mīmāṃsā discussion on word order in the context of the controversy of Kautsa (see also page 49 and note 20). Since Jaimini's date is quite uncertain (estimates vary between the 2nd century B.C. and the 2nd century A.D.) this does not lead to any definite conclusion. The same can be said with regard to Frauwallner's discovery of an early Mīmāṃsā text in the *Mahābhāṣya*. – Frauwallner's low assessment of Patañjali's scholarship and place in Indian thought (not dissimilar to the views defended in Scharfe 1961, but see my review 1963b) seems to reflect a philosophic bias that overrates the importance of epistemological issues and underrates the relevance of language for philosophy. It is surely preferable to abide by such views as expressed in Thieme 1935b, 181 ("... die Erörterung ... zeigt die ganze Kunst patanjaleischer Darstellung. In abstraktester Form werden die Gesichtspunkte für und wider gegeneinander ausgespielt, werden uns die verschiedenen Überlegungen in ihren Resultaten vorgeführt. Die Ausdrucksweise ist knapp genug, Missverständnisse des Interpreten entschuldbar zu machen, und doch wieder so genau, dass die falsche Auffassung eines Arguments sich unweigerlich beim nächsten verrät und rächt"), or Renou 1940,22 ("Le texte est écrit en prose simple, d'aspect assez archaïque, concise et d'une grande rigueur. Le raisonnement est d'une admirable pertinence ... la dialectique de Patañjali nous permet seule d'arriver au coeur de la pensée pāṇinéenne").

[20] *nanu coktaṃ na hi cchandāṃsi kriyante nityāni cchandāṃsīti | yady apy artho nityo yā tv asau varṇānupūrvī sā'nityā* (ed. Kielhorn 2.315, lines 13–4; also quoted Hiriyanna 1932, 313).

We have at the same time seen that the Indian grammarians paid attention not only to sentences, but also to sentence construction, to grammatical relations and to what is nowadays referred to as deep structure. Word order was clearly excluded from deep structure. In this connection transformational relations were discovered, and much attention was given to the semantic relations between transformationally related sentences.

CHAPTER III

WESTERN SANSKRITISTS ON WORD ORDER IN SANSKRIT

Western descriptions of word order in Sanskrit have, especially in the beginning, presented a picture which is fundamentally different from that given by the Indian theorists. These descriptions, which are often confined to surface structure, and always based upon study of a specified textual corpus, are characterized by the view, adhered to almost universally, that there exists a regular or traditional word order and that deviations from it can be explained. This view, already defended by Th. Benfey and A. Bergaigne, finds full expression in Delbrueck 1878, a monograph based upon the study of the *Śatapathabrāhmaṇa*, a large corpus and one of the oldest examples of Sanskrit prose. A prose text is deliberately chosen since it is taken to be more appropriate for an investigation into word order in ordinary speech, uninfluenced as it is by the exigencies of metre and versification. Delbrueck arrived at two conclusions: (1) there is a traditional word order in Sanskrit; (2) exceptions to this order are due to the fact, "dass ein Wort dem Anfang eines Satzes zurückt oder an den Anfang rückt, sobald ein Nachdruck des Sinnes auf ihm liegt" (1878, 76).

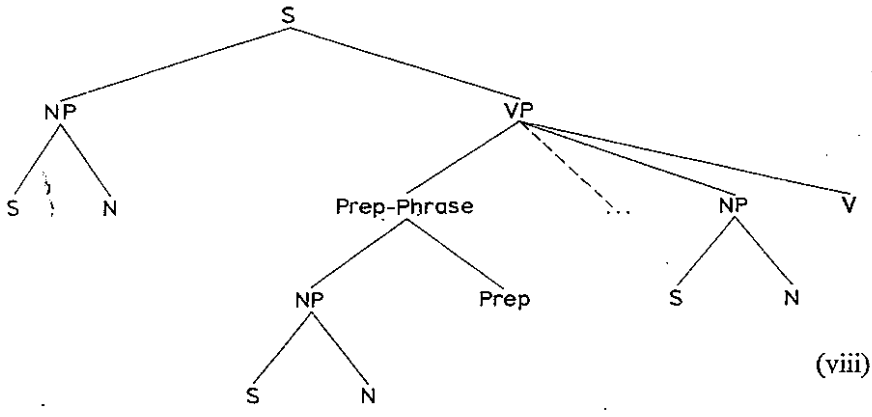
This 'traditional' word order is described as follows. The subject occurs at the beginning; the Verb at the end; Dative and Accusative in between, but the Accusative immediately precedes the Verb. Adjectives and Genitives precede Substantives, Participles and Appositions follow Substantives and Prepositions follow Cases (i.e., are Postpositions).

This could be described in a system similar to Chomsky 1965, with the help of the following rules:

$$S \rightarrow NP^{\frown}VP \tag{28}$$
$$VP \rightarrow (\text{Prep-Phrase})^{\frown}(\text{Prep-Phrase})^{\frown}\ldots{}^{\frown}(NP)^{\frown}V^{1} \tag{29}$$
$$\text{Prep-Phrase} \rightarrow NP^{\frown}(\text{Prep}) \tag{30}$$
$$NP \rightarrow (S)^{\frown}N. \tag{31}$$

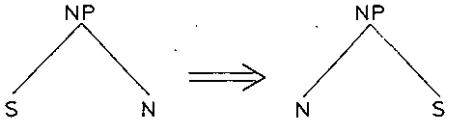
This may be symbolized by the following tree:

[1] The 'Prep-Phrase' Constituents may also be used to introduce Noun-Phrases with the termination of Dative, Instrumental, Ablative, and Locative.



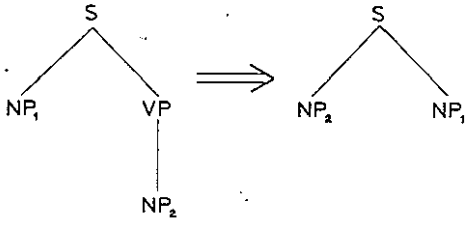
(viii)

For Participles and Appositions the following transformational rule will be required:



(32)

For nominal sentences, i.e., sentences where the Verb is deleted, the Subject and the Predicate change places (1878, 26–8). In other words, a transformation basically of the form:



(33)

is assumed (alternatively, two transformations may be assumed, one for the deletion of V and another for the reversal of order of the two Noun phrases).

Delbrueck devoted an interesting discussion to the question whether perhaps conclusion (2) mentioned above would suffice for the description of word order in Sanskrit: "Man könnte zwar gegen diese Beobachtung einen Einwand erheben und behaupten: die Wortstellung war vollkommen frei, und lediglich diktiert durch das Gesetz, dass das stärker betonte Satzglied vorn steht; die Inder betonten eben das Subject besonders stark, darum eröffnet dieses stets den Satz u.s.w." (1878, 76). Delbrueck rejects this view

on account of two considerations: first, he doubts "ob sich irgendwo im Bereiche der Erfahrung ein solcher Sprachzustand [i.e., free word order] findet"; secondly: "Wäre die Ordnung der Wörter vollkommen frei gewesen, so müsste sich eine grössere Mannigfaltigkeit zeigen, als thatsächlich vorhanden ist" (*ibid.*, 76–7). The latter argument seems to be motivated by impressions based upon frequency of occurrence of certain sequences, i.e., upon impressions which are essentially of a statistic nature.

Delbrueck's researches, given wider currency in Delbrueck 1888, provided the framework for the subsequent elucidation of the problem. Speyer (1896) adhered to Delbrueck's view and illustrated it with an example of a Sanskrit sentence taken from the *Mahābhāṣya* (Speyer 1896, § 247): *pramāṇabhūta ācāryo darbhapavitrapāṇiḥ śucāv avakāśe prāṅmukha upaviśya mahatā yatnena sūtraṃ praṇayati sma* 'the competent teacher, having sat down facing East with purifying *darbha* grass in his hand in a pure place, composed the rules with great care' (ed. Kielhorn I, 39 lines 10–1).[2] This can be analysed with the help of the rules (28)–(31), adding:

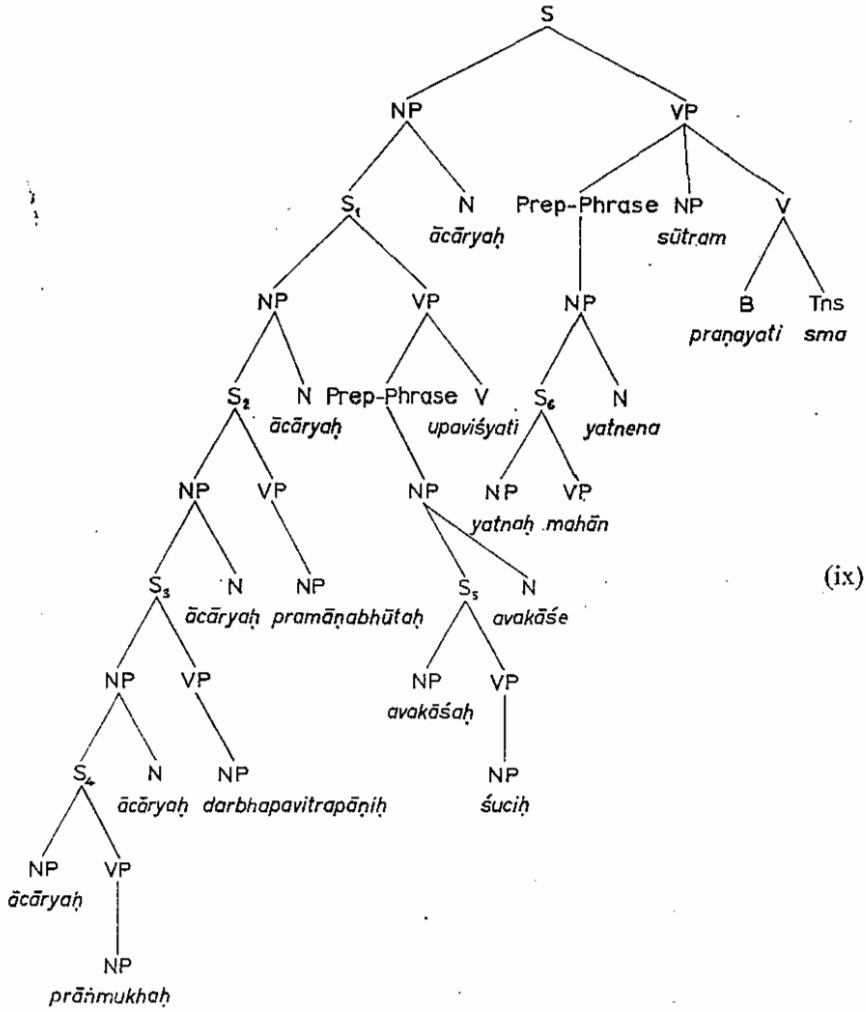
$$V \rightarrow B^{\frown}Tns. \qquad (34)$$

The required analysis may be symbolized by the (simplified) tree on page 54 (diagram ix).

Here S is: *ācāryo yatnena sūtraṃ praṇayati sma* 'the teacher composed the rules with care'; S_1 is: *ācāryo 'vakāśa upaviśyati* 'the teacher sits down in a place'; S_2 is: *ācāryaḥ pramāṇabhūtaḥ* 'the teacher is competent'; S_3 is: *ācāryo darbhapavitrapāṇiḥ* 'the teacher has purifying *darbha* grass in his hand'; S_4 is: *ācāryaḥ prāṅmukhaḥ* 'the teacher faces East'; S_5 is: *avakāśaḥ śuciḥ* 'the place is pure'; and S_6 is: *yatno mahān* 'the care is great'. Note that we have not taken into account that the nominal compounds *pramāṇabhūtaḥ*, *darbhapavitrapāṇiḥ* and *prāṅmukhaḥ* are also derived transformationally, so that the branches concerned are in fact longer.

In this way the following string could be derived: *ācāryaḥ prāṅmukhaḥ ācāryaḥ darbhapavitrapāṇiḥ ācāryaḥ pramāṇabhūtaḥ ācāryaḥ avakāśaḥ śuciḥ avakāśe upaviśyati ācāryaḥ yatnaḥ mahān yatnena sūtraṃ praṇayati sma.* Before deriving this, however, the transformational rules (32) and (33) have to be applied, yielding: *ācāryaḥ ācāryaḥ pramāṇabhūtaḥ ācāryaḥ darbhapavitrapāṇiḥ ācāryaḥ prāṅmukhaḥ ācāryaḥ avakāśe śuciḥ avakāśaḥ upaviśyati yatnena mahān yatnaḥ sūtram praṇayati sma* (note that the modifiers recursively introduced by S have been interpreted as Appositions). Applying

[2] This passage in the *Mahābhāṣya* elucidates the maxim: *na yathā loke tathā vyākaraṇe* 'it is not so that what applies to ordinary speech applies to grammar itself' (above, page 28). Scharfe (1961, 10) inferred from this a magical background to Indian linguistics; but see Staal 1963b, 256.



(ix)

deletion and other transformations (defined in such a way that one occurrence of *ācāryaḥ* will occupy the desired place), this results in: *pramāṇabhūtaḥ ācāryaḥ darbhapavitrapāṇiḥ prāṅmukhaḥ śucau avakāśe upaviśya mahatā yatnena sūtram praṇayati sma*. If *sandhi* rules are now applied, the result is almost the original sentence; *prāṅmukhaḥ* is however in the wrong place. We cannot get this right, for example, by changing the order of embedding of any of the sentences S_1, ..., S_4, as the reader may verify. The results are, at the most, *almost* correct. And so we are forced to conclude that Speyer's example is incorrect, despite the fact that every Sanskritist will immediately recognize how the sentence has to be interpreted semantically. This merely confirms our conclusion (above, page 36), that anyone who wishes to find

precise rules for word order in Sanskrit will run into difficulties, provided the sentences he studies are not uncommonly short.

In § 249 of his syntax, Speyer dealt with the position of certain particles which determine the entire sentence. Denoting such particles by Π, one could adopt instead of (28):

$$S \rightarrow \Pi^{\frown} NP^{\frown} VP. \qquad (28')$$

These particles are of two kinds: "Die den ganzen Satz bestimmenden Partikeln stehen teils an der Spitze des Satzes, teils werden sie dem ersten Worte angehängt." If we interpret 'das erste Wort' as the first NP, Speyer's rules may be expressed by (28') and:

$$\Pi \rightarrow \Pi_1, \Pi_2$$
$$\Pi_2{}^{\frown} NP \Rightarrow NP^{\frown} \Pi_1$$
$$\Pi_1 \rightarrow ca, vā, u, ha, svid, vai, khalu, kila, tu, na, \ldots$$
$$\Pi_2 \rightarrow atha, uta, api, param, kim, \ldots$$

The particle *na*, lastly, occurs "auch wohl unmittelbar vor das Verbum".

Following the development of the Western study of Sanskrit syntax, we mention Bloch 1906 only to observe that in this monograph word order is nowhere discussed. Minard (1936) on the other hand, studying certain subordinate clauses, again from the *Śatapathabrāhmaṇa*, described the regular succession of subordinate and main clause in the compound sentence which he calls 'dyptique', in almost lyrical terms: "Nulle fantaisie, d'ailleurs, nulle grâce. Partout ... rigueur, un éclat sans défaut comme sans sourire, la dureté attirante d'un mécanisme de précision. Et d'abord, des deux membres de la phrase, des deux volets du dyptique, la séquence même est réglée. Jamais elle ne s'inverse, qu'on n'en puisse trouver l'origine et la valeur à l'intérieur du système ou dans ses environs immédiats, dans la démarche de la pensée ou dans la pression du contexte" (Minard 1936, 3). Since it is the subordinate clause which always precedes, this can be regarded as a confirmation, at least for one type of sentence from the *Śatapathabrāhmaṇa*, of the order established by rule (31).

Canedo 1937 is a monograph especially devoted to the study of word order. An earlier similar monograph (Thommen 1903), largely based upon selected passages of the Sanskrit epic, is dismissed with the words: "Die Wortstellung des *Mahābhārata*, die er besonders untersucht hatte, ist vollständig frei" (Canedo 1937, 5; Gonda 1952, however, was to call this a 'conviction personelle', not a 'démonstration'). Canedo claimed that he studied *grammatical* regularities, and did not deal with what would nowadays be relegated to performance: "Die Wichtigkeit der psychologischen Momente für die Wortstellung soll selbstverständlich nicht in Abrede gestellt

werden; aber die 'Erklärung' gehört eher zur Psychologie des Stiles" (6). Canedo objected to Delbrueck's distinction between traditional and 'occasional' word order, but mainly on historical grounds: the so-called traditional word order may be recent, while the so-called occasional word order is often ancient. Speaking about the position of the Verb, Canedo said: "Durch alle Perioden der Sprache ist die Endstellung am häufigsten (habituell), häufiger als die beiden anderen zusammen, und die Anfangsstellung ist häufiger als die Mittelstellung" (27).

Adopting (14) and (15) as initial rules (above, page 12), the position of the Verb which comes next in frequency could be derived by applying (16) and (17). The third and rarest position could be derived by applying (17) only. By legislating thus, however, transformational rules seem to be used to derive less frequent expressions from more frequent ones, and the significance of such a procedure is not immediately clear.

In accordance with Canedo's approach the initial position of the Verb could be partly accounted for by observing that at least in part it characterizes sentences that are derived transformationally from underlying Phrase-markers containing special transformational markers (e.g., question morphemes, etc.). But sentences immediately derived from a base Phrase-marker (e.g., those with *asti* or those which, speaking semantically, continue a story or a description) may also have the Verb in initial position. The situation with regard to middle position of the Verb is similar. On the whole we shall see that the views of Western Sanskritists would have to be adapted, if an overall distinction between underlying and derived sentences is adopted.

With regard to the structure of nominal sentences Canedo disagreed with Delbrueck and Speyer: "Voranstellung des Subjekts [ist] viel häufiger als Voranstellung des Prädikatnomen" (36). As the most common order for the (verbal) Active sentence he regards the following disjunction: either 'Subjekt-Objekt-Prädikat' or 'Prädikat-Subjekt-Objekt' (39). Accordingly, two of the three alternatives mentioned earlier (27) are considered as common ('habituell'). For the Passive he lists: either 'Instrumental-Prädikat-Subjekt' or 'Instrumental-Subjekt-Prädikat'.

Out of the many views on more specific matters a few more may be mentioned here. While 'prepositions' and 'preverbs' sometimes precede and sometimes follow their Noun or Verb (for the prepositions a rule is given, but it is 'nicht absolut' and 'versagt oft' (44)), the *tmesis* of the Vedic preverb receives special treatment. The following example is quoted frequently: *ápa támaḥ pāpmānaṃ hate* 'he strikes [*hate*] the darkness, the evil away [*ápa*]' (*Taittirīyasaṃhitā* 2.1.10). Though this kind of *tmesis* could also occur in English (as in the translation just given), Canedo considered it for Sanskrit as "in der Natur der Sprache bedingt; sie ist eine natürliche,

nicht eine stilistische Eigentümlichkeit derselben" (88). This would prevent the adoption of a rule such as (15) (above, page 12), unless:

$$V \rightarrow Pre_V \frown B_V$$

(where Pre_V denotes 'Preverb' and B_V denotes 'Verbal Base') is added and a transformational rule is subsequently applied to effectuate the required rearrangement.

With regard to the combination of a Preposition with a Noun-Phrase consisting of Noun + Attribute, Canedo mentioned three possibilities: Attr-Präp-Subst; Attr-Subst-Präp; Subst-Attr-Präp. Only the middle case would follow directly from the rules of the base (i.e., from (31) on page 51); for the other two additional transformational rules for rearranging the elements would be required. As regards the order of Noun-Phrases, Canedo considered the following four as the most common arrangements: Instr-Lok-Akk-Verb; Lok-Akk-Verb; Instr-Akk-Verb; Dat-Akk-Verb. Note that they are not inconsistent with each other, and could be formulated as:

$$\left\{\begin{matrix}(\text{Instr}) - (\text{Lok}) \\ (\text{Dat})\end{matrix}\right\} - \text{Akk} - \text{Verb}.$$

As to the relationship between Genitive and Noun, "eine der verwickeltsten Erscheinungen der altindischen Syntax" (60), either of the two possible combinations is found. Whether, finally, an Adjective precedes or follows the Noun it qualifies, may depend on the meaning of the Adjective (64). In other words, Adjectives would have to be grouped in two not necessarily disjunct classes.

Canedo's monograph shows, among other things, that attempts at too wide generalizations which take only surface structure into account and which are primarily based upon impressions of frequency, are bound to result in an enumeration of various alternatives and numerous exceptions.[3] Within the same framework a much more careful attitude is adopted in Gonda (1951; 1952), where the problem area is delineated more precisely while at the same time the material upon which the investigation is based is more varied and extensive. Gonda's work is moreover distinguished by his consideration of a much greater variety of sentence types. Gonda (1952) takes exception to Delbrueck's view accepted by Speyer, Thommen and

[3] Compare Dover's judgment about studies of Greek word order: "More often, an objective general statement of the facts appears, to the seeker after rules, inconclusive in the extreme; it amounts to saying '*xyz* and *xzy* occur, but, on the other hand, *yxz, yzx, zxy*, and *zyx* also occur'" (Dover 1960, 1). Greenberg's universals of word order are nearly always almost-universals; they are moreover misleading in that no distinction is made between sentences with different deep structures. It seems very difficult, lastly, to fit in Sanskrit (Greenberg 1963, 61–3).

Canedo, that word order should be studied exclusively from prose material: "Nous ne possédons dans cette prose gauche, raide et monotone de l'ancienne littérature théologique et sacerdotale qu'une 'réfraction littéraire' spéciale de la langue vivante" (6). The poetic tradition in Sanskrit, on the other hand, is not "par là, artificielle" (7). His conclusions are therefore based upon an investigation into various kinds of texts, prose as well as poetry, Vedic as well as classical Sanskrit, and including the epic, the drama, and other literary work.

Some of the main results are the following. The Verb occurs most frequently in final position. In metrical *kāvya* and in the *Viṣṇupurāṇa*, however, it occurs in the middle. Initial position of the Verb is due to a variety of specific reasons, such as that the sentence is in the Imperative, the Future, or that it expresses a question, an exclamation, or the intention of the speaker; that the verb is *asti* or a verb of knowing, often in the first Person; that the sentence is a subordinate clause, expresses the continuation of the previous sentence, or, more general, the continuation of a narrative; or that the Verb is emphasized. Apparently, most of these cases are derived sentences where transformations are anyhow required. Middle position of the Verb, as for example in the texts quoted above, is similarly explained by special considerations, e.g., that other elements are put at the end of the sentence in order to facilitate transition to the next sentence, or else that the Verb follows an absolute case or a case which expresses time, place, etc. (cf. English 'here lies your book').

Despite these regularities, to which there are almost always exceptions (cf. above, page 57, note 3), the author arrives at the following clearly formulated interpretation of the material: "En ce qui concerne l'ordre des éléments de l'énoncé, l'indo-européen comportait une grande liberté, c.-à-d. que cet ordre n'avait *presqu'aucune valeur grammaticale* [my italics]. Aucun mot n'avait dans la phrase indo-européenne une place définie et constante. Il va sans dire que ceci n'exclut pas l'existence d'ordre habituel dans certains tours et certains types de phrases: comme il résulte des recherches qui vont être mentionnées, on trouve souvent dans des phrases analogues de plusieurs langues indo-européennes anciennes un ordre des mots à peu près constant et identique" (Gonda 1952, 71).

In order to further illustrate and support some of these generalizations, the author finally provides some numerical data regarding the number of occurrences of the Verb in initial, middle and final position, for selected passages taken from a variety of texts. In this connection various sentence types are again distinguished.

Gonda's investigations show that word order, even if it performs no grammatical function (whatever this means exactly), is relatively fixed in a

number of cases. He provides, however, no overall generalization which accounts for these facts or which leads to a theory about a fundamental or basic word order. It is not immediately clear, on the other hand, whether a similar analysis when confined to the types of sentence that can be said to belong to the base, would not reveal a more regular pattern. For this purpose a fresh analysis might be required, which would, however, when pursued along similar lines, at the most yield certain statistical regularities.

Summarizing, we may conclude that Western Sanskritists started to describe a traditional, habitual or merely preponderant fixed word order in Sanskrit. When these investigations became more precise, more exceptions were met with and various habitual arrangements of words for various kinds of sentence were postulated. It was also increasingly realized that word order has no grammatical significance or value. But most of the investigations by Western Sanskritists were based upon a specifically selected corpus of Sanskrit texts.

CHAPTER IV

SUMMARY AND CONCLUSIONS

On superficial examination the views on word order in Sanskrit propounded by Indian theorists and by Western Sanskritists appear to be greatly at variance. Almost all Indian theorists did, either implicitly or explicitly, regard word order as free. For no independent word is a specific position in the sentence prescribed. Sentences which differ in the arrangement of their words only, are considered as equivalent and synonymous. In so far as a difference of meaning or different shades of meaning can be found at all, this is not considered relevant. Most Western Sanskritists, on the other hand, reject the idea that word order in Sanskrit is free. According to them there are certain preferential, traditional, habitual or, at least, most frequent arrangements. Other arrangements, which also occur, tend to be treated as special cases or as exceptions to an overall regularity. Though more detailed investigations have shown that there are many different arrangements of words to account for different types of sentences, there is again a preferential order within each type. These descriptions, which generally offer approximations to regularities, if not rules, for the order of words, seem to be supported by frequency counts.

On closer inspection the gap between Indian and Western approaches appears to be narrow. This is not to say that the divergence is merely a matter of language and presentation. The two approaches, although to some extent complementary, are basically different. They agree however in that, on the whole, word order has *no grammatical significance*.[1] For the Indian

[1] See especially Gonda 1952, 71, quoted above, page 58. For Latin cf. Marouzeau, III, 1949, 195: "La notion de ce qu'on appelle l'ordre grammatical n'est pas moins trompeuse [i.e., than 'logical order']: dans une langue à construction libre, la grammaire ne commande l'ordre que dans des cas exceptionnels, qu'il suffit d'enregistrer, et qui ne comportent pas d'explication de principe. ..." For Greek cf. Dover 1960, 3; "If two utterances are syntactically identical, but differ in order, this does not prove that the determinants of their different orders are unknowable; it proves only that syntactical identity does not suffice to determine identity of order; and our task becomes the exploration of all the respects in which the two utterances are dissimilar, in the hope of finding there the vital difference which determined their difference of order" (note that if this task pertains to utterances, it seems to pertain in particular to performance). Dover's study leads to the following conclusion: "It is clear that these statistics are very far indeed from establishing for 'Classical Greek' *simpliciter* anything worth calling a syntactical rule of word order. Extended to a much greater variety of authors and texts, they would no doubt give us an

grammarians the purport of this doctrine is quite specific: *grammatical relations between words in the sentence*, i.e., *kāraka* relationships and similar grammatical relationships are expressed by inflexion and the like. The *order of words of the sentence*, on the other hand, has no such significance; it is entirely superficial. The relationship between the two approaches may be further analysed by reminding ourselves of Patañjali's reaction to certain opponents who attached significance to word order in the *Sūtra*: 'restrictions on usage' (*prayoganiyama*), said Patañjali, 'are not here clung to' (above, page 28). Similarly, the Mīmāṃsakas agreed with their opponents, the followers of Kautsa, at least in one respect: even if word order is fixed in certain utterances (*uccāraṇa*), this does not imply that word order is fixed in sentences in the same manner in which the order of elements is fixed, for example, in nominal compounds and inside other words (above, page 25).

Adapting these criticisms to the interpretation of the Western approach, we may state that the latter deals with *usage* and *utterances*, rather than with the *grammaticality of sentences*. This also explains the large numbers of exceptions, as well as mutual contradictions. Of course, both kinds of study are important, although the study of usage and utterances tends to be fruitful only to the extent that the study of grammaticality is presupposed. For this reason it may be assumed that the Western Sanskritists' investigations would have led to more definite results, had they adopted the perspective of a theory of language which distinguishes between underlying or base sentences, and derived sentences. Dover, in his study of Greek word order, is clearly aware of the difference between grammatical and frequent: "It is easy, but wrong, to equate 'statistically normal' with 'natural' and 'statistically abnormal' with 'distorted', 'inverted', etc. If, for example, we were investigating a language in which the order *SP* was invariable in statements and the order *PS* invariable in questions, it would be misleading to formulate the rule in terms such as: '*SP* is normal, but this normal order is reversed in questions'. Statements are more numerous than questions, but that is not a fact of a kind with which we are concerned; we should content ourselves with the pair of discoveries that (*a*) statement determines the order *SP*, (*b*) interrogation determines the order *PS*" (Dover 1960, 5).

The difference between the Western and the Indian approach to the study of Sanskrit word order may be characterized by saying that the former was mainly interested in the use of language or in *performance*, while the latter was mainly interested in the underlying regularities of language or in

interesting picture of the vagaries of individual preference – and thereby suggest with increasing force that all patterns of order which are describable in syntactical terms are secondary phenomena" (*ibid.*, 31).

competence. The Indian grammarians were accordingly interested in *rules*, the Western Sanskritists in probabilities of occurrence and frequencies. In some cases where Western and Indian scholars arrived at similar results, this may be explained by observing that the Indian scholars also were interested in the utterances of the Vedic corpus and not in the sentences of the Sanskrit (or, as the case may be, Vedic) language. In this connection it may be noted that the Indian theorists (including men like Āpte) were Sanskrit speakers, whereas Western Sanskritists have generally studied Sanskrit from the corpus of Sanskrit texts, in the same manner in which scholars of Latin have studied Latin.[2]

It is not quite necessary to study Sanskrit as a dead language, confining oneself to a corpus of texts (even though this corpus is immensely large). The present use of Sanskrit as a spoken language should be compared less to the modern, than to the medieval use of Latin. The most widespread view of Western Sanskritists in this respect is formulated as follows by Wackernagel-Renou: "Ceux-là mêmes qui étaient familiers avec le sanskrit parlaient concurremment une autre langue, plus populaire; le sanskrit avait à peu près la position du latin au moyen âge, de l'hébreu chez les Juifs. Ajourd'hui même, l'emploi exclusif du sanskrit est tout au plus une gageure; cependant il serait faux de lui dénier le caractère d'une langue parlée" (Wackernagel-Renou 1957, 21–2 and 86–7 notes 310, 312).

Some passages of the Report of the Government of India Sanskrit Commission (1956–1957) are more explicit and suggestive: "Just as many of the replies to the Questionnaire received by the Commission were in Sanskrit, quite a number of interviews also took place in Sanskrit. It was not the Pandits alone who gave their evidence in Sanskrit..." (p. 9); "Even at the present day Sanskrit is very living, because a large number of people use Sanskrit in their conversation, when they come from different parts of the country, and composition in Sanskrit, in both prose and verse, goes on almost unabated. It has been possible to write a history of recent Sanskrit literature..." (p. 88).

Whatever the precise significance of these statements, a theory of usage accounting for the arrangement of words in utterances has to be based upon a theory about the grammatical relations between words in sentences. It is becoming increasingly clear that "investigations of performance will proceed only so far as understanding of underlying competence permits" (Chomsky 1965, 10).

[2] Cf. Marouzeau 1953, 114 on Latin: "Ce qui nous manque pour assurer notre jugement, c'est le sens intime de la langue tel que le possédaient les sujets parlants; nous y devons suppléer par une interprétation laborieuse fondée sur des règles parfois sujettes à révision ou discussion."

Theoretical considerations apart, there are specific cases where the distinction between competence and performance becomes explicit. An 'occasional' utterance which represents an occurrence with a low acceptability or probability value, is not the same as an ungrammatical sentence which violates a rule (cf. Katz & Fodor 1964, 27). Moreover, though both grammaticality and acceptability admit of degrees, their scales do not coincide (Chomsky 1965, 11). This may be seen from the comparison of simple examples of sentences from the base in English and Sanskrit. Whereas *apaśyad rāmo govindam* (cf. above, page 12) is perfectly grammatical and unambiguous, meaning 'Rāma saw Govinda', but has perhaps a lower probability value than, e.g., *rāmo govindam apaśyat*, matters are quite different with respect to the string *Rāma Govinda saw*, which is quite ungrammatical in English and in addition meaningless or at least ambiguous (for it might mean 'Rāma saw Govinda', 'Govinda saw Rāma', 'he saw Rāma Govinda', 'he saw Rāma and Govinda', etc.), even though it may perhaps be met with under exceptional circumstances of English usage. The difference between *apaśyad rāmo govindam* and *saw Rāma Govinda* is inexplicable if the theory is adhered to that word order in Sanskrit may be described by a set of grammatical rules just as can be done in English, even if it be assumed that the rules for Sanskrit would be more complicated than those for English.

The difference in this respect between Sanskrit and English may also be illustrated by considering the interpretation of sentences derived transformationally from a generalised Phrase-marker. Sentences such as those quoted by Patañjali (*anaḍvāham udahāri yā...*: above, page 32) are perhaps uncommon, but they do not lack grammaticality any more than the similarly uncommon grammatical English sentence "Anyone who feels that if so many more students whom we haven't actually admitted are sitting in on the course than ones we have that the room had to be changed, then probably auditors will have to be excluded, is likely to agree that the curriculum needs revision" (Chomsky & Miller 1963, 286). On the other hand both Sanskrit *govindasya rāmo 'paśyan* and English *saw Govinda Rāma*, as well as sentences transformationally derived from their underlying base Phrase-markers, are (though for different reasons) ungrammatical.

While nobody would object to saying that *apaśyad rāmo govindam* and *rāmo govindam apaśyat* are synonymous, it may not be difficult to find examples of two Sanskrit sentences which only differ in the arrangement of the words but where a difference in meaning is nevertheless felt. It may also be felt that two such sentences would not fit into larger contexts equally well. Gonda often deals with cases where this state of affairs obtains, while it is referred to explicitly by Marouzeau at the beginning of his study on

word order in Latin: "Deux ordres possibles ne sont pas synonymes" (Marouzeau 1922, 1). While such differences may well be explicable within the context of a theory of performance, it must be noted that they could not be explained by any theory of competence which utilizes transformations to effectuate re-ordering, but adheres to the principle that transformations do not affect meaning. For according to such a theory different arrangements are generated by applying transformational rules, and these result in expressions synonymous with the underlying sentences. (Sometimes different orders may, of course, have to be derived from different deep structures.)

Comparing English and Sanskrit we therefore find ourselves reverting to a not unfamiliar traditional doctrine, i.e., that Sanskrit expresses by means of inflexion what English expresses by means of word order as well as (e.g., in the case of Pronouns) inflexion (cf., e.g., Bloomfield 1933, 197; Hirt 1925, 66: "... es ist bekannt wie flexionslose Sprachen durch eine im Wesentlichen feste Wortstellung einen Teil dessen ausdrücken, was sonst durch die Flexion erzielt wird"; etc.). This then may be said to be the significance of the statement that word order in Sanskrit is 'free'. The problem arises how to construct a mechanism which *first* derives expressions for certain grammatical relations and *subsequently* provides rules for mapping these expressions into *either* ordered sequences of words or strings, *or*, equivalently, unordered sets of words which are however determined by inflexion. It may be clear from our earlier results that such expressions for grammatical relations may be derived by means of a system of *kāraka* relationships as developed by Pāṇini or, equivalently, by means of Chomsky's definition of 'grammatical relation', illustrated with the help of trees which need not, however, be trimmed. It may be re-emphasized here that Chomsky was aware of the fact that the definition of 'grammatical relation' does not presuppose order: "the systems of grammatical relations defined in the two cases [i.e., set-systems and concatenation-systems] are identical" (Chomsky 1965, 125). This also provides the background for his remark that "the same grammatical function may be defined by several different rewriting rules of the base" (Chomsky 1965, 72). We could also express this by saying that *wild trees* may be regarded as *equivalence classes of trimmed trees*. The relation defining these equivalence classes is the relation between any two trimmed trees in which corresponding nodes dominate the same set.

We shall now give a sketch of how such a system could be set up, making use of wild trees and company-sensitive rules (above, page 15). Wild trees are trees such that the points dominated by a node constitute a set. Such trees symbolize the rules of the base, which are now constructed so as to introduce sets. These sets are stratified, i.e., the hierarchy of subsets containing elements dominated by a single node, is preserved. Otherwise it would be

impossible to identify the constituents and phrases required to determine conditions for the application of transformational rules; it would also be impossible to derive grammatical relations and give a semantic interpretation. It should be emphasized that wild trees perform all the functions required from the trimmed trees familiar from generative grammar, except the capacity to generate order: they provide the constituents and phrases needed for the application of transformational rules; they enable us to define grammatical relations; and they may, accordingly, provide us with a basis for the semantic interpretation of the sentences they picture (note that the projection rules in Katz's semantic theory correspond with grammatical relations: Katz 1966, 165, 167). They do not, of course, yield the word order which is required, e.g., in English. This will be effectuated by special order-introducing rules, which are analogous to the company-sensitive rules required for the introduction of concord or government. Since concord is in fact better described by transformational rules than by context-sensitive rules, transformational rules operating on sets may be required for the introduction of order as well (as in (52), below, page 77); but this is inessential in the present context.

As a fragment of a simplified base we shall now adopt the following rules (cf. above, page 14):

$$S \rightarrow \{NP, VP\} \tag{35}$$

$$VP \rightarrow \{NP, V, Num\} \tag{36}$$

$$NP \rightarrow \{N, Num, Cas, (S)\} \tag{37}$$

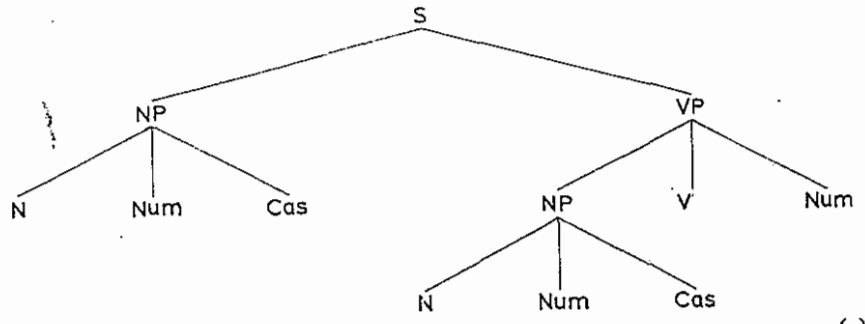
$$Num \rightarrow \left\{\begin{matrix}1\\2\\3\end{matrix}\right\} \text{('1' for Sg, '2' for Dual, '3' for Pl)} \tag{38}$$

$$Cas \rightarrow \left\{\begin{matrix}Nom\\Acc\\Instr\\Dat\\Abl\\Genit\\Loc\end{matrix}\right\} \tag{39}$$[3]

(Note that 'Det', 'Person', and many other markers and specifications may be required for a more adequate account).

[3] Note that the braces in (38) and (39) express alternatives, whereas in (35)–(37) they denote the boundaries of sets. In these cases however there is no danger of ambiguity.

These rules may be applied, for example, as symbolized in the following wild tree:



(x)

This base can be made a sound point of departure for either an English or a Sanskrit grammar. Government or concord will be introduced for Sanskrit by means of company-sensitive rules. When formulating such rules we shall make use of a triple arrow ($\Rrightarrow$). Note that company-sensitive rules may be simpler than the corresponding context-sensitive rules, because not all elements of a set need be referred to, whereas all adjoining elements of a string must be referred to.

That the Main Verb is governed by the Subject of S is expressed by the following triplet:

$$\{\{N, i\}, \{V, Num\}\} \Rrightarrow \{\{N, i\}, \{V, i\}\} \quad \text{for} \quad i = 1, 2, 3. \tag{40}$$

That the Subject of S is in the Nominative is expressed by:

$$\{\{N, Cas\}, VP\} \Rrightarrow \{\{N, Nom\}, VP\}. \tag{41}$$

That the Direct Object of S is in the Accusative is expressed by:

$$\{\{N, Cas\}, V\} \Rrightarrow \{\{N, Acc\}, V\}. \tag{42}$$

More special cases could be similarly accounted for, e.g., the rule that the Verb is in the Singular if the Subject is a Neuter Noun even when it is in the Plural. For this purpose, (37) would have to be replaced by:

$$NP \rightarrow \{N, Num, Cas, Gend, (S)\} \tag{37'}$$

and we would also need:

$$Gend \rightarrow \left\{ \begin{matrix} Masc \\ Fem \\ Neutr \end{matrix} \right\}.$$

The required company-sensitive rule, which presupposes (40) and follows it, is the following:

$$\{\{N, 3, Neutr\}, \{V, 3\}\} \Rrightarrow \{\{N, 3, Neutr\}, \{V, 1\}\}.$$

For English, proceeding from rules of the same base consisting of (35)–(39), we require company-sensitive rules which introduce ordered strings instead of sets. For example, after (41) we need:

$$\{\{N, Nom\}, VP\} \Rightarrow N^{\frown}Nom^{\frown}VP \qquad (41^*)$$

and after (42):

$$\{\{N, Acc\}, V\} \Rightarrow V^{\frown}N^{\frown}Acc. \qquad (42^*)$$

Alternatively, if we are interested in English grammar only, and not in comparative or universal grammar, this may be abbreviated and we may write instead of (41)–(41*) and (42)–(42*):

$$\{\{N, Cas\}, VP\} \Rightarrow N^{\frown}Nom^{\frown}VP \qquad (41^{**})$$
$$\{\{N, Cas\}, V\} \Rightarrow V^{\frown}N^{\frown}Acc. \qquad (42^{**})$$

In this manner order may be introduced. At the same time, either (41**) and (42**), or (41)–(41*) and (42)–(42*), as compared with (41) and (42) express the generalization that the same relations 'Subject-of' and 'Object-of' are expressed by case terminations in Sanskrit, and by order as well as case terminations (e.g., in the case of Pronouns) in English, respectively.

A very simple rule which ought to be expressed is that modifiers in general, and Adjectives, Participles, etc., in particular, are governed by the Noun they qualify. In the examples from Sanskrit met with earlier, such sentences were transformationally derived from underlying sentences, which are *nominal sentences* (this is of course not always the case). Such sentences would result from a base – still simplified but set up in a slightly more sophisticated fashion (e.g., by introducing 'Pred-Phrase'; see Chomsky 1965, 107) – with the help of a transformational rule which deletes a Copula or a similar verbal expression. This may be assumed to result in the expression: $\{NP_1, \{NP_2\}\}$. To express the required concord we now adopt the triplets:

$$\{\{N_1, i\}, \{\{N_2, Num\}\}\} \Rightarrow \{\{N_1, i\}, \{\{N_2, i\}\}\} \quad \text{for} \quad i = 1, 2, 3 \qquad (43)$$

and

$$\{\{N_1, Masc\}, \{\{N_2, Gend\}\}\} \Rightarrow \{\{N_1, Masc\}, \{\{N_2, Masc\}\}\} \qquad (44)$$

(Similarly for Fem and Neuter.)

When these sentences are embedded in Noun-Phrases with the help of (37), this stratification will have to be preserved under the transformations which introduce Adjective, etc. Elsewhere it may be necessary to introduce order, e.g., to distinguish between Adjectivization and Apposition, as follows:

$$\{\{N_1, Masc\}, \{\{N_2, Masc\}\}\} \Rightarrow N_2^{\frown}Masc^{\frown}N_1^{\frown}Masc$$
$$\{\{N_1, Masc\}, \{\{N_2, Masc\}\}\} \Rightarrow N_1^{\frown}Masc^{\frown}N_2^{\frown}Masc.$$

With the help of such procedures we are in a position to state that Adjec-

tives are governed by the Noun they qualify, but also to distinguish subsequently between Adjectives which follow the Noun they qualify, and Adjectives which precede it (as is required in French and in many other languages). The general statement that Adjectives are governed by the Noun they qualify, however, has a much wider scope and is also valid, for example, for sentences where a qualifier occurs which is not specifiable as either Adjective or Apposition (as, e.g., in Japanese).

The distinction between verbal and nominal sentences is a very important one in languages such as Sanskrit. In India the status of the nominal sentence, which is well developed as well as common in scientific Sanskrit (see, e.g., Staal 1965c), gave rise to a controversy between the grammarians and the Naiyāyikas (logicians). Whereas the grammarians insisted that the verbal sentence is basic and that nominal sentences are derived from them by deleting the Verb (i.e., that they have zero-occurrence of the Copula), the Naiyāyikas considered this a very artificial device and regarded the nominal sentence as a primary category. This controversy may have resulted from the exclusive emphasis laid on Noun and Verb by logicians and grammarians, respectively (Matilal 1966, 381 and 388 *sq.*).

We have seen (above, page 52) that Delbrueck and Speyer, followed by other Western Sanskritists, introduced the rule that in the nominal sentence in Sanskrit the Predicate precedes the Subject. The discussion about the apparent counter-example embodied in the first rule of Pāṇini's grammar (above, page 27), points in the same direction. It need not at present be decided whether this constitutes a grammatical rule relating to competence, or whether it is an observation regarding performance. It may be noted, however, that in this case word order as a *grammatical* feature would not be surprising; for ambiguity might otherwise result, just as in German '*Die Mutter sieht die Tochter*'. (The construction of copula sentences in English may be similarly ambiguous, cf. 'Miss Castlewood was the prettiest girl at the ball', Jespersen 1948, 153.) In the present context it is only necessary to show that if the Subject follows the Predicate because of a grammatical rule, this may be expressed in terms of the system sketched above. That order may be introduced is clear from (41*) and (42*) or (41**) and (42**); it is equally obvious that we may introduce order at any stage, wherever it should be required.

Such a procedure does not mean, however, that whenever order is required *somewhere*, it should be introduced *right at the beginning*. Yet it is this assumption which is apparently made in current work on generative grammar. The assumption underlies the importance attached by Hall to such Russian sentences as '*Mat' videla doc*'' (1964, 407), and by Chomsky to such German sentences as '*Die Mutter sieht die Tochter*' (1965, 126). These sentences

show that word order is *not always* irrelevant; but they do not show that word order is *never* irrelevant, i.e., always relevant. Whatever the precise situation in Russian and German, we now know the position in Sanskrit fairly well. The derivation of a specific word order for NP⌢VP sentences would be irrelevant syntactically; it is, accordingly, counter-intuitive. In order to avoid ambiguity the Sanskrit grammarians adopted a convention for certain sentences *of the meta-language* (above, page 28). Though this does not carry over automatically to the object-language (cf. *na yathā loke tathā vyākaraṇe* 'it is not so that what applies to ordinary speech applies to grammar itself'), Patañjali admits that *usage* in this respect is more widespread, when he says: *neha prayoganiyama ārabhyate* 'restrictions on usage are not here clung to' (above, page 28). But this usage, which is also observed by some Western Sanskritists, remains exceptional. Similarly, sentences such as '*Die Mutter sieht die Tochter*' are traditionally regarded as exceptions to the rule that word order is syntactically irrelevant (cf. above, page 60 note 1: "la grammaire ne commande l'ordre que dans des cas exceptionnels"). The most natural syntactic theory to account for this, will treat them as such. They can be easily accounted for by introducing order, when required, into a system that is otherwise in this respect unordered. Before discussing further implications of such an approach, let us see how precisely the required order could be introduced.

Adopting in the base (still simplified, cf. Chomsky 1965, 107) the rule:

$$\mathrm{VP} \rightarrow \begin{Bmatrix} \{\mathrm{Copula}, \mathrm{NP}\} \\ \{\mathrm{V}, \mathrm{NP}\} \end{Bmatrix} \qquad (45)^4$$

we require along with (40)–(42) (above, page 66):

$$\{\{\mathrm{N}, \mathrm{Nom}\}, \{\mathrm{Copula}, \{\mathrm{N}, \mathrm{Cas}\}\}\} \Rightarrow \{\{\mathrm{N}, \mathrm{Nom}\}, \{\mathrm{Copula}, \{\mathrm{N}, \mathrm{Nom}\}\}\} \qquad (46)$$

If the order Predicate-Subject were a grammatical feature, it could for Sanskrit be introduced by the same rule which introduces nominal sentences, i.e., by:

$$\{\{\mathrm{N}_1, \mathrm{Nom}\}, \{\mathrm{Copula}, \{\mathrm{N}_2, \mathrm{Cas}\}\}\} \Rightarrow \mathrm{N}_2 ⌢ \mathrm{Nom} ⌢ \mathrm{N}_1 ⌢ \mathrm{Nom}. \qquad (47)$$

It would seem conceivable that an analysis of word order in Sanskrit, similar to the investigations carried out by Western Sanskritists, but confined to sentences immediately derived from a base Phrase-marker, would unexpectedly reveal that also for verbal sentences the order at least of some words is grammatically fixed. This is extremely unlikely in view of all we

[4] The braces denote alternatives and set boundaries; cf. above, page 65 note 3.

have said before, and also because a fixed order such as this would possess no syntactic or semantic function (as it has in nominal sentences) and would, e.g., introduce a distinction between *rāmo govindam apaśyat* and *apaśyad govindaṃ rāmaḥ*, which is never made. But even if this eventuality should come true, it would still be just another exception. Moreover, we would still require a *general* rule which expresses that sentences, whether nominal or verbal, consist of a Noun-Phrase and a Predicate-Phrase, i.e., an unordered rule:

$$S \rightarrow \{NP, \text{Pred-Phrase}\}.$$

This could only be replaced by a rule introducing an ordered string, if the arrangement in all cases happened to be just the same. But this is even more unlikely, since in nominal sentences the Subject was determined as habitually following the Predicate, which is unlikely in most other cases.

Apart from Sanskrit and quite in general, all such considerations tend to show that systems incorporating wild trees and company-sensitive rules are much more likely to adequately express linguistic universals than rules which presuppose or introduce order. This would be so, even if word order in Sanskrit were utterly fixed – if we except the case of its being fixed in the same way as word order is fixed in English or in any other language, a result which no amount of abstraction could bring about. Let us on the one hand assume, in accordance with this hypothesis, that the order which perhaps occurs most frequently in Sanskrit, i.e., *rāmo govindam apaśyat* (cf. above, page 12), were *grammatically* determined, i.e., by the rules:

$$S \rightarrow NP^{\frown}VP \quad (14)$$
$$VP \rightarrow NP^{\frown}V. \quad (15)$$

For English, on the other hand, no legerdemain could convince us that we ought to dispense with:

$$S \rightarrow NP^{\frown}VP \quad (1)$$
$$VP \rightarrow V^{\frown}NP. \quad (2)$$

Though (1) happens to coincide with (14), (2) does not coincide with (15), and hence the linguistic universal behind (2) and (15) can only be expressed by:

$$VP \rightarrow \{NP, V\}.$$

This may be subsequently specified in different ways for different language types, as for English by:

$$\{NP, V\} \Rightarrow V^{\frown}NP$$

but for Sanskrit, in accordance with this hypothesis, by:

$$\{NP, V\} \Rightarrow NP^{\frown}V.$$

If, however, a language existed where we have a grammatical rule:

$$S \rightarrow VP^{\frown}NP \qquad (1'')$$

(as the nominal sentences in Sanskrit perhaps suggest), we must similarly replace (1) or (14) by:

$$S \rightarrow \{NP, VP\}. \qquad (1')$$

Accordingly we arrive at a system of universal grammar which is basically unordered and can only be described in terms of sets and wild trees. Order may be introduced into this unordered base as early as a specific language type permits. This conclusion does not depend on the conclusion arrived at earlier, i.e., that word order in Sanskrit is 'free'. For even if free word order in this sense would not obtain anywhere (as Delbrueck 1878, 76 and Chomsky 1965, 126 were inclined to think), the divergent arrangements of words in different types of language would require the base of a system of universal grammar to be unordered.

Of course, this generalization can also be made on the basis of Chomsky 1965; but only in a redundant and rather unnatural way. One might similarly adopt a medical meta-language, constructed in such a way that it can naturally express that men have a heart on the left side or on the right, and observe subsequently, that this implies that men have a heart. Medical theorists rightly adopt a language which enables us to express straight away that man has a heart.

Some scholars have found it difficult to understand that a system of generative grammar is not intended to serve as a model of the speaker or hearer (e.g., Reichling 1961, 14, 16; Uhlenbeck 1963, 9–10; but see Kraak 1966, especially 44–47). This error, which is the outcome of the systematic refusal to deal with deep structure which characterizes taxonomic linguistics, perhaps arises less easily when the base of a generative grammar is unordered in the way indicated. For it is obvious that no one could want to claim that people's brains contain some unordered structure representing the set {NP, VP}, which is then somehow converted by neural or other mechanisms into the ordered string NP$^{\frown}$VP (for some) or into VP$^{\frown}$NP (for others). The assumption that people are aware of the underlying set when or before they utter an ordered string, is even more fantastic. Such views would be similar to claiming that people's bodies contain a subtle heart, which is located nowhere, but which is converted into a gross manifestation on the left or on the right side. It is clear, on the other hand, that systems of generative grammar are systems of linguistic description, a particular instance being that (1') is postulated to account for both (1) and (1''), which in turn are to account for a variety of structures, including surface phenomena. Such postulates

have, again, nothing to do with a system being 'logical' or influenced by mathematical logic, as the same – and other – critics have complained.

It may be noted that the adoption here suggested of unordered sets to replace ordered strings, is similar to that adopted in Chomsky 1965, where the ordered branches of the semantic trees of Katz and Postal (1964) have been replaced by complex symbols denoting sets of syntactic features. – Of course, it is not suggested that this state of affairs (or that referred to in the previous paragraph) need in any way be regarded as an argument in support of the set-systems here advocated.

It is far beyond the scope of the present monograph to extend this investigation effectively to universal grammar, which would presuppose the availability of generative grammars for a variety of natural languages. We shall have some more general comments to make on universal grammar, but shall first consider some other examples in order to further illustrate and corroborate the above results. We have already seen that in both Latin and Greek the situation is very different from that in English, in that word order has on the whole no syntactical significance. For Latin, Marouzeau stated that grammar determines the order of words only in exceptional cases (see above, page 60 note 1). For Greek, Dover suggested that "all patterns of order which are describable in syntactical terms are secondary phenomena" (*ibid.*). The Sanskrit system may in principle be described by (40)–(42) (above, page 66) and (45)–(47) (above, page 69). With regard to nominal sentences, the situation in Arabic and Hebrew (and perhaps in Semitic in general) is the exact opposite. Here too Western scholars appear to have combined investigations into competence with studies of performance. Lacking the competence to unravel this performance we may be excused for merely quoting Fleisch (1956, 122; cf. Brockelmann 1956, 118–121): "...L'arabe classique ne demande rien à la place des mots pour caractériser leur fonction dans la phrase; par les voyelles finales de la déclinaison (et de la conjugaison), il avait en effet le moyen de déterminer, d'une manière inhérente au vocable, sa fonction dans la phrase. Et cependant l'ordre des mots n'est pas libre. En dehors des combinaisons rigides – comme déterminé suivi du déterminant dans l'annexion grammaticale, adjectif épithète après le nom – il existe un ordre à respecter: verbe + sujet + complément direct + complément circonstanciel [i.e., in verbal sentences]; sujet + attribut + complément circonstanciel, en phrase nominale."

Singling out for further illustration the arrangement of Subject and Predicate, we would have to express this statement, provided it describes grammatical regularity, by (45), and in addition, instead of (40), by:

$$\{\{N, i\}, \{V, Num\}\} \Rightarrow V^\frown i^\frown N^\frown i \quad \text{for} \quad i = 1, 2, 3 \qquad (48)$$

and instead of (47), by:

$$\{\{N_1, \text{Nom}\}, \{\text{Copula}, \{N_2, \text{Cas}\}\}\} \Rightarrow N_1 ^\frown \text{Nom} ^\frown N_2 ^\frown \text{Nom}. \quad (49)$$

Comparing the nominal structures to the right of the symbol '⇒' in (47) and (49) for Sanskrit and Arabic, respectively, it is obvious that no expression of universal grammar which could conceivably be inserted to the left of '⇒', would be able to account for these two sentence structures, unless it were formulated in terms of sets. Moreover, the general production of a purely nominal sentence is given again in terms of sets, i.e., by:

$$\{\{N_1, \text{Nom}\}, \{\text{Copula}, \{N_2, \text{Cas}\}\}\} \Rightarrow \{\{N_1, \text{Nom}\}, \{N_2, \text{Nom}\}\}. \quad (50)$$

This must be a transformational rule, since there is deletion of an element (cf. below, page 77).

With regard to Arabic two further observations may be made; both concern exceptions which help to establish the general rules.

First, the habitual word order became syntactically significant in middle Arabic when the terminations of classical Arabic had been lost (as in the parallel developments in Indo-European and, perhaps, in Archaic Chinese). As a reaction, authors of the middle Arabic period, e.g., Mutanabbī (916–65 A.D.) employed a completely free word order when writing classical Arabic. This was syntactically correct, though in some respects unusual. Even the most severe critics of Mutanabbī and of his language, however, never objected to this (Fück 1955, 148–50).

The second case concerns concord between Verb and Subject in NP⌢VP sentences. In general, concord depends exclusively on grammatical relations and must therefore be expressed by rules like (40) (above, page 66). As always in Indo-European, it depends on grammatical relations defined in terms of the surface structure ('*he* is easy to please'), not on the deep structure of underlying base Phrase-markers, from which it is transformationally derived (which would account for '*him* is easy to please'). Thus concord depends for example on the grammatical subject, not on the logical subject (cf. above, page 66; Chomsky 1965, 221–2 note 35). But in Arabic not the surface structure, but the arrangement of words in the finally derived string may in exceptional cases influence concord, especially when in this string the Predicate *precedes* the Subject. In that case, says Reckendorf (1898, 69) "ist vom Subjekt vorerst nur eine vage Vorstellung vorhanden" (note that this is formulated with reference not to competence, but to performance). This explains, e.g., cases where a verb in the plural precedes a subject in the *inner* plural (which otherwise determines the singular): *iaḳulûna ʾabnâʾu al-baʿîri* 'spoke [Plural] the sons [Inner Plural] of the camel'; or cases where a verb

in the singular precedes a subject in the dual: *tanâza'anî ar-raǧulâni* 'fought [Singular] with me the two men [Dual]'.

In English the selection of Pronouns generally depends in a similar manner on the arrangement of words in the finally derived string.[5] Lastly, some more examples, partly from English, will be considered. It seems fairly certain that (3) or (3'), which have to account for all the recursive properties of language (except conjunction and the like, but cf. Rosenbaum 1967), will be utilized for the introduction of Adjectives, Appositions, Participles, other sorts of Nominalizations, and all kinds of phrases. A certain number of these will require a rearrangement of words. For example, if (3) is adopted for Adjectivization by means of embedding, either the second occurrence of the resulting two identical Nouns will have to be erased, or the order of N and S must be reversed; for restrictive clauses, however, the order may be preserved. If (3') on the other hand is adopted for introducing restrictive clauses, the order of N and S must be reversed; it may be preserved, however, in the case of Adjectivization.

Many similar examples could be given for English, whereas in the case of many subordinate clauses it is not even clear which order we want to describe, e.g., 'though he loved smoking, he gave it up' as against: 'he gave up smoking, though he loved it'.[5] Of course, even in cases where there is no need to change the order, transformational rules will still be wanted for generating the required structures.

It is quite conceivable that in the course of a more detailed description of such structures, arguments for the adoption of either (3) or (3') will come forward. But even if these arguments would predominantly point into one direction (which seems unlikely), it is obvious that only an unordered rule would allow a universal procedure to be followed. For, while (3) or (3') require the transformational rules to preserve order in some cases but to alter it in others, transformational rules for all cases determine the required order, provided they are applied to the result of the application of an unordered rule such as:

$$\mathrm{NP} \rightarrow \{(\mathrm{Det}),\ \mathrm{N},\ (\mathrm{S})\}.$$

[5] From an account given by Mr. R. P. G. de Rijk of recent work on transformations carried out at M.I.T., I learned that it is always possible to replace in the finally derived string the second occurrence of two NP's with the same reference by a Pronoun (e.g., 'John noticed that he was becoming deaf'). It is sometimes possible in English (but never, it seems, in Turkish or in one of the languages of Ghana) to replace the first occurrence of such an NP by a Pronoun, provided a certain condition is fulfilled (e.g., 'That he was becoming deaf annoyed John'). This condition depends on grammatical relations and may therefore be formulated in terms of sets. Thus, there are two kinds of Pronoun which are quite different in origin (note that also in English the first kind, but not the second, may be replaced by 'the aforementioned').

Moreover, only this rule would express the generalization that for English (not to mention other languages) recursiveness is introduced into sentences by embedding other sentences into Noun-Phrases.

It may well be asked how transformations work in a syntactic theory based upon sets. It seems obvious that permutations are only definable in terms of strings. This may seem relevant in connection, e.g., with the analysis of questions. But just as it may seem preferable to describe questions not as permutation transformations from affirmative sentences, but both affirmative sentences and questions as transformations from underlying abstract structures (just as positive and negative sentences are derived from such structures, rather than negative sentences from positive ones: Kraak 1966, 158), it seems preferable to describe such abstract structures in terms of sets rather than strings, and apply transformational rules to these sets.

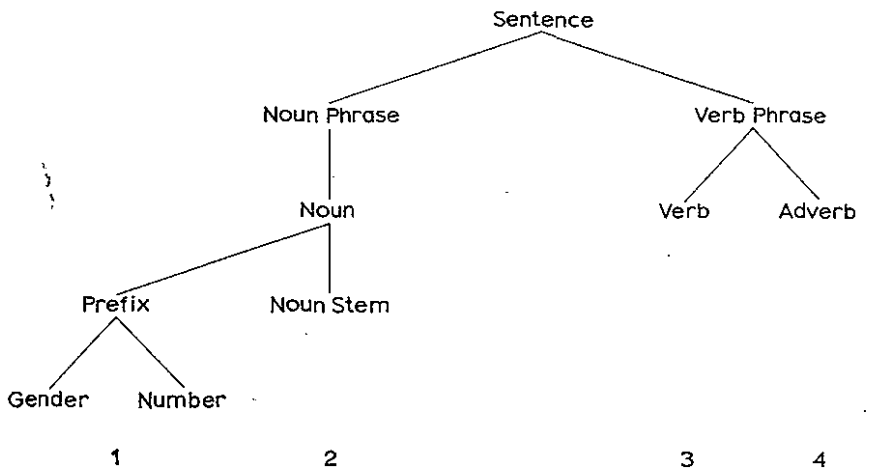
In the case of deletion and addition transformations it is even more likely that this is in many cases the most promising solution. It is obvious that in Sanskrit the optional deletion of *tena* 'by him' from such sentences as (24) (above, page 40):

tena kumbhāḥ kriyante 'pots are made by him',

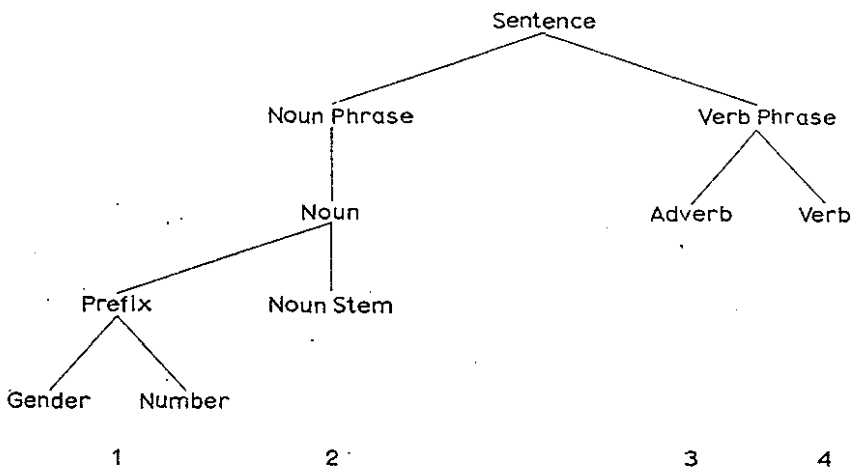
should be defined in such a way that it also applies to the other five grammatical permutations, i.e., *kumbhās tena kriyante*, *tena kriyante kumbhāḥ*, etc. This can only be done by means of one rule, if the description is given in terms of sets.

Passivization itself, in Sanskrit or Latin, cannot be described in terms of strings either, if it is to be described in a natural and not counter-intuitive way. In Sanskrit, *rāmo govindam apaśyat* 'Rāma saw Govinda', and each of its five permutations, is grammatical, and no particular one is optimal. But each of the permutations of: *adṛśyata rāmeṇa govindaḥ* 'Govinda was seen by Rāma', is equally grammatical and is the Passive of each of the former group of six. To express this in terms of Passive transformations formulated in terms of strings would require quite a large number of rules. One rule will again account for this, provided Passivization is described in terms of sets.

In general this would require that the Analyzability condition for the applicability of transformational rules be in such cases expressed in terms of sets. An example from the literature may make this clear. For the sake of exposition and simplicity, agreement has in this monograph been generally described by means of context-sensitive or company-sensitive rules. It may be preferable, however, to describe it with the help of transformations. If this is done as in Katz and Postal (1964, 9–11), the situation depicted in their Diagram 2.4:



but not that depicted in their Diagram 2.5:



falls under the domain of the structure of the transformation:

$$\underset{1}{\text{Gender}} + \text{Number}, \underset{2}{\text{Noun Stem}}, \underset{3}{\text{Verb}}, \underset{4}{X} \Rightarrow 1, 2, 1 + 3, 4.$$

This is clearly stated on page 10 (lines 3–4). But is it desirable? It seems obvious, on the contrary, that this structure index carries redundant information in the same way as some context-sensitive rules: for we want to deal with the situation depicted in Diagram 2.5 as well, since the position of the Adverb and the order of words in general has nothing to do with the agreement of the verb with the subject (cf. above, page 9, where a similar re-

mark was made concerning the description of grammatical relations). The redundant information precisely prevents the additional application of the transformational rule which is required, and thus imposes too strict limits on the applicability of a transformational rule. We need instead a kind of transformational rules defined on Analyzability conditions similar to the company-sensitive rules introduced earlier.

It is no doubt possible to replace the Analyzability conditions for the applicability of transformations formulated in terms of strings by similar conditions formulated in terms of sets, analogous to the replacement of context-sensitive by company-sensitive rules. In order to do this we may have to mark the elements of sets in a similar way as was earlier employed when stratification of sets was indicated by braces.

The company-sensitive rule for verbal agreement given above ((40) on page 60) can in fact be written as a transformational rule with a structure index, i.e.:

$$\underset{1\ 2}{\{\{N, i\}}, \underset{3\quad 4}{\{V, Num\}\}} \Rightarrow \{\{1, 2\}, \{3, 1\}\}. \qquad (51)$$

On the other hand such order-introducing rules as (47) (above, page 69) may be written as transformational rules of the form:

$$\{\{\underset{1\quad 2}{N, Nom}\}, \{Copula, \{\underset{4\quad 5}{N, Cas}\}\}\} \Rightarrow 4^\frown 2^\frown 1^\frown 2. \qquad (52)$$
$$\qquad\quad 3$$

By such simple changes the whole of transformational theory is preserved; but attention should be paid to the precise point where in grammars for individual languages, rules which generate strings are introduced.

We have now seen that even in English there are cases where it is more appropriate to formulate transformational rules in terms of sets than in terms of strings; the change, moreover, is largely terminological. Grammatical relations, as we have seen repeatedly, are always independent of order, and so is of course the system of constituents itself. The same holds for the semantic interpretation, since each of the projection rules of semantic theory coincides with a particular grammatical relation (see above, page 65). The arrangement of words in a sentence is therefore only semantically significant (as it is, e.g., in English) in as far as this arrangement expresses grammatical structure (as it does in English).

The resulting system is relatively simple but it is not as simple as the system of Chomsky 1965. The reason is that we were forced to introduce unordered rules to start with. From here one may proceed by introducing order along Chomskian lines, but in different directions for different structures within the same language, or for different types of language. Any system of universal

grammar appears to require such an unordered base, and so do systems of generative grammar for languages with 'free word order'.

If we wish to describe in more precise terms in what way such a system of universal grammar is more complicated than the system of Chomsky 1965, we shall see that its greater complexity is primarily due to the fact that Chomsky's system constitutes in fact a special case, appropriate for languages with a fixed word order. This explains at the same time that certain rules of Chomsky's system appear to carry redundant information from the point of view of universal grammar. Since even in English adverbials move rather freely, it is not certain that there are languages with absolutely fixed word order. Let us in general distinguish theoretically between (1) A-languages, with free word order; (2) B-languages, with partially free = partially fixed word order; and (3) C-languages, with fixed word order. In theoretical terms it may be postulated that universal grammar contains a substructure of the base of each grammar of an A-, B- or C-language. It might in fact contain the following rules:

$$S \rightarrow \{NP, VP\} \quad (a)$$
$$VP \rightarrow \{V, NP\} \quad (b)$$
$$NP \rightarrow \{N, (S)\} \quad (c)$$

and furthermore, apart from other kinds of universals, rules which introduce other constituents such as Prep-Phrase, Sentence Adverbial, Prep-Phrase Adverbial, and perhaps Det. Such a base embodies the universal deep structure and is mapped into a variety of particular surface structures. But this mapping is done by different rules for different languages or language types. These added rules (which are largely transformational) constitute for each language a particular 'supplement', which is not universal and does not contribute to the semantic interpretation. Of course, these supplements may again overlap or contain other supplements, and thereby circumscribe certain language types. For A-languages, their rules derive further sets; for C-languages, they immediately generate strings; for B-languages, a combination of both.

Speaking theoretically, (a)–(c) belongs to every language. But if (a)–(c), thus formulated in terms of sets, is regarded as a fixed subpart of each particular grammar, such a grammar, especially if it describes a C-language, may turn out to be more complicated than it need be *by itself*. There is, however, no objection to replacing the sets of (a)–(c) immediately by the required strings, if one is engaged in the practical job of writing a grammar for a C-language, provided one has no general theoretical or comparative purpose as well. That would enable us to arrive at precisely the system of Chomsky 1965.

This might be expressed in different terms as follows. The adaptation of particular grammars of C-languages by replacing the sets of the universal base immediately by strings, signifies that the entire edifice of one universal grammar along with all the particular supplements which make up particular grammars, is the simplest possible. But this does not imply that a particular grammar made up of the universal grammar along with one particular supplement, need also be the simplest possible. This is not surprising from a methodological point of view.

It seems most likely that most languages are in fact B-languages, though some may be almost similar to A-, and others almost similar to C-languages. While English may be almost a C-language, Sanskrit appears to be almost an A-language. The entire edifice of universal grammar as embedded in a particular grammar for Sanskrit acquires a structure which is basically Pāṇinian: it is a system which *first* introduces grammatical relations analogous to the *kāraka* relations (at the same time providing for the possibility of transformations and for semantic interpretation); *subsequently* introduces order on the basis of these relations; and finally introduces such elements as certain Pronouns, as well as *sandhi* rules, which operate on ordered strings.[6]

The system here envisaged may also be contrasted with earlier systems and characterized as follows.[7] So far, generative grammar has been conceived of as a device consisting of a *syntactic component* with two interpretations, one a *phonological component* and the other a *semantic component*. The ordered rules of the base introduce *strings* of *formatives*, *constituents* and *dummy symbols*, thus generating *generalized Phrase-markers* represented by *trimmed trees*. Among the rules of the base there is at least one recursive rule, in which the initial sentence symbol S is allowed to reappear on the right, so that the rules may reapply to this new occurrence of S. The *transformational subcomponent* of the syntactic component maps the deep structure generated by the base into surface structures. Whilst most dummy symbols are signals indicating that rules of the transformational subcomponent have to be applied (i.e., transformational markers), the symbol S, which

[6] In order to avoid all misunderstanding it may be emphasized that the system here advocated does not intend to explain free word order by replacing 'trimmed' trees by stratified 'wild trees'; this attempt would fail, e.g., for Sanskrit, for we have seen (above, pages 34, 54) that words may move beyond the boundaries of substrings dominated by particular constituents, or (which means the same) beyond the subsets of stratified sets. This failure itself is one of the arguments which favours the assumption that word order cannot be described in terms of trees, whether trimmed or wild. Therefore, the conclusion is drawn that word order does not belong to the deep structure, but must be relegated to the surface structure. But once this conclusion is reached, there is no more need to cling to trimmed trees, and trimmed trees may be everywhere replaced by wild trees without any loss.

[7] The remaining paragraphs owe their existence to a stimulating discussion with Dr. Kraak.

may be considered both a dummy and a constituent symbol, signals that a Phrase-marker must be embedded. The semantic interpretation, lastly, depends on the system of constituents and grammatical relations defined by the base and is derived by inserting the lexical items of the *lexicon* in specified positions in the base and applying *projection rules* which correspond to grammatical relations.

In the theory here envisaged the base of the syntactic component consists of a *kernel* of ordered rules (including at least one recursive rule) introducing *sets* of formatives, constituents and dummy symbols (transformational markers). This kernel is the same for all natural languages and hence a linguistic universal which is presupposed by particular grammars. Since the kernel generates *stratified* sets, which may be represented by *wild trees*, it immediately provides the system of constituents and grammatical relations required for the semantic interpretation. The kernel of the syntactic component, therefore, coincides with the non-lexical subpart of the semantic component, i.e., with a system of projection rules. Whereas the rules of the base in the system of Chomsky 1965 were "to a large extent universal" (*ibid.*, 141), the rules of the kernel are precisely the universal rules which determine the semantic interpretation. In addition to the kernel, the syntactic component contains other rules which vary from language to language or from language type to language type. For some languages these rules derive further sets from the sets generated by the kernel; for other languages they immediately generate ordered strings. It is clear that in neither case these additional rules contribute to the semantic interpretation. It is probable that these rules are transformational rules which operate on sets. Ultimately ordered strings will be introduced everywhere, and surface structures will be derived from these with the help of other transformational rules. The picture which emerges is not that of a syntactic component with a semantic interpretation (deep structure) and a phonological interpretation (surface structure), but that of a *kernel consisting of stratified sets which embodies the universal deep structure and is mapped into particular surface structures.*

Essentially such a theory is much more simple and perspicuous than earlier systems, since it permits the generation (or 'interpretation') of structures in one way only, *viz.*, from the unordered deep structure expressed by the kernel to ordered surface structures. This is intuitively more satisfactory and constitutes a natural development from the basic ideas that prompted earlier formulations of theories in generative grammar.

APPENDIX

SOME SEMANTIC RELATIONS

As an illustration of a specific application of the theory outlined above, some semantic relations recently treated (Staal 1967a), partly within the framework of Chomsky's *Aspects*, will be reconsidered. My solution of 1967a, if appropriate at all, will be seen to be so only for English or other languages with similar, at any rate fixed, word order. The special devices introduced there depend on word order and surface structure, and are therefore inherently superficial. The particular arrangement of words which happens to be grammatical in English was utilized only to the extent that it provided information about the underlying grammatical relations, which are themselves independent of word order. In other words, these special devices introduced redundant information in the same way as context-sensitive rules (see above, page 11). The required generalization is accomplished by replacing strings by sets and trimmed trees by wild trees; this can be carried out in a relatively simple manner. It may be assumed that this replacement is a step towards the generalization from English syntax to universal grammar.

In order to clearly show the point at issue I shall first briefly sketch the solution proposed in 1967a; subsequently show that this solution is not applicable to similar cases from Sanskrit; and finally introduce modifications which allow the theory to apply to both English and Sanskrit (as well as some other languages). It may be assumed that the resulting description belongs to universal grammar.

The problem under discussion is how to analyse the relation of paraphrase obtaining between such sentence pairs as:

John precedes Mary (53)
Mary follows John (54)

(in at least one sense of the verbs), or:

Peter buys books from John (55)
John sells books to Peter. (56)

The following solution was proposed. Special indicatory symbols were introduced into the complex symbols which occur in lexical items. For

example, the lexical item for *precede* was written in the lexicon as:

$$(precede, [+\,V, +\_\_\_NP\langle follow\rangle \ldots]).^{1} \qquad (57)$$

In general, if a verb is given in the lexicon in the form:

$$(V, [+\,V, +\_\_\_\ldots{}^\frown(Prep_j){}^\frown NP'\langle V'{}^\frown(Prep_k)\rangle \ldots]), \qquad (58)$$

this was defined so as to imply that the following sentences are paraphrases:

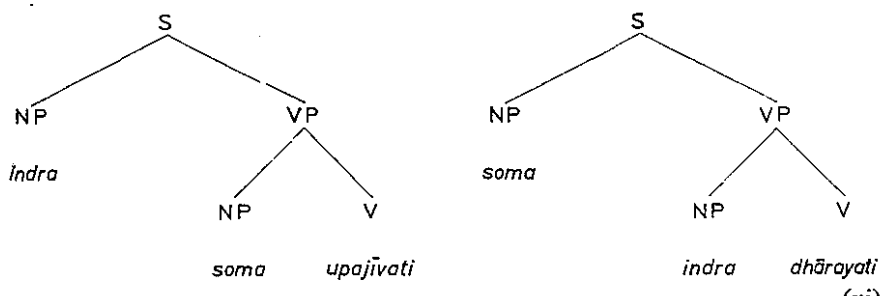
$$NP{}^\frown Aux{}^\frown V{}^\frown \ldots{}^\frown(Prep_j){}^\frown NP' \qquad (59)$$
$$NP'{}^\frown Aux{}^\frown V'{}^\frown \ldots{}^\frown(Prep_k){}^\frown NP. \qquad (60)$$

The actual result of this device is that a noun-phrase which, in a terminal string, immediately precedes the verb, and another noun-phrase which follows the verb but is together with the verb dominated by VP, change places. But what ought to be effectuated is that the subject should change position with another specified noun-phrase (e.g., the noun-phrase of the object), which is dominated by VP, but which need not follow the verb. This is the requirement as formulated in terms of grammatical relations and not in terms of accidental surface structures. In English, the subject happens to precede the verb immediately and the other noun-phrase happens to follow the verb. But in general this is not so (in some cases there are alternatives also in English, as we shall see.)

This becomes obvious as soon as we consider an analogous example from Sanskrit (actually almost any other language would provide similar indications). In Sanskrit we have to account for the relation of paraphrase which obtains between the following sentences (a specific word order, different from English, has been selected):

indraḥ somam upajīvati 'Indra lives on Soma' (61)
soma indraṃ dhārayati 'Soma supports Indra'. (62)

The underlying Phrase-markers may be represented by the trees:



(xi)

[1] The braces '{','}' adopted in 1967a are replaced by angles '⟨','⟩', since braces are used here to refer to sets.

where the occurrences of V are simplified in that indications of person, number, tense, etc. have been omitted.

We shall for the sake of simplicity denote verbs in the lexicon by means of the specific representative quoted here, i.e., by the third person of the present tense indicative. Let us assume, accordingly, that the lexicon contains the item:

$$(upajīvati, [+\,V, +\,\_\_\_\,NP\,\langle dhārayati\rangle \ldots]). \tag{63}$$

Applying definition (58), the relation of paraphrase between the following sentences may be accounted for:

indra upajīvati somam (64)
somo dhārayatīndram. (65)

However, each of the six permutations of (61) or (64) is a paraphrase of each of the six permutations of (62) or (65). To account for this it is not enough to interpret the trees of (xi) as wild and not as trimmed trees, unless (63) is also modified. Moreover, if *upajīvati* is a transitive verb, this cannot in general be expressed by specifying that the verb is followed by a NP (though dominated along with this NP by VP), i.e., by a context-restriction:

$$+\,\_\_\_\,NP, \tag{66}$$

since this restriction is confined to surface structures similar to those of English and does not apply to a number of other languages for which it is undoubtedly appropriate to say that they possess transitive verbs. We must, therefore, introduce a more general 'company-restriction', which specifies that the verb is accompanied by an object or combined with an object (which may precede or follow it). Precisely this results from the restriction:

$$+\,\{\_\_\_\,, NP\}. \tag{67}$$

In general, the context-sensitive subcategorisation rules involving expressions like (66), introduced by Chomsky (1965, 90 sq.), are not valid for Sanskrit or universal grammar. They should be replaced by company-sensitive subcategorisation rules involving expressions like (67). While this is an important difference from the conceptual point of view, the formal change is easily effected by replacing strings by sets and '^' by ','.

The lexical item for *upajīvati* may now be written as follows:

$$(upajīvati, [+\,V, +\,\{\_\_\_\,, \{NP\,\langle dhārayati, +\,\{\_\_\_\,, NP\}\rangle\}\}]). \tag{68}$$

In general, if a verb is given in the lexicon in the form:

$$(V, [+\,V, +\,\{\_\_\_\,, NP'\,\langle V', +\,\{\_\_\_\,, NP\}\rangle\}]) \tag{69}$$

this is defined so as to imply that the following structures underlie sentences that are paraphrases:

$$\{\text{NP}, \{\text{V}, \text{NP}'\}\} \quad (70)$$
$$\{\text{NP}', \{\text{V}', \text{NP}\}\}. \quad (71)$$

Applying this to (68), and further utilizing (37) (simplified), (41) and (42) (above, page 66) we can derive the following structures, which underlie sentences that are paraphrases:

$$\{\{\text{N}, \text{Nom}\}, \{upajīvati, \{\text{N}', \text{Acc}\}\}\} \quad (72)$$
$$\{\{\text{N}', \text{Nom}\}, \{dhārayati, \{\text{N}, \text{Acc}\}\}\} \quad (73)$$

for example:

$$\{indraḥ, \{upajīvati, somam\}\} \quad (74)$$
$$\{somaḥ, \{dhārayati, indram\}\} \quad (75)$$

and hence (61)–(62), (64)–(65), etc.

The device introduced by the definition of (69) not only accounts for the required paraphrases in Sanskrit, but in English as well. The lexicon will now be required to contain the item:

$$(precede, [+\text{V}, +\{\_\_\_, \text{NP}\langle follow, +\{\_\_\_, \text{NP}\}\rangle\}]). \quad (76)$$

This implies that the following structures underlie sentences that are paraphrases:

$$\{\text{NP}, \{precede, \text{NP}'\}\} \quad (77)$$
$$\{\text{NP}', \{follow, \text{NP}\}\}. \quad (78)$$

If we now utilize (37) (simplified), (41**) and (42**) (above, page 67) we can account for the paraphrase relation between the following structures:

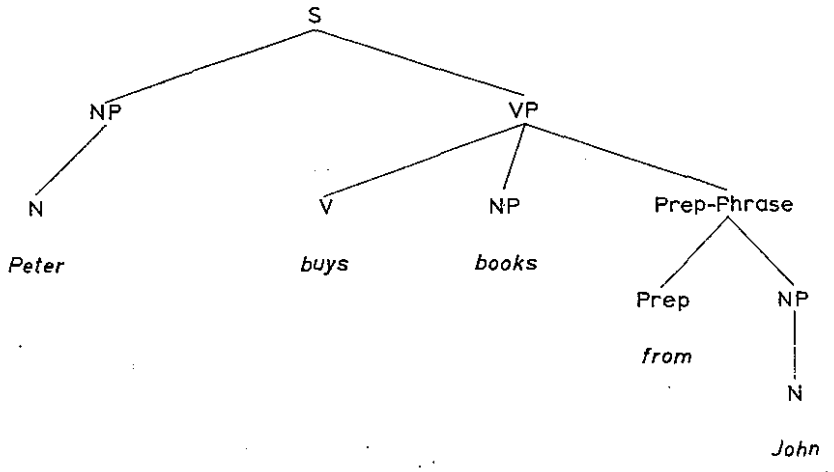
$$\text{N}^\frown\text{Nom}^\frown precede^\frown\text{N}'^\frown\text{Acc} \quad (79)$$
$$\text{N}'^\frown\text{Nom}^\frown follow^\frown\text{N}^\frown\text{Acc} \quad (80)$$

(the verbal terminations may be added and specified with the help of (40) – above, page 66 – and other rules, which have not been taken into account in order to simplify the present discussion). This accounts for 'he precedes her' and 'she follows him' being paraphrases, and also for the paraphrase relation between (53) and (54).

This treatment of paraphrase relations is more complicated than that proposed in 1967a. But this earlier simplicity was achieved at the cost of excluding general features of language which are manifested in English in a special way. It is, of course, fully legitimate to exploit the idiosyncratic properties of English for an English grammar not written for comparative purposes or for the sake of exhibiting general features of language. Still, the advantage of the present treatment (and also of, e.g., (67) over (66)) appears not merely from the point of view of universal grammar (as these particular

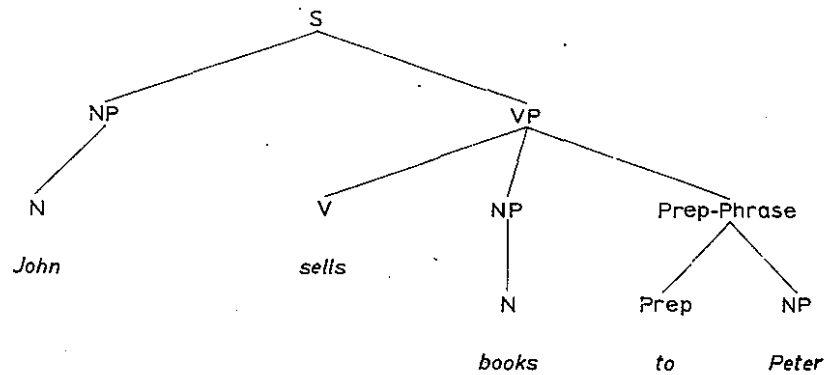
English structures are now derived from structures in universal grammar), but also from the point of view of English grammar, as these English structures are now derived from what they really depend on, i.e., not surface structure, but underlying grammatical relations. In view of this it may be assumed that independent syntactic motivations for such descriptions can be found also in English.[2]

We must also account for the paraphrase relation between (55) and (56) (above, page 81), which involves more complicated devices. The underlying Phrase-markers may be taken to be, respectively:



(xii)

and:



(xiii)

[2] Transitive verbs are sometimes preceded by their object, with or without inversion of the subject and main verb of the sentence: 'Many a rabbit had he snared without the gamekeeper noticing it'; 'Dates I could never remember'; 'Invalids we have no use for' (quoted by Zandvoort 1961, 282).

The solution proposed earlier and expressed by means of (58) can also be applied here, provided the lexicon contains:

$$(buy, [+\,V, +\_\_\_\_NP^{\frown}from^{\frown}NP\ \langle sell^{\frown}to\rangle]). \tag{81}$$

According to the definition this implies that (55) and (56) are paraphrases. Here again, the noun-phrase which immediately precedes the verb and the noun-phrase which immediately follows *from*, change places. But what ought to be described is that the subject changes places with the noun-phrase immediately dominated by Prep-Phrase, itself immediately dominated by Verb-Phrase. This is the requirement as formulated in terms of grammatical relations and not in terms of accidental surface structure.

We can now provide the required subcategorization for the verb *buy*. In the system of *Aspects*, this subcategorization would be given in terms of the context-restriction:

$$+\_\_\_\_NP^{\frown}from^{\frown}NP. \tag{82}$$

But this does not apply in a number of other languages where the same grammatical relation underlies the same phenomenon. We need instead the company-restriction:

$$+\,\{\_\_\_\_,\ NP,\ \{Prep,\ NP\}\}. \tag{83}$$

The English lexicon will accordingly be required to contain the following lexical item:

$$(buy, [+\,V, +\,\{\_\_\_\_,\ NP,\ \{from,\ NP\,\langle sell, +\,\{\_\_\_\_,\ NP,\ \{to,\ NP\}\}\rangle\}\}]) \tag{84}$$

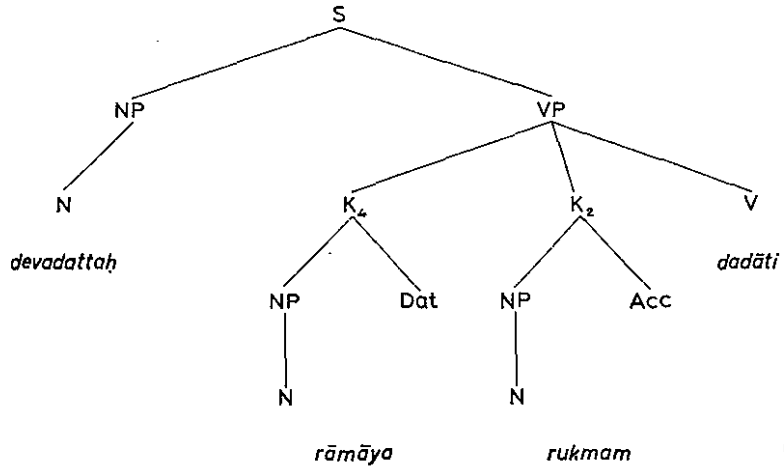
which will in a more natural and justifiable manner account for the paraphrase relation between (55) and (56).

In Sanskrit we have to explain the relation of paraphrase between the following sentences (a specific word order, different from English, has again been selected):

devadatto rāmāya rukmaṃ dadāti
'Devadatta gives a golden ornament to Rāma' (85)

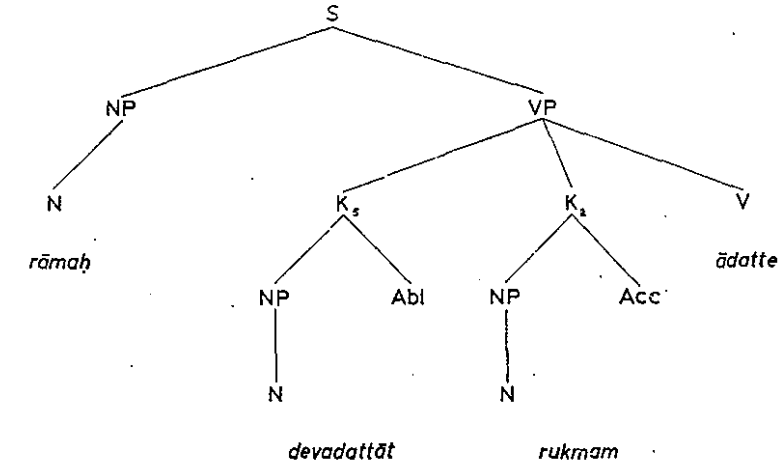
rāmo devadattād rukmam ādatte
'Rāma receives a golden ornament from Devadatta'. (86)

The underlying Phrase-markers may be represented by the following wild trees, respectively:



(xiv)

and:



(xv)

where the occurrence of V is again simplified by omitting person, number, etc. In these trees the symbols K_i have been introduced to remind ourselves of Pāṇini's terminology, where *kāraka* relations (cf. above, pages 36–45) are said to obtain between the verb and the different noun-phrases of the verb-phrase. The underlying *kāraka* relation for *rāmāya* is *saṃpradāna*, which is manifested by the Dative or 4th case (in Pāṇini's order); the underlying *kāraka* relation for *rukmam* is *karman*, which is manifested by the Accusative or 2nd case; the underlying *kāraka* relation for *devadattāt* is *apadāna*, which is manifested by the Ablative or 5th case. In the above terminology, the *kāraka* relations obtain between V and the NP immediately dominated by K_i. The K_i themselves express in general what was expressed by Prep-Phrase in the examples from English. But the constituent K_i may

be realized as {Prep, NP}, {Cas, NP}, as a NP in a specified place in the terminal string, or in other ways. In this system, the Object-of relation, *casu quo* the *karman kāraka* relation, *casu quo* the Accusative case, has been included. Moreover, the Subject-of relation, *casu quo* the Nominative case, could have been included as well.

The lexical item for *dadāti* may now be written as follows:

$$(dad\bar{a}ti, [+\mathrm{V}, +\{\_\_\_\_, \mathrm{K}_2, \mathrm{K}_4\langle \bar{a}datte, +\{\_\_\_\_, \mathrm{K}_2, \mathrm{K}_5\}\rangle\}]). \quad (87)$$

We shall postulate that the symbol occurring inside as well as outside the angles (i.e. K_2, in this case) will not be involved in the change of position which is being described. Provided we use (instead of (37): above, page 65) certain rules of the type: $\mathrm{K}_i \rightarrow \{\mathrm{NP}, \mathrm{Cas}_i\}$, and in addition rules to specify the cases and phonological rules, we can account for the paraphrase relation between (85) and (86) by adopting the following general convention.

If a verb is given in the lexicon in the form:

$$(V, [+\mathrm{V}, +\{\_\_\_\_, \mathrm{K}_j\langle \mathrm{V}', +\{\_\_\_\_, \mathrm{K}_k\}\rangle\}]) \quad (88)$$

this is defined with reference to cases (though it will be differently defined, e.g., with reference to prepositions) so as to imply that the following structures are paraphrases:

$$\{\{\mathrm{NP}, \mathrm{Nom}\}, \{\mathrm{V}, \{\mathrm{NP}', \mathrm{Cas}_j\}\}\} \quad (89)$$
$$\{\{\mathrm{NP}', \mathrm{Nom}\}, \{\mathrm{V}', \{\mathrm{NP}, \mathrm{Cas}_k\}\}\}. \quad (90)$$

When applying this to (87) we can derive from (89):

$$\{\{\mathrm{NP}, \mathrm{Nom}\}, \{dad\bar{a}ti, \mathrm{K}_2, \{\mathrm{NP}', \mathrm{Cas}_4\}\}\} \quad (91)$$
$$\{\{\mathrm{NP}, \mathrm{Nom}\}, \{dad\bar{a}ti, \{\mathrm{NP}, \mathrm{Acc}\}, \{\mathrm{NP}', \mathrm{Dat}\}\}\}; \quad (92)$$

and from (90):

$$\{\{\mathrm{NP}', \mathrm{Nom}\}, \{\bar{a}datte, \mathrm{K}_2, \{\mathrm{NP}, \mathrm{Cas}_5\}\}\} \quad (93)$$
$$\{\{\mathrm{NP}', \mathrm{Nom}\}, \{\bar{a}datte, \{\mathrm{NP}, \mathrm{Acc}\}, \{\mathrm{NP}, \mathrm{Abl}\}\}\}. \quad (94)$$

This accounts for the paraphrase relation between (85) and (86), or any other permutation of the words of these two sentences, respectively.

For English we start again from (88), which is now defined with reference to Prep-Phrases so as to imply that the following structures underlie sentences that are paraphrases:

$$\mathrm{NP}^\frown \mathrm{Aux}^\frown \mathrm{V}^\frown \ldots{}^\frown(\mathrm{Prep}_j)^\frown \mathrm{NP}' \quad (59)$$
$$\mathrm{NP}'^\frown \mathrm{Aux}^\frown \mathrm{V}'^\frown \ldots{}^\frown(\mathrm{Prep}_k)^\frown \mathrm{NP}. \quad (60)$$

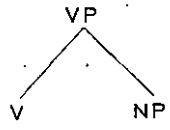
This accounts for the paraphrase relation between (55) and (56), provided we start from the lexical item:

$$(buy, [+\mathrm{V}, +\{\_\_\_\_, \mathrm{NP}, \{from, \mathrm{NP}\langle sell, +\{\_\_\_\_, \mathrm{NP}, \{to, \mathrm{NP}\}\}\rangle\}\}]). \quad (95)$$

Since (60) yields only the sequence: V⌢NP''⌢*to*⌢NP', we may also stipulate that another rule be framed which generates the equivalent order: V⌢NP'⌢NP''. This will account for 'John sells Peter books'.

In the formalisms introduced here, Cases, like Prepositions, are combined with Noun-phrases, and not with Nouns as was done before (see (37), above, page 65). This seems fully justified in the present context, though further investigation is required before a particular solution can be justified in general.

The replacement of strings by stratified sets, which is the new feature introduced by these descriptions, may have to be worked out differently when more material is taken into account. Whatever its final shape, the introduction of stratified sets serves the purpose of formulating grammatical descriptions, whether syntactic or semantic, directly and exclusively in terms of the grammatical relations which are involved. If these grammatical relations were formulated in the manner first proposed by Chomsky, i.e., as relations between, or ordered pairs of, constituents *belonging to different levels of a tree*, it would be difficult to introduce these relations directly into the descriptions. Nowhere does Chomsky in fact make direct use of these formalizations of grammatical relations. The grammatical relation *object-of*, for example, defined as [NP, VP] (Chomsky 1965, 71) cannot be easily introduced into a subcategorization rule since the constituents which occur in these expressions were introduced by *different* re-writing rules, i.e., occur on *different* levels of the tree:



(xvi)

If, on the other hand, the relation *object-of* is required for the definition e.g. of transitive verbs, it is more adequate, as we have seen, to use the expression:

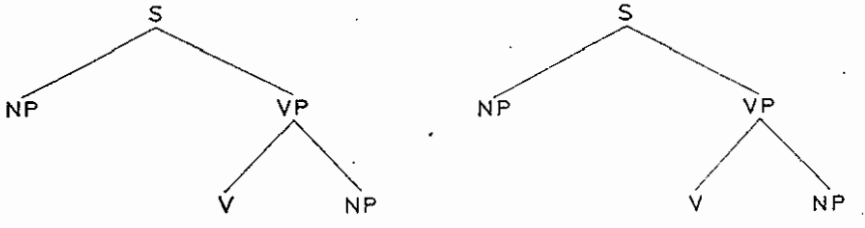
$$\{\underline{\quad}, \text{NP}\}. \tag{96}$$

This expression exactly characterizes the relation between, on the one hand, the V which fits into the open place, and, on the other hand, the entire expression itself in as far as it represents the VP directly dominating it. In other words, expressions such as [NP, V] may be eliminated altogether, for stratified sets such as {____, NP} characterize the corresponding grammatical relations directly. This is even more obvious when we consider a grammatical relation between constituents belonging to levels of a tree still further removed from each other. The grammatical relation between the NP realized as *Peter*, immediately dominated by Prep-Phrase which is

immediately dominated by VP in (xiii) (above, page 85), could not be expressed by [NP, VP], since this relation already defines the relation *object-of*. This relation is however precisely characterized by the stratified set:

$$\{V, NP, \{Prep, \_\_\_\}\}. \qquad (97)$$

As noted before (page 35), the expressions for stratified sets are derived from wild trees by using a familiar method, i.e., in the same manner in which (labelled) bracketing is derived from trimmed trees (the braces which mark the boundaries of sets could, of course, also be labelled, if necessary):



(xvii)

trimmed tree
(NP⌢(V⌢NP))
bracketed string

wild tree
{NP, {V, NP}}
stratified set

The illustrations discussed in this appendix further support the view that some of the syntactic or semantic properties earlier described in terms of the word order or surface structure of terminal strings, are more adequately, more naturally and more generally described in terms of the grammatical relations on which they depend, i.e., in terms of stratified sets.

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