CHAPTER FOUR

4 : GRAMMATICAL THEORY CONSTRUCTION-3
ASPECTS OF PĀṇINI’S SYNTACTICAL SYSTEM

4.1 KĀRAKA SYSTEM AS BRIDGE BETWEEN PROPOSITION AND UTTERANCE

Though Pāṇini’s Aṣṭādhyāyī has been identified as dealing with morphology and phonology ever since it became known to Western linguists, it is only recently¹ that they have realised that it also gives a detailed and interesting treatment of syntax. Though on the surface, it appears that Pāṇini’s grammar concentrates on derivation of word forms, when one delves deep into it and changes his viewpoint, one would easily come to the heart of Pāṇini’s system, namely, the kāraka system. The kāraka system acts as a bridge between the proposition one wants to convey and the actual utterance. The formation of words, is not just arbitrary formation, since without a meaningful proposition in the mind of the speaker to start with, no word formation is possible, since the inflections cannot be determined without a presupposition of a proposition or intention on the part of the speaker. The modern linguist studies Pāṇini’s Aṣṭādhyāyī not for historical interest, as would have been the case with other works so ancient, but for the light it can throw on many of the problems of theoretical syntax for which no definitive solutions are found yet in modern linguistics. Though Pāṇini’s treatment also brings
interacting principles of abstract character to bear on the syntactic processes of the language similar to those of modern linguistics, yet his approach is fundamentally different in certain respects. The kāraka system is the soul of Pāṇini's syntactic systems. The kāraka system plays a crucial role in accounting for the generalization concerning relation among the syntax of actives, passives and statives, the relation between nominals and sentences, the linking of cases to meanings and the grammatical functions associated implicitly with gerunds and infinitives.

4.2 GENITIVE CASE AS OCCURRING WHEN RELATION BETWEEN NOUN AND VERB IS VERY GENERAL

Pāṇini does not consider the genitive case a kāraka. Genitive case is a sambandha pada just as the vocative case is a sambodhana pada. The sixth-case ending or saṣṭhī vibhakti is generally attached to the sambanda pada. The term kāraka used by Pāṇini is explained as the capacity in which a thing participates in the accomplishment of an action and this capacity is the function of the vibhakti, the case-affix. The kāraka-vibhakti is the case termination added to a noun to indicate the relation of the noun to a verb in the sentence. Pāṇini has not given the saṃjñā or definition of sambandha though he has given the definitions for the different kārakas. The āutra for the sixth-case ending comes in P.2.3.50 saṣṭhī tase.
Śēṣa is explained as the relations of the owner with the owned etc., which relations are entirely different from that of kāraka. However, another more significant explanation is that when there is implication of just the relation of the cases like karma etc., and kartṛ kāraka, śaṣṭhī vibhakti is to be used. For instance, in satām gataṁ 'going in respect of good men' might have been otherwise expressed as in santo gacchanti 'the good men are going' where the relation of the subject with the verb would be explicit. Similarly, mātṛuḥ smarati 'the recollection occurs to him of his mother' would become explicit in mātaram smarati 'he recollects his mother'. In the foregoing examples, the genitive case endings stand in lieu of nominative, objective and instrumental cases in explicit statement. Genitive case endings, in these cases, occur because the relation of the nouns with the verbs is very general and not specific for kartṛ, karma, karaṇa etc. Some scholars hold that Pāṇini has made a distinction between deep and surface structure, the kārakaś or cases being deep structure and vibhaktis surface structure.

4.3 GENITIVE CASE AS ONLY SURFACE CASE IN SANSKRIT

There is one type of special instance in Sanskrit where there is owner-owned relation with the verb, which is not obtained in English. In 'He had three queens' in English, the nominative related with the verb 'to have' signifies owner-owned relation. The
nominative is transferred to the genitive case form in the Sanskrit equivalent *tasva tisraḥ mahisyāśān.* Following Fillmore, we may say that the verb 'be' here is a lexically empty verb constituent which can be replaced by a 'have' insertion after the transformation of genitive to nominative and of the subjectivization process to an objectivization process in English. Thus, this may be represented as -

\[
S \rightarrow \text{Genitive - be - NP (nominative)}
\]

in Sanskrit while the same may be represented as -

\[
S \rightarrow \text{nominative - have - NP (objective)}
\]

in English.

However, both Sanskrit genitive and English nominative have to be transposed by adnominal dative as

\[
S \rightarrow \text{NP (nominative) - be - Dative (deep)}.
\]

However, the genitive case forms in various types of structures cannot be changed to the same type of deep structure given above. Thus there are problems in transforming into deep structure the semantic elements in the surface structure. Thus it may be said that the genitive case in Sanskrit is a surface case only as supported by the theories of Pāṇini, Patañjali and Fillmore. It can also be said that deep structure conversion of the genitive case-structure is improbable as far as its universality in all languages is concerned.
4.4 DERIVATION PROCESS IN PANINI’S GRAMMAR AS BEGINNING FROM MEANING WHICH IS KNOWN

In Panini’s grammatical system, it is not possible to derive isolated words with the help of the rules in Astadhyayi. According to Panini, who belongs to vakyasamskarapaka, the entire vākya which is in the mind of the speaker is to be treated as a single coherent utterance. Unless we start from a network of semantic and syntactic relationship, it is difficult to grasp his grammar in its design and operation. Derivation process in Panini’s grammar begins from meaning which is known independently of grammar. Syntactic networks of grammar are represented by the kāraka labels and these labels are assigned to the meanings which are not defined by grammar but freely adopted for grammatical purposes. Panini’s rules transform semantic representation into formal elements by means of kāraka labels which represent the syntactic level of the sentences. According to Patanjali, the kāraka labels are determined by the verb meanings. He refers to kārakas as kriyakṛtaḥ viśeṣaḥ ‘the distinctive features determined by the verb-meanings’. Panini has determined six ways in which nominal meanings can be connected with the verb-meanings namely, apāya, abhipraya, adhakata, adhara, Ipsitama and svastratara.
It is known from Pāṇini’s rules that an utterance may contain more than one single verb where these verbs may be syntactically interdependent. When a single sentence involves more than one verb, there can be different kārakas of different verbs, or on the other hand, two or more verbs may have the same kārakas with the same or different syntactic titles. That the same kāraka may have two different titles in connection with the main or embedded verbs is presupposed in Pāṇini’s rules dealing with present participle, causative construction and reflexive passive construction.

4.5 PĀṆINI’S APPROACH AS NOT PERMITTING TRANSFORMATION OF ONE KĀRAKA FUNCTION INTO ANOTHER

A remarkable feature of Pāṇini’s descriptive procedure is that in his derivative system without basing the derivation of one independent sentence on the other independent sentence, unlike the case in modern linguistics. In Pāṇini’s system, active and passive sentences are derived independently, whereas in modern linguistics, the active sentence is taken as the base and the passive as a transformation. In Pāṇini’s approach, thus, active is not the basic sentence from which the passive is derived. Similarly, in Pāṇini’s approach, there are no rules which transform one kāraka function into another. Thus, it is not possible to transform kartṛ ‘agent’ to kārman ‘object’. In other words, there are no rules in Pāṇini’s system, which convert one level of grammar into the other.
A sentence is an organised whole and in a sentence the kāraka relations ultimately depend on the connection with a verbal form. A verbal form is a nucleus element which organises the sentence by determining kāraka-names. A verbal base denotes action and the action consists of many different activities 'vyāpāras'. Many kārakas 'operators' are engaged in one way or another with these activities. The ways in which the operators are engaged are not only as karta 'agent' and karman 'object', but also as karana 'instrument', adhikarana 'location' etc. All these kārakas help to bring about the final result of the action. For instance, the verbal base puc denotes the action of cooking, which consists of different vyāpāras of setting fire under the pot, putting the rice into the pot, etc., the kārakas engaged in some way or the other being devadatta, rice, fuel, pot etc., each with a different role, leading to the final result of softening of rice. Of all the kārakas, it is the agent who is distinguished by his independence. The agent acts independently and the rest of the kārakas depend on him for the fulfillment of the action. His independence is not to be taken as an absolute entity but as a fact which seems to the speaker to be independent in a given situation. Though, the primary independence belongs to the cook, the speaker is free to transfer the conception of agent to any one of the kārakas barring the sampradāna and apādāna, depending on the context. If the speaker has seen Devādatta when
he is pouring rice and water into the pot, he may choose to say *devaṭattah pacati* 'Devadatta cooks', but when he sees the fire burning and Devadatta is not present, the speaker may choose to say *kāstīmi odanaṃ pacati* (*kaśṭāḥ = ātmana*) 'the fire is cooking the rice (by itself)' In this case the independence is assigned to primarily the most effective means and the construction is called *karaṇa kartari* where the most independent item 'svatantra' is also the most effective means 'sādhakatama' of the action. However, the terms *karaṇakartari, adhikaranakartari, and karmakartari* cannot be taken to stand for the construction showing the transformation of the basic *kārakes of karaṇa, adhikaraṇa and karman into kartṛ*. Patanjalī refers to such constructions as *adhikaraṇena tulyakriyāḥ* 'an agent whose action is the same as the action in the location' and *karaṇena tulyakriyāḥ* 'an agent whose action is the same as the action in the instrument'. But Pāñini's system does not provide rules which transform one *kāraka* into another. In other words, the *Aṣṭādhyāyī* does not constitute rules which can substitute one *kāraka* for another. In the same way, when one says that *sthālī pacati* (*sthālīyām = ātmanī) 'the pot is cooking (the rice in itself)', the construction is referred to as *adhikaraṇa kartari*, in which the independent item is also the locus of the action. In connection with some verbs it is also possible to treat the item as an independent which is primarily the goal of the action 'īpsitatama'. For
primarily the goal of the action 'Ipsitatama'. For instance, the speaker may say that the rice cooks itself as though it were in no need of a human agent. In that case, 'the rice is cooking itself' is not rendered as Odanah pacati (odanam = ātmānam). In order to derive this distinctly, Pāṇini has laid down the special rule P.3.1.87 karmavat karmāṇa tulyakriyāḥ 'an agent (denoted by 1-endings) whose action is the same as the action in the subject is treated like an object', which means that all the operations that take place in the passive will also take place in the karmakartari construction. It is to be noted that the karmakartari usage of odanah pacvate is not a passive sentence but a reflexive active sentence having passive morphology. Similarly, the karmakartari construction is not to be construed as the transformation of the object kāraka into the agent kāraka since Pāṇini’s grammatical system provides no rules for changing one kāraka into another.

But according to the traditional interpretation, the derivation of the reflexive passive sentence depends on the properties of corresponding active sentence. The simple active sentence devadattaḥ odanam pacati is considered as basic and the derivation of the reflexive odanah pacyate is dependent on the corresponding active sentence. The name karmakartari is also explained by considering the correspondence between the simple active and the reflexive passive like active¹. Traditional interpretation holds that the
construction is called *karmakartari* because the agent in *odanah pacvate* is what is an object in the simple active sentence *devadattah odanam pacati*.

Similarly, the names *karana kartari* and *adhikarana kartari* stand for the construction where the agent *kāṣṭhāni* in *kāṣṭhāni pacanti* and *sthalī* in *sthalīpacati* correspond to the instrument *kāṣṭhaiḥ* in *kāṣṭhaiḥ pacati* and the location *sthalvāṃ* in *sthalvāṃ pacati*.

Thus it is clear that the traditional commentators maintain that the simple active is the basic sentence and the reflexive passive is derived from it or dependent on it. But it is difficult to see how P.3.1.87 can account for the *kartṛ* designation to the item *odana* in the reflexive passive by comparing it with the *karman* item in the simple active construction. It is clear that syntactic explanation of a sentence in Pāṇini’s system is never dependent on other sentences as the transformational grammar does in the case of active and passive sentences. The basic difference between Pāṇini’s is grammar and transformational grammar lies in the fact that the latter can transform one grammatical function into another whereas the former cannot do so. Pāṇini’s grammar does not have rules which can transfer *karman* into *kartṛ* or vice versa. In Pāṇini’s system it is not possible to convert one *kāraka* label into another once the *kāraka* label has been assigned like *kartṛ*, in the
same sentence. It is because one kāraka function cannot be changed into another in one and the same sentence that the traditional commentators had to resort explaining the phrase karmanā tulyakriyāḥ comparing the simple sentence with the special passive reflexive. Pāṇini’s system will be seriously affected if the derivation of one sentence is dependent on the property of some items in another sentence. The finely balanced kāraka relations have always reference only to the deep abstract structure of a single sentence because the kārakas were assigned in the first place from the meaning in the speaker’s mind or intention. It is only the morphological and phonological rules in the Āstādhyāyī that make reference to the surface form. It is now clear that the traditional explanation of P.3.1.87 is contrary to the spirit of the deriving procedure of Pāṇini’s system.

4.6 KĀRAKA SYSTEM AS KEystone OF PĀṇINI’S SYNTACTICAL SYSTEM

The kāraka system may be considered as the keystone of Pāṇini’s syntax. The kāraka system is involved in accounting for a number of generalizations concerning the relation between the syntax of actives, passives and statives, the relation between sentences and nominals, the linking of cases to meanings and the grammatical functions associated with implicitly with gerunds and infinitives??
4.7 THE VIEW OF MODERN LINGUISTICS THAT ACTIVE IS BASIC, PASSIVE BEING DERIVED FROM ACTIVE

Modern generative grammar has treated the relation between actives, passives and statives as derivational, the active being taken as basic and the passive as derived from it by a syntactic rule or by a lexical rule. Since the publication of Chomsky 1970, there has been a wide spread agreement that the relation between the structure of a sentence and the structure of nominals is not derivational. The relation, instead, is expressed by giving sentences and nominals parallel expansions in the phrase structure by some version of x-bar theory.

4.8 PĀŅINĪ'S SOLUTION OF ACTIVE, PASSIVE AND STATIVES AS ALTERNATIVE REALIZATIONS OF THE SAME UNDERLYING STRUCTURE

In contrast with the approaches of the modern linguistics, Pāṇini’s solution is non-derivational on both counts. Pāṇini’s approach introduces a set of grammatical categories in terms of which the related structures can be represented as identical at the appropriate level of abstraction, active sentences being in no sense more basic than passive sentences since they are alternative realizations of the same underlying structure. In a similar way, sentences are
no more basic than nominals and vice versa. Hence Pāṇini's rules goes beyond lexicalism in that it generates them by rules which are not just parallel but identical if we leave morphological details.

4.9 KĀRAKAS AS IN INTERFACING BOTH SEMANTICS AND MORPHOLOGY

The kārakas are the pivotal categories of the abstract syntactic representation, the functions assigned to nominals in relation to the verbal root. kārakas are neither semantic nor morphological categories in themselves, but they correspond to semantics according to rules specified in the grammar and to morphology according to other rules specified in the grammar.

4.10 MORPHOLOGY MORE THAN ONCE

The leading principle of the kāraka system is that every kāraka must be expressed by the morphology, but no kāraka may be expressed more than once. Formally, this is achieved by a set of morphological spell-out rules headed by the overriding restriction P.2.3.1 anabhihite 'if not already expressed'.

For example, the derivation of the sentence devadattah pacatv odanam proceeds as follows. From the proposition or meaning of the sentence, in his mind, the speaker selects the drāty and pṛātipadika from the lexicon lists associated with the grammar. The
position of the root in the dhātu-pāṭha and the diacritics associated with it provide the information needed about its morphological idiosyncracies. For example, the entry for pac, DUPaCAs pake is listed in the first conjugation class which will receive the present tense theme Sap (= a) by P.3.8 kartari sap. The derivation starts with the selection of items from the lexicon and deciding upon a semantic relation between them. The nominal items are freely assigned features of gender and number and the verb roots are freely assigned a time reference. In this example, the ‘independent’ devadatta and the ‘agent’s principal goal’ odana are assigned masculine gender, singular number and they have no person, that is, neither ‘first’ nor ‘second’ person. For the verb pac, we choose reference to vartamāna ‘ongoing time’. Devadatta is assigned the function of agent by P.1.4.54 svatantrah kartā ‘the agent is characterised semantically as the ‘independent’ kāraka’ and odana is assigned the function of goal by P.1.4.49 kartur īpsitatamam karma ‘the goal is characterised semantically as the ‘principal goal of the agent’. The verb gets the abstract present tense marker 1AT to ‘express’ its reference to ongoing time in accordance with P.3.2.123 vartamāne lat.
4.11 **LAT AS EXPRESSING THREE MUTUALLY EXCLUSIVE CHOICES RESULTING IN THREE TYPES OF SENTENCES AND NOMINALS**

By another rule P.3.4.69 *lah karmaṇī ca bhāve ca karmakebhyaḥ*, **LAT 'expresses'** in the technical sense of the system either *karta* 'agent' or *karman* 'goal' or *bhāva* state or verbal process itself in verbs lacking goal. These three mutually exclusive choices will give us the following three types of sentences 1(a), 1(b) and 1(c) respectively and the same three functions in noun-forming suffixes account for the corresponding nominals 2(a), 2(b) and 2(c) respectively.

(1) **Sentences (finite verb)**

(a) Active (i) *devadattah-Nom*

*pačaka*- Active

*odanam* - Acc

'Devadatta is cooking rice'

(ii) *devadattah-Nom*

*svapiti*- Active

'Devadatta is sleeping'

(b) Passive

*devadattenā-Instr.*

*pacaya*- Passive

*odanaḥ*- Nom.

'Rice is being cooked by Devadatta'

(2) **Nominals**

(i) *devadattah-Nom*

*pacaka*- Nom

*odanasya*- Nom

'Devadatta (is) a cooker of rice'

(ii) *devadattah-Nom*

*svapita*- Nom

'Devadatta (is) a sleeper'

*devadattenā-Instr.*

*pacva*- Nom.

*odanaḥ*- Nom.

'Rice is cooked by Devadatta'
(c) Stative devadattena-Instr.  (i) devadattena-Instr
supyate - Passive paktir - Nom
'Devadatta is
sleeping'
('By Devadatta is
being slept')

(ii) devadattasya-Gen paktih - Nom
'Devadatta is
cooking'

Suppose we choose the first option of having
\textit{lät} 'express' the agent. In the fiction, \textit{lät} will be
spelled out as the appropriate ending of the active
voice, which finally yields \textit{pacati}. The spell-out rules
of \textit{kārakas} ensure the correct selection of cases. The
goal function is expressed by assigning an accusative
ending to the nominal which bears that function in
accordance with P.2.3.2 \textit{karmanī dvitiya}. The agent
function is expressed by assigning an instrumental
ending to the nominal bearing that function in
accordance with P.2.3.18 \textit{kartṛ karmanyos tritiya}. The
leading principle that nothing is expressed more than
once (\textit{anabhīhite}) comes into play. In this derivation,
the verb endings have been chosen to express the agent.
Therefore, the goal is not yet expressed and therefore,
it gets an accusative ending \textit{odana} + \textit{ām} --> \textit{odanam}, but
the agent is expressed and cannot now be assigned an
instrumental ending. The ungrammatical construction
devadattena pacaty odanam is thereby correctly
blocked. Instead, the rule P.2.3.46 prātipadikārthā-lingavacana parimāṇa vacanamātre prathama steps in, which assigns the nominative case when only the nominal stem notion, gender and number remain to be expressed. Applying to devadatta, it thus completes the derivation of devadattah pacatī odanām.

4.12 GRAMMATICAL RELATIONS AND THEIR MORPHOLOGICAL EXPRESSION

The grammatical relations and their morphological 'expression' may be shown diagrammatically by lines linking verb with relevant nominal, labelling the line as 'agent' or 'goal' and boxing the morphological elements which 'express' the function. Thus the syntactic structure of 1(a)(i) in Pāṇini's approach may be shown as in 3(i) below:

```
    agent
    ----------

3(i)     devadattah    pacatī    odanām
                  \                  /
                           goal
```

The 'agent' line shows that -ti expresses that devadatta is the agent of pacatī and the 'goal' line shows that -am expresses that odana is the goal of pacatī.

The syntactic structure of sentence 1(b) is given in 3(ii) below:
In this case, we have chosen the option of having the abstract tense marker \( \text{LAT} \) express the goal. Thus only the nominal stem notion and grammatical features remain to be expressed in \( \text{odana} \) and so the nominative ending is added to it. The agent function of \( \text{devadatta} \) remains to be expressed by the instrumental ending (Ta ---\( \rightarrow \) ena).

With the third function of \( \text{LAT} \), the expression of process, the syntactic structure of the sentence 1(c) is given in (4) below:

\[
\text{Process} \quad \begin{array}{c}
\text{agent} \\
\text{devadatt}[\text{ena}] \quad \text{supya}[\text{te}]
\end{array}
\]

The parallelism between derived nominals and sentences lies in their identical grammatical relations and in the fact that deverbal (\( \text{krt} \)) noun suffixes have the same three functions as the abstract tense markers such as \( \text{LAT} \), namely, of expressing the agent (cooker), the goal (cooked) or the process itself (cooking). This gives rise to three types of nominal phrases corresponding to the three types of sentences, active (2a), passive (2b) and stative (2c), which are given below diagrammatically.
The suffix -aka underlying Nyul expresses the agent function. The goal of the deverbal noun is expressed by the genitive case, by virtue of the special rule P.2.3.65 kartr̥ karmanoḥ kṛti that sets aside the general rule P.2.3.2 karmacī dvitiya requiring the accusative.

Passive nominals 2(b) are entirely parallel to passive sentences 1(b) in that the suffix on the root expresses the goal.

The stative nominals also work by the same principles. Since there are two kārakas in 2(c)(i) and the verb expresses neither of them, the above rules correctly predict that we have two oblique cases, an instrumental expressing the agent and a genitive expressing the goal by the rule P.2.3.65 kartr̥ karmanoḥ kṛti.
In 2(c)(ii) the agent of deverbal nouns is expressed by the genitive ending, provided there is no goal in accordance with P.2.3.65 kartṛkarmaṇoh kṛti and P.2.3.66 ubhayaprāptau karmaṇi ungrammatical sentences and nominals will be found to be excluded either because some intended grammatical function is not expressed in them so that the grammar cannot assign the proper meaning to them or else because some grammatical function is expressed more than once in them, in violation of the condition 2.3.1 anabhihite.

4.13 'EXPRESS' AS A META-GRAMMATICAL NOTION

The term 'express' is strictly a technical term, though not defined in the grammar itself, presumably because it is not a concept to be elucidated by the grammar but rather a pre-requisite of grammatical description itself. These must be determined indirectly from the internal logic of the system.

The technical term abhidhā 'express' should not be equated with 'marking' or 'signalling' of a meaning in surface structure. Kiparsky\(^2\) defines
'express' as: A function F is expressed by an element E if and only if E is linked with F in the derivation of a sentence. The linking of F and E takes place by applying a rule in which F is stated in the locative case and E is stated in the nominal case. For instance, the present tense lat expresses ongoing time by one such rule (P.3.2.123 vartamāne lat) and agent, goal, or process by another rule (P.3.4.69 lah karmanī ca bhāve cākarma kebhyaḥ). Even if E is then deleted, F is still 'expressed' without having any overt manifestation. For example, vrtrahan 'vrtra-killer' is derived from [vrtra + am] + [han + v + su] in accordance with P.3.2.87 brahmabhrūṇa vrtrēsū kvip [P.3.2.86 karman] [P.3.2.84 bhute]. The goal function 'karman' is expressed by the accusative ending -am which is obligatorily deleted by the general rule when it enters into a compound, and the agent function kartṛ is expressed by the deverbal suffix v which is obligatorily deleted whenever it is introduced.

Thus, it is clear from the kāraka principle and abhidhā principle that an element may express several functions provided that it is linked to each of them by some rule in the derivation of a sentence. For example, this possibility is realised in the tense element lat, which expresses both ongoing time and the functions of agent, goal or process (P.3.2.123 and P.3.4.69). Thus it is seen that there is no one-to-one correspondence between meanings and their expressions.
even at the initial stage when the linkings have been
effected, prior to the application of morphological and
phonological rules.

4.14 INTEGRATION OF DERIVATION OF NOMINALS WITH
DERIVATION OF SENTENCES

The outstanding feature of Pāṇini's treatment
of Sanskrit nominalization is the way their derivation
is integrated with the derivation of sentences. We
find that the finite verb endings and the primary
nominal (kṛt) suffixes form part of a single system of
suffixes with parallel range of functions, that is the
expression of the agent, goal functions and of process,
and they have parallel morphological distribution,
namely, the position directly after a verb root.

4.15 DESCRIPTIVE OPTIONS ALLOWED BY KĀRAKA THEORY
EITHER BY MAPPING OF MEANINGS INTO KĀRAKAS OR
BY MAPPING OF KĀRAKAS INTO CASES

A major structural advantage of kāraka theory
is that there is a certain richness in the system,
which allows descriptive option. Pāṇini can deal with
the variants at two levels in his grammar, either in
the mapping of meanings into kārakas or in the mapping
of kārakas into cases. If kārakas K1 and K2 are
normally expressed by C1 and C2 and K1 normally
corresponds to meaning M, then the mapping M-K1-C1 is
given by the general system and the necessary special
rule allowing C2 with verb V might be either
(i) M is optionally K2 with V or

(ii) K1 is optionally expressed by C2 with V.
Diagrammatically expressed these options are

(i) M ----> \------> K1 ----> C1
      \------> K2 ----> C2

(ii) M ----> K1 ----> \------> C1
      \------> c2

These alternatives are quite distinct since a kāraka is not just a label for a case but an abstract syntactic function with diverse morphological consequences. For instance, the variation between accusative and instrumental case in the object of the verb div 'gamble' given below is treated by Pāṇini at the kāraka level.

(i) aksān -accusative
dīvyatī 'the gambles with dice'

(ii) aksair - instrumental
dīvyatī 'he gambles with dice'

Though the semantic relation of the 'most effective means' normally corresponds to the instrument function, expressed by the instrumental case, for this particular root, however, a special rule allows the same semantic relation to be mapped into the goal function, expressed by the accusative case, as given below:
<table>
<thead>
<tr>
<th>Semantics</th>
<th>Abstract Syntax</th>
<th>Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>'most effective means'</td>
<td>\rightarrow instrument \rightarrow instrumental</td>
<td>\rightarrow goal \rightarrow accusative</td>
</tr>
</tbody>
</table>

However, the same case variation with 'hu' 'offer a libation' is dealt with at the next lower level, by allowing the goal with this verb to be expressed by the instrumental case.

(i) \textit{ājyam} - accusative \[ juhoti \text{ 'he offers ghee'} \]

(ii) \textit{ājvēna} - instrumental \[ juhoti \text{ 'he offers ghee'} \]

<table>
<thead>
<tr>
<th>Semantics</th>
<th>Abstract Syntax</th>
<th>Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>'agent's principal goal'</td>
<td>\rightarrow goal \rightarrow accusative</td>
<td>\rightarrow instrumental</td>
</tr>
</tbody>
</table>

This treatment predicts that the complement of \textit{diy} functions as a true goal as well as an instrument in the grammatical processes of Sanskrit, whereas the complement of \textit{hu} is only a goal, not an instrument.
4.16 **EXCLUSION OF SENTENCES WITH TWO GOALS OR TWO INSTRUMENTS**

The semantic correlates of two of the karakas, namely, karana 'instrument' and karman 'goal' evidently to limit these two karakas to one verb, so as to exclude sentences with two goals or two instruments. In contrast, sentences with two apādānas, two sampradānas, two adhikaraṇas and two agents are perfectly acceptable. As for causative sentences, it is true that the two agents are semantically related to two different acts, the causation and the process, but syntactically in Pāṇini's analysis, the causative verb is treated as a single verb with two agents, the one of causation bearing the additional designation hetu.

4.17 **CONTROL OF NON-FI**

karakas are the categories in terms of which control of non-finite sentential complements must be formulated in Sanskrit. Control in Sanskrit sentential complements depends on grammatical functions 'agent' and 'goal' rather than on the surface grammatical relations 'subject' and 'object' as in English. For example in the Sanskrit sentences

\[ (i) \text{devadatta}ḥ \text{pacat}y \text{odanam} \]
\[ (ii) \text{devadattenum} \text{pacyata} \text{odanah} \]
Pāṇini’s rule P.3.4.21 samāna kartṛkavyoh pūrvakāle for the gerund suffix ktvā specifies that the two verb roots must have the same kartṛ ‘agent’. On the other hand, in the similar English sentences,

Having arrived at the village

(i) Peter cooked rice
(ii) The rice was cooked by Peter

the understood subject of ‘having arrived’ is Peter in (i) and the rice in (ii) unlike in Sanskrit where both (i) and (ii) mean the same thing, namely, ‘Having arrived at the village, Devadatta cooked the rice’. The same condition is given in the rule P.3.3.158 samāna kartṛkesu tumun that introduces the infinitive suffix -tumUN on roots that are complements of verbs meaning ‘to want’. This rule accounts for sentences such as (i) devadatto bhoktum icchati ‘Devadatta wants to eat’ (ii) devadattena bhoktum isyate ‘Devadatta wants to eat’.

The other rules for the infinitive are formulated without a condition of identify of agents, as for most of them such a condition seems unnecessary. It is vacuous to have distinct agent for the construction like kālo gantum30 ‘it is time to go’ because the governing word kāla ‘time’ has no specific agent.
4.18 **NON-I** **M** **POSITION OF CONDITION OF IDENTITY OF AGENTS ON THE INFINITIVE OF PURPOSE TO PERMIT GOAL OF MAIN CLAUSE TO CONTROL AGENT OF THE INFINITIVE**

An interesting case in the infinitive of purpose (tadarthya) comes by the rule P.3.3.10 tumun-ṭvulan kriyāyām kriyārthaḥyām 'tumUN and ṇvuł [---⟩aka] are added to a root denoting future [P.3.3.3 bhavisyanti] action which is the purpose of an action denoted by a connected root'. This rule accounts for sentences, such as,

```
devadatto bhoktum odanam pacati  'Devadatta is cooking rice to eat'.
```

The problem why the identity of agent condition is missing in the rule P.3.3.10 has been discussed by Deshpande who dismisses out of hand the possibility that the omission is deliberately intended to allow infinitives with agents distinct from the agent of their governing verb and concludes that the grammar is inconsistent and suggests that the inconsistency may be due to pre-Pāṇinian elements in the grammar. However, hypothetical pre-Pāṇinian sources are poor explanations for apparent Paninian inconsistencies because we are aware that Panini did change the wording of rules he borrowed. It is better to keep this question open rather than closing it prematurely by an appeal to unknown pre-Pāṇinian sources. In this particular case, however, a better solution which preserves the consistency of grammar
would be to hold that the reason Pāṇini did not impose a condition of identity of agent on the infinitive of purpose (P.3.3.10) is that he intended to derive sentences where the agent of the infinitive is controlled by the goal of the main clause.

4.19 PĀṆINI'S SYSTEM OF KĀRAKAS AS PROVIDING SIMPLE TREATMENT OF AGREEMENT CIRCUMVENTING THE NOTION OF SUBJECT

Pāṇini's system of case assignment provides an ingenious and simple treatment of agreement which circumvents the subject and is in fact superior to the familiar rule in modern linguistics that verb agrees with its subject. The relational structure for 'I am cooking rice' and 'I am sleeping' are given below:

(i)  
\[
\begin{array}{ccc}
\text{agent} & \text{pacā} & \text{odan[ām]} \\
\text{1st person} & \text{1st person} & \text{3rd person} \\
\text{Nominative} & \text{Active} & \text{Accusative} \\
\end{array}
\]

\[
\text{goal}
\]

(ii)  
\[
\begin{array}{ccc}
\text{agent} & \text{pacya[te]} & \text{odanah} \\
\text{1st person} & \text{3rd person} & \text{3rd person} \\
\text{instrument} & \text{Passive} & \text{Nominative} \\
\end{array}
\]

\[
\text{goal}
\]
The agreement rule in essence is that the verb endings are first or second person if they 'express' the kāraka relation of a first or second person, and third person otherwise. In (i) the tense morpheme 1AT is linked to the first person pronoun aham and is therefore, realized as the first person ending -mi. The same is true in (iii). Third person endings are the default case arising when the tense is linked to a third person nominal [as in (ii)] or is not linked to a nominal at all as in (iv). The verb and nominal so linked are designated as samānādhikaraṇa 'having the same substratum by Pāñini and the relation is equated with that which holds between the head and its modifiers in a non phrase. Thus, person agreement in the verb and adjectival concord are in this treatment manifestations of the same semantic relationship.

Specifically, Pāñini's agreement rules are as given below:

(iii)  
agent
\[
\begin{array}{ll}
\text{aham} & \text{svapi[mi]}\\
1\text{st person} & 1\text{st person} \\
\text{Nominative} & \text{Active}
\end{array}
\]

(iv)  
agent
\[
\begin{array}{ll}
\text{may[ā]} & \text{supya[te]}\\
1\text{st person} & 3\text{rd person} \\
\text{Instrument} & \text{Passive}
\end{array}
\]
When the second person pronoun stem is a coreferential adjunct, even underlyingly, the second person set of endings is assigned.

When the first person pronoun stem is coreferential adjunct, even underlyingly, the first person set of endings is assigned.

Otherwise the third person set of endings is assigned.

The specification 'even underlyingly' is necessary to ensure agreement even when the pronoun is omitted in the actual sentence as in pecan 'you are cooking'. Thus, the kāraka theory and the notion of samānādhikarana provide a treatment of verb agreement which gets around the problem of the lack of a subject.

4.20 PĀṇINI'S KĀRAKA SYSTEM AS OVERCOMING NECESSITY OF TRANSFORMATIONAL RULES UNLIKE MODERN TRANSFORMATIONAL GRAMMAR

Unlike transformational grammars, Pāṇini's kāraka theory does not require rules that convert one grammatical category into another. A kāraka function thus remains unchanged, once it is assigned. There are no rules in Pāṇini's grammatical system that could turn
it into another kāraka function. Pāṇini’s approach is such that the very structure of his system forbids such transformational rules. In a transformational grammar, the deep and surface structures are formal objects of the same kind, namely, trees with labeled nodes and directed branches and involve the same set of categories, namely, sentences, noun phrase, verb phrase etc., and the same grammatical relations defined upon them, namely, subject, object, etc. According to Kiparsky, in Pāṇini’s system, the corresponding levels are formally distinct and he identifies four hierarchical levels as (1) semantics, (2) abstract syntax like kāraka, (3) surface structure or morphology and (4) phonetics; each category belonging to one and only one level in this hierarchy. In other words, the levels are represented by disjoint sets of categories and there are no categories which do not belong to one of the levels. Each syntactic rule maps some part of the structure directly into the corresponding structure at the next higher level. For example, the derivation of the participle gacchantam ‘going’ in the sentence vajñadatto devadattam grāmaṁ gacchantam apāyat vajñadatta saw Devadatta going to the village’ is as follows: The abstract tense marker LAT is first introduced to denote present time, by the rule P.3.2.123 vartamāne LAT, subject to the general condition that abstract tense markers (lah) are added when a goal or an agent is to be expressed and in roots with no goal, when the process is to be expressed by
the rule P.3.4.69 *laṅkarmatī ca bhāve cākarmakebhyaḥ*. Next, the abstract tense marker *lāT* is replaced by the principal morpheme *at* because it is coreferential with a non-nominative according to P.3.2.124 *lātaḥ satrāñacāv aprathamā samānādhikaraṇe*. Diagrammatically,

1. Semantic level: *vartamāna* (present time)
   
   \[ P.3.2.123 \]

2. Abstract level: *lāT* (present time)
   
   \[ P.3.2.124 \]

3. Morphology *at* (the morpheme *at*)

The rule which maps level 1 to level 2, namely, P.3.2.123 is conditioned by other factors at level 2, namely, those stated in P.3.4.69. The rule which maps level 2 into level 3, namely, P.3.2.124 is conditioned by other factors at level 3, namely, *aprathamā samānādhikaraṇe*.

4.21 KĀRAKA SYSTEM AS PROVIDING ALTERNATIVE OPTIONS

In transformational grammars, the active structure is treated as basic and the passive is derived from it by some grammatical operation such as syntactic movement transformation or NP-movement. This contrasts with Pāṇini’s treatment, where the active and passive are completely at par. Neither active, nor passive is derived from the other. On the other hand,
both are derived from the same underlying structure which can be mapped into the active or the passive construction by alternative options provided in the syntax.

The sanskrit equivalent of 'the rice is cooking' is not odanah pacati - active, but odanah pacvate - passive; the former being excluded by rule P.3.1.87 karmavat karmanah tulyakriyah 'an agent which is related to the action like a goal is treated like a goal'. To be 'treated like a goal' means in particular to trigger passive verb morphology; the form pacvate is thereby correctly derived. It is to be noted that odanah pacvate is not a passive sentence. Its 'subject' is a true agent and the verb ending expresses that relation in spite of its passive-like form.

An interesting feature of Pāṇini's derivation system is that the correct case marking falls out from the rules that account for ordinary non-causative sentences. For example, the analysis of 'Devadatta causes yajñadatta to cook rice' can be diagrammatically represented as follows:

```
agent (hetu)

devadattah  yajñadatt[ena]  pacaya[ty]  odan[am]
group

agent
goal
```
4.22 Pāṇini's Grammatical Theory as Superior to Modern Transformational Grammars in Explaining Causative Structure

Pāṇini derives causative verbs by the rule P.3.1.26 hetumati ca which adds the causative suffix i (NiC) to the root that has a hetu, an agent with the semantic property that it impels another agent in accordance with P.1.4.55 tatravyojako hetuṣca Devadatta receives nominative case since its agency is expressed by the finite verb and yajñadatta receives instrumental case to express agency. The latter has no good explanation in transformational grammar.35

4.23 Pāṇini's Grammar as Containing No Syntactic Deletions Unlike Modern Transformational Grammars

Unlike transformational grammars, Pāṇini's grammar contains no syntactic deletions, though deletion of morphological and phonological elements is common in it. However, Pāṇini assumes that words may be omitted in sentences if they are evident from the meaning or context, since it was obviously impossible for Pāṇini to ignore the elliptic sentences in Sanskrit. That Pāṇini had them in mind is evident because some rules he formulated make reference to the results of such ellipses, one such rule being in connection with the role of verb agreement which has already been discussed.
4.24 Pāṇini's Agreement Rules as Applying Even When Pronouns Are Deleted

Pāṇini's agreement rule states that verbs have second and first person endings when they have, as coreferential adjunct, the second and first person pronouns, even underlingly (sthaninay.api). In the grammatical process A --- B / C - D, sthanin in Pāṇini's technical term for the item A. In Pāṇini's grammar, there are no rules that substitute anything for the personal pronouns. Unless a free deletion process is assumed to operate, which, when applying to pronouns, eliminates the context for agreement, Pāṇini's wording of the agreement rule does not make much sense.

\[
\begin{pmatrix}
yuṣmad \\
asmad
\end{pmatrix}
\rightarrow
pac + lat
\rightarrow pac + lat
\]

The deletion would precede and bleed the agreement rule because of Pāṇini's principal ordering convention, sarvatra siddhān, giving incorrectly a third person ending, instead of the correct derivation pacāmi, pacasi. In order to prevent this from happening, it is necessary to state explicitly in the agreement rule that it applies even when the pronouns are deleted. Thus, Pāṇini assumes a free deletion process, views it like all deletion in his grammar as substitution, his grammatical theory would allow it to interact with the rules of his grammar, potentially applying before such rules as agreement.
Another explicit reference to omitted words occurs in a rule relating to infinitive construction. For example, while considering the range of elliptic variants of a sentence such as aham edhān āhartum gacchāmi 'I am going to fetch firewood' that might occur, in answer to a question or when a word is obvious from the context, the first person singular pronoun aham can be freely omitted. In answer to various questions, the following various are possible:

(i) Where are you going? : edhān āhartum 'to fetch firewood'
(ii) What are you going to fetch? : edhān 'firewood'
(iii) What about fetching the firewood? : gacchāmi 'I am going to'
(iv) For what are you going? : edhān gacchāmi 'I am going firewood'

But one of the logically possible patterns of deletion, namely (iv), is ungrammatical, just as its English counterpart. Instead another construction which is correct, is used, namely (v) below:

(v) edhebhvo gacchāmi 'I am going for firewood'

In order to account for the ungrammaticality of (iv) and the grammaticality of (v), Pāṇini introduces a special case assignment rule P.2.3.14 krivārthopanadasa va ca karmani sthānīnah 'the dative
case, instead of the usual accusative, expresses the goal of an underlying, that is, deleted sthānīn verb in construction with upapada is a verb denoting an action whose purpose is an action'. The verb replaced by null in (iv) above is śhartum. It is construed with the verb gacchāmi by the above rule. Thus P.2.3.14 applies to yield (v). The general rule which assigns the accusative case to goals is automatically blocked by the utsarğa/ apavāda 'elsewhere' relation that holds between the rules.

4.25 DISTINCTION BETWEEN UNEXRESSED GOAL AND IMPOSSIBILITY OF EXISTENCE OF GOAL IN DETERMINING ENVIRONMENT FOR GRAMMATICAL OPERATION

Pāṇini has also made explicit reference to ellipses in the rules that define the goal function (karman), if they are taken in the literal sense:

P.1.4.49 kartur Ṛpisitamatam karma 'the immediate goal of the agent is karman'

P.1.4.50 tathāyuktam canīpsitam 'also a non-goal so connected'

P.1.4.51 akathitam ca 'also if unmentioned'

The tradition takes Ṛpsita (tama) in P.1.4.49 and P.1.4.50 in the narrow sense of '(most) desired to be reached' so that P.1.4.49 accounts for 'he sees his beloved' (most desired to be reached), P.1.4.50 accounts for 'he sees robbers (not desired to be
reached) and P.1.4.51 intending to derive double accusative constructions of the kind 'he asks the boy the way', but there is no satisfactory way to show the relevance of the word akathita to double accusative constructions, as pointed out by Joshi. Joshi, therefore, suggests that ipsis(tama) should be taken in a more general sense as '(immediate) goal'. He argues that P.1.4.49 is intended to cover all single goals and that it is P.1.4.50 and not P.1.4.51 which accounts for double goal constructions. He suggests that P.1.4.51 akathitam becomes unnecessary and, therefore, it might have been added to the grammar after Panini. Kiparsky has argued that the role played by ellipsis can account for P.1.4.51 as an indispensable function in the system.

He explains that akathitam which means 'not expressed' or 'not mentioned' in the sentence and that the purpose of the rule P.1.4.51 is to ensure goals omitted by ellipsis do function as environments for rules that refer to goals, in the same way as goals that are overtly expressed. Why the provision of P.1.4.51 is required can be seen easily if one considers that to apply the rules correctly, it is essential that transitive verbs with ellipsed goals of the type 'he knows (it)', 'he is eating (something)' be counted as sakarmaka 'having a goal'. Mere ellipsis of a goal does not make verbs intrasitive. The difference between the ungrammatical and grammatical
interpretations is that in the former the verb has an **akathita** 'ellipsed', 'unexpressed' goal and is therefore transitive, while in the latter, it has no goal at all and is truly transitive. In such rules as P.3.4.71-72, the **akathita** goal must count as a real goal if the correct interpretations of sentences are to be derived. Though the principle of ellipsis allows us to freely restore an understood goal in the relevant sentences, Pāṇini's fundamental principle of transparency 40 'sarvatra siddham' will not allow that suppressed goal to serve as an environment for any grammatical operation in derivation such as P.1.3.45 or P.3.4.71-72 unless some special provision to that effect is made in the grammar. That special provision is precisely the rule P.1.4.51 **akathitam ca** which says that even unexpressed 'immediate goals of the agent' function as full fledged goals in the derivation.

4.26 **PĀṆINI'S THEORY AS PRESUPPOSING A FREE DELETION PROCESS**

From the above considerations, it may be said that Pāṇini's grammatical theory presupposes a general deletion rule, operating freely in the grammatical derivations of sentences which drops words which are obvious from the meaning or context.
4.27 **The Principle that Subordinate Verbs Do Not Assign Case to Items in Main Clauses**

A major difficulty encountered in Pāṇini's system in regard to control is how the goal of the embedded clause is interpreted in sentence:

\[
\text{devadatt\textasciitilde\textacuten odana\textasciitilde\textacuten pacati bhokt\textasciitilde\textacuten}
\]

'Devadatta cooks the rice to eat (it)'

The goal of the non-finite bhokt\textasciitilde\textacuten would normally be understood to be the same as that its governing verb pacati, namely odana\textasciitilde\textacuten. When we consider how this is accounted for in Pāṇini's grammar, we run into some apparent problems, since it seems necessary to assume that the accusative ending of odana\textasciitilde\textacuten expresses two goal relations (karman) at the same time, namely that odana is the goal of the finite verb pacati and also that it is the goal of the non-finite verb bhokt\textasciitilde\textacuten, as given diagrammatically below:

But since the ending can be inserted only once, we cannot maintain that it 'expresses' two kāraka relations unless one is ready to give up the
interpretation that abhidhā 'express' is a rule-governed linking between functions and morphological elements and thus the technical meaning of 'expression' thereby becomes obscure.

A much worse problem is faced in the passive, where both goal functions could be expressed, but the resulting sentence would be ungrammatical.

The correct form of this passive sentence has nominative case on odana and so fails to 'express' that odana is the goal of bhoktum and is given below:

(i) devadattena odanah pacyate bhoktum.

Deshpande has reviewed the remedies proposed by Kātyāyana and Patañjali and rejects them as unworkable. Instead he suggests that the correct principle is the one later formulated by Bhartṛhari and he has paraphrased it as follows:

P(i): 'If there are two actions related to each other such that one of them is the principal action and the other is the subordinate action, then the surface
syntax (that is case endings) of shared kārakas is determined by the principal action and not the subordinate action'.

The effect of this principle is that the nominative case assigned by pacvate in (ii) above takes precedence over the accusative case assigned by bhoktum, and the goal relation of odana to bhoktum is not expressed at all. Deshpande also suggests that this principle was adopted consciously by Panini in the construction of the Aṣṭādhyāyī.

Kiparsky has reformulated more simply the same principle as follows:

P(ii): 'Subordinate verbs do not assign case to items in main clauses'.

This principle implies that we must erase 'goal' line connecting odanam and bhoktum in the diagrams D(i) and D(ii) given above. This eliminates our difficulty with D(i) since odanam now gets an accusative assigned to it only once, namely, by pacati and the sentence is therefore, parsed by the grammar as desired. This also offers an explanation for why D(ii) is ungrammatical since odanam cannot get assigned accusative case by bhoktum because of the principle P(ii) above and so the sentence cannot be parsed by the grammar. The problem still remaining is, in sentences
(i) and (ii) above what expresses odana in the goal of bhoktum? The principle P(ii) above forbids bhoktum from assigning case to odana and so by the principle 'express', 'A function F is expressed by an element E if and only if E is linked with F in the derivation of a sentence', these sentences do not express in the technical sense, any relation between odana and bhoktum. Though this consequence seems disconcerting on the surface, it will be seen that it is the right thing to say about these sentences. The goal of gerunds and purpose of infinitives is indeed not controlled but free. This is seen from the fact that they can very well have their own goal, which may be different from the goal of the main clause (iii) or coreferential with it (iv) as in (iii) devadattena Kāśṭhāni bhidyante paktum odanam 'Devadatta is splitting firewood in order to cook rice' and (iv) devadattena odanam pacyate bhoktum enam 'Devadatta is cooking rice in order to eat it'.

These sentences can be phrased in accordance with principles 'express' and P(ii) above since there is no question of a subordinate verb assigning case to an item in a main clause on the other hand the subordinate verbs paktum and bhoktum assign case to their own goals odanam and enam respectively within the infinitive clause. But, as explained before, a goal may remain unexpressed (akathita), though still figuring implicitly in the functional structure of the
sentences in accordance with P.1.4.51 akathitam ca. The result is that we have sentences.

devadattena kāśṭhāni bhidyante paktum and devadattena odanaḥ pacyate bhoktā, each with two interpretations depending on whether the implicit (akathita) goal of the infinitive is understood as different or the same as the explicit goal of the main verb.

4.28 THE CRITERION FOR GRAMMATICALITY OF A SENTENCE AS ‘EXPRESSION’ OF EVERY KĀRAKA BY SOME GRAMMATICAL ELEMENT

Thus it may be said that grammar is to be harmonized with the facts of usage so that idiomatic sentences come out grammatically also correct and unidiomatic sentences come out ungrammatical. Another aspect of grammar is that a Sanskrit sentence is grammatical if this relation can be parsed by the rules of the system. Parsing is possible only if every grammatical function (kāraka) is expressed (abhidhā) by some grammatical element. In this abstract sense, there is a close relationship between form and meaning in the system, though there is no such close relationship in the surface structure of sanskrit sentences because of the effects of deletion including both grammatical rules and drop suffixes and the extra-grammatical principle that permits ellipsis of entire words.
Pāṇini describes Sanskrit sentences and their constituents by means of a derivational system the units of which are bases, pre-suffixial base elements or stems, affixes, syntactic words. Bases are of two types: verbal bases and nominal bases. Verbal and nominal bases may be primitive or derived. A sentence which could be found in actual usage is derived from a string which cannot be found in actual usage but is posited in the grammar, by operations stated in the Astādhyāyī, in order to describe the sentence as a sequence of syntactically and semantically connected words obtained by introducing affixes to items. Complete strings as posited in the grammar consist of related padas(p) in which nominal endings (E^n) and verb endings (E^v) respectively follow nominal stems (N) and verbal stems (V), whose meanings bear stateable relations with each other and can be represented as:

(1) String = (N - E^n)p --- (V - E^v)p

Strings of this type are themselves derived from more abstract strings of the type

String = N - E^n ---- V - L

Where L-suffixes follow verbs.
Strings and the sentences accounted for by the strings can be simple or complex, so also can be stems, simple or complex. A simple stem with respect to a nominal or verbal ending is just a nominal base \((B^n)\) or verbal base \((B^v)\). A complex stem in respect of a nominal ending consists of a nominal base and a feminine affix \((A^f)\). A complex stem with respect to a verb ending consists of a verb and one of a group of affixes including \(\text{map}\), which Paninians call \(\text{vikarana} (A^v)\). Thus (1) can be rewritten as:

\[
(2) \text{String } \left( [{(B^n)}_a(A^f)]_a-E^n \right)_p \rightarrow \left( [{(B^v)}_a(A^v)]_a-E^v \right)_p
\]

The affixes are introduced under meaning conditions and concurrence conditions. An affix treated as signifying a particular meaning is introduced after a given unit on condition that this meaning is to be signified. An affix treated as co-signifying a meaning is introduced after a unit on condition that this be used in a meaning to be co-signified by the affix. An affix may also be introduced to a given item on condition that this co-occur with another item. Some affixes have to be introduced as totally redundant elements.

4.30 PĀṆINI AS TAKING MEANING INTO CONSIDERATION FROM THE VERY OUTSET OF GRAMMATICAL DERIVATION

Thus, Pāṇini takes meaning into consideration from the very outset of derivation. Pāṇini simply speaks of such meanings in terms of conventionally
known terms because he presumes that the particular meanings in question are semantic notions known to any speaker of Sanskrit. Such semantic notions include time references, namely, present (VARTAMĀNA) (P.3.2.123), past (bhūta) (P.3.2.110), future (bhavīsyat) (P.3.3.13), modalities such as commands (vidhi P.3.3.161), numbers (P.1.4.21-22). In addition, Panini operates with syntactico-semantic categories to which the sūtras of the Astādhyāyī assign direct participants in actions (kāraka). Then operational rules provide for different affixes to occur when particular kārakas as assigned these kāraka categories are to be signified. The six category names apādāna, sampradāna, karana, adhikarana, karmā, karte which also includes a subcategory hetu are assigned to direct participants in actions by the sūtras P.1.4.24, 42, 45, 54, 55, 49, 32. These sūtras themselves concern categories that are semantically categorised, though not purely semantic.

4.31 Panini as treating both grammar and phonology

In deriving actual sentences from strings posited

Deriving actual sentences from strings of the type (1) given above involves positing for bases and affixes single basic forms found in such abstract strings and subject to contextual operations which account for the distribution of related variants. These operations include substituting one grammatical element
for another, adding augments to items in grammatically characterised contexts, replacing sounds in phonological contexts. Thus, Panini treats both grammar and phonology.

4.32 PĀṆINI AS NOT DESCRIBING RELATIONS AMONG TYPES OF SENTENCES AS THEY FALL OUTSIDE GRAMMATICAL OPERATIONS INTO ONTOLOGICAL ASPECTS OF SENTENCE

Panini considers relations among various sentences only in so far as they are linked to particular grammatical features and operations such as affixation. Consequently, he does not describe systematically relations among certain types of sentences such as positive and negative, declarative and interrogative sentences or sentences with and without relative clauses.

4.33 KĀRAKAS AS FREGIAN FUNCTIONS

There are many arguments on the levels assumed to have been recognised by Panini in his grammatical system. Cardona holds\(^46\) that Panini's kāraka classifications serve as intermediaries between grammatical expressions and their semantics. Kiparsky and Staal\(^47\) operate with four levels, namely, semantic representation, deep structure, surface structure and phonologic representation. As opposed to Cardona, Kiparsky an Staal, A.C.Sinha\(^48\) claims that kāraka categorizations do not constitute a separate level and that kāraka categories are purely semantic. This
Panini's commentators explain this phenomenon as follows:

For every action a kartr 'performer' is required. With the help of other means such as pot, fire sticks etc., a kartr like devadatta performs the action of cooking rice. At a certain point in the process of cooking devadatta's efforts are no more required and rice gets softened even in his absence. Thus one may feel the independent role played by each object such as pot etc., with reference to the action of cooking. The agent is distinguished by his independence. Thus the speaker who feels the independent role played by other karakas in the absence of the agent may assign the role of agent of any one of them. The concept of independence thus being transferred to karakas other than kartr results in expressions such as athali pacati 'the pot cooks' or kasthani pacanti 'the fire-sticks cook'. In the former construction, we have a case of adhikarana-kartr whereas in the latter we have a case of karanakartr. Such constructions imply extreme case in happening of the event: Though, it is possible to transfer independence to the object (karman) like odana it would result in incorrect constructions like odanah pacati*, which Panini does not allow. Panini, instead, recommends passivisation of the active voice, which he achieves through the extended application (atideha) of karman to kartr in P.3.1.87. He states that if an
agent has the same action as that of an object, it should be treated as kārmat. In this example, odana which is kartṛ because of independence is looked upon as kārman since its action is the same as that of the object of cooking, namely, getting softened. odana performing the double role with reference to the action denoted by the root pac becomes kārmakartṛ. The verbal endings convey the kārman and we have the construction odanaḥ pacvate. Such constructions are called kārmakartari.

4.35 **AGENT TREATED MORPHOLOGICALLY AS AN OBJECT IN KARMA-KARTARI**

However, P.3.1.87 is problematic on several counts. The rule along with the following three rules dealing with kārmakartari construction appears to emerge all of a sudden against the background of the series of rules teaching vikaraṇas. It can be connected with the earlier topic only in a far fetched manner. Secondly, the rule lacks the word kartā which is required for the completion of meaning. Neither is it available through anuvṛtti. Thus it appears that the entire section dealing with kārmakartari is inserted later on in the Aṣṭādhvāyī, though sufficient evidence for this conjecture is not available.
This is a transformation of an active transitive verb into intransitive verb which corresponds to what is called 'reflexive' in Western Grammars. The transformation appears clearly possible only if the root denotes a subsidiary action performed by what is the object in the first expression. From this Fillozat claims that Pāṇini had a conception of an agent treated morphologically like an object, not of an agent who is simultaneously agent and object. It is to be understood as 'agent treated like an object' and not as 'agent-object'. He claims that this is a conception of an active meaning and not a reflexive meaning.