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A TRANSFORMATIONAL GRAMMAR OF AMAHUACA (PANO)

A Thesis

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for the Degree of Master of Arts

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INTRODUCTION

This thesis follows the "transformational approach" to grammar in the description of Amahuaca, a South American Indian language of which no grammar has previously been published.[1] This language is classified as Central Panoan[2] and is spoken by the tropical forest tribe referred to by the name Amahuaca, located mainly on the Inuya, Curiuja, Mapuya, and Sepahua Rivers in Loreto, east-central Peru. The present Amahuaca population in Peru is between 500 and 1000.[3] Speakers of this language have also been found living in the area of the Breu River in the state of Acre in western Brazil.

The data which serve as the basis for this study were gathered principally at Varadero, at the headwaters of the Inuya River (10°, 38.1 min. S.; 72°, 24.7 min. W.), while the author was engaged in field work under the auspices of the Summer Institute of Linguistics and the Wycliffe Bible Translators, from June, 1953, to March, 1964.

This present study is not intended to be a complete grammar of Amahuaca. Although the main Amahuaca sentence types, the principal transformations, and rules which describe the more common morphophonemic processes in the language are presented, certain aspects of the grammar have been omitted from

the study. For example, embedded sentences and clauses are not handled by the transformations presented in this thesis. An embedded sentence or clause is one which occurs as a constituent (such as subject or object) of another clause.[4] A phonological item which is almost completely disregarded in this study is tone. Amahuaca has a register tone system of two phonemic levels and displays rather elaborate sandhi, which is dependent upon the syntactic class membership of the words which occur in sequence in the sentence.[5]

In this thesis, the traditional phonemic approach is followed in the description of the phonemes and morphophonemic changes in Amahuaca. These items in other languages have sometimes been described in terms of distinctive features.[6]

In addition to presenting a description of the Amahuaca language, an aim of this thesis has been to demonstrate that a generative grammar of the transformational kind is an effective instrument for describing relationships between clauses and between clause constituents of this language which are difficult to describe in an explicit way by means of other kinds of grammars. A further aim has been to show that the description of this particular language sheds light on certain problems that are being faced in the grammatical analysis of other languages and in the formulation of a general theory of linguistic structure.

The first section of the thesis provides a brief historical background and general description of the transformational approach to grammar.

Subsequent sections consist mainly of explanations of the phrase structure rules, transformational rules, and morphophonemic rules which have been formulated for Amahuaca and indications of ways in which these rules and the phenomena to which they apply are pertinent to problems of more general interest to descriptive linguists.

FOOTNOTES

[1]A tentative phonemic description of Amahuaca, a paper on tone sandhi in the language, and an article concerning a few morphemes which reveal the mental attitude of the speaker have appeared in print. These are, respectively: Henry Osborn (1948), Robert and Delores Russell (1959), and Robert Russell (1958).

[2]According to the classification of Sol Tax (1960), p. 43, after McQuown (1955) and Greenberg (1956, 1960).

[3]In general, the Amahuaca live in very small settlements spread over a large area. The people are semi-nomadic, moving to a new location every two or three years. These factors, together with the inaccessibility of some of the Amahuaca settlements, have made an accurate census impossible.

[4]Examples of embedded clauses in Amahuaca are: JONI XUNI MIN HIINYANTAXMUN JOQUI-NU 'The old man you saw last moon has come', MIN JATO HINANSHINAHTONMUN JII RURAHIHCAN-QUI-QUI 'They are feeding trees with what you gave them yesterday.'

[5]See Robert and Delores Russell (1959).

[6]For an explanation of the distinctive feature model, see Morris Halle (1962, 1964).

I. THE TRANSFORMATIONAL APPROACH

Underlying much of the work in the field of descriptive linguistics in recent years is the concept of immediate constituents, the view that grammatical constructions can be described in terms of successive layers of components.[1] According to this concept, which is a version of parsing, a sentence can be divided into two or more constituents, for example a noun phrase and a verb phrase, and each of these constituents (phrases, in this case) can then be divided into its respective parts. The process of labeling and dividing continues until further division is impossible or does not reveal anything that would normally be termed structure. Thus, an immediate constituent (IC) analysis of the sentence THE HUNTER SHOT A DEER divides the sentence into a noun phrase and a verb phrase. The noun phrase consists of an article and a noun, while the verb phrase consists of a transitive verb and a noun phrase. This noun phrase, like the other, consists of an article and a noun. Furthermore, it can be said that shot consists of shoot and past tense.[2]

A grammar which is based on the concept of immediate constituents is sometimes referred to as a constituent structure

(or phrase structure) grammar. Paul M. Postal has pointed out that "it was . . . not until 1956 that any real suggestion was made within the tradition of modern structural linguistics that the fundamental ideas involved in the phrase or immediate constituent structure approach were inadequate as such."[3] In that year was published Noam Chomsky's article "Three models for the description of a language."[4] In his consideration of three approaches to the analysis of language, Chomsky indicated the basic inadequacies of constituent structure grammars. The "search for a rigorous formulation in linguistics," as he termed it, resulted in Chomsky's Syntactic Structures.[5] The publication of this book in 1957 began a revolutionary development in linguistics in America, one which was destined to influence European linguistics also. This development has come to be known as transformational grammar. Zellig Harris, under whom Chomsky had studied, had laid some of the groundwork for the transformational approach.[6] R. B. Lees' review of Syntactic Structures[7] helped attract attention to the new model of grammar. During the years since 1957, the transformational approach has steadily gained adherents and has been employed in the description of a number of different languages.[8] Although most of the transformational studies published thus far have been those which have used English as a basis for developing, testing, and explicating the theory,[9] the approach rests on what are believed to be universal language phenomena, and so there is no reason known why

it should not prove useful in the description of any natural language.

According to this view, a grammar is a finite set of rules which can generate all the grammatical sentences of a language (an infinite set of sentences in the case of any natural language) and no ungrammatical sentences and which assigns a structural description to each of the sentences it generates.

A transformational grammar consists of a syntactic component and a phonological (morphophonemic) component.[10] The former contains, along with the constituent (phrase) structure section, a transformational section. The transformational section of the grammar consists of rules which perform such operations as permutation of parts of the sentence, replacement of one element with another, and deletion of elements. These are operations which the phrase structure rules are incapable of performing. That transformational rules are more "powerful" than phrase structure rules allows a transformational grammar to make explicit the relationship between two sentences which a speaker of the language knows to be related. For example, a transformational grammar accounts for the relationship between such sentences as THE PRESIDENT DECORATED THE ASTRONAUT and THE ASTRONAUT WAS DECORATED BY THE PRESIDENT by means of a single rule, which derives the passive sentence from the active sentence.[11] Other transformational rules derive interrogative sentences from

declarative sentences, negative sentences from affirmative sentences, etc.[12] Transformational rules of various kinds are presented in Chapter IV below. ~~One form of transformational rule is seen in Section 5 below.~~

Phrase structure (PS) rules employed in transformational grammars are ordered and are of the form XAY → XBY, in which X or Y or both X and Y may be null, but B may not be null. These are expansion rules, and so they do not allow for deletion. The arrow can be read 'is rewritten as'.

One symbol to the left of the arrow is rewritten as one or more symbols to the right of the arrow. If the symbol to the left of the arrow is rewritten as two or more symbols, these are joined by plus signs indicating concatenation, as in the rule C → D + E.

Another way of writing the rule XAY → XBY, when neither X nor Y is null, is as follows: A → B in the environment preceded by X and followed by Y. By allowing / to stand for 'in the environment' and ___ to represent the relative position of the symbol being rewritten, the rule can be presented in this form: A → B / X ___ Y. This is a context - sensitive rule, as are the rules A → B / X ___ (that is, in the environment preceded by X) and A → B / ___ Y (that is, in the environment followed by Y). A rule in which there is no need to specify the environment of the symbol being rewritten, such as the rule C → D + E, is a context-free rule.

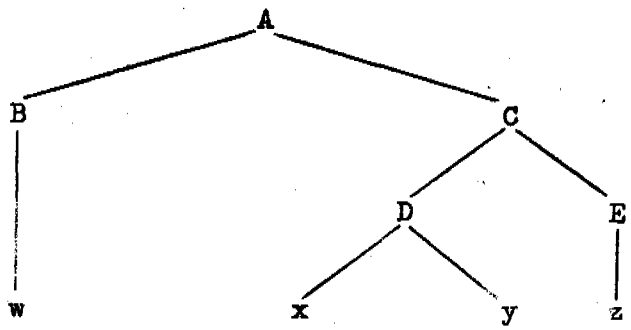
B in the rule A → B / X ___ Y may not represent A plus a single other element, for this would not allow for a unique derivation of a resulting string.[13] A string is the initial unit (the sentence) or the line of concatenated symbols resulting from the application of one or more PS rules of a grammar. The derivation of a string is the history of that particular string. It consists of a sequence of strings of symbols beginning with the initial string in the set of rules. Each subsequent string differs from the preceding one only by the change resulting from a single application of one of the rules.[14] For example, a particular grammar may have the following PS rules:

1. A → B + C
2. C → D + E
3. B → w
4. D → x + y
5. E → z

The derivation of the string w + x + y + z based on this grammar is as follows:

A	(initial string)
B + C	(rule 1)
B + D + E	(rule 2)
w + D + E	(rule 3)
w + x + y + E	(rule 4)
w + x + y + z	(rule 5)

A phrase marker (P marker) is a representation of the constituent structure of a particular string in the form of a labeled tree or a labeled bracketing. The former device is employed in this thesis. A P marker of this type for the string w + x + y + z generated by the grammar presented above is as follows:



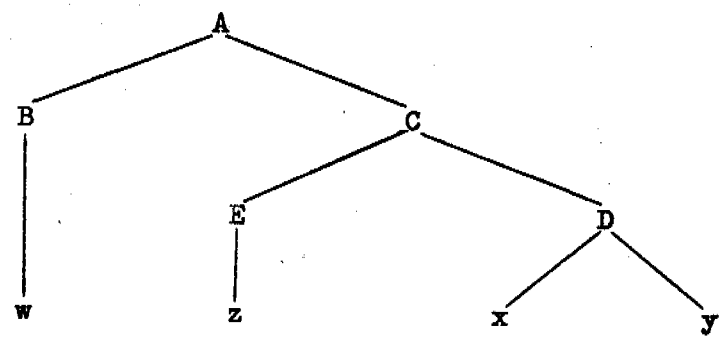
While PS rules generate P markers, transformational rules in general change a P marker into another P marker (or, stated conversely, derive one P marker from another) or combine two or more P markers. A transformation which operates on a single string is called a singulary transformation, while one which operates on two or more strings is called a generalized transformation. Generalized transformations are optional. Singulary transformations may be either optional or obligatory. A sentence generated by the phrase structure and in which all pertinent obligatory transformations (but no optional transformations) have been performed is called a kernel sentence. A non-kernel sentence is one in which at least one optional transformation has been performed.

A transformational rule consists of two parts: (a) the structural description (SD) of the string upon which it is operating and (b) the structural change (SC) it is effecting. For example, if the hypothetical language considered above has a sentence w + z + x + y, this sentence can be derived from the sentence w + x + y + z by means of the following transformation, in which C stands for component and the numerical subscript indicates the order of this component in the structural description. Commas separate components, while plus signs join elements which are being treated as a single component in the transformation:

SD: w, x + y, z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3 - C_2$

The change which is effected involves the P marker, and not just the terminal string (string consisting entirely of terminal symbols). The resulting P marker is:



In the phonological (morphophonemic) section of a transformational grammar, there are rules which differ from phrase structure rules in that they can have two or more

symbols on the left of the arrow and a single symbol or form on the right. For example, the following is a morphophonemic rule for English:

baj + Past → bɔt

This has been a general sketch of the transformational approach to grammar and a glance at a few of the symbols and devices which would normally be explained in the metatheory. In subsequent sections of the thesis, the application of this approach will be considered in detail in the description of Amahuaca.

FOOTNOTES

[1]Postal (1964b), p. 140, states that these ideas "have been under development within modern linguistics for approximately thirty years."

[2]For a detailed description of immediate constituent analysis, see R. Wells (1947) and P. M. Postal (1964a).

[3]Postal (1964b), p. 141.

[4]Chomsky (1956).

[5]Chomsky (1957).

[6]Harris (1952, 1957).

[7]Lees (1957).

[8]For example, Bach (1962), Halle (1959), Harms (1962), Postal (1962).

[9]For example, Fillmore (1962), Klima (1964), Lees (1960), Smith (1961).

[10]See Chomsky (1964), pp. 81-91.

[11]See rule 12 on p. 112 of Syntactic Structures and a discussion of this rule on pp. 42, 43 and 78-80.

[12]For additional transformational rules for English, see Chomsky (1962) in Fodor and Katz (1964), pp. 227-233 and Klima (1964), pp. 318-321.

[13]For a discussion of this, see Bach (1964), p. 39.

[14]For a further discussion of derivations, see Chomsky (1957), pp. 26-30 and Bach (1964), pp. 15, 16.

II. AMAHUACA SENTENCE TYPES

The major categories of Amahuaca sentences are: (I) simple sentences (one-clause sentences), (II) compound sentences (sentences consisting of two or more clauses of which none of them is embedded in any other), (III) complex sentences (sentences which are not compound but have one or more clauses embedded in the main clause as constituents of the main clause), and (IV) compound-complex sentences (sentences containing two or more non-embedded clauses and one or more embedded clauses). Non-final clauses which are not embedded are referred to as dependent clauses. They differ in certain ways from final clauses or clauses of simple sentences and embedded clauses. The following Amahuaca sentences illustrate the difference between categories II and III:

(II) MIN VANAYANTAMUN JOCONHI TAA VATA-QUI-NU[1] 'You planted sugarcane last moon, and it is sprouting.'

(III) TAA VATA MIN VANÁYANTAXMUN JOCONHI-QUI-NU 'The sugarcane you planted last moon is sprouting.'

From the English translations of these examples, it would seem that the distinction between compound and complex sentences in Amahuaca is the same as that which exists between

these two types of sentences in English. That this is not actually the case will be demonstrated in later sections of this thesis, although complex sentences and compound-complex sentences (as here defined) are not included in the grammatical rules presented in the thesis.

Simple sentences in Amahuaca may be classified as (A) activity sentences or (B) equational sentences, and clauses may be classified similarly as activity clauses or equational clauses. Activity sentences or clauses always contain a verb, while equational sentences or clauses usually do not. Some examples of (A) are:

JAN JOSHINXO-NU 'He came yesterday.'

PIYACANTIMUN JOCHIN HIYA HINANXO-QUI 'Older brother gave me a bow.'

JARIMUN CHAXO CAQUI-NUPU 'There went a deer.'

Examples of (B) are:

SHARAAMUN TAA VATA-NU 'The sugarcane is good.

XUNIMUN JAN-QUI 'He is old.'

PIYA NAHAYAMUN MIPA-NUPU 'Your father has lots of arrows.'

VIZMAMUN JATON JATI-NUCANPU 'Their home is far away.'

HIYAMUN HUN-NUPU 'It is I (lit: I am I).'

In addition to the classifications presented above, Amahuaca sentences can be classified with respect to mode as (1) indicative, (2) interrogative, (3) indicative-interrogative, and

(4) imperative. Examples of sentences of these respective categories are:

(1) JIRIMUNI JAN-QUI-NU 'He is eating.'

TOHAMUN MIN TAPAZ-NU 'Your house is big.'

(2) JIRIHIRA JAN-QUI 'Is he eating?'

TOHARA MIN TAPAZ 'Is your house big?'

(3) JIRIHIRA JAN-QUI-NU 'I don't know whether he is eating.'

TOHARA MIN TAPAZ-NU 'I don't know whether your house is big.'

(4) JIRI-PU 'Eat!'

MANINHA HIYA VIXONTAN-PU 'Go get me some bananas!'

Sentences of these first three categories (that is, 1 through 3 above) can be divided into (a) perfect and (b) imperfect with respect to aspect. Some examples are:

(a) MOHAMUN COCA CAQUI-NU 'Uncle has just gone.'

JIRA JAN RURASHINAX 'Did he fell trees yesterday?'

(b) MOHAMUN CAHI COCA-QUI-NU 'Uncle is going now.'

JIRI RURASHINAXRA JAN-QUI 'Was he felling trees yesterday?'

Although it is possible to classify Amahuaca sentences as affirmative sentences or negative sentences on the basis of whether the final (or only) clause is affirmative or negative, it is best to restrict this classification to individual clauses and simple sentences. In a negative activity clause, -YAMA occurs affixed to the verb stem, while in a negative equational clause, -MA occurs affixed to the noun phrase, pronoun, or

adjective phrase together with which it constitutes the description component of the sentence. The vowel immediately preceding -MA is reduplicated if it is not already the second member of a geminate cluster. The respective negative forms of the simple sentences presented in examples (1) and (2) above are:

(1) JIRIYAMAMUNI JAN-QUI-NU 'He is not eating.'

TOHAAMAMUN MIN TAPAZ-NU 'Your house is not big.'

(2) JIRIYAMAHIRA JAN-QUI 'Isn't he eating?'

TOHAAMARA MIN TAPAZ 'Isn't your house big?

The transitive-intransitive distinction of verbs and clauses is an important one in Amahuaca. Although no sentence categories based on this dichotomy are suggested, transitive verb phrases are distinguished from intransitive verb phrases, and it will be seen that this opposition is manifested in a number of the phrase structure rules and transformational rules presented in this thesis.

FOOTNOTES

[1]A listing of the orthographic symbols for Amahuaca in which each symbol is followed by an indication of the phoneme it represents is as follows:

a /a/, c /k/, ch /č/, h /ʔ/, i /i/, j /h/, m /m/, n /n/, o /o/, p /p/, qu /k/, r /ř/, sh /š/, t /t/, tz /ts/, u /ɨ/, v /w/, x /x/, y /y/, z /s/, ´ /high tone/.

Tone markings have been omitted from most of the examples in this thesis. Utterance-initial h has been written in the examples, although in actual speech, glottal stop is deleted in utterance-initial position. Hyphens are employed in the examples to separate the progressive aspect indicator, the indicative mood indicator, and the imperative mood indicator from the constituents to which these are phonologically bound. The interrogative mood indicator is also an enclitic, but due to its occurrence in various positions in the sentence, the hyphen has not been employed to separate it from the form to which it is bound.

For a description of the phonetic values of the Amahuaca phonemes, see Chapter V.

III. PHRASE STRUCTURE OF AMAHUACA

In this chapter, a number of the phrase structure rules for Amahuaca are explained and illustrated. However, not all the rules which have been formulated are considered here. A more complete listing of PS rules and a key to the symbols that are employed will be found in Chapter VI. In some cases the explanations given here would be strengthened by reference to the transformations which operate on the strings generated by the particular PS rules under consideration. However, little mention is made here of these transformations, inasmuch as they are examined in the following chapter. In the explanations given here there has been an effort to point out that many of the problems faced in the formulation of these rules are not unique to this particular grammar and this language, but are problems in the analysis of other languages. Some of these problems are theoretical matters which are involved in some of the current issues in descriptive linguistics.

The first seven phrase structure rules in this transformational grammar of Amahuaca are as follows:[1]

PS1. $S \rightarrow \left\{\begin{matrix} Cl \\ CC \end{matrix}\right\}$ Mod (Voc)

PS2. $CC \rightarrow P + H$

PS3. $P \rightarrow \begin{Bmatrix} DCl \\ CC \end{Bmatrix}$

PS4. $H \rightarrow \begin{bmatrix} \begin{Bmatrix} Cl \\ CC \end{Bmatrix} \\ \begin{Bmatrix} DCl \\ CC \end{Bmatrix} \end{bmatrix} / \begin{bmatrix} \_\_\_ \text{ Mod} \\ \text{Otherwise} \end{bmatrix}$

PS5. $DCl \rightarrow Cl + CR + Emp$

PS6. $Cl \rightarrow \begin{Bmatrix} ClA \\ ClE \end{Bmatrix}$

PS7. $Mod \rightarrow \left\{ \begin{matrix} Imper \\ (Imperf) \end{matrix} \begin{Bmatrix} Indic & (SAR) \\ Interr \end{Bmatrix} \right\}$

In these rules, choice between items enclosed in the same set of ~~brackets~~ braces is arbitrary. Items enclosed in parentheses are optional. Plus signs are omitted when they would immediately precede or follow brackets, parentheses, or braces. Thus the first rule indicates that S can be rewritten as either Cl + Mod + optional Voc or CC + Mod + optional Voc. That is, a sentence (S) in Amahuaca is either a clause (Cl) plus a modal (Mod) or a clause construct (CC) plus a modal. Either can be accompanied by a following vocative expression (Voc).

A type of Amahuaca utterance which is not included in PS1 or subsequent rules is one which consists of only an interjection, such as cha, a male speaker's expression of disappointment, and co, a female speaker's expression of disappointment. This could be considered a minor sentence type. Such sentences cannot be derived by deletion transformations, for

they are not represented in the phrase structure of the grammar. It appears, however, that they can be accounted for by one or more replacement transformations.

It will be noted that this first rule introduces compound sentences in the phrase structure of the grammar. This differs from the phrase structure rules for English formulated by Chomsky, Lees, and Klima, which handle only simple sentences.[1] In grammars of the type represented by these sets of English phrase structure rules, simple sentences are conjoined by generalized transformations to form compound sentences. However, such an approach would not appear to be satisfactory even for English, for it either does not allow for the arbitrary choice of conjunctions to be employed or allows that choice to be made in a transformational rule. Even if English had only the conjunctions and, but, and or (coordinating conjunctions), it would seem best to introduce compound sentences in the phrase structure so that the decision about which conjunction to use in a given compound sentence could be made before the transformational rules were applied. Furthermore, if the grammar is to distinguish between coordinating conjunctions and subordinating conjunctions, the rule allowing for the choice of type of conjunction would necessarily precede the rules governing the selection of the particular morpheme to be employed. Thus English phrase structure could include the following rules, in this relative order but not necessarily restricted to this

particular sequence:

$$S \rightarrow \begin{Bmatrix} Cl \\ CC \end{Bmatrix}$$

$$CC \rightarrow Cl + Conj + Cl$$

$$Conj \rightarrow \begin{Bmatrix} Coord \\ Subord \end{Bmatrix}$$

$$Coord \rightarrow \begin{Bmatrix} AND \\ BUT \\ OR \\ \dots \end{Bmatrix}$$

$$Subord \rightarrow \begin{Bmatrix} BECAUSE \\ IF \\ ALTHOUGH \\ \dots \end{Bmatrix}$$

The problem of conjunction in Amahuaca is in some ways more acute than it is in English, for the conjunction (clause relator) in Amahuaca indicates a number of interclausal relationships. For example, if a compound sentence in Amahuaca consists of two clauses, the clause relator joined to the first clause indicates whether the two clauses have the same subject or different subjects. If the subjects are different, the clause relator may indicate that the subject of the ~~final~~ first clause identifies with the object of the ~~second~~ or that the object of the first identifies with the subject of the second. In addition, the time relationship between the two clauses is often, but not always, made explicit.

Rule PS2 of this description of Amahuaca indicates that a clause construct consists of a peripheral constituent (P)

plus a head constituent (H). PS3 indicates that the peripheral constituent may consist of either a dependent (non-final) clause (DC1) or a clause construct. PS4 indicates that the head constituent may be either a single final clause or a clause construct when followed by a modal and that otherwise it may be either a dependent clause or a clause construct. Brackets ~~Braces~~ are employed in the rule and elsewhere to show parallelism between elements on one side of / and the other.

It will be noted that PS3 and PS4 are recursive. In both of these rules, the symbol CC occurs to the right of the arrow, although the same symbol appears to the left of the arrow in PS2. A grammar of any natural language must be characterized by recursion. Otherwise, it cannot generate ~~be~~ an infinite set of sentences. Bach states that "the recursive property of a grammar is best built in not by PS rules but by transformations."[2] Nevertheless, it appears that the introduction of recursion in the phrase structure is both acceptable and necessary. It seems to afford the only satisfactory way to account for conjunction without allowing for an arbitrary choice of conjunction morphemes in the transformational section of the grammar. If CC is chosen in either PS3 or PS4, it is necessary to return to PS2 and then proceed from there. Although the rules are ordered, a particular rule may operate a number of times on a given string or may not operate at all on that string. For example, PS6 would be applied twice in the case

of the string Cl + CR + Emp + Cl + Indic, operating first on one of the Cl nodes and then on the other, while the rules rewriting Imper, Imperf, and Interr would not apply at all in this particular sentence.

PS5 indicates that a dependent clause consists of a clause plus a clause relator (CR) plus an emphasis indicator (Emp).

PS6 shows that a clause may be either an activity clause (ClA) or an equational clause (ClE). PS7 analyzes the modal as an imperative marker (Imper) or either an indicative marker (Indic) or an interrogative marker (Interr) preceded by an optional imperfect aspect indicator (Imperf). The indicative marker may be followed by a speaker - audience relator (SAR).

It would be possible to compress PS1 through PS5 into the following rule: S → (Cl + CR + Emp) Cl + Mod (Voc). One dependent clause (of optional occurrence) is introduced by this rule, and additional dependent clauses can be added by transformations. However, such an analysis would eliminate the possibility of demonstrating the precise supraclausal structure of a particular Amahuaca sentence, for all clauses would be derived directly from (dominated directly by) the S node. This rule contains weaknesses similar to those of the following PS rule for English: S → Cl (Conj + Cl). In spite of its shortcomings, this rule is perhaps an improvement over some of

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of the string Cl + CR + Emp + Cl + Indic, operating first on one of the Cl nodes and then on the other, while the rules rewriting Imper, Imperf, and Interr would not apply at all in this particular sentence.

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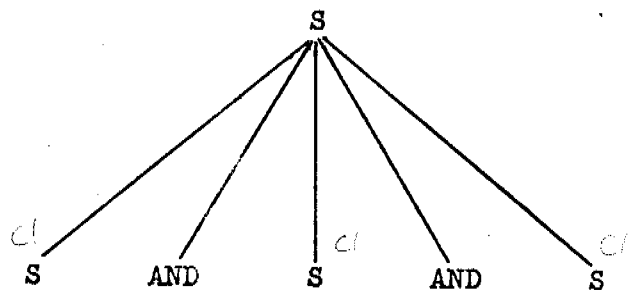
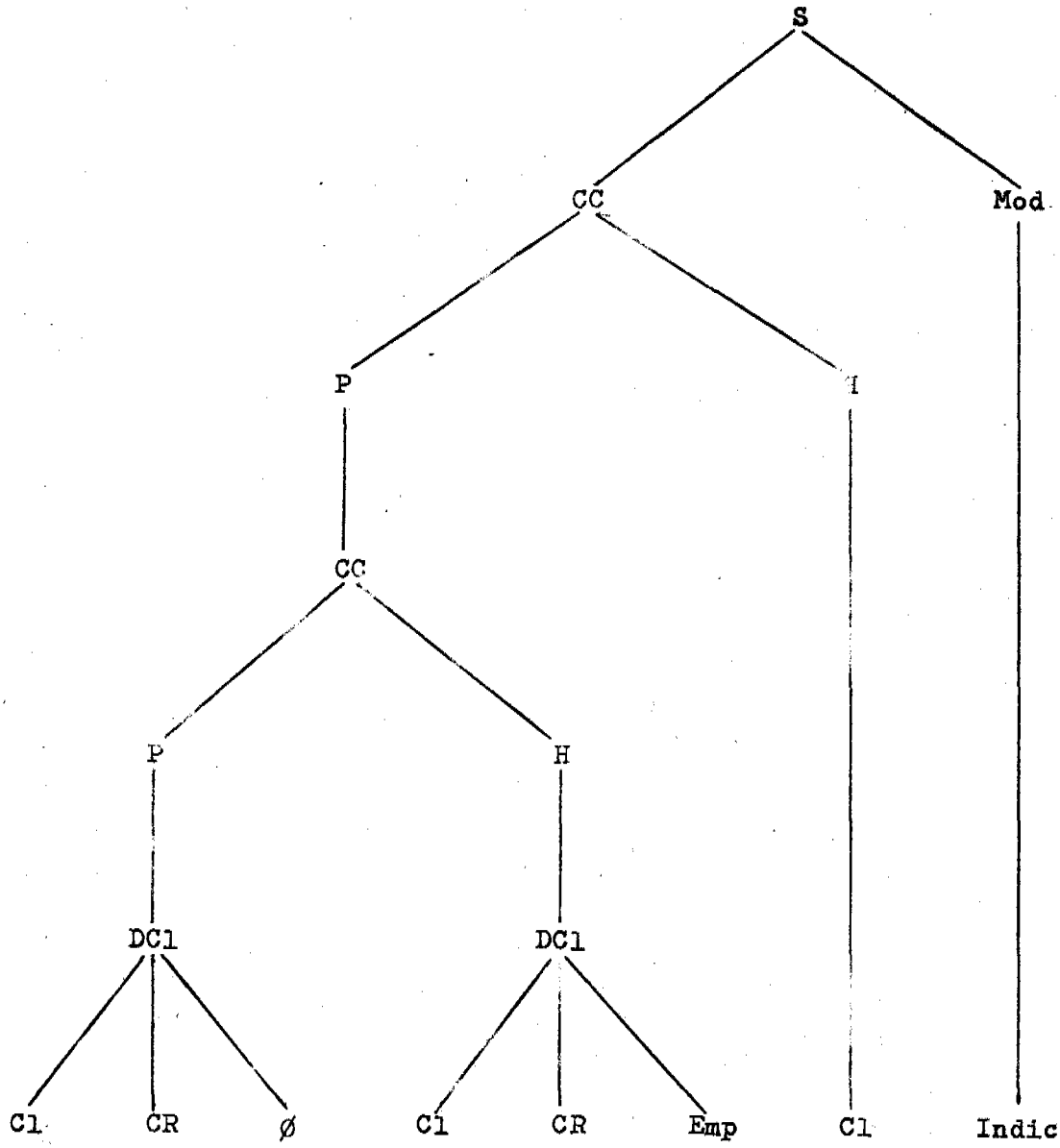
the analyses of English conjunction which have been proposed, for it allows for the choice of conjunctions in the phrase structure section of the grammar.[3]

The problem of conjunction in Amahuaca is not solved until all the arbitrary choices involved in selecting the clause relator which is to occur as part of a particular dependent clause have been considered. These will be examined in detail below. At this point it is important to show that the Amahuaca PS rules presented thus far imply and describe a structuring of clauses in compound sentences. This level of structure is not demonstrated by the prevalent transformational view of conjunction.[4] According to that view, the sentence HE WENT UPSTREAM AND KILLED A MONKEY, AND THE NEXT DAY WE CAME HERE can be represented in the following fragmentary P marker:



According to the analysis presented in this thesis, the sentence RUVOQUI CAXON SHINO JAN HASHINCUNMUN NON JANO JOYANCU-NU, which is an Amahuaca translation of the English sentence just considered, can be represented in the following P marker:



In the English sentence, the verb of each clause is in the past tense. Hence it can be said that this compound sentence is formed by conjoining the sentences HE WENT UPSTREAM, HE KILLED A MONKEY, and THE NEXT DAY WE CAME HERE.

In the Amahuaca sentence, only the final clause has absolute tense. In this case, it is a perfect (punctiliar) past

tense indicating that the action took place 'last moon'. Joined to each of the other verbs of the sentence is a clause relator which indicates, in addition to a few other things, the relative tense existing between ~~each~~ peripheral clause, ~~and~~ the corresponding head constituent. In the discussion here and in subsequent sections of the thesis, by 'peripheral (P) clause' is meant the only clause under the P node ~~in question~~ or the one to the right of two clauses which are dominated by that P node. Likewise, by 'head (H) clause' is meant the only clause dominated by the H node ~~in question~~ or the one to the right in the case of two clauses dominated by that H node.

The clause relator in the first clause of the Amahuaca sentence above is XON, which indicates (a) that this P clause and the corresponding H clause have the same subject (that is, the subjects identify), (b) that the activities described in the two clauses took place during the same day but not necessarily at the same point of time or in direct sequence, and (c) that the verb of the second clause (H clause) is transitive. By "subject" here and below is meant Nom of PS8 and PS11.

The clause relator SHINCUN in the second of these clauses indicates (a) that this clause has a subject which is different from that of the H clause to which the clause and its satellite are peripheral and (b) that the activity described in the second clause of the sentence took place the day before the activity described in the final clause transpired.

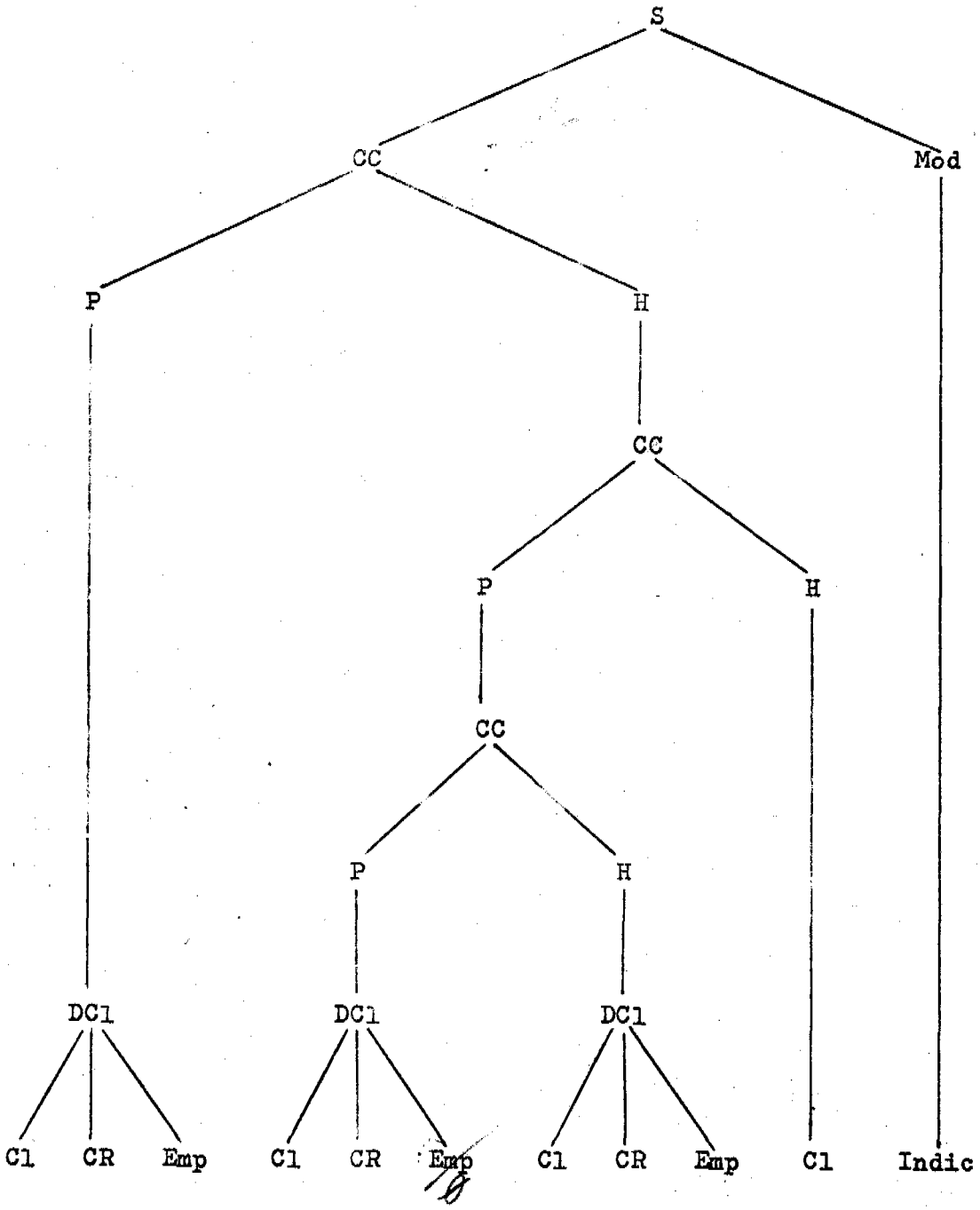
Notice that although XON and (SHIN) CUN are the closest Amahuaca equivalents to the English conjunction AND, the clauses of the Amahuaca sentence are not so independent as are those of the English sentence. It appears that an attempt to form this compound sentence in Amahuaca by the use of a generalized transformation operating on RUVOQUI JAN CAYANXO-NU 'he went upstream last moon', SHINO JAN HAYANXO-NU 'he killed a monkey last moon', and NON JANO JOYANCU-NU 'we came here last moon' would meet with some serious problems, especially if they were conjoined according to the pattern represented by the P marker above for the corresponding English sentence.

There are many types of Amahuaca sentences which illustrate a supraclausal structure (that is, an external structure of clauses in a compound sentence) which is more complex than that displayed by this sentence. In this sentence, the first clause is peripheral to the second clause, and these two are peripheral to the third clause. This is a case of left branching. Below are two sentences which display both left branching and right branching. Although both of these sentences are from the same tape-recorded text, the one does not immediately follow the other in the text. The first of these sentences is:

PACUUSHINAXMUN NON HOVI HIIHI CANUZHAINMUN NON HATARAYA JARI CAYANCU-CU 'We landed (literally, fell down), and the next day it rained, and when it stopped, we went there (thither)

to Atalaya.'

A P marker representing the supraclausal structure of this sentence is as follows:



It is evident that the first clause of this sentence is not directly peripheral to either the second or the third clause, because the sentence would be just as grammatical if both the second clause and the third clause were deleted.

I say "just as grammatical," for according to the present analysis, the NON 'we' following the first clause should not be there. This raises a very important consideration. It seems to be the feeling of many linguists who are engaged in field work and the description of previously unwritten and unanalyzed languages that what the informant utters must be assumed to be "correct". However, it has been pointed out by Chomsky and others that in writing a grammar a linguist is mainly concerned with the speaker's competence, not with his performance.[5] This is a principle which is basic to language description and yet one which is often overlooked. The transformational approach provides a basis for determining what sentences are grammatical and for establishing degrees of grammaticality.[6]

That which I consider to be a deviation from complete grammaticality in this particular Amahuaca sentence is a common phenomenon in the performance of Amahuaca speakers, and it supports the analysis of compound sentences which is set forth in this thesis. In the case of the sentence being considered, the first NON is interpreted as not belonging to the first clause. The following completely grammatical sentence results when the

NON and the two middle clauses of the sentence are deleted:
PACUUSHINAXMUN NON HATARAYA JARI CAYANCU-CU 'We landed, and the next day we went there to Atalaya.'
That the NON which was deleted was not a constituent of the first clause is seen by the fact that this clause PACUUSHINAXMUN '(we) landed the day before and' can be replaced in the original sentence by a clause having a different subject, such as JAN PACUUSHINCUNMUN 'she landed the day before and', resulting in the following sentence:
JAN PACUUSHINCUNMUN NON HOVE HIIHI CANUZHAINMUN NON HATARAYA JARI CAYANCU-CU 'She landed, and the next day it rained, and when it stopped, we went there to Atalaya.'

Many sentences of this type have been observed. Frequently a discontinuous or displaced constituent of this type (a pronominal subject which is separated from the clause to which it belongs by one or more intervening clauses) is followed by pause, and with respect to timing, tone change, etc., the displaced constituent would appear to be a part of the preceding clause. Amahuaca sentences are frequently quite long,[7] and it is not uncommon for a discontinuous constituent of the kind discussed here to be followed by a pause for breath.[8] Thus a pronominal subject often belongs to a breath group or pause group of which it is clearly not a grammatical constituent. The pronoun becomes a discontinuous element when it or the ensuing pause is followed by one or more clauses which

separate the pronoun from the clause of which it is the subject, in which case the pronoun is repeated with the proper clause. This is precisely the case of the sentence being considered.

The clause relator SHINAX in the first clause of this sentence indicates (a) that the subject of this P clause identifies with the subject of the corresponding H clause, (b) that the verb phrase of that H clause is intransitive, and (c) that the activity described in the P clause occurred a day (or two) before that described in the H clause. shinax

The clause relator of the second clause is HI, which indicates the same as (a) and (b) above and also (c) that the activity described in the corresponding H clause occurred during (or as a part of) the activity described in the P clause. It will be noted that the emphasis indicator has been deleted from the end of this dependent clause. hi

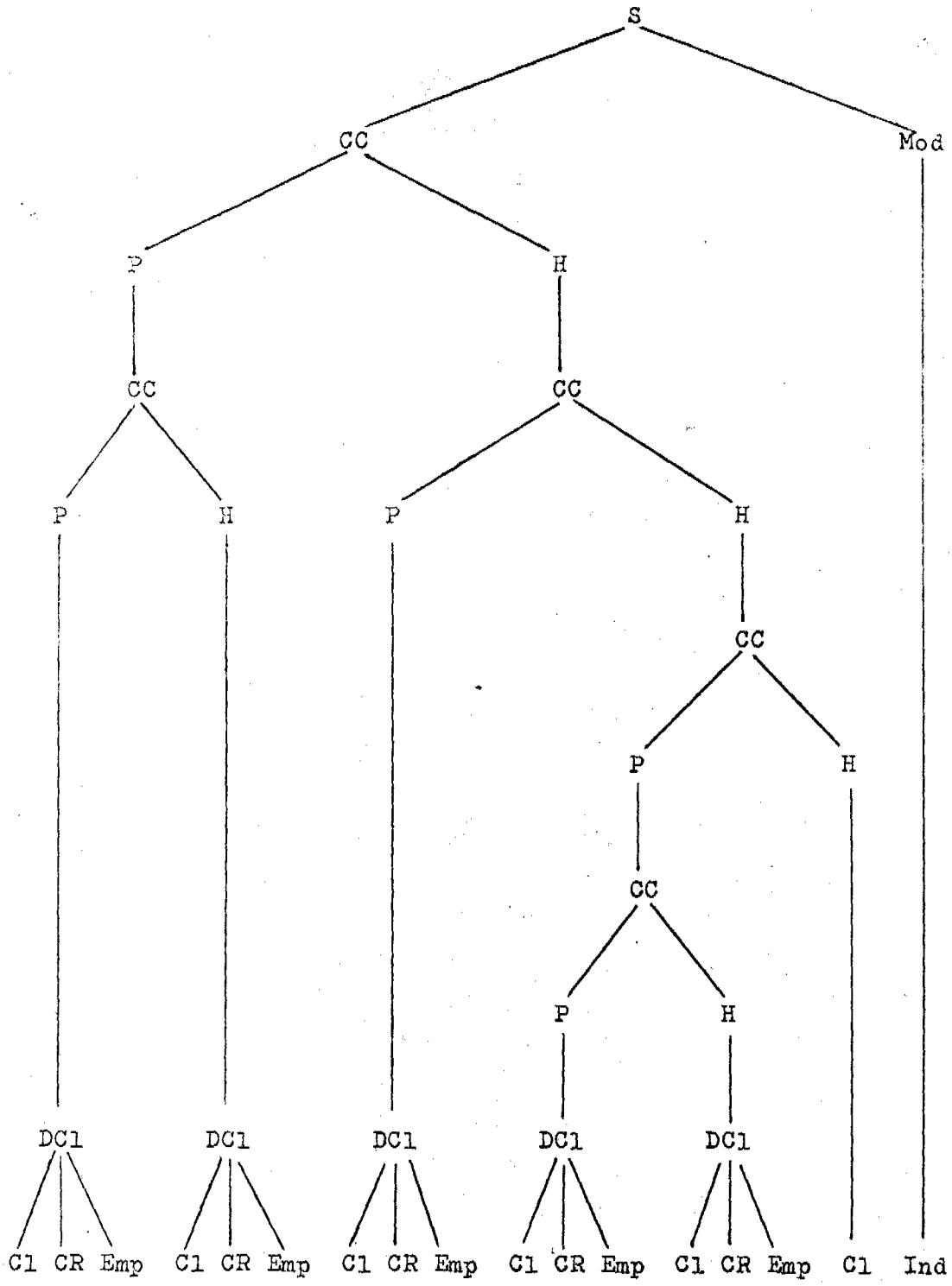
In the third clause, the clause relator is HAIN, which indicates (a) that the subject of this P clause is different from that of the corresponding H clause and (b) that the activity described in the H clause occurred at more or less the same time as that of the P clause. hain

The second sentence which we shall employ to illustrate supraclausal structure in Amahuaca is the following, in which the clauses have been numbered as a means of reference for the explanation below:

(1) NON CACUNMUNQUIHA (2) ROBERTONON HAINYA YARINACOCHAN JAN JOSHINCUNMUN (3) NON HOXARAVUUQUIRANMUN (4) NON HAVIYO PISHTAN NURIHAX CAXOMUN (5) HAVIYO VUNACU NOCU HIITANAMUN (6) NON CANON JAHON YARINACOCHAN JOYANCU-CU

'She says that after we went, she came to Yarinacocha with Robert's wife, and the next day, after we had gone from the nearer location in the small airplane, the new airplane went to meet us, and then we came to Yarinacocha last moon.' The morpheme QUIHA 'quotative' in the first clause is an enclitic which indicates that the speaker did not personally observe all that he is reporting but rather, that part of the information being reported was conveyed to him by another person. A P marker representing the supraclausal structure of this sentence is as follows:

"quiha" - quote


S
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DC1
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Cl CR Emp
Cl CR Emp
Cl CR Emp
Cl CR Emp
Cl CR Emp
Cl
Ind

The subject of clause 1 is NON 'we', which identifies with the subject of clauses 3, 4, and 6. It will be noted that the clause relator of clause 1 is CUN, basically the same as SHINCUN in clause 2 except that the latter contains the morpheme SHIN, which, when occurring in a clause relator, indicates that the activity described in the P clause took place a day (or two) before that described in the H clause. There is a change in subject from the first clause of this sentence to the second and also from the second clause to the final clause.

The clause relator QUIRAN (actually a verb modifier which functions as a clause relator when TAN has been deleted) of clause 3 indicates (a) that the subject of this P clause identifies with that of the corresponding H clause, (b) that the activity described in the H clause took place immediately after that described in the P clause, (c) that the verb of the H clause is JO, and (d) that the verb of the P clause is intransitive. quiran (tan)

In clause 4, the clause relator is XO, which indicates (a) that the subject of this P clause identifies with the object of the corresponding H clause and (b) that some time elapsed between the occurrence of the activity described in the P clause and that of the activity described in the H clause. xo

In clause 5, the clause relator is NA (an alternate of HA), which indicates (a) that the object of the P clause identifies with the subject of the corresponding H clause and (b) ha (na)

that the activity described in the H clause took place immediately after that described in the P clause.

The preceding discussion and illustrations are concerned mainly with PS1 through PS5, although PS6 and PS7 are explained briefly. The two types of clauses presented in PS6 (activity clauses and equational clauses) are illustrated in Chapter II above by the use of simple sentences. In that same chapter, there are sentences illustrating the various modes (imperative, indicative, interrogative) and the two aspects (perfect, imperfect) which are presented in PS7.

The speaker-audience relator (SAR), which may occur in an indicative sentence, indicates the relative sex of the speaker and audience and the number of the audience. A male speaker employs PU when addressing one male, Ø (ZERO) when addressing one female, and CANPU when addressing more than one person, regardless of sex, while a female speaker employs Ø (ZERO) when speaking to one male, U when speaking to one female, CAN when speaking to a plural male audience or a mixed audience, and CAN-U when speaking to a plural female audience.

This raises an interesting problem. PS77 is as follows:

PS77. SAR → (can) $\left\{\begin{matrix} pu \\ u \\ \emptyset \end{matrix}\right\}$

This rule indicates that the choice between PU, U, Ø, CANPU, CAN-U, and CAN-Ø is purely arbitrary. However, it would

be "incorrect" for a man to employ PU when addressing a woman, even if the sentence he uttered was grammatically correct. This is a pragmatic consideration and is outside the scope of grammar.[9]

PS8, PS9, and PS10 are as follows:

PS8. CIA → (Comp) Emp + Nom + I + VP

PS9. VP → $\begin{Bmatrix} VPt \\ VPi \end{Bmatrix}$

PS10. I → $\begin{bmatrix} I_1 \\ I_2 \end{bmatrix}$ / — $\begin{bmatrix} VPt \\ VPi \end{bmatrix}$

This rule indicates that an activity clause in Amahuaca consists of an optional complement (Comp) plus an emphasis indicator plus a nominal (Nom) plus a nominal inflection (I) plus a verb phrase (VP). PS27 shows that the Comp in a particular clause may be a time component (T), a frequency component (Fre), a location component (L), a location-from component (LF), a manner component (M), an instrument component (Ins), or an accompaniment component (Acc).

Emp in PS8 is handled as a separate constituent, inasmuch as it can occur affixed to any of the other constituents of the clause, but it occurs only once in a clause (that is, in addition to its occurrence immediately following a clause relator). Thus Emp serves as a point of reference in a transformation which permutes a constituent to the initial position (position of emphasis) in the clause. Also Emp is used as a point of reference in describing the position of the interrog-

ative indicator in certain types of sentences.

It would seem that the I of PS8 is more closely connected to Nom than it is to VP or Comp and should therefore not be considered a constituent of CIA in the same way that these other components are. If the internal structure of CIA were described in terms of a head constituent and a peripheral constituent, the I would be considered part of the peripheral constituent, while the VP would belong to the head constituent. Nevertheless, in the present analysis, there are advantages in handling this I as a constituent separate from Nom. An example is in the case of T50, which is discussed below.

PS9 indicates that a verb phrase in Amahuaca is either <u>transitive</u> (VPt) or <u>intransitive</u> (VPi), and PS10 shows that the nominal inflection is I_1 when it is followed by VPt and I_2 when it is followed by VPi. The following sentences illustrate PS8 and PS9:

COSHIMUN CHAMIN JATO HAOMIXO-NU

'Younger brother grabbed them quickly.'

COSHIMUN CHAMIX CAXO-NU

'Younger brother went quickly.'

It would be possible to combine PS8, PS9, and PS10 in the following rule:

$$\text{CIA} \rightarrow (\text{Comp})\ \text{Emp} + \text{Nom} \begin{Bmatrix} I_1 + \text{VPt} \\ I_2 + \text{VPi} \end{Bmatrix}$$

The reason that the three rules have been chosen in pref-

erence to this single rule is that the latter does not provide the symbols I and VP, which are useful in some of the transformational rules, such as the following generalized transformation (T50):

SD: D, Emp + $Pron_2$ + JA + CRco + Emp,

$Pron_1$, I + Emp + $Pron_2$ + VP + Y

SC: C_1 - C_2 - C_3 - C_4 → C_1 - C_4, when $Pron_2$ in C_2 = $Pron_2$ in C_4.

An example of the application of this transformation is:

Base sentence - VACUMUN HUN JAXONMUN
HIYANMUN HUN JATO HIINNICU-NU
'I was a child and I saw them.'

Resultant sentence - VACUN HUN JATO HIINNICU-NU
'I saw them as a child (when I was a child).'

What T50 does to the base sentence in this case is to transfer the medial N from HIYANMUN to VACUMUN and then delete everything after VACUN up to the third MUN. Some of the symbols in T50 which have not yet been explained are included in PS11, PS12, and PS13. These rules are as follows:

PS11. CIE → Nom + Emp + D $\left[\begin{matrix}(\text{VTer}) \\ \text{\_\_\_}\end{matrix}\right] / \left[\begin{matrix}\text{\_\_\_ (Imperf) } \left\{\begin{matrix}\text{Indic (SAR)} \\ \text{Interr}\end{matrix}\right\} \\ \text{Otherwise}\end{matrix}\right]$

PS12. $D \rightarrow \left\{ \begin{matrix} \left\{ \begin{matrix} AdjP \\ Adj_3 \end{matrix} \right\} \\ \begin{matrix} NP \\ Pron_1 \end{matrix} \end{matrix} \right\} \quad (M_1) \quad (Neg)$

PS13. $Nom \rightarrow \left\{ \begin{matrix} NP \\ Pron_1 + Pron_2 \end{matrix} \right\}$

An equational clause is rewritten as a nominal, which is (a) a noun phrase (NP) or (b) a pronoun of class 1 followed by a pronoun of class 2 ($Pron_1 + Pron_2$), plus a description (D) plus an optional verb terminal (VTer), but this optional constituent may occur only if the indicative indicator or interrogative indicator occurs, in which case the imperfect aspect indicator may also occur.

A description may consist of an adjective phrase (AdjP) or an adjective of type 3 (Adj_3), either of which may be followed by a modifier of type 1 (M_1), or may consist of either a noun phrase or a pronoun of class 1. Negative (Neg) is optional in occurrence after any of these. Some examples of equational clauses are:

MIN XUQUIMUN SHARAA-NU 'Your corn is good.'

SHARAAMUN MIN XUQUI-NU 'Your corn is good.'

HUN HAINMUN JAN VAVA-NUPU 'My wife is her grandchild.'

(or: 'Her grandchild is my wife.')

JAN VAVAMUN HUN HAIN-NUPU 'My wife is her grandchild.'

(or: 'Her grandchild is my wife.')

In the last two examples, it would be impossible to tell

which of the noun phrases is the "subject" of the sentence. This argues against grammatical theories which depend upon "functional meanings" of the constituents. However, if Neg occurs in the clause or if Nom is $Pron_1$ + $Pron_2$ (or simply $Pron_2$), D is distinguished from Nom:

HUN HAINMAMUN JAN VAVA-NUPU 'Her grandchild is not my wife.'

HIYAMUN HUN JAN VATA-NUPU 'I am his brother.'

JAN VUZAMUN HUN-NUPU I am his brother.'

At this point the reason for handling $Pron_1$ + $Pron_2$ as a single constituent (Nom) should be considered. In Amahuaca there are five different sets of personal pronouns, as can be seen in PS63 through PS67. The only case in which there are co-occurrence restrictions on these sets of pronouns is when a $Pron_1$ which is not dominated by D, Comp, VPt, or Vt is followed by $Pron_2$. In this case, HIYA 'I' is followed by HUN 'I', MIYA 'you' is followed by MIN 'you', etc. The next to last example above illustrates this co-occurrence in an equational clause. The following is an example of the co-occurrence of $Pron_1$ and $Pron_2$ in an activity clause:

JAAXMUN JAN CAXO-NUPU 'He went.'

By handling $Pron_1$ + $Pron_2$ as a single constituent in the phrase structure, it is possible to describe this co-occurrence by listing the one set of pronouns in one PS rule and then relating the two sets in another rule:

PS63. $\text{Pron}_1 \rightarrow \left\{ \begin{array}{ll} \underline{\text{hiya}} & \text{'I'} \\ \underline{\text{miya}} & \text{'you'} \\ \underline{\text{jaa}}_1 & \text{'he, she'} \\ \underline{\text{jaa}}_2 & \text{'it'} \\ \underline{\text{nocu}} & \text{'we'} \\ \underline{\text{mato}} & \text{'you'} \\ \underline{\text{jato}} & \text{'they'} \end{array} \right\} (M_1)$

PS64. $\text{Pron}_2 \rightarrow \left[\begin{array}{ll} \underline{\text{hun}} & \text{'I'} \\ \underline{\text{min}} & \text{'you'} \\ \underline{\text{jan}} & \text{'he, she'} \\ \emptyset & \text{'it'} \\ \underline{\text{non}} & \text{'we'} \\ \underline{\text{man}} & \text{'you'} \\ \underline{\text{hcan}} & \text{'they'} \end{array} \right] / \left[\begin{array}{l} \underline{\text{hiya}} \\ \underline{\text{miya}} \\ \underline{\text{jaa}}_1 \\ \underline{\text{jaa}}_2 \\ \underline{\text{nocü}} \\ \underline{\text{mato}} \\ \underline{\text{jato}} \end{array} \right] (M_1) \_\_$

There are other ways of describing this co-occurrence. It would be possible, for example, to exclude Pron_1 from Nom. A transformation could then optionally insert $\left[\begin{array}{l} \text{hiya} \\ \text{miya} \\ \text{...} \end{array} \right]$ before Emp when Emp is followed by $\left[\begin{array}{l} \text{hun} \\ \text{min} \\ \text{...} \end{array} \right]$ in a clause in which Comp does not occur. An alternate way of handling Emp is to insert it by the transformation suggested above and by every transformation which permutes a constituent to clause-initial position. The disadvantages of these two approaches have kept them from being followed in the present analysis.

This problem of co-occurrence of pronouns is not unique to Amahuaca. It exists in English, and I am not aware of a proposed solution in terms of transformational grammar. Although there is no restriction on the selection of an "object pronoun" to fill the space in the sentence HE IS HITTING _____,

there is a rule which adds SELF, and in most cases other necessary changes, to the pronoun chosen (thus making it reflexive) when the pronoun "identifies" with the "subject" of the sentence. This phenomenon supports the interpretation that YOU has been deleted from English imperative sentences which contain no overt subject, such as HIT YOURSELF. However, in order for such rules to work, the correspondence between the subject pronouns and the object pronouns must be demonstrated in the grammar.

PS14 through PS19 are as follows:

PS14. $VPt \rightarrow \left\{\begin{matrix} NP \\ Pron_1 \end{matrix}\right\} Vt$

PA15. $VPi \rightarrow ViS\ (VM) \left[\begin{matrix} VTer \\ \_\_\_ \end{matrix}\right] / \left[\begin{matrix} \_\_\_\ (Imperf) \left\{\begin{matrix} Indic\ (SAR) \\ Interr \end{matrix}\right\} \\ Otherwise \end{matrix}\right]$

PS16. $Vt \rightarrow \left\{\begin{matrix} \left\{\begin{matrix} NP \\ Pron_1 \end{matrix}\right\} VtioS \\ Vtos \end{matrix}\right\} (VM) \left[\begin{matrix} VTer \\ \_\_\_ \end{matrix}\right] / \left[\text{As in PS15}\right]$

PS17. $ViS \rightarrow \left\{\begin{matrix} ViR \\ Adj \\ Ne \\ VtoR + Intzr \end{matrix}\right\}$

PS18. $VtioS \rightarrow \left\{\begin{matrix} VtioR \\ VtoR \left\{\begin{matrix} Ben \\ Mal \end{matrix}\right\} \end{matrix}\right\}$

PS19. $Vtos \rightarrow \left\{\begin{matrix} VtoR \\ \left\{\begin{matrix} ViR \\ Adj \\ Ne \end{matrix}\right\} Tzr \end{matrix}\right\}$

PS14 indicates that a transitive verb phrase consists of a transitive verb (Vt) preceded by either a noun phrase or a pronoun of class 1. In other words, a transitive verb phrase

is one in which the verb has an "object." Vt, as is seen in PS16, consists of (a) either a noun phrase or a pronoun of class 1, followed by a transitive verb stem of the kind which "takes an indirect object" (VtioS), or (b) simply an ordinary transitive verb stem (VtoS). In either case, the verb stem may be followed by a verb modifier (VM) and has an obligatory verb terminal if the Vt is followed by a modal other than Imper. PS18 shows that VtioS consists of either (a) a transitive verb root of the kind which "takes an indirect object" (VtioR) or (b) an ordinary transitive root (VtoR) plus a benefactive (Ben) or malefactive (Mal). VtoS, as is seen in PS19, consists of (a) VtoR or (b) either an intransitive verb root (ViR), an adjective (Adj), or a noun expression (Ne), followed by a transitivizer (Tzr). Examples of transitive verb phrases are:

PIYA PACUQUI 'has dropped an arrow'

PIYA MIYA HINAN 'give you an arrow'

CARO HIYA VIXONQUI 'has brought me firewood (or: has brought firewood for me)'

JOCHI HIYA RUTUNNIXO 'killed Older Brother for (against) me'

JAA JIRISHINCU (high tone on I after R) 'fed him yesterday'

PIYA CHAHOQUI (high tone on O) 'has made the arrow black'

MAITIQUI (high tone on I after T) 'has made a headband'

Returning to PS15 and PS17, we see that an intransitive verb phrase consists of an intransitive verb stem (ViS) plus

an optional verb modifier and, if VPi occurs in the final clause of the sentence and is followed by a modal other than Imper, a verb terminal. ViS consists of either an intransitive root (ViR), an adjective, a noun expression, or an ordinary transitive root which is accompanied by an intransitivizer (Intzr). Some examples of intransitive verb phrases are:

HOXAXO 'slept'

NASHIHNAYA (high tone on I) 'bathed early this morning'

JOXOHI 'is becoming white'

HINOHI 'is pretending to be a tiger'

JIRISHINCU 'ate yesterday'

PACUUQUI 'has fallen down'

PS17 through PS19 represent a higher degree of internal structuring than is usually presented in the phrase structure component of a transformational grammar. Some of these items could have been handled effectively by T rules. However, it has seemed best to utilize PS rules in place of T rules in this grammar in cases where either would work equally well or where the use of the former would result in only slight loss of economy. It is hoped that the reservation of T rules for cases in which PS rules are too "weak" to perform economically (or in any way at all) what is required will demonstrate the inadequacy of a constituent structure grammar as a tool for describing Amahuaca.[10] The following rule is one of the most

complicated in this grammar:

PS20. $VM \rightarrow \left\{ \begin{array}{l} \left(\begin{array}{ll} VNeg & (TM_1) \end{array} \right) \\ \left(\begin{array}{ll} \left\{ \begin{array}{l} Frus \\ Desid \end{array} \right\} & (VNeg) \end{array} \right) \\ \left(\begin{array}{l} TM_1 \\ (VNeg) \quad Itin \quad (TM_1) \end{array} \right) \\ Dir \end{array} \right\} (Dir)$

A verb modifier (VM) consists of a single constituent or of up to four constituents out of an inventory of six. The difficulty of formulating a PS rule of this type is due to the fact that while none of these constituents is of obligatory occurrence in a verb, when two or more of them do occur, in general a fixed relative order must be maintained. Deviations in order from that presented in PS20 result in changes in meaning and are handled by T rules. A verb modifier may consist of (a) a verbal negative (VNeg) followed by an optional class 1 tense modifier (TM_1), (b) either a frustrative (Frus) or a desiderative (Desid), followed by an optional verbal negative, (c) an optional direction indicator (Dir) which is preceded by a class 1 tense modifier or an itinerant (Itin), the latter being preceded by an optional verbal negative and followed by an optional class 1 tense modifier, or (d) simply a direction indicator. The introduction of negation in the phrase structure of the grammar differs from the views of Chomsky and Klima but seems to be the simplest solution for Amahuaca.[11] Some examples of verbs with a VM (in which the VM is underlined) are:

(a) CAYAMAHI 'is not going'

JIRIYAMAHNAYAXANH 'not eat tomorrow morning'

(b) PACUUCAHANQUI 'has almost fallen'

NINCAAPAIXO 'wanted to hear'

(c) CAYOOTAN 'go away right now'

YOHIYAMAVAHINYOTAN 'go away right now without speaking'

(d) TZAHOOHI 'sit down here'

Amahuaca has a rather complex tense system. Although some of these "tenses" have been handled by including one of the tense modifiers (TM_1) in the verb modifier, nearly three dozen "tenses" remain to be accounted for. This makes for PS rules which are more complicated than those prepared for English, in which the various tenses and a few other items are handled in three PS rules:[12]

17. Aux → C (M) (have + en) (be + ing)

18. C → Present, Past

19. M → Can, may, will, shall, must

The following forms of the Amahuaca verb HIIN 'see', third person singular perfect indicative (without TM_1), illustrate a phase of the tense system in Amahuaca:

HIINPAHONNIXO 'saw in the remote past'

HIINNIXO 'saw years ago'

HIINTAI 'saw last year (or season)'

HIINYANXO 'saw last moon'

HIINSHINXO 'saw yesterday (or the day before)'

HIINXO 'saw earlier today'

HIINQUI 'has just seen'

HIINHAI 'once saw'

HIINNON 'will see soon'

HIINXAHINNON 'will see in the future'

HIINXAHINNANON 'will see in the distant future'

HIINMIZ 'might see'

What has been referred to as "tense" is actually tense-aspect. Although only twelve forms are listed above, the list would nearly triple with the addition of the imperfect forms and the perfect interrogative forms. The following rules introduce these phenomena in the phrase structure of Amahuaca:

PS21. $\text{VTer} \rightarrow \begin{bmatrix} \text{VTerI} \\ \text{VTerP} \end{bmatrix} / \begin{bmatrix} \underline{\quad}\text{Imperf} \\ \text{Otherwise} \end{bmatrix}$

PS22. $\text{VTerI} \rightarrow \left\{ \begin{matrix} (\text{TM}_2)\ \text{PaI} \\ (\text{TM}_3)\ \text{PrI} \\ \text{FuI} \\ \text{PaHab} \end{matrix} \right\}$

PS23. $\text{VTerP} \rightarrow \left\{ \begin{matrix} (\text{TM}_2)\ \text{PaP} \\ \text{PrP} \\ (\text{TM}_3)\ \text{FuP} \\ \text{Gen} \\ \text{Adm} \end{matrix} \right\}$

These rules state that a verb terminal in Amahuaca is either an imperfect verb terminal (VTerI) or a perfect verb terminal (VTerP), the former occurring only when followed by the imperfect aspect indicator and the latter occurring in

other environments. An imperfect verb terminal may be past (PaI), present (PrI), future (FuI), or past habitual (PaHab), the first of these being optionally preceded by a tense modifier of class 2 (TM_2) and the second, by a tense modifier of class 3 (TM_3). A perfect verb terminal may be past (PaP), present (PrP), future (FuP), general (Gen), or admonitional (Adm). The past perfect terminal may be preceded by TM_2, and the future perfect terminal may be preceded by TM_3. These rules allow all arbitrary choices to be made in the phrase structure of the grammar. The application of transformations to the strings generated by these rules is examined in chapter IV.

It is necessary to return now to the discussion of clause relators (conjunctions) which was begun in the first part of this chapter. The following rules allow all arbitrary choices concerning the particular clause relator (CR) to be employed in a particular dependent clause to be made in the phrase structure:

PS24. $CR \rightarrow \left\{\begin{matrix}(TM_2) \\ CRsub\end{matrix}\right\} \quad CRco$

PS25. $CRsub \rightarrow \left\{\begin{matrix}CRI \\ CRP\end{matrix}\right\}$

PS26. $CRP \rightarrow \left\{\begin{matrix}CRP_a \\ (TM_2)\end{matrix}\right\} \quad CRP_b$

Clause relators are divided into two classes, coordinate clause relators (CRco) and subordinate clause relators (CRsub),

the former of which may be preceded by a tense modifier of class 2. The subordinate clause relators are divided into two classes, imperfect clause relators (CRI) and perfect clause relators (CRP), the latter of which are divided into CRP_a and CRP_b on the basis of the optional occurrence of TM_2 preceding CRP_b. The actualization of these various kinds of clause relators is handled in T10 through T18, which are discussed in Chapter IV. That is, the phonemic shapes of the respective clause relators are not indicated by the phrase structure of the grammar. It appears to be impossible to generate these phonemic shapes by the phrase structure.

Most of the other PS rules listed in Chapter V require no special explanation. However, it should be pointed out that a number of items not already discussed which are not usually included in the phrase structure rules of a transformational grammar have been presented in the phrase structure of this transformational grammar of Amahuaca. One of these is the internal structure of the noun phrase. According to Chomsky's proposed PS rules for English, a noun phrase consists of an article plus a noun plus singular or plural. His rules are:[13]

$$NP \rightarrow \begin{Bmatrix} NP_{sing} \\ NP_{pl} \end{Bmatrix}$$

$NP_{sing} \rightarrow T + N + \emptyset$

$NP_{pl} \rightarrow T + N + S'$

T → the

N → man, ball, etc.

Although T would also include such words as a, this, that, and some, there are problems in this approach. Adjectives and other such modifiers of nouns appear in Chomsky's grammar only as predicate complements. Thus the noun phrase THE OLD MAN is derived from THE MAN IS OLD by means of a transformation. This results in various difficulties, some of which are discussed by Lees in The Grammar of English Nominalizations.[14] No adequate solutions have been offered for some of these problems. For example, no rule has been formulated to account for the order of the modifiers in noun phrases like the following: THE SAME TWO LITTLE OLD GREY-HAIRED MEN. Also, there is a problem in deriving OUR FATHER from FATHER OF OUR(S). Furthermore, it would seem more plausible to derive THAT DOG IS A BEAUTIFUL PERFORMER from THAT DOG PERFORMS BEAUTIFULLY than to derive it from some combination of the following: THAT DOG IS BEAUTIFUL, THAT DOG IS A PERFORMER, THE PERFORMER IS BEAUTIFUL.[15]

The present analysis of the noun phrase in Amahuaca avoids some of these and other problems. This analysis is presented in PS39 through PS62. These rules are listed in Chapter VI and are self-explanatory. Below, the following rules are

illustrated in the opposite order from that of their occurrence in the grammar: PS60, PS52, PS48, PS41, PS40, PS39.

Examples of PS60: HUHA 'my mother'

XANUNHPA 'Xanu's father'

Examples of PS52: MATONCO 'hill (MAI 'ground', TONCO 'protrusion')

TUHONNA 'Tuho's (absolute)'

JONINNA 'the man's (absolute)'

HUHANNA 'my mother's (absolute)'

HUNA 'mine'

RURATI 'axe' (RURA 'chop, fell', TI 'nominalizer')

MURACOTI 'glove' (MUVI 'hand', RACO 'wrap', TI 'nominalizer')

JIRITI 'food' (JIRI 'eat', TI 'nominalizer')

Examples of PS48: TUHOCAVIZ 'like Tuho'

HAACAVIZ 'like a tapir'

HUHATIXON 'the size of my mother'

MIYACAVIZ 'like you'

MIYATIXON 'your size'

VIMIYA 'having fruit'

TOHONI 'pregnant' (TOHO 'fetus', NI 'with')

Examples of PS41: JONI TOHA 'a big man'

JONI TOHA PISHTA 'a somewhat big man'

SHINO TOHONI 'a pregnant monkey'

VACU JONI TOHA 'a large son'

JONI VACU TOHA 'a large boy'

JONI VACU TORO PISHTA 'a short boy'

JII PUHI CORO 'a grey tree leaf'

JII PUHI VINSHIN SHARAA 'a bright red tree leaf'

NAMI JUNU HITZIZ PISHTA 'somewhat hot meat broth'

Examples of PS40: HUN 'my'

NAN 'this'

TUHON 'Tuho's'

UN VACU JONIN 'my son's'

JONI VACU TORO PISHTAN 'the short boy's'

NAN JONI VACU TORO PISHTAN 'this short boy's'

Examples of PS39: JII PUHI VINSHIN SHARAAZTII 'the only (or: one) bright red tree leaf.

NAN JONI VACU TORO PISHTAN JII PUHI VINSHIN SHARAAZTII 'this short boy's one bright tree leaf'

While the PS rules which are involved in the description of the noun phrase cannot by themselves generate every possible type of noun phrase, they provide P markers on which T rules can effect the necessary changes. For example, a transformation derives the noun phrase VATA VIMIYA 'having sweet fruit' from VIMI VATA 'sweet fruit' and VIMIYA 'having fruit'.

Much more could be said about interesting phenomena in the Amahuaca language which are revealed by the PS rules listed in Chapter VI. Some of these are touched on in the explanations of transformations in Chapter IV.

FOOTNOTES

[1]See Chomsky (1957), p. 111, (1962), Lees (1960), pp. 5-20, Klima (1964), pp. 250-52.

[2]Bach (1964), p. 39.

[3]See in this connection the paper "English Coordinating Conjunctions" by Lila Gleitman.

[4]See Chomsky (1957), pp. 35-37 and p. 113 and also Bach (1964), p. 120. The implication in the rules and discussion referred to is that sentences being conjoined were generated independently by the grammar.

[5]For example, note the comments of Chomsky in the formal discussion of the paper by Wick Miller and Susan Ervin entitled "The Development of Grammar in Child Language" at the Conference on First-language Acquisition in 1961. These are included in Bellugi and Brown (1964). Among other things, Chomsky said: "For one thing, it should be clearly recognized that a grammar is not a description of the performance of the speaker, but rather of his linguistic competence, and that a description of competence and a description of performance are different things."

[6]See Chomsky (1961b).

[7]Nineteen dependent clauses in a sentence have been observed.

[8]This would seem to be evidence against an approach to grammar in which there is an attempt to define clause boundaries on the basis of potential pause and breath.

[9]For a discussion of the linguist's "merely marginal" concern with the pragmatic aspect of language, see Greenberg (1964).

[10]This has been demonstrated for other languages elsewhere. See, for example Paul M. Postal (1964b).

[11]Chomsky (1957), pp. 61, 62; Klima (1964), pp. 250-76.

[12]Chomsky (1962) in Fodor and Katz, p. 225.

[13]Chomsky (1957), p. 111.

[14]Lees (1960), especially pp. 113-24; 180-82.

[15]This type of sentence is considered by Sandra Annear (1964), p. 121.

IV. EXAMINATION OF AMAHUACA TRANSFORMATIONS

In the last chapter a number of PS rules were explained. Some of those same rules and additional ones are involved in generating strings upon which the transformations considered in the present chapter operate. A more complete listing of Amahuaca transformations appears in chapter VII. There is a problem in illustrating the effect of a transformation by citing an example, for in many cases the resultant sentence requires one or more additional transformations in order to become "completely grammatical." For this reason, Amahuaca examples cited in this chapter to illustrate particular transformations are preceded by an asterisk if these sentences must undergo further transformation.

Actually, there is another reason why the sentences that are generated by the PS rules and T rules should not have attained their final shape at this point. The morphophonemic rules should not be applied until after the transformations have been performed. Nevertheless, in general, examples in this thesis are rendered in their proper phonemic shapes. Some of the rules which have operated to produce these phonemic shapes are discussed in the following chapter. It will be noted that

some of the transformations examined here are obligatory in occurrence. That is to say, the transformation must be performed on every string which fits the structural description in the particular T rule. Every obligatory transformation of this grammar is indicated by an asterisk preceding the rule. Other transformations are optional. That is, they may or may not be applied to a particular string which fits the structural description. In this grammar, every transformation is given a label which describes briefly the function of the transformation. Each T rule presented in this chapter is illustrated by one or more examples from the Amahuaca language. In these illustrations, Ex means 'example', (b) indicates the base sentence, and (r) indicates the resultant sentence. The constituent which is emphasized in a particular Amahuaca sentence is underlined in the English translation of this sentence. For an explanation of the metatheory and metasymbols involved in these rules, see chapter I. A listing of Amahuaca PS rules and a key to the symbols employed in them appear in chapter VI. Chapter VII has a more complete listing of Amahuaca transformations than will be considered in this present chapter. In the T rules of this grammar, X, Y, and Z are cover symbols and in some cases are null. In general, a cover symbol (Y) in medial position in the SD represents part of the clause which is specified in part by the symbols preceding and following Y. However, in the case of any of the transformations in which parts

of the right-most clause of a P and the right-most clause of the corresponding H are specified (T6 through T14, except T8 and T13), Y* (distinguished from ordinary Y by the asterisk) may contain one or more clauses which are not specified in part by other symbols in the SD and are not directly dominated by the CC node which dominates the P and H under consideration.

Examples of Amahuaca transformations are:

*T1. Actualization of PaP in indicative sentences.

SD: X + Nom + Y, PaP, Indic + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{cu} \\ \underline{xo} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom = Pron_1 + \begin{Bmatrix} \underline{hun} \\ \underline{non} \\ \underline{min} \\ \underline{man} \end{Bmatrix} \\ Otherwise \end{bmatrix}$

Ex: (b)*HIYA JANOMUN MIYA MIN X JOSHIN PaP - NU

(r)*HIYA JANOMUN MIYA MIN X JOSHINCU - NU

'You came <u>to my place</u> yesterday.'

Ex: (b)*HIYA JANOMUN JAA JAN X JOSHIN PaP - NU

(r)*HIYA JANOMUN JAA JAN X JOSHINXO - NU

'He came <u>to my place</u> yesterday.'

This and the three succeeding transformations generate the forms of the past perfect and present perfect verb terminals. It would be theoretically possible to handle these suffixes in the PS rules. However, this would involve changing the ordering

of the present rules and would require rather complicated rules in order to specify the symbols which occur between the determining pronoun and the verb terminal. For example, PS21 and PS23 could be renumbered PS16b and PS16c, respectively. The following rule could then be added:

PS16d. PaP → [cu / xo] / [{ hun / non / min / man } { Emp + D / ViS { NP / Pron$_1$ } { NP / Pron$_1$ } VtioS / { NP / Pron$_1$ } VtoS } (VM) } —]
Otherwise

This rule would replace only T1. It is obvious that the relative simplicity and economy of the T rule argue in favor of handling these verbal suffixes in the transformational section of the grammar.

In the discussion of verb modifiers (VM) in chapter III, there was considered a class of morphemes which have been termed itinerants (Itin).[1] In general, the <u>come itinerant</u> (ItinC) is VURAN when the verb stem to which it is attached is transitive and QUIRAN when the verb stem to which it is attached is intransitive. Likewise, in general, the <u>go itinerant</u> (ItinG) is VAHIN when the verb stem to which it is attached is transitive and CAHIN when the stem to which it is attached is intransitive. This much is handled by the PS rules.[2] However, if the Nom of the clause in which the Itin occurs is JATO + HCAN 'they', VURAN replaces QUIRAN, and VAHIN

replaces CAHIN. This is handled by the following transformation:

*T5. Replacement of $\left[\begin{matrix}\text{quiran}\\ \text{cahin}\end{matrix}\right]$ by $\left[\begin{matrix}\text{vuran}\\ \text{vahin}\end{matrix}\right]$.

SD: X + Nom + Y, $\left[\begin{matrix}\text{quiran}\\ \text{cahin}\end{matrix}\right]$, Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\text{vuran}\\ \text{vahin}\end{matrix}\right] - C_3$ /

Nom = jato + hcan

Ex: (b)*RAMAAMAMUN JATO HCAN X JIRICAHINXO-NU

(r)*RAMAAMAMUN JATO HCAN X JIRIVAHINXO-NU

'They ate and went long ago.'

This sentence is put in final form by T22, T26, and T31, which permute X to the position after JATO, delete JATOX, and permute HCAN to between VAHIN and XO. A morphophonemic rule then deletes the H of HCAN, rendering the following: RAMAAMAMUN JIRIVAHINCANXO - NU.

In an earlier unpublished paper describing Amahuaca sentences having two or more clauses, I listed four clause relators which had the same phonemic shapes as the itinerants discussed above and these were governed by similar rules.[3] Included in a class with these four clause relators was TAN, which could be translated 'and do something right away'. TAN was in complementary distribution with VURAN (which occurred affixed to a transitive stem when the verb of the corresponding H clause was a come verb), QUIRAN (which occurred affixed to an intransitive stem under conditions parallel to those of

VURAN), VAHIN (which occurred affixed to a transitive stem when the verb of the corresponding H clause was a go verb), and CAHIN (which occurred affixed to an intransitive stem under conditions parallel to those of VAHIN). However, if the verb of the H clause was VU 'come'(plural), QUIRAN was replaced by VURAN, and if it was VO 'go' (plural), CAHIN was replaced by VAHIN. The approach which was followed in the description referred to provided no precise way of handling these morphemes without the sort of repetition just indicated. However, in a transformational grammar, the distribution of these morphemes can be described in a relatively simple manner by means of T5 and the following rule, which accounts for the occurrence of Itin in the position of CR:

*T10. Deletion of CR tan when preceded by Itin.[4]

SD: $X + \begin{bmatrix} \text{ItinC} \\ \text{ItinG} \end{bmatrix}$, tan, $Y^* + \begin{bmatrix} \text{ViRmoC} \\ \text{ViRmoG} \end{bmatrix} + Z$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

Ex: (b)*JATO YOHIVAHINTANMUN JAN CASHINXO-NU

(r) JATO YOHIVAHINMUN JAN CASHINXO-NU[5]

'He spoke to them and went (away) yesterday.'

The following are some of the transformations which complete the selection of the appropriate clause relator (CR) to be employed in a given sentence. PS rules proved inadequate in determining the specific CR. The use of Y* in these rules is explained on pages 58 and 59.

*T6. Division of CRco.

SD: $X + Nom + \left\{\begin{matrix} I \\ D \end{matrix} + VP\right\} + \left\{\underline{TM_2}\right\}, CRco, Y^* + Nom + Z$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} CRcos \\ CRcod \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom \text{ in } C_1 = Nom \text{ in } C_3 \\ Otherwise \end{bmatrix}$

Ex: (b)*MIYAMUN MIN TOHA CRco MUN JAAMUN JAN PISHTA-NU

(r)*MIYAMUN MIN TOHA CRcod MUN JAAMUN JAN PISHTA-NU[6]

'<u>You</u> are large, and <u>he</u> is small.'

*T7. Actualization of CRcos.

SD: $X, CRcos, Y^* + \left\{\begin{matrix} VP \\ D \end{matrix}\right\} + Z$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\underline{\begin{matrix} xon \\ hax \end{matrix}}\right] - C_3 \; / \; \begin{bmatrix} VP \text{ in } C_3 = VPt \\ Otherwise \end{bmatrix}$

Ex: (b)*JARI JAN CA CRcos MUN JAN JATO YOHIXO-NU

(r)*JARI JAN CAXONMUN JAN JATO YOHIXO-NU

'He went there and spoke to them.'

*T8. Actualization of CRcod.

SD: $X + Nom + Y, CRcod, Z$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\underline{\begin{matrix} havan \\ cun \end{matrix}}\right] - C_3 \; / \; \begin{bmatrix} Nom = \underline{jato + hcan} \\ Otherwise \end{bmatrix}$

Ex: (b)*MIYAMUN MIN TOHA CRcod MUN JAAMUN JAN PISHTA-NU

(r)MIYAMUN MIN TOHACUNMUN JAAMUN JAN PISHTA-NU

'<u>You</u> are large, and <u>he</u> is small.'

Ex: (b)*JAN CA CRcod MUN HUN JOCU-NU

(r)JAN CACUNMUN HUN JOCU-NU

'He went, and I came.'

*T9. Actualization of CRP_a.

SD: X + Nom + I + VP, CRP_a, Y*+ Nom + I + VP + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{\text{tan}} \\ \underline{\text{hain}}\end{matrix}\right] - C_3$ /

$$\left[\begin{matrix}\text{Nom in } C_1 = \text{Nom in } C_3 \\ \text{Otherwise}\end{matrix}\right]$$

Ex: (b)*JAN NOCOO CRP_a MUN HUN JOSHINCU-NU

(r)JAN NOCOOHAINMUN HUN JOSHINCU-NU

'When he arrived, I came yesterday.'

*T11. Actualization of CRP_b.

$$\text{SD: } X + \text{Nom} + I + \left\{\begin{matrix}\text{ViS} + \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} \\ \left\{\begin{matrix}\text{VM} \\ \text{---}\end{matrix}\right\} + \text{Vt}\end{matrix}\right\} + \left\{\begin{matrix}\text{TM}_2 \\ \text{---}\end{matrix}\right\}, CRP_b, Y^* + \text{Nom} + I + \left\{\begin{matrix}\text{VPi} \\ \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} + \text{Vt}\end{matrix}\right\} + Z$$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{\text{xo}} \\ \\ \underline{\text{ha}}\end{matrix}\right] - C_3$ /

$$\left[\begin{matrix}\text{when } \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} \text{ in Nom of } C_1 = \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} \text{ of } C_3 \\ \text{when } \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} \text{ of } C_1 = \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} \text{ in Nom of } C_3\end{matrix}\right]$$

Ex: (b)*JAAXMUN JAN JO CRP_b MUN HIYANMUN HUN JAA HIINCU-NU

(r)JAAXMUN JAN JOXOMUN HIYANMUN HUN JAA HIINCU-NU[7]

'He came, and I saw him.'

Ex: (b)*HIYANMUN HUN JAA HIIN CRP_b MUN JAAXMUN JAN CAXO-NU

(r)HIYANMUN HUN JAA HIINHAMUN JAAXMUN JAN CAXO-NU

'I saw him, and (just then) he went.'

T rules of the type just examined determine the actualization of morphemes represented by non-terminal symbols in the phrase structure. Other rules of this kind are T16 and T17, which have to do with the actualization of the imperfect aspect indicator (Imperf). If these rules are compared with T3 and T4, it will be seen that the present perfect endings (PrP) are very similar in shape to the Imperf forms, and the rules governing these two kinds of constituents are similar. The slight differences in form can probably be explained by phonological rules. It is considered that at present these are separate morpheme classes, although they were no doubt one class at an earlier stage of the language. The two following sentences, in which no hyphens are employed to separate enclitics from the rest of the sentence, reveal the similarity in form between the PrP and Imperf. The second sentence contains HI 'present imperfect tense indicator'.

HIINRA MINHAI 'Have you seen (it)?'

HIINHIRA MINHCAI 'Do you see (it)?'

Some of the T rules of this grammar delete one or more morphemes. This was seen in the case of tan in T10, and is illustrated also by T26 and T30:

*T26. Deletion of $Pron_1$ + $\left\{\frac{I}{\quad}\right\}$ when followed by $Pron_2$.

SD: X + Emp, $Pron_1$ + $\left\{\frac{I}{\quad}\right\}$, $Pron_2$ + Y

SC: C_1 - C_2 - C_3 → C_1 - C_3

Ex: (b)*HUN VUTZAMUN JAA JAN-NU

(r)HUN VUTZAMUN JAN-NU

'He is my brother.'

Ex: (b)*HOXAZTIPAMUN HIYAN HUN JAA HIINSHINCU-NU

(r)HOXAZTIPAMUN HUN JAA HIINSHINCU-NU

'I saw him yesterday.'

*T30. Deletion of I in CIA when followed by Imperf.

SD: X + VP + NP, I, Imperf + Y

SC: C_1 - C_2 - C_3 → C_1 - C_3

Ex: (b)*XUQUIMUN VANAHI CHIPIN-QUI-NU

(r)XUQUIMUN VANAHI CHIPI-QUI-NU

'Younger Sister is planting corn.'.

While both T26 and T30 are obligatory, some deletion rules are optional. Examples are T27 and T28:

T27. Deletion of NP when not followed by Emp.

SD: X + Emp + Y, NP, Z

SC: C_1 - C_2 - C_3 → C_1 - C_3 / when NP does not have Nn or Nh as its head constituent.

Ex: (b)MOHAMUN CHAXO CAQUI-NUPU

'Now the deer has gone.'

(r)MOHAMUN CAQUI-NUPU

'Now it has gone.'

Ex: (b)HUNAMUN NAN PIYA-NUPU

'This arrow is mine.'

(r)HUNAMUN-NUPU

'It is mine.'

Ex: (b)SHARAAMUN MIN XUQUI-NU

'Your corn is good.'

(r)SHARAAMUN-NU

'It is good.'

T28. Deletion of $\begin{Bmatrix} NP \\ Pron_1 \end{Bmatrix}$ in CIA when not followed by Emp and not part of Nom.

SD: $X + Emp + \begin{Bmatrix} Nom \\ \_\_\_ \end{Bmatrix} + Y, \begin{Bmatrix} NP \\ Pron_1 \end{Bmatrix}, Z$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

Ex: (b)MOHAMUN JAN CHAMI CUNAQUI-NU

'He has already called Younger Brother.'

(r)MOHAMUN JAN CUNAQUI-NU

'He has already called (him).'

Some of the transformations replace one morpheme or constituent with another. An example of this type of rule is the following:

T46. Replacement of hnu by cu or hqui.

SD: X, hnu, Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}cu \\ hqui\end{matrix}\right] - C_3$ /

$\left[\begin{matrix}cu \\ Otherwise\end{matrix}\right]$, except when hnu occurs in the first sentence of the utterance.

Ex: (b)COSHIMUN HUN JOYANCU-NU

(r)COSHIMUN HUN JOYANCU-CU

'I came quickly last month.'

Other T rules insert single morphemes or larger constituents into a clause. Examples are T18, T19, T23, and T36.

*T18. Insertion of I_2 in CIE followed by Imperf when VTer does not occur.

SD: X + Nom + Emp + D, Imperf + Y

SC: $C_1 - C_2 \rightarrow C_1 - I_2 - C_2$

Ex: (b)*XUQUI MACOMUN SHARAA-QUI-NU

(r)XUQUI MACOMUN SHARACUX-QUI-NU

'Fresh (green) corn is (always) good.'

T19. Insertion of Indic after Interr.

SD: X + Interr, Y

SC: $C_1 - C_2 \rightarrow C_1 -$ Indic $- C_2$

Ex: (b)TOHARA 'Is it big?'

(r)TOHARA-NU 'That is the question: is it big?'

T23. Insertion of additional Comp.

SD: X + Emp + Nom, Y + VP + Z

SC: $C_1 + C_2 \rightarrow C_1$ - Comp - C_2

Ex: (b)RAMAAMAMUN HUN CANICU-NUPU

'I went <u>long ago</u>.'

(r)RAMAAMAMUN HUN JARI CANICU-NUPU

'I went there <u>long ago</u>.'

*T36. Insertion of <u>ja</u> in CIA and CIE.

SD: X + $\left\{\begin{matrix}\text{NP} \\ \text{Pron}_2\end{matrix}\right\}$, $\left\{\begin{matrix}\text{VTerP} \\ \text{CR}\end{matrix}\right\}$ + Y

SC: $C_1 - C_2 \rightarrow C_1$ - <u>ja</u> - C_2, when the clause does not contain $\left\{\begin{matrix}\text{VtioS} \\ \text{VtoS}\end{matrix}\right\}$.

Ex: (b)*PACUUMUN JAN QUI-NU

(r)PACUUMUN JAN JAQUI-NU

'He has <u>fallen</u>.'

Ex: (b)*SHARAAMUN HAA NAMI XO-NUPU

(r)SHARAAMUN HAA NAMI JAXO-NUPU

'The tapir meat was <u>good</u>.'

Some of the T rules bring about permutations of constituents. An example is T21:

T21. Transposition of D and Nom.

SD: X, Nom, Emp, D + $\left\{\underline{I_2}\right\}$, Y

SC: $C_1 - C_2 - C_3 - C_4 - C_5 \rightarrow C_1 - C_4 - C_3 - C_2 - C_5$

Ex: (b)XUQUI MACOMUN SHARACUX-QUI-NU

'Fresh corn is (always) good.'

(r)SHARACUXMUN XUQUI MACO-QUI-NU

'Fresh corn is (always) good.'

Ex: (b)MIN PIYAMUN VUNAA-NUPU

'Your arrow is new.'

(r)VUNAAMUN MIN PIYA-NUPU

'Your arrow is new.'

The importance of ordering in the T rules which have been formulated for Amahuaca can be seen by a comparison of the first example of T21 above with the example of T18. This is also seen in a comparison of T21 with T37, which has not been illustrated in this chapter.

A generalized transformation (T50) is illustrated in chapter III. Most of the transformations listed in chapter VII are relatively clear and will not be explained here. The T rules of this grammar allow Emp and Interr to occur in initial position in the clause. This permits the type of sentence generated by T50 and also permits Interr to be joined to the CR of the preceding clause:

JAN JUMACUNRA MIN JOHA

'Did you come and he refused (to come)?'

T51 deletes both Emp and Interr when they are in clause-initial position not preceded by another clause:

*T51. Deletion of $\left\{\begin{matrix}\text{Emp}\\\text{Interr}\end{matrix}\right\}$ in initial position in the sentence.

SD: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$ / when X is null.

Ex: (b)*RA MIN JOHAI

(r)MIN JOHAI

'Have you come?'

Although the list of transformations presented in chapter VII is not complete, it serves to demonstrate the kinds of rules which have been formulated for Amahuaca and the ordering of these rules.

FOOTNOTES

[1]See the explanation of PS20 in chapter III.

[2]See PS117 to PS119 in chapter VI.

[3]Robert Russell (1961).

[4]For the history of ViRmoC and ViRmoG, see PS83 to PS85.

[5]In this example, as in some of the others, deletions have been made which depend upon later T rules. An example is a deletion of both pronouns of Nom in the first clause and of JAAX in the second.

[6]In this sentence, MUN has been permuted from after MIN to the position following MIYA, although this is not handled until T25 by the transformations listed in this thesis.

[7]Some of the pronouns occurring in this sentence would be deleted by subsequent rules.

[8]In this example, deletion rule T27 was applied ahead of schedule in order to make the point of the illustration clear.

V. MORPHOPHONEMIC RULES FOR AMAHUACA

In chapter III the constituent structure of Amahuaca from the top down, that is, from the sentence down to the morpheme, was presented. By morpheme is meant each of the minimal units generated by the PS rules and rewritten in orthographic symbols. It would have been possible to have chosen the paragraph or discourse instead of the sentence as the largest unit for analysis.[1] However, in the transformational approach to grammar, the sentence is considered to be the basic grammatical unit, and grammar and language are defined with reference to this unit.[2] Thus we saw in chapter III how a sentence in Amahuaca can be analyzed in terms of clauses, phrases, and morphemes. Looking at this as a synthetic process, we can say that we saw how morphemes go together to form phrases, phrases go together to form clauses, and one or more clauses plus a modal form a sentence.

It has not been necessary thus far to employ the term word. We now define a word in this grammar as the sequence of morphemes between divisions which result when a sentence is divided at the beginning (preceding the first phoneme) of each verb, noun, pronoun, adjective, adverb, and interjection which is generated

by the PS rules, that is, at the beginning of each constituent which can occur in initial position in the sentence. By verb, noun, etc., is meant every class of these stems, for example, ViS, VtioS, VtoS, Nn, Nh, Na, No, etc. However, no division is made at the beginning of a morpheme which could otherwise occur in sentence-initial position but which in the sentence under consideration is a non-initial constituent of a complex unit, such as tonco 'protuberance' in the Nocx matonco 'hill'.

According to the "word division" described here, a modal (Mod) would not begin a word but would be part of a word which included one or more morphemes which were dominated by a node, such as VP, which did not dominate the modal. According to the initial rule of the phrase structure, Mod is dominated only by S. Thus Imper, Imperf, Indic, and Interr are enclitics. All except the last are separated by a hyphen from the word to which they are phonologically bound in the examples in previous chapters of this thesis. Normally, in the Amahuaca orthography only the Imperf and the Indic are preceded by a hyphen.

There are other kinds of "enclitics" in Amahuaca, such as the -n (indicating possession) which is joined to xuni 'old' in the expression joni xunin tahu 'the old man's foot'. In this case, -n is similar to the English -'s in the expressions the Queen of Spain's wealth and the lady in the front seat's hat. That is, the Amahuaca -n and the noun phrase to which it is

joined are constituents of another unit, which in this case is the modifier of a noun.

The reason for separating Imperf and Indic from what they follow by the use of hyphens is only partly grammatical. The deletion of glottal stop from hqui 'imperfect aspect indicator' and hnu 'indicative mode indicator' in certain environments and its optional deletion in certain other environments results in the problem of whether to write this enclitic-initial h (1) only when glottal stop actually occurs, (2) always, regardless of the cases in which glottal stop is deleted in oral speech, or (3) not at all. The course which has been followed is to let hyphen represent glottal stop when it occurs in that particular environment and also its absence in the cases in which glottal stop has been deleted. This makes for uniform spelling, but it obscures some interesting morphophonemic phenomena. These are pointed out in part by rules MA9 and MA10 below.

In this chapter, we shall begin with the morpheme, classifying each morpheme as a root (MpmR) or a non-root (MpmA). By root is meant, in general, a morpheme which can occur in initial position in the sentence.[3] The rules presented below describe MpmR and MpmA in terms of syllables, phonemes, and morphophonemic alternations. Words in Amahuaca have been described in terms of syllables elsewhere.[4]

Inasmuch as syllables of various types are used in the

present analysis for describing morphemes, a few explanations are in order. The PS rules of this grammar indicate the morphemes which constitute the various kinds of words. In brief, every word contains one or more roots, and if only one, that root is in initial position. There are no prefixes in Amahuaca. If there are more than one root in a word, these immediately follow one another. The phoneme j [h] occurs only in initial position in a root: jo 'come', jojo 'keep on coming'. Phoneme sequences which are lacking both within a morpheme and between morphemes are:*/xi, yi, ia, iu, io, oi, oa, ou/. The maximum vowel sequence within a morpheme or a word is two, and the maximum consonant sequence within a word is three (when nasalization of vowel is interpreted as vowel plus nasal consonant), and even this number is infrequent. In general, two consonants in cluster belong to different syllables. The only consonant clusters within a syllable consist of n plus glottal stop or fricative.

In this chapter, as elsewhere in the thesis, the orthographic symbols are employed to represent the respective phonemes. For a preliminary listing of their phonetic values, see footnote 1 of chapter II.

The following is a set of morpheme constituent rules (MC rules):

MC1. Mpm → $\left\{\begin{matrix}\text{MpmR}\\ \text{MpmA}\end{matrix}\right\}$

MC2. MpmR → $\left\{\begin{matrix}\text{Syl}_1\ (\text{Syl}_2)\ (\text{Syl}_1)\\ (\text{Syl}_1)\ \text{Syl}_3\end{matrix}\right\}$ [5]

MC3. MpmA → $\left\{\begin{matrix}\text{Addition}\\ \text{Replacement (Addition)}\end{matrix}\right\}$

MC4. Addition → $\left\{\begin{matrix}(\underline{h})\ \text{Syl}_1\ (\text{Syl}_2)\\ \text{Syl}_3\\ (\left\{\begin{matrix}\underline{n}\\ \underline{z}\\ \underline{x}\end{matrix}\right\})\ \text{Syl}_2\\ \left\{\begin{matrix}\underline{n}\\ \underline{x}\end{matrix}\right\}\end{matrix}\right\}$

MC5. Replacement → $\left\{\begin{matrix}\text{V}_2\ \text{for}\ \text{V}_1\\ \text{V}_1\ (\text{V}_1)\ \text{for}\ \text{V}_1\\ \text{V}_1\ (\text{Syl}_1)\ \text{for}\ \text{V}_2\\ \text{high tone for low tone}\end{matrix}\right\}$

MC6. $\text{Syl}_1 \rightarrow \text{C}_1 + \text{V}_1 \left[\begin{matrix}(\text{C}_2)\\ (\left\{\begin{matrix}\underline{z}\\ \underline{sh}\\ \underline{x}\end{matrix}\right\})\\ \underline{\quad}\end{matrix}\right] / \left[\begin{matrix}\underline{\quad}\left\{\begin{matrix}\underline{p}\\ \underline{t}\\ \underline{c}\end{matrix}\right\}\\ \underline{\quad}\ \underline{v}\\ \text{Otherwise}\end{matrix}\right]$

MC7. $\text{Syl}_2 \rightarrow (\text{C}_1) \left\{\begin{matrix}\text{V}_1\ (\left\{\begin{matrix}\text{C}_2\\ \underline{h}\end{matrix}\right\})\\ \text{V}_2\end{matrix}\right\}$ [6]

MC8. $\text{Syl}_3 \rightarrow \text{C}_1 + \text{V}_1 + \underline{n} + \underline{h}$

MC9. $\text{C}_1 \rightarrow \left[\begin{matrix}\underline{j}\\ \{\underline{p}, \underline{t}, \underline{c}, \underline{tz}, \underline{ch}, \underline{sh}, \underline{z}, \underline{x}, \underline{m}, \underline{n}, \underline{r}, \underline{v}, \underline{y}, \underline{h}\}\end{matrix}\right] / \left[\begin{matrix}\text{In root-initial position}\\ \text{Otherwise}\end{matrix}\right]$

MC10. $\text{C}_2 \rightarrow \{\underline{z}, \underline{sh}, \underline{x}, \underline{n}\}$

MC11. $\text{V}_1 \rightarrow \{\underline{i}, \underline{a}, \underline{u}, \underline{o}\}$

MC12. $\text{V}_2 \rightarrow \{\underline{ii}, \underline{aa}, \underline{uu}, \underline{oo}\}$ [7]

Root morphemes which illustrate MC2 are: ha 'do, kill', jo 'come', nuo 'clay', chaii 'far away, long', jiri 'eat', chihi 'fire', hatza 'manioc', shino 'monkey', tocoro 'species of toad', chishna 'skinny', nacax 'termite', harah 'cry', maxcun 'leaf-cutter ant', cuxaa 'mouth', cuntii 'pot'.

Non-root morphemes which illustrate MC4 are: ha 'present perfect tense', ti 'nominalizer', ruz 'only', pai 'desiderative', yama 'verbal negative', muran 'in', caviz 'like', mahiz 'without', hnaya 'early in the morning', nto 'without', ztii 'one, only', n 'possessive', x 'intransitive reference'.

Examples of the application of MC5 are: pacu 'drop' + intransitivizer → pacuu 'fall down', muhu 'break' (trans.) + intransitivizer → muhucuu 'break' (intrans.), coho 'burn' (intrans.) + transitivizer → coha 'burn' (trans.), xanovo 'women' → xanovaun 'women's', maxoo 'possum' + possessive → maxopa 'possum's', jiri 'eat' + transitivizer → jirí 'give food to'.

A further word should now be said about the phonetic values represented by the orthographic symbols presented in the above rules.[8] Here and below, the phonetic equivalents are enclosed in brackets. The stops p, t, c are normally voiceless and unaspirated: [p], [t], [k]. The symbol j represents aspiration [h], h represents glottal stop [ʔ], and the usual phonetic values of the other symbols are as follows: tz [ts], [tθ]; ch [č]; sh [š], [s̱]; z [s], [θ]; x [x], [x̱]; m [m]; n [n];[9] r[ř]; v

[w], [ʉ]; y [y]; i [i] (sometimes between [i] and [e]); a [a]; u [ɨ]; o [o] (sometimes between [o] and [u]). High tone is represented by (´) over the vowel.

The following phonetic rules (Ph rules) account for some of the most common types of phonetic variation in the language:

Ph1. $\begin{bmatrix} m \\ n \end{bmatrix} \rightarrow \begin{bmatrix} [mb] \\ [nd] \end{bmatrix}$ / preceded by $C_1 + V_1$ which is an odd-numbered syllable of the word and followed by $\begin{Bmatrix} V_1 \\ V_2 \end{Bmatrix} \left(\left\{\begin{matrix} x \\ h \end{matrix}\right\}\right)$.

Ph2. $\begin{bmatrix} i \\ a \\ u \\ o \end{bmatrix} n \rightarrow \begin{bmatrix} [i\ I] \\ [a\ A] \\ [ɨ\ Ɨ] \\ [o\ O] \end{bmatrix}$ / $\_\_$ ~~n~~ $\left\{\begin{matrix} p \\ t \\ c \\ tz \\ ch \\ sh \\ z \\ x \end{matrix}\right\}$, when the non-nasal C_1 begins an even-numbered syllable of the word.

Ph3. $\begin{bmatrix} i \\ a \\ u \\ o \end{bmatrix} n \rightarrow \begin{bmatrix} [ị] \\ [ą] \\ [ɨ̨] \\ [ǫ] \end{bmatrix}$ / when n is in syllable-final position. $\_\_$ n, except when n is in syllable-initial position.

Ph4. $\begin{bmatrix} p \\ t \\ c \end{bmatrix} \rightarrow \begin{bmatrix} [b] \\ [d] \\ [g] \end{bmatrix}$ / preceded by syllable-final n which is in an even-numbered syllable of the word or by nh.

The rules governing tone sandhi are not presented in this thesis but can be seen in Robert and Delores Russell (1959).

The following are a few of the rules which govern morphemic alternation in Amahuaca. Some of these morpheme alternation rules (MA rules) are general in application, while others are restricted to specific morphemes or to morphemes of specific

phonemic shapes. Although the ordering of some of these rules is important, a number of the rules are independent of the others. The MA rules are:

MA1. h → ∅ / utterance-initial position[10]

MA2. $\begin{bmatrix} V_1 \\ V_2 \end{bmatrix} \rightarrow \begin{bmatrix} V_1 \\ V_2 \end{bmatrix}$ h / utterance-final position

MA3. c → qu / — i[11]

MA4. $\begin{bmatrix} \text{ViR} \\ \text{VtioR} \\ \text{Vtor} \end{bmatrix}$ reduplicated → $\begin{bmatrix} \text{ViR + ViR} \\ \text{VtioR + VtioR} \\ \text{VtoR + VtoR} \end{bmatrix}$ h

MA5. $\begin{bmatrix} \text{hi} \\ \text{ha} \\ \text{hax} \\ \text{hai} \end{bmatrix} \rightarrow \begin{bmatrix} \text{qui} \\ \text{ca} \\ \text{cax} \\ \text{cai} \end{bmatrix} / \left\{ \begin{matrix} \text{h} \\ \text{hi} \\ \text{ha} \end{matrix} \right\}$ — , when $\left\{ \begin{matrix} \text{hi} \\ \text{ha} \end{matrix} \right\}$ are MpmR, and $\left\{ \begin{matrix} \text{ha} \\ \text{hax} \\ \text{hai} \\ \text{hi} \end{matrix} \right\}$ are MpmA.

MA6. $\begin{bmatrix} \text{ha} & \text{'PrP'} \\ \text{ca} & \text{'PrP'} \end{bmatrix}$ hqui 'Indic' → $\begin{bmatrix} \text{hai} \\ \text{cai} \end{bmatrix}$

MA7. hax → tax / yan 'TM_{2a}: last moon' ___

MA8. $\begin{bmatrix} \text{hi} \\ \text{ha} \\ \text{hax} \end{bmatrix} \rightarrow \begin{bmatrix} \text{ni} \\ \text{na} \\ \text{nax} \end{bmatrix}$ / monosyllabic Mpm ending in n —

MA9. hnu → nu / hqui —

MA10. hqui → qui / $\left\{ \begin{matrix} \text{VTer} \\ \text{hcan} \end{matrix} \right\}$ —

MA11. hcan → can / $\left\{ \begin{matrix} \text{ViS} \\ \text{VtioS} \\ \text{VtoS} \end{matrix} \right\}$ (VM) —

MA12. ti 'TM_{2b}' + PaP → tai

MA13. nohax → hax / $\left\{\begin{matrix}\text{Adv}_2 \\ \text{disyllabic Adv}_3\end{matrix}\right\}$ —

MA14. $C_1 + V_1 + n \rightarrow C_1 + V_1$ / — n, when n begins an even-numbered syllable of the word.

MA15. ma 'Neg' → mama' / affixed to an odd-numbered syllable of a word if the syllable ends in V_1.

MA16. $V_1 \rightarrow V_2$ / — ma 'Neg', when ma is the second or only syllable of Neg.

MA17. $\left[\begin{matrix}\text{pahon} \\ \text{vuran} \\ \text{quiran} \\ \text{vahin} \\ \text{cahin} \\ \text{pai} \\ \text{'hnaya}\end{matrix}\right] \rightarrow \left[\begin{matrix}\text{panh} \\ \text{vunhran} \\ \text{quinhran} \\ \text{vanh} \\ \text{canh} \\ \text{pa} \\ \text{yaa}\end{matrix}\right]$ / stem with odd number of syllables ——.

MA18. yoo → yo / stem with even number of syllables ——.

MA19. xahin → xanh / —— $\left\{\begin{matrix}\text{Imper} \\ \text{tan}\end{matrix}\right\}$

Illustrations of some of these MA rules are as follows:

(MA5) MIYANRA MIN HOROHA 'Did you cultivate it?'

MIYANRA MIN HACA 'Did you do it?'

MOHARA MIN CAHAI 'Have you already gone?'

MOHARA MIN HACAI 'Have you already done it?'

JIRIHI JANHQUINU[12] 'He is eating.'

HARAHQUI JANHQUINU 'He is crying.'

(MA6) MOHAMUN HUN JOHAI 'I have now come.'

MOHAMUN MIN HICAI 'You have now done it (intransitive).'

(MA7) HOROHAX JANHQUINU 'He was cultivating.'

HOROYANTAX JANHQUINU 'He was cultivating last moon.'

(MA8) HOXAHI JANHQUINU 'He is sleeping.'

HOXAMUNI JANHQUINU 'He is sleeping.' (MA14 has also applied.)

CAMUNNI JANHQUINU 'He is going.'

HASHINNAX JANHQUINU 'He was doing it yesterday.'

(MA9) SHARAAMUN MIN PIYAHNU 'Your arrow is good.'

NASHIMUNI CHAMIHQUINU 'Younger Brother is bathing.'

(MA10) VANATAISHQUINU 'We plant (it).'

HORONOXCANQUINU 'They cultivate.' (This also illustrates MA11.)

(MA12) TAPAZMUN HUN COHATAIHNUPU 'I burned the house last year.'

(MA13) TAPAZANOHAXMUN JAN CAINXOHNU 'He came out of the house.'

JARIHAXMUN JAN CAINXOHNU 'He came out of there.'

HORAMANOHAXMUN JAN JOXOHNU 'He came from nearby.'

(MA14) JOSHINNAX JANHQUINU 'He was coming yesterday.'

HOROSHINAX JANHQUINU 'He was cultivating yesterday.'

(MA15) HIROMAMUNHNU 'It is bad.'

HIROMAMAAMAMUNHNU 'It is not bad.' (MA16 has also applied.)

(MA17) JAN JOPANHNIXONU 'He came many years ago.'

(MA18) CAYOOTANPU 'Go right away!'

HIINYOTANPU 'Go see right away!'

JIRIYOTANPU 'Go eat right away!'

(MA19) HAROXANHPU 'Fix it (later)!'

VUCHIXANHTANPU 'Go find it (later)!'

No effort has been made in this thesis to show that the Ph rules precede the MA rules in application. However, if such is the case, it explains why the n of hnu 'Indic' does not actualize as [nd] in utterances like hoxahaxcanquinu 'They are sleeping,' in which h has been deleted. No reference need be made to the fact that hnu is an enclitic in describing the phonetic shape of this morpheme in a particular utterance if the nasal actualization rule Ph1 can be considered to have applied before rule MA9 deleted the glottal stop from hnu.

FOOTNOTES

[1]For an example of an analysis of a unit larger than the sentence, see Harris (1952).

[2]Various statements could be cited, such as the statements of Chomsky (1957) which follow: (a) "...I will consider a language to be a set (finite or infinite) of sentences, each finite in length and constructed out of a finite set of elements." (b) "The grammar of L will thus be a device that generates all the grammatical sequences of L and none of the ungrammatical ones " (p. 13).

[3]There are a few morphemes like -pa 'father' and -ha 'mother' which are considered to be roots eventhough they do not occur in sentence-initial position. These always occur bound to another root in a complex stem: hupa 'my father', miha 'your mother'.

[4]Robert and Delores Russell (1958). In this unpublished paper, entitled "Allophonic Variation in Amahuaca" there is a more traditional and more complete description of Amahuaca phonology.

[5]Three-syllable morphemes are rare. Some of them are obviously borrowings and results of onomatopoeia and others appear to have evolved from a combination of two morphemes. Examples are mishito 'cat', hatapa 'chicken', chichica 'knife', tocoro 'species of toad', and hiroma 'bad'.

[6]The sequence n plus fricative in syllable-final position is extremely rare in occurrence. Examples are hayanx 'species of liana' and Xahonx 'a woman's name'. These words appear to be monomorphemic. If [Ṽ] were interpreted phonemically as a nazalized vowel, this type of cluster would be eliminated. Clusters of glottal stop preceded by n and followed by a stop, nasal, or r are problematical. It is definite that the n and the stop, nasal, or vibrant belong to different syllables and different morphemes, and it appears that the clusters of h plus a following consonant have all resulted from contraction. An example is unhra 'my male cross cousin'.

[7]The interpretation of a vowel of more than one mora of length is problematical when the vowel is in the second syllable of a morpheme. In this present analysis, such a vowel is interpreted as a long vowel instead of as a geminate vowel cluster. This interpretation is supported by the fact that there are no morphemes having the canonical form CVCVVin which the last two vowels are non-identical. Some examples of morphemes of the form $C_1 + V_1 (C_2) (C_1) V_2$ are: chaii 'long, far', cuntii 'pot', cuxaa 'mouth', sharaa 'good', maxoo 'possum', and capuu 'caiman', mishpoo 'sand'.

There are many morphemes of the form $C_1V_1V_1$ in which the two vowels are identical: haa 'tapir', jii 'tree', voo 'hair', juu 'species of small ant'. These are in general parallel in inflection and length to morphemes of the form $C_1V_1V_1$ in which the vowels are not identical: nai 'sky', nua 'trumpeter bird', jau 'what', tao 'species of palm tree'.

[8]The phonetic symbols listed here follow Pike (1947), pp. 5-7.

[9]Rules handling the voicing of stops and the actualization of the nasals as [mb] and [nd] occur below.

[10]However, in the illustrations in this thesis, utterance-initial h is not deleted, and utterance-final h (See MA2) is not written.

[11]This is a purely orthographic device employed in order to conform to the usage of c and qu in the Spanish orthography.

[12]In this example and the subsequent examples in the thesis, Imperf and Indic are not preceded by hyphen.

VI. INDEX OF AMAHUACA PS RULES

A. Rules

PS1. $S \rightarrow \left\{ \begin{matrix} Cl \\ CC \end{matrix} \right\}$ Mod (Voc)

PS2. CC → P + H

PS3. $P \rightarrow \left\{ \begin{matrix} DCl \\ CC \end{matrix} \right\}$

PS4. $H \rightarrow \left[\begin{matrix} \left\{ \begin{matrix} Cl \\ CC \end{matrix} \right\} \\ \left\{ \begin{matrix} DCl \\ CC \end{matrix} \right\} \end{matrix} \right] / \left[\begin{matrix} \_\_ \text{ Mod} \\ \\ \text{Otherwise} \end{matrix} \right]$

PS5. DCl → Cl + CR + Emp

PS6. $Cl \rightarrow \left\{ \begin{matrix} ClA \\ ClE \end{matrix} \right\}$

PS7. $\text{Mod} \rightarrow \left\{ \begin{matrix} \text{Imper} \\ \text{(Imperf)} \end{matrix} \left\{ \begin{matrix} \text{Indic (SAR)} \\ \text{Interr} \end{matrix} \right\} \right\}$

PS8. ClA → (Comp) Emp + Nom + I + VP

PS9. $VP \rightarrow \left\{ \begin{matrix} VPt \\ VPi \end{matrix} \right\}$

PS10. $I \rightarrow \left[\begin{matrix} I_1 \\ I_2 \end{matrix} \right] / \_\_ \left[\begin{matrix} VPt \\ VPi \end{matrix} \right]$

PS11. $ClE \rightarrow Nom + Emp + D \left[\begin{matrix} \text{(Vter)} \\ \_\_ \end{matrix} \right] / \left[\begin{matrix} \_\_ \text{ (Imperf)} \left\{ \begin{matrix} \text{Indic (SAR)} \\ \text{Interr} \end{matrix} \right\} \\ \text{Otherwise} \end{matrix} \right]$

PS12. $D \rightarrow \left\{ \begin{matrix} \left\{ \begin{matrix} AdjP \\ Adj_3 \end{matrix} \right\} & (M_1) \\ NP & \\ Pron_1 & \end{matrix} \right\}$ (Neg)

PS13. $Nom \rightarrow \left\{ \begin{matrix} NP \\ Pron_1 + Pron_2 \end{matrix} \right\}$

PS14. $VPt \rightarrow \left\{ \begin{matrix} NP \\ Pron_1 \end{matrix} \right\} Vt$

PS15. $VPi \rightarrow ViS \quad (VM) \quad \left[\begin{matrix} VTer \\ \_\_\_ \end{matrix} \right] / \left[\text{As in PS11} \right]$

PS16. $Vt \rightarrow \left\{ \begin{matrix} \left\{ \begin{matrix} NP \\ Pron_1 \end{matrix} \right\} & VtioS \\ VtoS & \end{matrix} \right\} \quad (VM) \quad \left[\begin{matrix} VTer \\ \_\_\_ \end{matrix} \right] / \left[\text{As in PS11} \right]$

PS17. $ViS \rightarrow \left\{ \begin{matrix} ViR \\ Adj \\ Ne \\ VtoR + Intzr \end{matrix} \right\}$

PS18. $VtioS \rightarrow \left\{ \begin{matrix} VtioR \\ VtoR \quad \left\{ \begin{matrix} Ben \\ Mal \end{matrix} \right\} \end{matrix} \right\}$

PS19. $VtoS \rightarrow \left\{ \begin{matrix} VtoR \\ \left\{ \begin{matrix} ViR \\ Adj \\ Ne \end{matrix} \right\} \quad Tzr \end{matrix} \right\}$

PS20. $VM \rightarrow \left\{ \begin{matrix} VNeg \quad (TM_1) \\ \left\{ \begin{matrix} Frus \\ Desid \end{matrix} \right\} \quad (VNeg) \\ \left\{ \begin{matrix} TM_1 \\ (VNeg) \quad Itin \quad (TM_1) \end{matrix} \right\} \quad (Dir) \\ Dir \end{matrix} \right\}$

PS21. $VTer \rightarrow \left[\begin{matrix} VTerI \\ VTerP \end{matrix} \right] / \left[\begin{matrix} Imperf \\ \overline{Otherwise} \end{matrix} \right]$

PS22. $VTerI \rightarrow \left\{ \begin{matrix} (TM_2) & PaI \\ (TM_3) & PrI \\ FuI & \\ PaHab & \end{matrix} \right\}$

PS23. $VTerP \rightarrow \left\{ \begin{matrix} (TM_2) & PaP \\ & PrP \\ (TM_3) & FuP \\ & Gen \\ & Adm \end{matrix} \right\}$

PS24. $CR \rightarrow \left\{ \begin{matrix} (TM_2) & CRco \\ CRsub & \end{matrix} \right\}$

PS25. $CRsub \rightarrow \left\{ \begin{matrix} CRI \\ CRP \end{matrix} \right\}$

PS26. $CRP \rightarrow \left\{ \begin{matrix} CRP_a \\ (TM_2) \quad CRP_b \end{matrix} \right\}$

PS27. $Comp \rightarrow \left\{ \begin{matrix} T \\ Fre \\ L \\ LF \\ M \\ Ins \\ Acc \end{matrix} \right\}$

PS28. $T \rightarrow \left\{ \begin{matrix} NP \left\{ \begin{matrix} I_1 \\ \underline{tan} \end{matrix} \right\} \\ Pron_4 \\ Adv_1 \end{matrix} \right\}$

PS29. $Fre \rightarrow \left\{ \begin{matrix} Adv_5 \\ Adj_4 + \underline{tan} \end{matrix} \right\}$

PS30. $L \rightarrow \left\{ \begin{matrix} L_1 \\ L_2 \end{matrix} \right\}$

PS31. $LF \rightarrow L_1 + \underline{nohax}$

PS32. $L_1 \rightarrow \left\{ \begin{matrix} NP \left\{ \begin{matrix} I_1 \\ Postp \end{matrix} \right\} \\ AdvP \\ Adv_4 \end{matrix} \right\}$

PS33. $L_2 \rightarrow \left\{ \begin{matrix} NP \\ Pron_5 \end{matrix} \right\}$ <u>qui</u>

PS34. $AdvP \rightarrow \left\{ \begin{matrix} (\left\{ \begin{matrix} NP \\ Pron_1 \end{matrix} \right\}) \quad Adv_2 \\ Adv_2 \quad (\left\{ \begin{matrix} Adv_3 \\ AM \end{matrix} \right\}) \\ Adv_3 \quad (AM) \end{matrix} \right\}$

PS35. $Ma \rightarrow Adv_4$

PS36. $Ins \rightarrow \left\{ \begin{matrix} NP \ + \ I_1 \\ Pron_4 \end{matrix} \right\}$

PS37. $Acc \rightarrow \left\{ \begin{matrix} NP \\ Pron_1 \\ Pron_5 \end{matrix} \right\} W_1$

PS38. $Voc \rightarrow \left\{ \begin{matrix} \left\{ \begin{matrix} Nn \\ Ne \end{matrix} \right\} \ I_5 \\ Interj \end{matrix} \right\}$

PS39. $NP \rightarrow \left\{ \begin{matrix} Nn \\ (PreM) \quad Nx \end{matrix} \right\} \ (M_1)$

PS40. $PreM \rightarrow \left\{ \begin{matrix} Pron_3 \\ Dem \\ \left\{ \begin{matrix} Nn \\ (\left\{ \begin{matrix} Pron_3 \\ Dem \end{matrix} \right\}) \quad Nx \end{matrix} \right\} I_1 \end{matrix} \right\}$

PS41. $Nx \rightarrow Ne \left\{ \begin{matrix} (\left\{ \begin{matrix} Adj \\ AdjP \end{matrix} \right\}) \quad (\underline{vo}) \\ (Adj_3) \end{matrix} \right\}$

PS42. $Ne \rightarrow \left\{ \begin{matrix} N \\ NC_1 \\ NC_2 \end{matrix} \right\}$

PS43. $NC_1 \rightarrow N + Adj$

PS44. $NC_2 \rightarrow N + N$

PS45. $AdjP \rightarrow Adj \ (Adj_2)$

PS46. $Adj \rightarrow \left\{ \begin{matrix} Adj_1 \\ Adj_2 \end{matrix} \right\}$

PS47. $Adj_1 \rightarrow \left\{ \begin{matrix} Adjs \\ Adjcx \end{matrix} \right\}$

PS48. $Adj_3 \rightarrow \left\{ \begin{matrix} \left\{ \begin{matrix} Nn \\ N \\ Pron_1 \end{matrix} \right\} \left\{ \begin{matrix} Sim \\ Csn \end{matrix} \right\} \\ N + W_2 \end{matrix} \right\}$

PS49. $N \rightarrow \left\{ \begin{matrix} Nh \\ Na \\ No \end{matrix} \right\}$

PS50. $No \rightarrow \left\{ \begin{matrix} Nos \\ Nocx \end{matrix} \right\}$

PS51. $Nos \rightarrow \left\{ \begin{matrix} Nos_1 \\ Nos_2 \\ Nos_3 \end{matrix} \right\}$

PS52. $Nocx \rightarrow \left\{ \begin{matrix} Nos_1 + Nos_2 \\ \left\{ \begin{matrix} \left\{ \begin{matrix} Nn \\ Nh \end{matrix} \right\} I_1 \\ Pron_3 \end{matrix} \right\} PA \\ \left\{ \begin{matrix} (Nos_1) \ VtoR \\ ViR \end{matrix} \right\} Nzr \end{matrix} \right\}$

PS53. $Adjs \rightarrow$ coro 'grey', vinshin 'red', vata 'sweet', etc.

PS54. $Adjcx \rightarrow Nos_1 + Adjzr$

PS55. Nos_1 → mai 'ground', muvi 'hand', tahu 'foot', etc.

PS56. Nos_2 → tonco 'protuberance', toxpi 'wort', choro 'scar from burn', etc.

PS57. Nos_3 → tapaz 'house', jii 'tree', junu 'river, broth', etc.

PS58. Nh → {Nhs / Nhcx}

PS59. Nhs → joni 'man', xano 'woman', jochi 'older brother', etc.

PS60. Nhcx → {$Pron_{5a}$ + pa 'father', ha 'mother', etc. / Nn + I_1 + 'h + pa 'father'}

PS61. Nn → Maxoopo, Tuhc, Xanu, etc. (personal names)

PS62. Na → chaxo 'deer', shinc 'monkey', haa 'tapir', etc.

PS63. $Pron_1$ → {hiya 'I'; miya 'you'; jaa_1 'he, she'; jaa_2 'it'; nocu 'we'; mato 'you'; jato 'they'} (M_1)

PS64. $Pron_2$ → [hun 'I'; min 'you'; jan 'he, she'; ø 'it'; non 'we'; man 'you'; hcan 'they'] / [hiya; miya; jaa_1; jaa_2; nocu; mato; jato] (M_1) ___

PS65. $Pron_3$ → {hun 'my'; min 'your'; jan 'his, her'; nocun 'our'; maton 'your'; jaton 'their'}

PS66. $Pron_4 \rightarrow \left\{ \begin{array}{ll} \underline{huhon} & \text{'on me'} \\ \underline{mihon} & \text{'on you'} \\ \underline{jahon} & \text{'on him, her'} \\ \underline{nohon} & \text{'on us'} \\ \underline{mahon} & \text{'on you'} \\ \underline{jahon} & \text{'on them'} \end{array} \right\} (M_1)$

PS67. $Pron_5 \rightarrow \left\{ \begin{array}{l} Pron_{5a} \\ Pron_{5b} \end{array} \right\}$

PS68. $Pron_{5a} \rightarrow \left\{ \begin{array}{ll} \underline{hu} & \text{'I, me'} \\ \underline{mi} & \text{'you'} \\ \underline{ja} & \text{'he, him, she, her, it'} \end{array} \right\}$

PS69. $Pron_{5b} \rightarrow \left\{ \begin{array}{ll} \underline{no} & \text{'we, us'} \\ \underline{ma} \ (\underline{to}) & \text{'you'} \\ \underline{jato} & \text{'they, them'} \end{array} \right\}$

PS70. Dem → $\left\{ \begin{array}{ll} \underline{nan} & \text{'this'} \\ \underline{ja} & \text{'that'} \end{array} \right\}$

PS71. VNeg → yama 'not'

PS72. Neg → ma 'not'

PS73. Emp → $(M_2) \left\{ \begin{array}{l} \underline{mun} \\ \underline{pan} \end{array} \right\}$

PS74. M_1 → covin 'really', ztii 'one, only', etc.

PS75. M_2 → razi 'only', rivi 'also', viz 'first', etc.

PS76. Imper → SAR

PS77. SAR → (can) $\left\{ \begin{array}{l} \underline{pu} \\ \underline{u} \\ \underline{\emptyset} \end{array} \right\}$

PS78. Indic → hnu

PS79. Interr → ra

PS80. VtiotR → hinan 'give', human 'share with', muton 'show', etc.

PS81. VtoR → hiin 'see', horo 'cultivate', rutu 'kill', etc.

PS82. ViR → { ViRmo / ViRo }

PS83. ViRmo → { ViRmoC / ViRmoG }

PS84. ViRmoC → { jo 'come (sg.)' / vu 'come (pl.)' }

PS85. ViRmoG → { ca 'go (sg.)' / vo 'go (pl.)' }

PS86. ViRo → jiri 'eat', hoxa 'sleep', nashi 'bathe', etc.

PS87. ~~#~~PaI~~#~~ → hax

PS88. ~~#~~PrI~~#~~ → hi

PS89. ~~#~~FuI~~#~~ → catzi

PS90. PaHab → nox

PS91. Gen → hai

PS92. Adm → miz

PS93. ~~#~~Fu~~P~~ → non

PS94. Ben → xon

PS95. Mal → n

PS96. TM_1 → { yoo 'right away' / 'hnaya 'early in the morning' }

PS97. TM_2 → { TM_{2a} / TM_{2b} }

PS98. TM_{2a} → { shin 'yesterday' / yan 'last moon' }

PS99. TM_{2b} → { ti 'last year' / (pahon) ni '(many) years ago' }

PS100. TM_3 → { nontu 'tomorrow' / xahin (na) '(very) remote future' }

PS101. Postp → ŋuran 'in', hiva 'beside', etc.

PS102. Adv_1 → canon 'now', moha 'already, now', etc.

PS103. Adv_2 → $\left\{ \begin{array}{l} \left\{ \begin{array}{l} na \\ ŋo \\ nu \end{array} \right\} + \left\{ \begin{array}{l} oui \\ no \\ (cu) \end{array} \right\} \; ri \\ ja \left\{ \begin{array}{l} no \\ ri \end{array} \right\} \end{array} \right\}$

PS104. Adv_3 → vizma 'far', horama 'near', chaii 'far away', etc.

PS105. Adv_4 → coshi 'fast', yanima 'slowly', mucumahaz 'forcefully', etc.

PS106. Adv_5 → hunaa 'again'

PS107. Adj_2 → $\left\{ \begin{array}{l} AM \\ hiroma \text{ 'bad', } xuni \text{ 'old', etc.} \end{array} \right\}$

PS108. AM → sharaa 'good, well', pishta 'little, somewhat', etc.

PS109. Adj_4 → ravuu 'two', naha 'lots', etc.

PS110. W_1 → $\left\{ \begin{array}{ll} \left\{ \begin{array}{l} ya \\ vu \end{array} \right\} & \text{'along with'} \\ mahiz & \text{'without'} \end{array} \right\}$

PS111. W_2 → $\left\{ \begin{array}{ll} \left\{ \begin{array}{l} ya \\ ni \end{array} \right\} & \text{'with, having'} \\ mahiz & \text{'not having'} \end{array} \right\}$

PS112. Sim → caviz 'similar to', etc.

PS113. Csn → tixon 'the size of'

PS114. PA → na

PS115. Nzr → ti

PS116. Adjzr → nto, ta, etc.

PS117. Itin → $\left\{ \begin{array}{l} ItinC \\ ItinG \end{array} \right\}$

PS118. ItinC → $\begin{bmatrix} \underline{quiran} \\ \underline{vuran} \end{bmatrix}$ / $\begin{bmatrix} V\_S \ (VX) \ \_\_ \\ Otherwise \end{bmatrix}$

PS119. ItinG → $\begin{bmatrix} \underline{cahin} \\ \underline{vahin} \end{bmatrix}$ / [Same as in PS118.]

PS120. Frus + cahan 'almost'

PS121. Desid → pai

PS122. Dir → tan 'away', etc.

PS123. I_1 → n

PS124. I_2 → x

PS125. Interj → mai 'male attention getter', pi 'female attention getter'

B. Key to Abbreviations

The following symbols are presented in the order in which they are introduced in the PS rules:

S 'sentence'	ClE 'equational clause'
Cl 'clause'	Imper 'imperative'
CC 'clause construct'	Imperf 'imperfect'
Mod 'modal'	Indic 'indicative'
Voc 'vocative'	SAR 'speaker-audience relator'
P 'peripheral constituent'	Interr 'interrogative'
H 'head constituent'	Comp 'complement'
DCl 'dependent clause'	Emp 'emphasis indicator'
CR 'clause relator'	Nom 'nominal'
ClA 'activity clause'	I 'nominal inflection'

VP 'verb phrase'

VPt 'transitive verb phrase'

VPi 'intransitive verb phrase'

D 'description'

VTer 'verb terminal'

AdjP 'adjective phrase'

M 'modifier'

Adj 'adjective'

NP 'noun phrase'

Pron 'pronoun'

Neg 'negative'

Vt 'transitive verb'

ViS 'intransitive verb stem'

VM 'verb modifier'

VtioS 'transitive verb stem taking indirect object'

VtoS 'ordinary transitive verb stem'

ViR 'intransitive verb root'

Ne 'noun element'

VtoR 'ordinary transitive verb root'

Intzr 'intransitivizer'

VtioR 'transitive verb root taking an indirect object'

Ben 'benefactive'

Mal 'malefactive'

Tzr 'transitivizer'

VNeg 'verbal negative'

TM 'tense modifier'

Frus 'frustrative'

Desid 'desiderative'

Itin 'itinerant'

Dir 'direction indicator'

VTerI 'imperfect verb terminal'

VTerP 'perfect verb terminal'

PaI 'past imperfect'

PrI 'present imperfect'

FuI 'future imperfect'

PaHab 'past habitual'

PaP 'past perfect'

PrP 'present perfect'

FuP 'future perfect'

Gen 'general'

Adm 'admonitory suffix'

CRco 'coordinate clause relator'

CRsub 'subordinate clause relator'

CRI 'imperfect clause relator'

CRP 'perfect clause relator'

T 'time'

Fre 'frequency'

L 'location'

LF 'location-from'

Ma 'manner'

Ins 'instrument'

Acc 'accompaniment'

Adv 'adverb'

Postp 'postposition'

AM 'adverb modifier'

W 'with - having indicator'

Nn 'personal name'

Interj 'interjection'

PreM 'pre-modifier'

Nx 'noun expression'

Dem 'demonstrative'

N 'noun'

NC 'noun compound'

Adjs 'simple adjective'

Adjcx 'complex adjective'

Sim 'simulfactive'

Csn 'comparison'

Nh 'human noun'

Na 'animal noun'

No 'ordinary noun'

Nos 'simple ordinary noun'

Nocx 'complex ordinary noun'

Nzr 'nominalizer'

Nhs 'simple human noun'

Nhcx 'complex human noun'

ViRmo 'intransitive verb root of motion'

ViRmoC 'come intransitive verb root'

ViRmoG 'go intransitive verb root'

ItinC 'come itinerant'

ItinG 'go itinerant'

VII. INDEX OF AMAHUACA TRANSFORMATIONS

*T1. Actualization of PaP in indicative sentences.

SD: X + Nom + Y, PaP, Indic + Z

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{cu} \\ \underline{xo} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom = Pron_1 + \begin{Bmatrix} \underline{hun} \\ \underline{non} \\ \underline{min} \\ \underline{man} \end{Bmatrix} \\ Otherwise \end{bmatrix}$$

*T2. Actualization of PaP in interrogative sentences.

SD: X + Nom + Y, PaP, Interr + Z

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{ha} \\ \underline{hax} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom = Pron_1 + \begin{Bmatrix} \underline{hun} \\ \underline{non} \\ \underline{min} \\ \underline{man} \end{Bmatrix} \\ Otherwise \end{bmatrix}$$

*T3. Actualization of PrP in indicative sentences.

SD: X + Nom + Y, PrP, Indic + Z

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{ha} \\ \underline{qui} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom = Pron_1 + \begin{Bmatrix} \underline{hun} \\ \underline{non} \end{Bmatrix} \\ Otherwise \end{bmatrix}$$

*T4. Actualization of PrP in interrogative sentences.

SD: X + Nom + Y, PrP, Interr + Z

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{hai} \\ \underline{hi} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom = Pron_1 + \begin{Bmatrix} \underline{hun} \\ \underline{non} \\ \underline{min} \\ \underline{man} \end{Bmatrix} \\ Otherwise \end{bmatrix}$$

*T5. Replacement of $\begin{bmatrix} \underline{quiran} \\ \underline{cahin} \end{bmatrix}$ by $\begin{bmatrix} \underline{vuran} \\ \underline{vahin} \end{bmatrix}$.

SD: X + Nom + Y, $\begin{bmatrix} \underline{quiran} \\ \underline{cahin} \end{bmatrix}$, Z

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{vuran} \\ \underline{vahin} \end{bmatrix} - C_3 \; / \; Nom = \underline{jato} + \underline{hcan}$$

*T6. Division of CRco.

SD: $X + Nom + \begin{Bmatrix} I \\ D \end{Bmatrix} + VP \} + \begin{Bmatrix} TM_2 \\ \underline{\quad} \end{Bmatrix}$, CRco, $Y^* + Nom + Z$

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} CRcos \\ CRcod \end{bmatrix} - C_3 \; / \; \begin{bmatrix} Nom \text{ in } C_1 = Nom \text{ in } C_3 \\ Otherwise \end{bmatrix}$$

*T7. Actualization of CRcos.

SD: X, CRcos, $Y^* + \begin{Bmatrix} VP \\ D \end{Bmatrix} + Z$

$$SC: C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{xon} \\ \underline{hax} \end{bmatrix} - C_3 \; / \; \begin{bmatrix} VP \text{ in } C_3 = VPt \\ Otherwise \end{bmatrix}$$

*T8. Actualization of CRcod.

SD: X + Nom + Y, CRcod, Z

$$\text{SC: } C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{\text{havan}} \\ \underline{\text{cun}}\end{matrix}\right] - C_3 \;/\; \left[\begin{matrix}\text{Nom} = \underline{\text{jato + hcan}} \\ \text{Otherwise}\end{matrix}\right]$$

*T9. Actualization of CRP_a.

SD: X + Nom + I + VP, CRP_a, Y^* + Nom + I + VP + Z

$$\text{SC: } C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{\text{tan}} \\ \underline{\text{hain}}\end{matrix}\right] - C_3 \;/\; \left[\begin{matrix}\text{Nom in } C_1 = \text{Nom in } C_3 \\ \text{Otherwise}\end{matrix}\right]$$

*T10. Deletion of CR $\underline{\text{tan}}$ when preceded by Itin.

$$\text{SD: } X + \left[\begin{matrix}\text{ItinC} \\ \text{ItinG}\end{matrix}\right], \underline{\text{tan}}, Y^* + \left[\begin{matrix}\text{ViRmoC} \\ \text{ViRmoG}\end{matrix}\right] + Z$$

$$\text{SC: } C_1 - C_2 - C_3 \rightarrow C_1 - C_3$$

*T11. Actualization of CRP_b.

$$\text{SD: } X + \text{Nom} + I + \left\{\begin{matrix}\text{ViS} + \left\{\begin{matrix}\text{VM} \\ \text{---}\end{matrix}\right\} \\ \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} + \text{Vt}\end{matrix}\right\} + \left\{\begin{matrix}\text{TM}_2 \\ \text{---}\end{matrix}\right\}, CRP_b, Y^* + \text{Nom} + I + \left\{\begin{matrix}\text{VPi} \\ \left\{\begin{matrix}\text{NP} \\ \text{Pron}_1\end{matrix}\right\} + \text{Vt}\end{matrix}\right\} + Z$$

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{xo} \\ \\ \underline{ha} \end{bmatrix} - C_3$ /

$$\begin{bmatrix} \text{when } \begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix} \text{ in Nom of } C_1 = \begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix} \text{ of } C_3 \\ \text{when } \begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix} \text{ of } C_1 = \begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix} \text{ in Nom of } C_3 \end{bmatrix}$$

*T12. Division of CRI.

SD: X + Nom + I + VP, CRI, Y* + Nom + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \text{CRIs} \\ \text{CRId} \end{bmatrix} - C_3$ /

$$\begin{bmatrix} \text{Nom in } C_1 = \text{Nom in } C_3 \\ \text{Otherwise} \end{bmatrix}$$

*T13. Actualization of CRIs.

SD: X, CRIs, Y + VP + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \begin{bmatrix} \underline{quin} \\ \underline{hi} \end{bmatrix} - C_3$ /

$$\begin{bmatrix} \text{VP in } C_3 = \text{VPt} \\ \text{Otherwise} \end{bmatrix}$$

*T14. Actualization of CRId.

SD: X + Nom + I + VP, CRId, Y* + Nom + $\begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix}$ + Vt + Z

SC: $C_1 - C_2 - C_3 \rightarrow - C_1 - \underline{haito} - C_3$ /

when $\begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix}$ in Nom of $C_1 = \begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix}$ of C_3

T15. Substitution of <u>taish</u> for PaHab <u>nox</u>.

SD: X, <u>nocu</u> + <u>non</u> + I, Y, <u>nox</u>, Imperf + Z

SC: $C_1 - C_2 - C_3 - C_4 - C_5 \rightarrow C_1 - C_3 - \underline{taish} - C_5$

*T16. Actualization of Imperf in indicative sentences.

SD: X + Nom + Y, Imperf, Indic + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{hca} \\ \underline{hqui}\end{matrix}\right] - C_3$ /

$$\left[\begin{matrix}\text{Nom} = \text{Pron}_1 + \left\{\begin{matrix}\underline{hun} \\ \underline{non}\end{matrix}\right\} \\ \text{Otherwise}\end{matrix}\right]$$

*T17. Actualization of Imperf in interrogative sentences.

SD: X + Nom + Y, Imperf, Interr + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - \left[\begin{matrix}\underline{hcai} \\ \\ \underline{ni} \\ \underline{hqui}\end{matrix}\right] - C_3$ /

$$\left[\begin{matrix}\text{Nom} = \text{Pron}_1 + \left\{\begin{matrix}\underline{hun} \\ \underline{non} \\ \underline{min} \\ \underline{man}\end{matrix}\right\} \\ \\ \text{Nom} = \underline{jato + hcan} \\ \text{Otherwise}\end{matrix}\right]$$

*T18. Insertion of I_2 in C1E followed by Imperf when VTer does not occur.

SD: X + Nom + Emp + D, Imperf + Y

SC: $C_1 - C_2 \rightarrow C_1 - I_2 - C_2$

T19. Insertion of Indic after Interr.

SD: X + Interr, Y

SC: $C_1 - C_2 \rightarrow C_1 - \text{Indic} - C_2$

*T20. Permutation of Interr when preceded by Imperf.

SD: $X + \left\{\begin{matrix}\text{VP} \\ D + \left\{\begin{matrix}\text{VTer} \\ I_2\end{matrix}\right\}\end{matrix}\right\}$, Imperf, Interr, Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

T21. Transposition of D and Nom.

SD: X, Nom, Emp, D + $\left\{ \begin{matrix} I_2 \\ \underline{\quad} \end{matrix} \right\}$, Y

SC: $C_1 - C_2 - C_3 - C_4 - C_5 \rightarrow C_1 - C_4 - C_3 - C_2 - C_5$

*T22. Permutation of I following $Pron_1$ + $Pron_2$.

SD: X + $Pron_1$, $Pron_2$, I, Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

T23. Insertion of additional Comp.

SD: X + Emp + Nom, Y + VP + Z

SC: $C_1 - C_2 \rightarrow C_1 -$ Comp $- C_2$

T24. Permutation of a non-verbal constituent to clause-initial position.

SD: $\left\{ \begin{matrix} X + Emp \\ \underline{\quad} \end{matrix} \right\}$, Emp + Y, $\left\{ \begin{matrix} NP \\ Pron_1 \end{matrix} \right\}$ + $\left\{ \begin{matrix} I \\ \underline{\quad} \end{matrix} \right\}$, Z

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

*T25. Permutation of Emp in ClE when preceded by $Pron_2$.

SD: X + $Pron_1$, $Pron_2$, Emp + D + Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

*T26. Deletion of $Pron_1$ + $\left\{ \begin{matrix} I \\ \underline{\quad} \end{matrix} \right\}$ when followed by $Pron_2$.

SD: X + Emp, $Pron_1$ + $\left\{ \begin{matrix} I \\ \underline{\quad} \end{matrix} \right\}$, $Pron_2$ + Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

T27. Deletion of Np when not followed by Emp.

SD: X + Emp + Y, NP, Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$ / when NP does not have Nn or Nh as its head constituent.

T28. Deletion of $\left\{\begin{matrix}\text{NP}\\ \text{Pron}_1\end{matrix}\right\}$ in C1A when not followed by Emp and not part of Nom.

SD: X + Emp + $\left\{\begin{matrix}\text{Nom}\\ \text{---}\end{matrix}\right\}$ + Y, $\left\{\begin{matrix}\text{NP}\\ \text{Pron}_1\end{matrix}\right\}$, Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

*T29. Permutation of $\left\{\begin{matrix}\text{NP + I}\\ \text{Pron}_2\end{matrix}\right\}$ in imperfect sentences.

SD: X, $\left\{\begin{matrix}\text{NP + I}\\ \text{Pron}_2\end{matrix}\right\}$, VP + $\left\{\begin{matrix}\text{Interr}\\ \text{---}\end{matrix}\right\}$, Imperf + Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3^* - C_2 - C_4$

*T30. Deletion of I in C1A when followed by Imperf.

SD: X + VP + NP, I, Imperf + Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

*T31. Permutation of <u>hcan</u> when TM_{2a} occurs (or no TM_2 occurs).

SD: X, <u>hcan</u>, Y + $\left\{\begin{matrix}\text{TM}_{2a}\\ \text{---}\end{matrix}\right\}$, $\left\{\begin{matrix}\text{PaP}\\ \text{PrP}\\ \text{Adm}\end{matrix}\right\}$ + Z

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

*T32. Permutation of <u>hcan</u> when TM_{2b} occurs.

SD: X, <u>hcan</u>, Y, TM_{2b} + PaP + Z

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

*T33. Permutation of <u>hcan</u> when <u>pahon</u> occurs.

SD: X, <u>hcan</u>, <u>pahon</u>, Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

T34. Deletion of I_2 when preceded by NP in C1A.

SD: X + NP, I_2, VPi + Y

SC: C_1 - C_2 - C_3 → C_1 - C_3

T35. Permutation of verb stem to clause-initial position.

SD: $\begin{Bmatrix} X + Emp \\ \_\_\_ \end{Bmatrix}$, Emp + $Pron_2$, $\begin{Bmatrix} ViS \\ VtioS \\ Vtos \end{Bmatrix}$ + $\begin{Bmatrix} VM \\ \_\_\_ \end{Bmatrix}$, Y

SC: C_1 - C_2 - C_3 - C_4 → C_1 - C_3 - C_2 - C_4

*T36. Insertion of ja in C1A and C1E, when $\begin{Bmatrix} NP \\ Pron_2 \end{Bmatrix}$ immed. precede $\begin{Bmatrix} VTerP \\ CR \end{Bmatrix}$

SD: X + $\begin{Bmatrix} NP \\ Pron_2 \end{Bmatrix}$, $\begin{Bmatrix} VTerP \\ CR \end{Bmatrix}$ + Y

SC: C_1 - C_2 → C_1 - ja - C_2, when the clause does not contain $\begin{Bmatrix} VtioS \\ VtoS \end{Bmatrix}$.

*T37. Permutation of VTerI in C1E.

SD: X + D + Emp, Nom, VTerI, Y

SC: C_1 - C_2 - C_3 - C_4 → C_1 - C_3 - C_2 - C_4

*T38. Permutation of Interr in sentences in which Imperf does not occur.

SD: X + Emp, Y, Interr, Z

SC: C_1 - C_2 - C_3 - C_4 → C_1 - C_3 - C_2 - C_4

T39. Insertion of 'quotative' quiha in indicative sentences in which Imperf does not occur.

SD: X + Emp, Y

SC: C_1 - C_2 → C_1 - quiha - C_2 / when C_2 does not contain Imperf or Interr.

T40. Insertion of quotative in indicative sentences in which Imperf occurs.

SD: X + Emp + Y, Imperf + Z

SC: $C_1 - C_2 \rightarrow C_1$ - quiha - C_2 / when C_1 contains Indic but does not contain Interr.

T41. Insertion of rocon 'indeed' in interrogative sentences.

SD: X + Emp, Y

SC: $C_1 - C_2 \rightarrow C_1$ - rocon - C_2 / when Y contains Interr.

*T42. Deletion of Emp in interrogative sentences.

SD: X, Emp, Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$ / when C_3 contains Interr but not Indic.

T43. Transposition of constituents in ClA.

SD: X, $\begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix}$, $\begin{Bmatrix} \text{NP} \\ \text{Pron}_1 \end{Bmatrix}$, VtioS + Y

SC: $C_1 - C_2 - C_3 - C_4 \rightarrow C_1 - C_3 - C_2 - C_4$

T44. Addition of ri before Interr ra. ~~Replacement of Interr ra by vira.~~

SD: $\begin{Bmatrix} X + CR \\ \text{\_\_\_} \end{Bmatrix}$ + $\begin{Bmatrix} \text{tzova} & \text{'who?'} \\ \text{rato} & \text{'which?'} \\ \text{raqui} & \text{'where?'} \\ \text{rani} & \text{'where?'} \\ \text{jau} & \text{'what?'} \\ \text{cutza} & \text{'what, when?'} \\ \text{cuz} & \text{'how?'} \end{Bmatrix}$ + Y, ra, + Z

SC: $C_1 - C_2 - C_3 \rightarrow C_1$ - vira - C_2 / when C_2 does not contain Indic.

*T45. Replacement of Indic hnu by hin.

SD: X + yoo + $\left\{\begin{matrix}\text{tan} \\ \text{\_\_\_}\end{matrix}\right\}$ + non, hnu, Y

SC: C_1 - C_2 - C_3 → C_1 - hin - C_3

T46. Replacement of Indic hnu by cu or hqui.

SD: X, hnu, Y

SC: C_1 - C_2 - C_3 → C_1 - $\left[\begin{matrix}\text{cu} \\ \text{hqui}\end{matrix}\right]$ - C_3 / $\left[\begin{matrix}\text{cu} \text{ \_\_\_} \\ \text{Otherwise , except when hnu} \\ \text{~~occurs in~~ the first sentence} \\ \text{of the utterance.}\end{matrix}\right]$

the sentence under consideration is

*T47. Deletion of SAR.

SD: X + $\left\{\begin{matrix}\text{cu} \\ \text{hqui}\end{matrix}\right\}$, SAR

SC: C_1 - C_2 → C_1

T48. Inflection of L_1.

SD: X + L_1, Y + VP + Z

SC: C_1 - C_2 → C_1 - $\left[\begin{matrix}\text{nohax} \\ \text{xon}\end{matrix}\right]$ - C_2 / $\left[\begin{matrix}\text{VP} = \text{VPi} \\ \text{VP} = \text{VPt}\end{matrix}\right]$

T49. Insertion of TM_3 xahin before CRIs.

SD: X, $\left\{\begin{matrix}\text{quin} \\ \text{hi}\end{matrix}\right\}$ + Y

SC: C_1 - C_2 → C_1 - xahin - C_2

T50. Generalized T incorporating D into C1A.

SD: D, Emp + Pron_2 + ja + CRco + Emp, Pron_1, I + Emp + Pron_2 + VP + Y

SC: C_1 - C_2 - C_3 - C_4 → C_1 - C_4 / when Pron_2 in C_2 = Pron_2 in C_4.

*T51. Deletion of $\left\{\begin{matrix}\text{Emp}\\ \text{Interr}\end{matrix}\right\}$ in initial position in sentence.

SD: X, $\left\{\begin{matrix}\text{Emp}\\ \text{Interr}\end{matrix}\right\}$, Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$ / when X is null.

T52. Deletion of Emp.

SD: X, Emp, Y

SC: $C_1 - C_2 - C_3 \rightarrow C_1 - C_3$

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