

CAMELOT, 1968,

being an account of some of the linguistic Events of that Year: wherein are detailed the Declarations of the New Court and the Weapons used in the Awefull Battle to repeal Certain Decrees of the Old Court. This History is humbly dedicated to those Valiant young Knights who, in quest of the Holy Grail, shed their Blood under the onslaught of Savage wild boars in the Forests of Lincoln and Grant, and in the Stone Valley of Michigan, in the Duchy of Czechago, Summer, 1968, Richard the Leather-buttocked, Lord Mayor.

Sir Lancelot of Benwick
Morgan le Fay
The Green Knight

This paper originated as a report on the syntax/semantics courses at the 1968 Linguistic Institute, held at the University of Illinois at Urbana, although the authors editorialized with abandon and added material and conclusions that did not appear in those courses. The authors attended the institute as exchange students from sixth century Britain (in the 1960s, the National Science Foundation had money for that sort of thing) and appear so far to have avoided deportation to their native century. The paper was circulated in mimeographed form in autumn 1968. The version printed here has been shortened significantly; some sections, which duplicate papers that are now readily available, have been replaced by summaries, and scurrilous accounts of interpretive semantics and lexicalist syntax have been removed along with some of the more pretentious rhapsodies over generative semantics, although a few of the latter have been retained to preserve the flavor of the original.

I. INTRODUCTION

1.1 Lectures in syntax and linguistic theory at the 1968 Linguistic Institute vividly demonstrated two things. First, that there is no one theory that could fairly be called the theory of transformational-generative grammar. The theory that used to go by this name has split sharply, and probably

irrevocably, into two schools - the "lexicalists" and the "transformationalists". And second, that an adequate theory of "grammar" must include many phenomena previously considered outside grammar, and even outside linguistics.

1.2 The most basic difference between the lexicalist position¹, as formulated by Noam Chomsky and Ray Jackendoff, and the transformationalist position, is the belief of the lexicalists that there is a crucial difference between syntactic facts and semantic facts. Most other differences between the two theories follow from this one. More specifically, the lexicalists' belief in a sharp distinction between syntax and semantics leads them, for example, to generate quantifiers and negatives in base structures in positions as close as possible to their surface positions, and then, since they need transformations to move these items around, to permit transformational operations to affect the meaning of a sentence. (They avoid saying that transformations change meaning by saying that meaning is not fully determined until all transformations have applied, at which point semantic interpretation rules assign a reading to the sentence.) Since their base structures are not semantic structures but structures of syntactic categories, they require rules of semantic interpretation that operate "after" the attachment of lexical items and the operation of the transformational component.

One semantic interpretation rule is that which determines the meaning of a sentence after a quantifier has been moved so that its scope relations² have changed. The rule assigns scope by looking at the surface structure and moving the quantifier up one S node in the semantic representation (some sort of parallel tree?), provided that it isn't moved over another quantifier or negative. The scope of the quantifier is given by the resulting structural relations. If it is true that a quantifier is never moved out of the scope of a negative and vice versa in semantic interpretation, the semantic interpretation rule could be reformulated as a constraint on transformations involving quantifiers and negative, namely, that quantifiers cannot be moved into the scope of negatives and vice versa. Since similar translations are possible for the lexicalists' semantic interpretation of pronouns and a host of other cases, it is not out of order to ask how to tell the difference between a semantic interpretation rule and a transformation looked at from the other end. The constraints on semantic interpretation rules, for as many as have been proposed by the lexicalists, seem to be the exact inverses of constraints on corresponding transformations. If this is so, the lexicalists seem not to need transformations at all, since their semantic interpretation rules would do

exactly what transformations do, only in the opposite order, working from surface structure to semantic representation.

1.3 There is apparently nothing that would in principle prevent the lexicalists from transformationally relating *The wind hit the pillow* and *The pill hit the window*, to use an example attributed to Zellig Harris. The feeling of discomfort that linguists have with "relationships" of this sort stems from their deep-seated, if often inexplicit, desire for naturalness, a notion discussed in detail in Zwicky (1968).

In early transformational grammar, the main criterion of the metatheory was simplicity. Linguistic theory was to provide a formal measure of simplicity that would determine which of two grammars that were equally complete and equally self-consistent was the better. Three things eventually cast doubt upon this evaluation procedure. The first was that no complete grammar was forthcoming, and it was impossible to judge incomplete grammars in this schema. Yet judging grammars was what was in question. Second, a great controversy arose as to how to measure simplicity, and it soon became apparent that no external method existed. The third point is that for all their talk about explanatory adequacy, those who were concerned with simplicity wrote better-looking grammars than they deserved to. That is, their grammars looked better than they really were. For example, as Ross pointed out, in the affix-hopping rule in "Syntactic Structures", Chomsky says that what affixes hop over is the term

- | | |
|-----|-------------|
| (1) | v |
| | M |
| | <i>have</i> |
| | <i>be</i> |

Why the ad hoc feature *v* and not *!* or *\$*? And why does this disjunctive set recur in so many rules? Intuitively we feel that ordinary verbs (*v*), modals (*M*), *have* and *be* are all members of a single set, verbs. But in Chomsky's theory, this is only an accident. It was only by reading too much into Chomsky's notation that we made any sense at all out of this disjunctive set, for, as Ross points out, the terms could as well have been

- | | |
|-----|--------------------|
| (2) | Adjective |
| | Article |
| | <i>toastmaster</i> |
| | <i>and</i> |

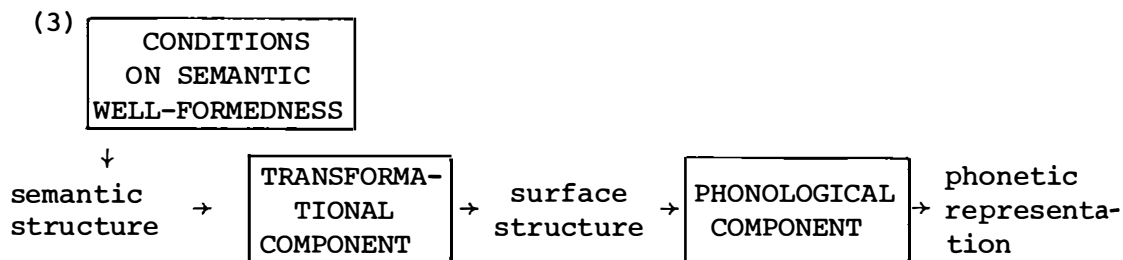
But what was most instrumental in pointing up the inadequacy of this aspect of Chomsky's theory was that he

placed so few restrictions on base and transformational rules that given alternative solutions, the choice between them was often arbitrary. Even today, many generative grammarians, including Chomsky, write as if it were a personal aesthetic choice whether to have a large base component and few transformational rules or vice versa. The notational system a theory provides is a direct reflection of the power and generality of the theory, not merely an ad hoc tool for writing down descriptions. A theory that has too powerful a notation approaches emptiness.

A scientifically interesting theory must be more than simple, more than complete, more than consistent. The fourth and overriding consideration is naturalness. The claims made by the grammar must be reflections of truth and generalizations about language. This, in turn, entails constraints on the grammar itself. For instance, if it turns out that most transformational rules need to operate only on constituents, then further investigation may show that all transformations must operate in this manner and show why they must. This introduces a very powerful constraint on the grammar, which is likewise a very powerful tool of research. At the same time, it makes a positive claim about how language works.

A grammar with only descriptive adequacy gives back no more than is put in, but a grammar with explanatory adequacy should do far more. One can look at sentences casually and see that they have subjects and predicates, but one cannot look at them casually and see that grammatical rules must apply only to constituents.

2.0 The other group of linguists seriously working in the theory that used to be called transformational-generative grammar (Ross, Lakoff, McCawley, Bach, Fillmore, etc.) are less concerned with generating structures that utterances of a language may be mapped onto than they are with characterizing how a speaker expresses what he does express. Their conception (after McCawley, 1968c) of this theory of grammar is describable by the diagram (3).



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The questions with which they are concerned include:

1. What will an adequate semantic representation have to include? What form will it have?
2. What can a transformation do? What does it look like?
3. At what stage and in what manner are semantic representations converted into words of the language? Is the answer to this question such as to account for the striking parallelism in the different uses of the same word in different languages? For example, *sad* and *warm* in

John is sad about losing his dog.

"Gone with the Wind" is a sad book.

John is a sad case.

This room is warm.

I'm warm.

The weather is warm today.

This coat is warm. This is a warm coat.

4. How can opacity and ambiguity of source of definite description be accounted for in such sentences as:

John says that the man across the street from Max killed Tom.

which could be a report of John saying *The man across the street from Max killed Tom* or it could be a report of John saying *Rupert Jones killed Tom* with the speaker describing Rupert Jones as *the man across the street from Max*.

5. What determines the form and possible positions, and even possibility of occurrence, of anaphoric terms (personal pronouns, reflexive pronouns, epithets, alternative descriptions)?

6. What are the deep semantic relationships of quantifier words like *all*, *every*, *some* (pl), *some* (sg), *many*, *most*, *few*, *each*, *any*?

This second group of linguists are pursuing the goal of understanding the nature of human language (rather than merely devising schemes for writing descriptions of particular languages) through examining in fine detail how one language (usually English) works. They are investigating phenomena, forming and testing hypotheses about them, and comparing these hypotheses with other phenomena in the language and similar phenomena in other languages. Many of their tentative conclusions, and more of the questions they are asking, are

are put forth in McCawley (1967), on which many of the following paragraphs depend heavily.

3.1 To return to the first question above, "What will an adequate semantic representation have to include"--because different groupings of semantic units have different meanings, an adequate semantic representation will have to represent groupings; in other words, constituent structure. For an example of different groupings having different meanings, consider the ambiguity of (4a) between the interpretations of (4b) and (4c).

- (4) a. *John doesn't beat his wife because he loves her.*
b. *(not (John beats his wife)) ([because] John loves his wife)*
c. *(John beats his wife) (not ([because] John loves his wife))*

Since sentences like

- (5) a. *John admires John*
b. *John admires himself*

are not perfect paraphrases of each other, [(b) must be interpreted so that the admirer and the admired are identical; (a) allows, and for some people, requires an interpretation in which they are distinct], an adequate semantic representation will have to include some way of keeping track of referents of terms. Referential indices have been commonly assumed to be adequate for this, but indices alone will not satisfactorily handle sentences such as (6a), interpretable by some people as (6b) and by others as (6c).

- (6) a. *I dreamed that I was Margaret, and that I kissed me. (not myself)*
b. *I_i dreamed that I_i was Margaret_j and that I_j kissed me_i.*
c. *I_i dreamed that I_i was Margaret_j and that I_i kissed me_j.*

and indices cannot handle at all such sentences as

- (7) *John thinks that Nixon_i and Humphrey_j are different people, and that they_{i,j} will campaign against each other and one of them_{i,j} will lose, but I think that Nixon_{i?/k?} and Humphrey_{j?/k?} are the*

same person, and that he_{ij?/k?} will win.

G. Lakoff (1968b) has proposed that a theory of "counterparts" be incorporated into linguistic theory to supply the identity criteria needed to handle such problems. Furthermore, since there are distinctions in meaning within such sets of sentences as

- (8) a. *Everyone wants to go home.*
b. *Everyone wants everyone to go home.*
- (9) a. *Only Lucifer pities himself.*
b. *Only Lucifer pities Lucifer.*

it appears that a distinction must be made between constants and variables in semantic representation. Symbolic logic representation is quite adequate for the sentences in the first set:

- (10) a. $\forall_x (x \text{ wants } (x \text{ go home}))$
b. $\forall_x (x \text{ wants } (\forall_y (y \text{ go home})))$

but only crude representations of the second set have been attempted, e.g., one in which *only* is taken as a two-place predicate with an individual and a propositional function as its arguments:

- (11) a. $\text{Only}_x (\text{Lucifer}, x \text{ pity } x)$
b. $\text{Only}_x (\text{Lucifer}, x \text{ pity Lucifer})$

[Sections 3.12-3.13, here omitted, summarized points made in McCawley (1967) about the relevance of formal logic to the description of natural language and the conclusion that semantic structure and syntactic structure could be taken as having the same formal nature and as involving the same set of categories. Section 3.14, also omitted, related to an unpublished paper by Bever and Ross on discourse structure.]

3.2 The second question, regarding the characterization of the notion "transformation" has been considered in great detail in Ross (1967a). Although some of us may admit it only off the cuff, most of us are unhappy with transformations with more than five or six terms and with rules that involve disjunctive sets such as (1).

3.3 The third question, where and how real words materialize, was first discussed seriously in Gruber (1965), but even this treatment is rather vague. Later papers, particularly McCawley

(1968c) and Gruber (1967), contain more specific and more worked-out proposals. Some tentative conclusions are that lexical insertion takes place among the cyclic rules, after the operation of most transformations. (This is discussed in more detail in Section IV of this report).

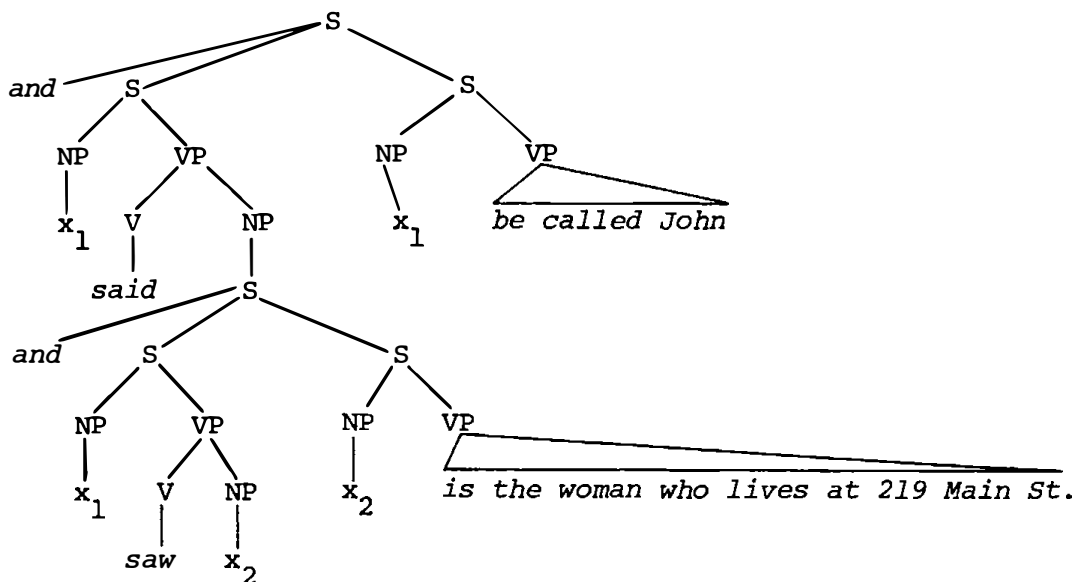
The second part of this question, the "different uses" of "the same word" in one language and its parallelism among languages has hardly begun to be explored. It is to this question that we hope to be able to devote a considerable amount of time and effort.

3.4 No fully satisfactory answers have been found for the problems of opacity, but the problems are stated clearly in McCawley (1970a) and in some independent (and unavailable) work of Paul Postal. The solutions proposed by Postal and McCawley are essentially the same - to account for referential phenomena by using indices as the arguments of predicates. These indices are defined or described in propositions conjoined to the tree at points varying with the origin of the description, i.e., the speaker or someone he is talking about. Thus, the two readings of the sentence

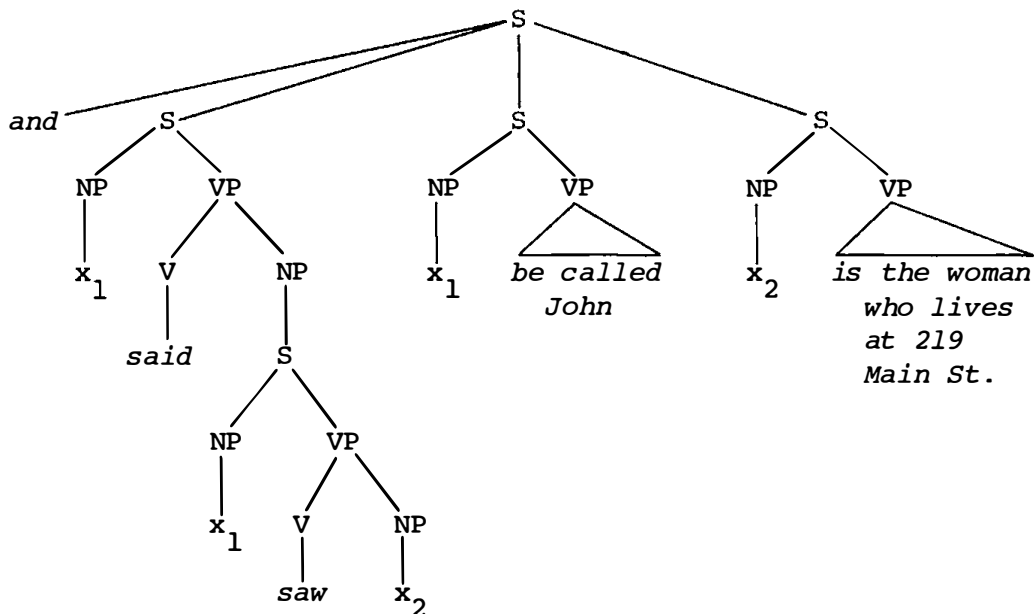
John said he saw the woman who lives at 219 Main St.

would have trees corresponding to

(12) a. Reading 1



b. Reading 2



3.5 Lots of "answers" have been proposed for questions regarding the use of anaphoric terms, and linguists are concerned with the unhappy fact that none of them can account for the whole range of data. It seems fairly clear that structural relations between anaphoric expression and "antecedent", as well as left-to-right (temporal) order are relevant, but whether this is a result of the way rules apply, or an independent fact statable only as conditions on output, or what exactly, is an open question. The first solution is discussed in Ross (1967b) and the second in Lakoff (1968c). Another discussion that shows the complexity of the problem of dealing with anaphoric terms is found in Karttunen (1968).

3.6 Because quantifiers contribute to meaning, and are clearly not terms, they are generally taken to be predicates. But what they are predicates of, and how they get to where they turn up are problems occupying the attention of several linguists. The kind of data they are wrestling with includes the following:

I. (13a) is ambiguous between (13b) and (13c).

(13) a. *John tried to kiss every girl at the party.*

b. \forall (John tried (John kiss x))
 x : x is a girl
 at the party

- c. *John tried* (\forall (John kiss x)
 x : x is a girl
at the party

II. (14a) is equivalent to (14b), but (15a) differs from (15b) in that (15a) has the readings (15c,d), while (15b) has only (15d).

- (14) a. *All of my friends drink Kool-Aid.*
b. *My friends all drink Kool-Aid.*
(15) a. *They all didn't go to the party.*
b. *They didn't all go to the party.*
c. $\forall_x \neg(x \text{ went to the party})$
d. $\neg(\forall_x (x \text{ went to the party}))$

Furthermore, (16b) is a sentence of English, like (14b), but (16a), which parallels (14a) is not.

- (16) b. *Harry, John, and Bill all drink Kool-Aid.*
a. **All of Harry, John, and Bill drink Kool-Aid.*

II. CURRENT STATUS OF THE BASE COMPONENT

4.0 Chomsky and Halle have insisted that just as a universal alphabet of phonological primes (distinctive features) is necessary for an adequate phonological theory, there is a universal set of nonterminal nodes (syntactic categories) in syntax, from which individual languages pick a subset. But Chomsky gives only lip service to this idea and does not develop it. The research of Postal, McCawley, Lakoff, and Ross has led them to make a much stronger claim:

The rules of the base, as well as the node names, are universal, up to the left-to-right ordering of constituents.

Ross concludes from this proposition that the base is biologically innate.

4.1 What is the status of the "base component" itself? Beginning in about 1966, McCawley began to develop the idea that the base of a grammar need not be considered a set of rewriting rules, but could rather be considered as a set of conditions on the well-formedness of trees [Node Admissibility Conditions (NACs)]. Such conditions have the form $\langle A: BC \rangle$,

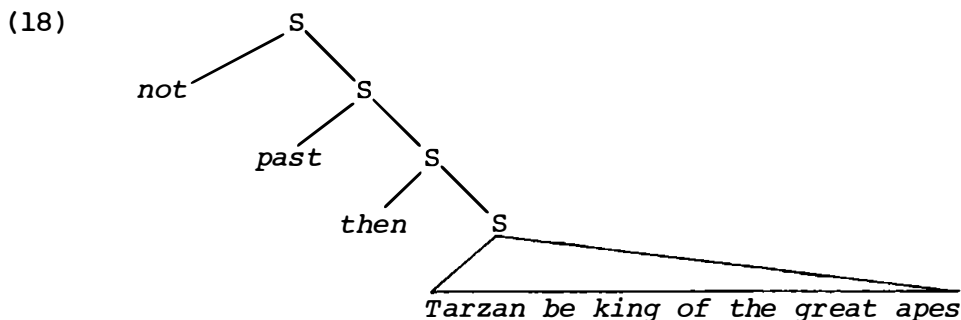
which is read, "a node labeled A is well formed if it immediately and exclusively dominates a node labeled B and a node labeled C, in that order". Thus, a tree is well formed if every node in the tree satisfies some node-admissibility condition of the base component and if the root of the tree is labeled S.

NACs, in contrast to rewriting rules, which produce strings from which trees could be derived, generate classes of trees directly.³ They do not algorithmically "produce" trees. As the poet laureate of linguistics has said, "Grammars are written by fools like me, but only God can make a tree" - meaning, presumably, that linguists need not concern themselves with the origins of trees in order to deal with their properties. Node admissibility conditions, rather than creating trees, can be considered as a set of input conditions--conditions on the input to the transformations.⁴

4.2 Node names. As linguists have looked closer and closer at syntax, they have found more and more and bigger and bigger turtles.⁵ To put it bluntly, they have been forced to conclude that underlying representations are abstract to the extent that all nodes that branch are labeled S; in other words, the basic structure of language is a predicate with its arguments. What kind of evidence is it that "forces" them to such a conclusion? For example, since they make the assumption, without which linguistic theory is so unconstrained as to be incapable of making reasonable predictions and generalizations, that pronouns can refer only to constituents, the analysis of the sentences

- (17) *Tarzan was not then the king of the great apes.*
That would come in later years.

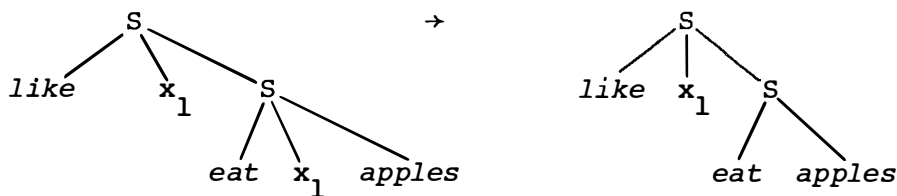
entails that "past tense" and *not* are not inside the constituent that contains the meaning 'Tarzan be king of the great apes', to which *that* in the next sentence refers. Accordingly, they postulate that the structure of the first sentence of (17) is, very roughly:



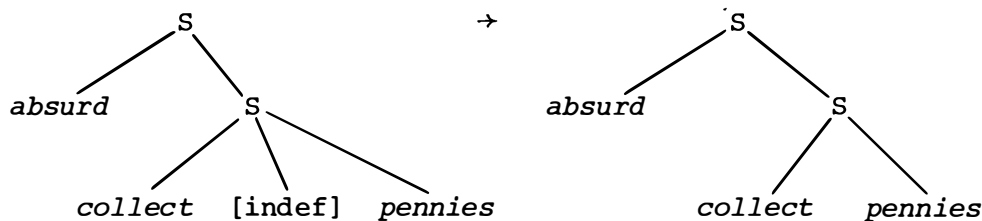
If all the nonterminal nodes are S, what are the terminal nodes of underlying representations? Predicates ("verbs") and arguments (noun phrases). Period. Some minds may boggle at calling *not* a verb, but there are languages (e.g., Finnish) where it is a verb and is inflected just like other verbs; the preposition *near* in English is also an adjective, and if the syntactic equivalence (Lakoff, 1966) is not immediately evident, the semantic equivalence of verbs and adjectives should be obvious to anyone who has ever translated anything from a foreign language. Arguments may be: (1) propositions (additional occurrences of S), (2) referential indices that refer, ultimately, to conceived objects (including human beings) or abstract ideas, (3) sets.⁶

Having predicates and arguments as the only underlying terminal nodes means that our beloved VP no longer exists as an underlying category. Ross and Lakoff have suggested that "verb phrases" are sentences that have lost their subjects - through deletion (under identity, or when indefinite), as in (19) and (20):

(19) *John likes to eat apples.*

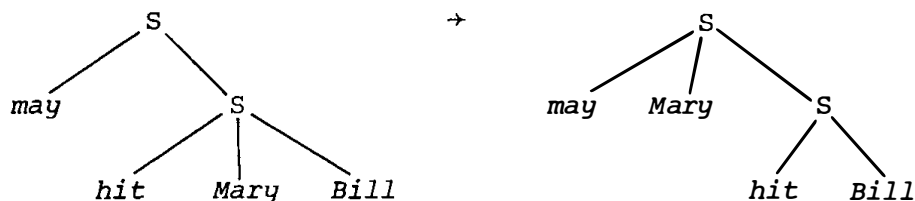


(20) *Collecting pennies is absurd.*



or by the subject's being raised into the next higher sentences, as in:

(21) *Mary may hit Bill.*



It is not clear how this treatment applies to "simple" sentences like

(22) *Mary hit Bill.*

but it is clear from the meaning that more than one predicate and two arguments is involved and that the underlying structure of the elements involved is not a string.

III. SECTIONAL ANOMALY

5.0 In earlier transformational grammar, selectional restrictions were held to be syntactic. Thus there was a feature [+Animate] for which the subject of the verb *pretend* had to be marked, so as to prevent sentences like

(23) **The rock pretended to be a cow.*

Similarly, there was a feature [-Directional Adverb], which the verb *sleep* was marked for; i.e., if *sleep* occurred in a sentence there could be no directional adverb. This prevented sentences like

(24) **John slept into the room.*

Notice that this claims (1) that such features are language particular, since there might very well, for example, be a language without the verb *pretend* or without directional adverbs per se, and (2) that such features are item particular, i.e., that it is a fact about the word *pretend* that its subjects must be animate.

Obviously there are generalizations being missed. One theory that hopes to capture them is that of George Lakoff, who claims that selectional anomalies, such as those in

(25) **The rock decided to buy a new cow.*

**Harry rained.*

are semantic in the sense that basically they are contradictions. Such a theory claims that (1) the study of such contradictions is part of the general theory of contradiction and that these contradictions hold universally, and (2) that it is a fact about language, and not about *pretend* alone, that the English word *pretend* requires an animate subject.

5.1 Presupposition. Contradictions are not always apparent in a sentence. Thus, in

(26) *The boy who is tall is not tall.*

the relative clause contains a presupposition contradicting the assertion of the clause of the main verb. Only assertions

can be denied, so that if the presupposition is false, one can place no truth value on the sentence. Philosophers have long been puzzled by the oddity of sentences like (27a), which presupposes the existence of a king of France at the present time, and (27b), which seems to assume or presuppose the existence of unicorns.

- (27) a. *The present king of France is bald.*
b. *Unicorns don't exist.*

This is discussed, somewhat inconclusively, in Linsky (1967) and in Cartwright (1963).

Not only can parts of a sentence be contradictory, but presuppositions and the like can cause redundancies as well. Thus, in the sentences

- (28) *The boy who is tall is tall.*
The tall boy is tall.

there is a redundancy.

This raises certain questions. Sentences about pregnant women may or may not contain a redundancy. Lakoff notes that while (29a) is not redundant, (29b) is:

- (29) a. *That person is a woman and is pregnant.*
b. *That person is pregnant and is a woman.*

At once, this reminds us of the treatment of pronominalization--order is relevant--and ties in with the notion of specificity in discourse. Once we know a person is pregnant, we know that that person is female, but the reverse is not true. Thus, the hearer seems to assimilate information in a roughly left-to-right order. In any case, order matters in terms of conjunction of the two sentences above. For any assertion, it may be the case that all previous assertions in the utterance or discourse act as presuppositions.

So far we have talked of conjoined clauses or sentences (e.g., in discourses). Returning to relative clauses, it is the case that for them order is likewise important. Thus (30a) is not redundant, whereas (30b) is:

- (30) a. *That person, who is $\begin{Bmatrix} \text{female} \\ \text{a woman} \end{Bmatrix}$, is pregnant.*
b. *That person, who is pregnant, is $\begin{Bmatrix} \text{female} \\ \text{a woman} \end{Bmatrix}$.*

Thus earlier phrases, like earlier clauses and sentences, can act as presuppositions.

Drawing on this, Lakoff finds that words, too, act like conjoined sentences. That is, (31a) is redundant precisely

the way that (31b) is:

- (31) a. *That woman is female.*
b. *That person who is female is female.*

Thus, in terms of redundancy and contradiction, items on many levels of grammar act alike. Any account of semantics, it is claimed, must take account of this.

5.2 Semantics and pragmatics. If this is the case, then selectional restrictions are not sentence-internal facts. There may be no presupposition within the sentence itself to render it infelicitous, but there may be in the real world (in the sense of one's beliefs about the real world). Selectional restrictions are then facts about whole discourses or systems of belief.

Consider the features [+Human] and [+Animate]. In a first approximation to the problem of why you can't say

- (32) *The rock wanted to be a table.*

you could set up three syntactic features. *Rock* would be [-Animate] (and hence [-Human]); *cow* would be [+Animate, -Human]; *boy* would be [+Human]. [+Animate] things can want, [+Human] things can talk, etc. But notice the problem of amoebas; while we can easily speak of an amoeba (but not a zinnia) hiding, the status of an utterance such as

- (33) *The amoeba wanted to hide.*

may not be so clear. The sentence

- (34) *My cat believes I'm going to feed it.*

implies that cats can have beliefs. But what about goldfish? Lakoff notes that there seems to be a correlation between which animates we attribute human qualities like belief to and which we can use pronouns like *he* and *she* for. Probably what is involved here is not simple features attached to lexical items, but systems of belief. Bob Binnick mentioned in a discussion of this topic the quite different treatment of Pluto and Goofy in the Disney comics. Goofy is so human that many people in the lecture hall hadn't even noticed that he was in fact a dog.⁷ Yet both *he* and Pluto (*it?*) are dogs. It would make no sense at all to claim this was a syntactic fact; yet pronominalization has always been held to be a part of syntax.

5.3 Performance. That factors that hitherto have been considered as merely part of performance, and have been excluded from linguistics, enter into syntax and semantics

is shown by the sentence

- (35) *John's cousin's sister's friend's... spouse is pregnant.*

Whether this contains a contradiction or not or a redundancy can only be determined by checking the entire noun phrase, which could be indefinitely long. In a sentence like

- (36) *John's former spouse's former spouse's.. former spouse is pregnant.*

(which could likewise be indefinitely long) the evenness or oddness of the number of occurrences of *former spouse* in the NP is the determining factor.⁸

For sentences with *but*, *too*, and *either* (discussed in Green, 1968), beliefs determine the felicity of sentences. Thus, (37a) reflects our cultural heritage, whereas (37b) is infelicitous for most of us:

- (37) a. *Mary is a blonde, and Sue is dumb, too.*
b. *Mary is a blonde, and Sue knows syntax, too.*

5.4 Status of the theory of selectional anomaly as contradiction. This theory is new and not well developed. How selection relates to contradiction is still not well defined. It is also an open question whether features are ever needed at all. Lakoff, Ross, and Fraser seem to say yes; Green, Binnick, Morgan, and McCawley say no. Furthermore, what the universal categories (if any) are, is unknown. And Ross notes that there is still the familiar problem of grammatical gender.

IV. THE IMPLICATIONS OF SEMANTAX: LEXICAL INSERTION, THE NOTION "POSSIBLE LEXICAL ITEM", THE WELL-FORMEDNESS OF UNDERLYING STRUCTURES

6.0 Many questions arise if we have a grammar relating semantic and surface (syntactic) structures directly by a single set of rules, as sketched in Section I. How would the grammar work? How do lexical items come in? What are the semantic primes? Where do lexical items enter the derivation? The lexicon, long assumed to be a simple area, is now seen to be quite difficult.

6.1 Semantic primes.⁹ To see how it is determined whether one item is more basic than another, consider the items *alive* and *dead*. McCawley argues that *alive* is more basic than *dead*, because to be dead, something must once have been alive. (Thus the dictionary definition of *dead* as "deprived of life"). *Dead* probably means 'having become not alive', which can be

formalized in terms of time reference as

- (38) "x is dead at time t" =
 $(\exists t': t' < t) (\text{Become}_t, (\text{Not}(\text{Alive}(x))))$

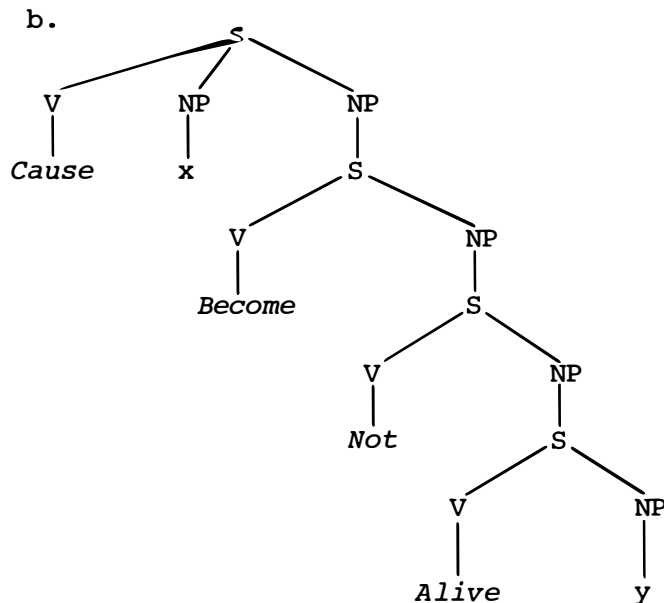
An analysis of *alive* in terms of *dead*, say, as 'not yet dead', is untenable, since it would imply that nothing could ever be immortal; nothing that will never be dead could then be alive. Furthermore, such a definition would render absurd such metaphors as *The statue is almost alive*.

If we accept (38), then "x dies at time t" should be analyzed as

- (38) $\text{Become}_t (\text{Not}(\text{Alive}(x)))$

To go a step further, "x kills y at time t" may then be analyzed as (40a), or in tree form, (40b):

- (40) a. $\text{Cause}_t (x, (\text{Become}_t (\text{Not}(\text{Alive}(y))))$



But the derived structure is probably

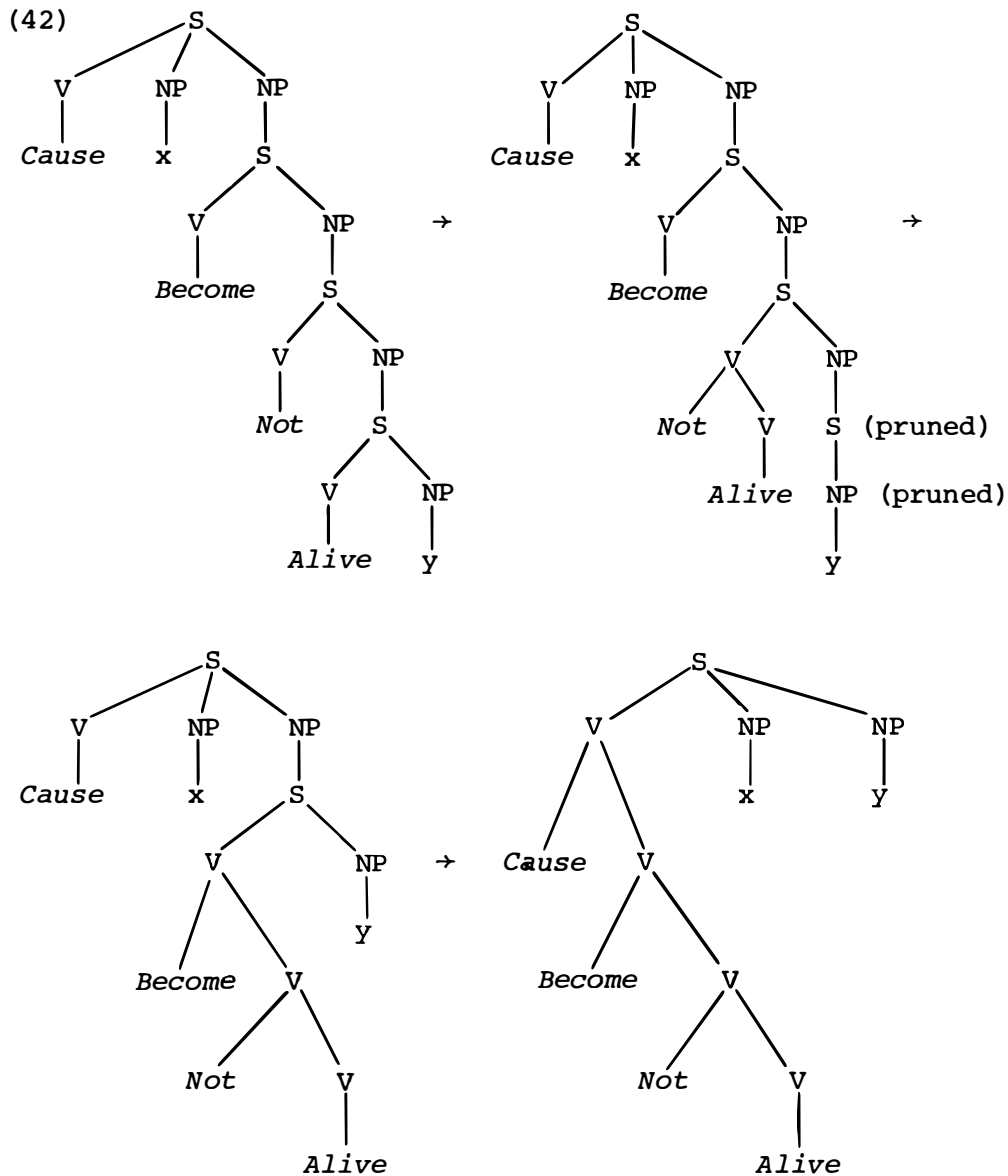
- (41)
-
- ```

graph TD
 S[S] --- V[V]
 S --- NP1[NP]
 S --- NP2[NP]
 V --- kill[kill]
 NP1 --- x[x]
 NP2 --- y[y]

```

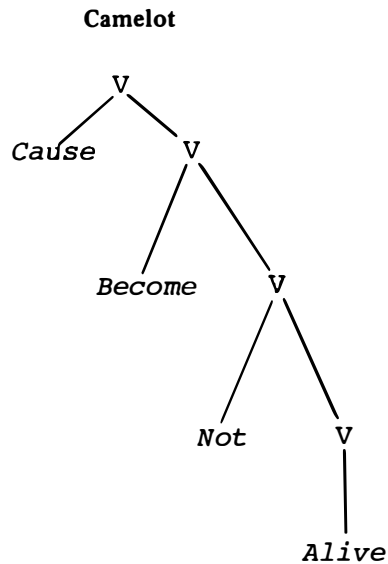
To get a derived structure like this from underlying structures like the above, McCawley has proposed an otherwise unmotivated

rule of predicate raising. By this optional rule, a V can be daughter-adjoined to the right of the next highest V. Thus we get a derivation:



At this point there is a constituent

(43)



that can be replaced by the lexical item *kill*.

6.2 This treatment has the advantage of providing linguists with a framework for talking about different meanings of "the same word", e.g., ask in:

- (44) *I asked them to take off my gloves.*  
*I asked to take off my gloves.*  
*I asked them when to take off my gloves.*  
*I asked them to dinner.*  
*I asked them for a dollar.*

and permits them to talk about these as representing semantic structures that are partly identical and partly different. It also permits them to talk about the notion "possible lexical item"--that is, what restrictions there may be on what semantic structures can be realized as a single lexical item. (A detailed discussion of this appears in Morgan, 1969.) If this notion causes mouths to gape and minds to boggle, or if it engenders only puzzlement, it is because it could not even be discussed in the terms of previous linguistic theories. Not until the development of the abstract linguistic theory that this year has seen were there concepts that could permit, let alone cause one to ask "what is a possible lexical item?", "why is an English word *smank* meaning 'I broke my arm yesterday' absolutely inconceivable?"

There are two obvious and powerful constraints on possible lexical items. The first is that lexical items replace only constituents. Thus, a lexical item could never mean anything like 'every broken'. The second is that lexical items must be

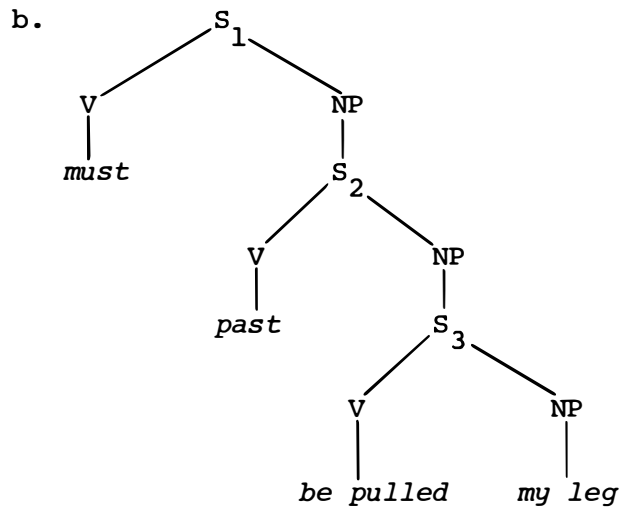
derived from well-formed semantic structures. It is obvious from this treatment that there may be gaps in the lexicon of a language, i.e., structures not replaceable by lexical items. We must distinguish fortuitous gaps (e.g., \*agress) from systematic gaps, which might be due, for example, to a language's not having transformational rules that could combine certain pieces of semantic structure to form a single constituent.

6.3 The place of lexical insertion. Considerations such as the above lead us to consider the ordering of lexical insertion rules relative to other transformation. Five possibilities are suggested for the place of lexical insertion in a grammar.

- (i) Wherever the structural description of the lexical insertion rule is met.
- (ii) At the absolute beginning of derivations.
- (iii) At the absolute end of derivations.
- (iv) After the cycle of transformations, at the beginning of the post-cyclic rules.
- (v) Among the cyclic rules.

The second possibility is inadequate if it is assumed that lexical insertion replaces only constituents, since several transformations that create new constituents that are then replaced by lexical items would have to precede it.<sup>10</sup> (iii) will not be adequate either, because some transformations treat separate pieces of single lexical items (e.g., particle movement) and would not be applicable until, for instance, the particle existed, and the particle would not exist until after lexical insertion. The interaction between idioms and cyclic rules--the fact that some idioms may undergo transformations--disqualifies (iv).<sup>11</sup> That is, in the derivation of (45a), lexical insertion on  $S_3$  must precede subject-raising on  $S_1$ , which permits *my leg* to become the subject of *must*:

- (45) a. *My leg must have been pulled.*



This leaves (i) and (v) as candidates. (i), it should be noted, permits a much wider class of structures for lexical items to replace. (v), on the other hand, claims that no lexical items ever replace a constituent that comes about through the operation of postcyclic rules, and indeed, it is difficult to find a candidate for such an item. But large numbers of items depend on the application of cyclic rules. It is interesting to mention in this regard Kimball's observation that rules that apply cyclically all leave structures relatively intact, and rules that radically change structure (e.g., relative-clause formation, extraposition) all turn out to be postcyclic--after lexical insertion, if it is a cyclic rule.

6.4 Well-formedness of underlying structures revisited. The considerations of Section 6.3 bring us back to the notion "well-formed semantic structure". It is clear that the number of arguments a predicate can take is not unlimited, and not all combinations and permutations of types of arguments are possible for all predicates. That is, we do not find autonomous "sentences" like

- (46)    *\*I told the hatrack a bookcase.*  
          *\*The man heard the dog the fern.*  
          *\*The man struck the dog that the Russians*  
              *had arrived at O'Hare Airport.*  
          *\*John resembles that Chomsky wrote "Syntactic*  
              *Structures".*  
          *\*That syntax may be more abstract than even*  
              *Postal thinks sewed a red corduroy dress.*

Since it is not obvious that these kinds of anomalies are the result of contradictions, are we to have general node admissibility conditions that define which arguments a predicate can have? Certainly there are generalizations that can be made. For example, psychological predicates like *believe* and *imagine* have referential animate arguments that become their subjects and sentential arguments that become their object complements. Supposed counterexamples like

- (47)     *John believed Harry.*  
          *John believed that hypothesis.*  
          *I can't imagine eyeless people.*  
          *Solomon decided the issue for the people.*

are not valid counterexamples; from their meaning (try to paraphrase them), it is clear that they are more complex than sentences like:

- (48)     *John believed that Dewey would win.*  
          *I imagine the police will start a riot.*  
          *Solomon decided to remain silent.*

But writing general node admissibility conditions based on generalizations like these leads to the counterintuitive expansion of predicate classes, with words simultaneously being members of several classes, that Lees had in his pre-"Aspects" grammar of English nominalizations, unless the hypothesis is accepted that words, even words considered to be one "morpheme" like *hit* and *kill*, have a considerable amount of internal structure.

In trying to discover the predicates internal to specific lexical items one finds that certain predicates keep recurring: *Cause*, *Become*, *Permit*, *Intend*. Trying to discover their transformational properties and privileges of occurrence has led some linguists to hypothesize that ultimately the constraints on the relationships of a semantic predicate to other predicates and the privileges of occurrence of various argument types with it reflect not facts about particular languages, or even facts about particular predicates alone, but facts about possible beliefs about possible words; deep structure equals semantic representation, these linguists would like to claim, and is limited ultimately only by the bounds of human imagination. The use of lexical items in which these predicates occur is a different matter however. Whether a particular lexical item can be used to express a given configuration of predicates reflects more than the conceptual ability of the speaker. There are formal and

general (possibly universal) constraints on lexical insertion that are not bound to any limitation on possible concepts.

For example, in Portuguese, the complements of verbs that mean "begin", "stop", "continue", "cease", "be in the habit of", "be able", "know how", "need to", "have to", "try to", "dare to", "manage to", "forget", "remember", "condescend", "decide", "want", "learn", "be late", and others with similar meanings are a certain kind of infinitive that contrasts in form with the infinitive complements of verbs that mean "force", "persuade", "permit", "prohibit", "behoove", "be important to", "benefit", "thank", "pardon", "censure", "see", "hear", "believe", "know", "show", "regret", "like to", "be surprised", "be frightened". This is a syntactic fact. It correlates with the [semantic] fact that the verb-complement constructions of the first type are all of the form (49a),

(49) a.  $x_i$  \_\_\_\_\_ [ $x_i$  [do] \_\_\_\_\_]

while the constructions of the second type are of the form (49b),

b.  $x_i$  \_\_\_\_\_ [ $x_j$  [do] \_\_\_\_\_]

where  $x_i$  may be the same as  $x_j$ , but need not be. This is paralleled in English by the fact that while we can say

- (50) a. *I began to write a novel.*  
 b. *I am now able to tie my shoes.*  
 c. *I forgot to do my homework.*  
 d. *I managed to talk to Brutus Force.*

we cannot say

- (51) a. *\*I began for you to write a novel.*  
 b. *\*I am now able for you to tie my shoes.*  
 c. *\*I forgot for you to do your homework.*  
 d. *\*I managed for you to talk to Quang Phuc Dong.*

The sentences of (51) are equally improbably utterances in English, Portuguese, or any other language imaginable, beyond the "fact" that the situations they appear to express are impossible, or at least difficult to conceive. What is being hypothesized is that in no language do speakers use verbs that mean the same thing as the English *begin to* (or *be able to*, *remember to*, *condescend to*, *try to*, and so on) with constructions expressing meanings such that their subject is different from the subject of the clause immediately sub-

ordinate to them. In saying that each of these sentences is exactly as improbable as each of the others in (51), the implication intended is that they are all uninterpretable; but to the extent that it is possible to assign any meaning to, or glean any meaning from any of them, as people may claim to be able to do, even those people will agree that the sentences in (51) are not the proper, appropriate ways to express those meanings. For example, (51d) might be claimed to mean "I managed to do something to permit (or cause) you to talk to Chairman Quang", but (51d) is still not considered a proper way to express this meaning.

#### NOTES

<sup>1</sup>The exposition here of the lexicalist position may contain unintentional misrepresentations of the nature of the hypothesis, for which we apologize. Our purpose here is to outline the basic points, as we understand them, of a poorly documented theory. [Times have changed. See now Chomsky (1972), Jackendoff (1972), and the references cited in those two works. - J.McC.]

<sup>2</sup>"Scope" refers to how much of a structure a quantifier or a negative operates upon, as illustrated in the following sentences:

*Only LBJ will vote for Hubert.*  
*LBJ only will vote for Hubert.*  
*LBJ will only vote for Hubert.*  
*LBJ will vote only for Hubert.*  
*LBJ will vote for only Hubert.*  
*LBJ will vote for Hubert only.*

<sup>3</sup>McCawley gives the following statement of the conditions under which a tree *T* is well formed relative to a given system of node admissibility conditions.

1. The terminal nodes of *T* are labeled by terminal symbols.
2. The topmost node is labeled by *S*.
3. For every nonterminal node of *T*, there is a condition  $\langle X: X_1 \dots X_n \rangle$  in *G* such that the node is labeled *X* and its daughters are labeled  $X_1 \dots X_n$  (in order).



<sup>4</sup>Straight (1968) has made a fascinating suggestion that there is no separate component defining well-formed semantic representation; rather, he proposes that semantic representation is in fact conceptual structure, and the transformations themselves define well-formed input in that a derivation with an ill-formed input will always "hang up" somewhere and thus not yield any surface structure. Thus, grammar is a filtering mechanism that relates only certain configurations of "thought" to linguistic utterances.

<sup>5</sup>The reference is to a story about William James, quoted in Ross (1967a). It is said that after a lecture on cosmology and the structure of the solar system, James was approached by a little old lady, who said, "Your theory that the sun is the center of the solar system, and that the earth is a ball which rotates around it, has a very convincing ring to it, Mr. James, but it's wrong. I've got a better theory".

"And what is that, madam?" inquired James politely.

"That we live on a crust of earth which is on the back of a giant turtle."

Not wishing to demolish this absurd theory by bringing to bear the masses of scientific evidence he had at his command, James decided to dissuade his opponent gently, by making her see some of the inadequacies of her position.

"If your theory is correct madam," he asked, "what does this turtle stand on?"

"You're a very clever man, Mr. James, and that's a very good question," she replied, "but I have an answer to it: the first turtle stands on the back of a second, far larger turtle who stands directly under him."

"But what does the second turtle stand on?" persisted James patiently.

To this, the little lady crowed triumphantly, "It's no use, Mr. James--it's turtles all the way down."

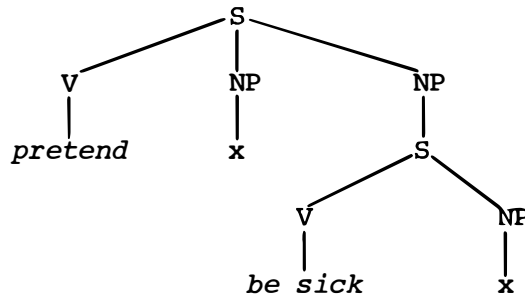
<sup>6</sup>Nominalizations are considered to originate as indices with relative clauses; so, for example, *John's invention* is at an early point in its derivation representable as 'the *x* such that John invented *x*' and *John's invention of the frammis* as 'the event *y* such that in *y* John invented the frammis'.

<sup>7</sup>[Contrary to popular belief, Goofy is a horse. He just looks like a dog and indeed has grown to look more and more canine as the years have passed - J. McC.]

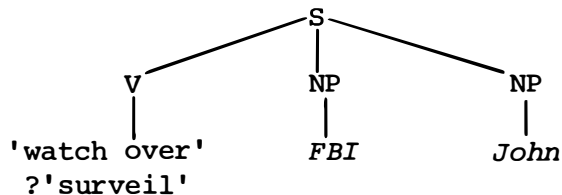
<sup>8</sup>[This is false if one admits the possibility of sex-change surgery, in which case a woman who was formerly a man can have a lesbian affair with her former spouse. Keith Donnellan has observed that this possibility implies that many supposed selectional violations are in fact perfectly normal ways of talking about bizarre but possible situations; e.g., if your father has undergone a sex-change operation, you could say *My father has hurt herself* to report that your father has suffered an injury. - J. McC.]

<sup>9</sup>The discussion in Section 6.1 and Section 6.3 draws heavily on McCawley (1968c) and on McCawley's lectures at the Linguistic Institute.

<sup>10</sup>For instance, equi-NP-deletion must operate on



to yield a constituent for which *maligner* can be inserted. Likewise, the passive must apply to



to permit the *by*-phrase of *John is under surveillance by the FBI* to be identified with the passive *by*-phrase (example due to Postal).

<sup>11</sup>[While this discussion is "based on" McCawley (1968c), the authors correctly reject here one of the principal conclusions of McCawley (1968c). - J. McC.]

## PRONOUNS AND REFERENCE

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*This paper originated in class lectures at Harvard in Spring 1968 and at the 1968 Linguistic Institute at the University of Illinois at Urbana. It was originally to have contained the following sections:*

*1. Some constraints on pronominalization*

*1.1 Output conditions*

*1.2 Transformational constraints*

*2. Types of identity*

*3. Pronouns and abstract syntax*

*4. Pronouns and referential opacity*

*Appendix. The cycle.*

*A duplicated version of Section 1.1 was circulated in late 1968, and Sections 1 and 2 were later distributed by Indiana University Linguistics Club; the remaining sections were never written.*

*"Pronouns and reference" is probably the most widely quoted of the papers contained in this volume; numerous references to it are to be found throughout the by now massive literature on*