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Title
Pronouns and Reference

Permalink
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Publication Date
1968

Pronouns and Reference

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ACKNOWLEDGEMENTS

Chapter 1 Some Constraints on Pronominalization

1.1 Output Conditions

1.1.0 Introduction

In the past few years, several pieces of evidence
have come to light which suggest that pronominalization cannot
be a surface structure phenomenon; instead, this evidence
suggests that the constraints on pronominalization must be
stated before certain transformational rules apply. The facts
fall into two classes:

> (I) Cases where a transformational rule must be
>   ordered after pronominalization.
>
> (II) A class of cases where pronominalization,
>   wherever ordered, must apply cyclically;
>   that is, it must apply on an earlier cycle
>   than some other transformation (which might
>   be ordered earlier, but would apply after-
>   wards on a later cycle.)

In the arguments that have sought to establish (I) and (II), a
critical assumption has been made, namely, that pronominaliza-
tion can always apply freely left-to-right (forwards) and that
any constraints on the application of pronominalization must
be placed on right-to-left (backwards) pronominalization. The
cases mentioned in (I) and (II) all involve sentences where
forwards pronominalization is impossible in surface structure.
The claim made is that in each case there is a more abstract
level of analysis where forwards pronominalization is always

possible. In what follows I shall attempt to show that the assumption that there are no constraints on forward pronominalization is false, and that the phenomena of (I) can be handled only by imposing such constraints. In addition, I shall present evidence to the effect that the constraints necessary to handle the cases in (I) must be stated as output conditions rather than as conditions on some transformational rule. I will also present evidence indicating that the facts of (II) do not show that pronominalization in cyclic, and also that they cannot be handled by output conditions, even allowing constraints on forward pronominalization. I conclude that there are at least two types of constraints on pronominalization:

> (I) Output conditions, i.e., constraints stated at the level of surface structure which indicate in what configurations pronouns and their antecedents can appear.

> (II) Transformational conditions, e.e., general constraints which forbid certain types of transformational rules from applying to structures which contain pronoun-antecedent pairs.

1.1.1 Adverb-preposing

1.1.1.1 The rule-ordering argument

There is rule of English which moves adverbials to the front of the sentence, deriving (2) from (1)

(1) John ate supper before Bill left town.

(2) Before Bill left town, John ate supper.

Ross (1967) argues that this rule of Adverb preposing must precede pronominalization, on the basis of the following examples:[1,2]

(3) John ate supper before he left town.

(4) *He ate supper before John left town.

(5) Before John left town, he ate supper.

(6) Before he left town, John ate supper.

Ross suggests that pronominalization may apply right-to-left (backwards) only if it goes down into subordinate clauses. This condition holds in (6), which is grammatical, but not in (4), where "He ate supper" is a main, not subordinate clause. In (6) Adverb preposing has applied before pronominalization, so that the condition on backwards pronominalization will hold at the time pronominalization applies. Had pronominalization applied first, it would have been impossible to block (4) while permitting (5). Thus, we have the ordering:

Adverb preposing

Pronominalization

Ross, in agreement with Langacker (1966), claims that pronominal-
ization always works from left-to-right (forwards). In the face
of sentences like the following:

      (7)   John saw a snake near him.

      (8)   *He saw a snake near John.

      (9)   Near him, John saw a snake.

     (10)   *Near John, he saw a snake.

it was proposed (by Postal, I believe) that (9) be derived
from (7) by a second preposing rule which followed pronominali-
zation. If the rule precedes pronominalization, then there is
no way to stop (10), while maintaining the principle that
pronominalization can always go forward. Thus we have the
ordering:

      Adverb preposing$_1$

      Pronominalization

      Adverb preposing$_2$

In what follows, I will show that adverb preposing$_2$ does not
exist, that (9) must be derived by adverb preposing$_1$, and that
the generalization that pronominalization can always go for-
wards is incorrect. Moreover, since adverb preposing$_2$ was the
only rule thought to have to follow pronominalization, a demon-
stration that it does not exist will make it possible for us

to entertain two hypotheses: either pronominalization is the
last rule in the grammar, or the constraints on pronominaliza-
tion are stated as output conditions. Consider the sentences:

(11) John smokes pot in his apartment.

(12) *He smokes pot in John's apartment.

(13) In his apartment, John smokes pot.

(14) *In John's apartment, he smokes pot.

Here we find the same paradigm as in (7) - (10), so, pre-
sumably, (13) would be derived from (11) by adverb preposing$_2$.
Now consider:

(15) John smokes pot in the apartment, which he rents.

(16) *He smokes pot in the apartment, which John rents.

(17) In the apartment, which he rents, John smokes
      pot.

(18) In the apartment, which John rents, he smokes pot.

In these cases, we find the same paradigm as in (3) - (6). Pre-
sumably, (17) would be derived from (15) by adverb preposing$_1$.

     Note that in (13) and (17) the same type of adverbial
is being moved, presumably by different rules. The only
difference is that the adverbial in (17) has a clause (an em-
bedded S) in its derived structure, while that in (13) does
not. So one might be tempted to say that adverb preposing$_1$
only moves adverbials containing clauses, while adverb preposing$_2$

moves only adverbs not containing clauses. This is a curious complementarity, and leads one to think that the postulation of two complementary rules misses a generalization.

Now consider:

(19)   John gives _Mary_ pot to smoke in _his_ apartment, where _she_ stays.

(20)   *John gives _her_ pot to smoke, in _his_ apartment, where _Mary_ stays.

(21)   *He gives _Mary_ pot to smoke in _John's_ apartment, where _she_ stays.

(22)   *He gives _her_ pot to smoke in _John's_ apartment, where _Mary_ stays.

(23)   In _his_ apartment, where _she_ stays, John gives Mary pot to smoke.

(24)   In _his_ apartment, where _Mary_ stays, John gives _her_ pot to smoke.

(25)   *In _John's_ apartment, where _she_ stays, he gives _Mary_ pot to smoke.

(26)   *In _John's_ apartment, where _Mary_ stays, he gives _her_ pot to smoke.

The crucial sentences here are (20) and (24). How can we block (20) while permitting (24)? Is (24) derived by _Adverb preposing_$_1$ or _Adverb preposing_$_2$? Suppose (24) is derived by adverb preposing$_1$, which precedes pronominalization. Then "her" in (24) can be derived by forwards pronominalization

If (24) is derived by <u>adverb preposing</u>$_2$, which follows pronom-
inalization, then "her" in (24) cannot be accounted for, since
it would have to be derived by backwards pronominalization in
a context where it cannot apply (compare (20)).

However, if (24) is derived by <u>adverb preposing</u>$_1$,
then "his" in (24) cannot be accounted for. Since <u>adverb pre-
posing</u>$_1$ precedes pronominalization "his" must be derived by
backwards pronominalization. However, if backwards pronominali-
zation can only go into subordinate clauses, this is impossible.
Note that we could account for "his" in (24) if (24) were de-
rived by <u>adverb preposing</u>$_2$. But, as we mentioned above, we
could then not account for "her".

We seem to be caught in a paradox. Given the Ross-
Langacker contraints on pronominalization. (24) cannot be de-
rived by either <u>adverb preposing</u>$_1$ or <u>adverb preposing</u>$_2$. What
is going on here? If one looks at each of the starred sentences
in (19) - (26) and asks what goes wrong in each one, things
become clearer. In each of these cases, the restrictions are
the same as those in   the simple cases of (11) -
(14) and (15) - (18). In (20), (21), and (22), backwards pro-
nominalization is occurring where it shouldn't (as in (12) and
(16)). (25) and (26) are out for the same reason as (14),
namely, forwards pronominalization is not permitted when the
antecedent is in a preposed adverbial with no embedded clause.
Note that in both (25) and (26), it is "he" that has gone wrong,
not "her". Moreover, "his" is permissible in (24) for the same

reason as it is in (13) and 'her' is permissible in (24) for the same reason as it is in (18).

Thus, the pronominalization facts that we find in (19) - (26) are the same as those in (11)- (14) and (15) - (18), and should be explained in the same way. The fact that (24) cannot be accounted for by two complementary rules of adverb preposing, separated by pronominalization, indicates that such a description is inadequate for (11) - (14) and (15) - (18) as well. Instead, there should be a single rule of adverb preposing, the one which moves the adverbial to the front in (24), since this single rule, however it is stated and wherever it is ordered, must produce the same results in both (11)-(14) and (15)-(18).

Should this single, general rule of adverb preposing be ordered before or after pronominalization? If it follows pronominalization, then there would be no way of deriving (18) without also deriving (16). In order to derive (18), we would first have to derive (16) and then apply adverb preposing. But adverb preposing is an optional rule; if it optionally does not apply, then we derive (16) as grammatical, which it is not. One might propose that adverb preposing be made obligatory if backwards pronominalization has applied as in (16). This would be wrong for two reasons. First, such a condition on a transformation would be unique; no other such conditions are known, and so the theory of grammar would have to be changed in order to state it for this one case. Second, there is the much stronger objection that a clear generalization would be missed by such

a rule ordering. In order to derive (18), we would first have to generate (16) 'incorrectly' by backwards pronominalization and then make adverb preposing obligatory just in this case to prevent ungrammatical sentences. Now consider just how we would have to constrain backwards pronominalization in order to get this result. Clearly, we could lift all restrictions on backwards pronominalization, since there are many that do not involve adverbials containing clauses at all; for these cases we would get incorrect results. For example,

(27)   *He said that John left.

(28)   *He saw the girl who likes John.

A possible restriction would be to allow free backwards pronominalization out of adverbials containing clauses. However, this won't work, since there are adverbials containing clauses that cannot prepose. For example, remain and stay take locative adverbs that cannot prepose.

(29)   John remained in England.

(30)   *In England, John remained.

If one allowed such backwards pronominalization, one would derive

(31)   *He remained in the apartment which John rented.

This could not be patched up by later adverb preposing:

(32)   *In the apartment which John rented, he remained.

Thus, backwards pronominalization would have to be restricted to just those adverbials containing clauses that could later be moved by <u>adverb preposing</u>. That, is, the restriction stating which adverbs could be moved by <u>adverb preposing</u> would have to be stated twice; once for pronominalization and once for <u>adverb preposing</u>. Clearly, a generalization is being missed.

For these reasons, <u>adverb preposing</u> cannot follow pronominalization, and must therefore precede it. This being the case, the facts of (11)-(14) must be handled by a change in the conditions on pronominalization. The scope of backwards pronominalization must be extended to permit (13); correspondingly, the scope of forwards pronominalization must be restricted to exclude (14).

1.1.1.2. The Subject-Nonsubject Division

Preposed adverbial constructions have some additional peculiarities. Consider

(33)   In <u>Mary's</u> apartment, a thief assaulted <u>her</u>.

(34)? *In <u>her</u> apartment, a thief assaulted <u>Mary</u>.[3]

(35)   *In <u>Mary's</u> apartment, <u>she</u> was assaulted by a
          thief.

(36)   In <u>her</u> apartment, <u>Mary</u> was assaulted by a
          thief.

(35) and (36) are just like (13) and (14). In (35), pronominali-

zation cannot go forward from a non-clausal preposed adverb to a subject ('she'). In (36), pronominalization can go backwards from a subject ('Mary') into a non-clausal preposed adverb. (33) and (34) reveal an asymmetry between surface structure subjects and nonsubjects. In (33) (compare (35) we find that pronominalization can go forward from a non-clausal preposed adverb to a nonsubject. In (34) (compare (36)), we see that pronominalization cannot go backwards from a nonsubject ('Mary') into a non-clausal preposed adverb. Considering that adverb preposing must precede pronominalization, we see that only the subject cases deviate from the Ross-Langacker rules: they are the opposite of what one would expect. The nonsubject cases are entirely in accord with the Ross-Langacker conditions.

This phenomenon alone shows that it is utterly impossible to save, by the use of a rule-ordering argument, the claim that pronominalization can always go forward. Sentences (33)-(34) act as though adverb preposing followed pronominalization, while (35)-(36) act as though adverb-preposing preceded pronominalization. Thus, no matter where adverb preposing is ordered with respect to pronominalization, forward pronominalization must be blocked in some environment, and the distinction between subject and nonsubject position must be stated in the conditions on pronominalization.

1.1.1.3 Main Clauses

The subject-nonsubject division has been noted previously by Dwight Bolinger (personal communication) and Adrian Akmajian (personal communication) independently. We noted above in the cases of (3)-(6), that pronominalization cannot go backwards into main clauses. However, the examples (3)-(6) only mentioned subjects of main clauses. If we look further, we will find that though pronominalization cannot go backwards out of subordinate clauses to subjects of main clauses, it can go backwards out of subordinate clauses to nonsubjects of main clauses.

> (37) Mary hit John, before he had a chance to get up.
>
> (38) Mary hit him, before John had a chance to get up.
>
> (39) John was hit by Mary, before he had a chance to get up.
>
> (40) *He was hit by Mary, before John had a chance to get up.

(38) shows that pronominalization goes backwards to objects of main clauses; the following sentences show that the same is true of other nonsubjects.

> (41) Mary gave him a dollar bill, before Sam had a chance to refuse.
>
> (42) Mary placed a bowl of chicken soup before him, before Sam had a chance to refuse.

> (43) Mary sacked out in <u>his</u> apartment, before
>   <u>Sam</u> could kick her out.
>
> (44) Mary butted in during <u>his</u> speech, before I
>   could tell her that <u>John</u> was a top CIA
>   official.

Examples like these could easily be multiplied.
They show that, aside from any considerations of rule ordering,
any statement of the conditions under which pronominalization
can occur must take the subject-nonsubject distinction into
account.

1.1.2 Topicalization

There are two rules of English which topicalize
a noun phrase by moving it to the front of the sentence. One
of these leaves a pronoun behind, as in (45); the other leaves
no pronoun behind, as in (46).

> (45) Bill's apartment, Harry always talks to
>   Mary about it.
>
> (46) Bill's apartment, Harry always talks to
>   Mary about.

Ross has shown that these are separate rules, since they obey
different conditions (which are not predictable from ordinary
constraints on movement transformations). The topicalization

rule that does not leave a pronoun behind cannot operate on embedded pronoun subjects.

> (47) Him, I don't think he has a chance.
>
> (48) *Him, I don't think has a chance.

Since the difference between these two rules is irrelevant to the discussion that follows, we will consider them together, placing the pronoun in parentheses.

Postal noted that Topicalization produces a pronominalization paradigm like that of (7)-(10).

> (49) Bill always talkes to Mary about his apartment.
>
> (50) *He always talks to Mary about Bill's apartment.
>
> (51) His apartment, Bill always talks to Mary about (it).
>
> (52) *Bill's apartment, he always talks to Mary about (it).

Postal concluded, for the same reasons given in (7)-(10), that Topicalization had to follow pronominalization. However, if one considers topicalized NP's containing clauses, one finds the same paradigm as for preposed adverbs with clauses.

> (53) Bill always talks to Mary about this apartment, which he rents.

(54) *He always talks to Mary about this
          apartment, which Bill rents.

(55) This apartment, which he rents, Bill
          always talks to Mary about (it).

(56) This apartment, which Bill rents, he
          always talks to Mary about (it).

As in (15)-(18), these cases would suggest that there are two
topicalization rules, one preceding and one following pro-
nominalization; the first would apply to NP's with clauses,
the second to NP's without clauses. But as in the case of
adverb preposing, we can construct examples parallel to those
of (19)-(26) to show that this is impossible.

(57) Bill always talks to Mary about his
          apartment, where she used to live.

(58) *Bill always talks to her about his
          apartment, where Mary used to live.

(59) *He always talks to Mary about Bill's
          apartment, where she used to live.

(60) *He always talks to her about Bill's
          apartment, where Mary used to live.

(61) His apartment, where she used to live,
          Bill always talks to Mary about (it).

(62) His apartment, where Mary used to live,
          Bill always talks to her about (it).

(63) *Bill's apartment, where <u>she</u> used to live,

      <u>he</u> always talks to <u>Mary</u> about (it).

(64) *<u>Bill</u>'s apartment, where <u>Mary</u> used to live,

      <u>he</u> always talks to <u>her</u> about (it).

As in (19)-(26), this paradigm shows that there cannot be two topicalization rules; rather there must be one rule, which precedes pronominalization. Forward pronominalization must be blocked in (52), and backward pronominalization permitted in (51).

<u>Topicalization</u> also reveals the subject-nonsubject asymmetry. Consider

(65) Mary always talks to <u>Bill</u> about <u>his</u>

      apartment.

(66) *Mary always talks to <u>him</u> about <u>Bill</u>'s

      apartment.

(67)? *<u>His</u> apartment, Mary always talks to <u>Bill</u>

      about (it).

(68) <u>Bill</u>'s apartment, Mary always talks to <u>him</u>

      about (it).

Compare (66) and (68) to (50) and (52). (52) does not permit forward pronominalization to subjects; (68) does permit it for objects. (67) is more interesting. I find it marginally acceptable--better than (66), but worse that (68). Others I've questioned either agree with my intuitions or find (67)

completely acceptable. For the latter dialect, there is an extra asymmetry. In forward pronominalization, the subject-nonsubject asymmetry appears--(52) and (68) differ-- whereas in backwards pronominalization, there is no subject-nonsubject distinction for this dialect--(51) and (67) work the same way. In this dialect, a rule-ordering explanation preserving unrestricted forward pronominalization is doubly impossible.

1.1.3 Cleft Sentences

The first of the subject-nonsubject asymmetries was pointed out by Ross (personal communication). Ross noticed that cleft sentences display the same paradigms as (49)-(52) and (65)-(68).

(69) John bit his dog.

(70) *He bit John's dog.

(71) It was his dog that John bit.

(72) *It was John's dog that he bit.

(73) John's dog bit him.

(74)? His dog bit John.

(75)? It was his dog that bit John.

(76) It was John's dog that bit him.

As in the corresponding topicalization, I find (75) marginal (compare (67))--better than (74) and worse that (76). Some agree, and others find (75) completely acceptable.

Ross realized that these facts were a serious anomaly for the theory of pronominalization presented in Ross (1967a) and Langacker (1966). They seem to indicate, as do the topicalization facts, that such a theory is out of the question and that constraints will have to be placed on forward pronominalization. Moreover, any rule-ordering explanation for the cleft-sentence facts is ruled out since cleft-sentence show the same clausal-nonclausal asymmetry as adverb preposing and topicalization. Compare (72) with (77).

(72) *It was John's dog that he bit.

(77) It was this dog, which John owns, that he bit.

(77) shows that forward pronominalization is permitted out of clauses which are inside clefted elements.

As with adverb preposing and topicalization, one might think that there are two rules of cleft-sentence formation: one for clauses, preceding pronominalization; and the other, for non-clauses, which would follow pronominalization. But, as in the other cases, it is possible to construct a paradigm disproving this.

(78) John told Mary about his dog, which she likes.

(79) *He told Mary about John's dog, which she likes.

(80) *John told her about his dog, which

Mary likes.

(81) *He told her about John's dog, which

Mary likes.

(82) It was his dog, which she likes, that

John told Mary about.

(83) *It was John's dog, which she likes,

that he told Mary about.

(84) It was his dog, which Mary likes, that

John told her about.

(85) *It was John's dog, which Mary likes,

that he told her about.

For the same reasons mentioned in the discussions of (19)-(26)
and (57)-(64), sentences (78)-(85) show that no simple rule-
ordering solution is possible for the pronominalization pheno-
mena in cleft sentences. Pronominalization must follow, not
precede, cleft sentence formation.

1.1.4 Pronouns and Stress

The only rules that I know of that had been thought
to follow pronominalization are adverb preposing, topicalization
and cleft sentence formation. As I have just shown, these rules
cannot follow pronominalization, and it seems that no trans-
formational rule does, at least in English. Is this an

accidental fact? Do there just happen not to be any rules
that follow pronominalization? Or is it a necessary fact?
Could there in principle be no such rules?

I would like to claim that it is a necessary fact,
a fact about the nature of anaphoric processes in language, not
a fact about one rule in English. We have assumed, following
Langacker and Ross, that the constraints on the occurrence of
pronouns were to be stated as part of the rule of pronominali-
zation. Instead, I would like to suggest that these constraints
are not part of any rule, but are instead well-formedness con-
ditions on possible surface structures in English--output con-
ditions, like those discussed by Ross[4] and Perlmutter[5].
Assume that the rule of pronominalization is separate from the
statement of the constraints on pronominalization. Let the
sule apply freely forwards and backwards, and let a set of
constraints at the end of the grammar throw out certain combin-
ations of pronoun and antecedent as ill-formed. Such notions
can be incorporated into the theory of grammar in the following
way.

> (86) (I) Restrict the form of possible pronominali-
>   zation rules so that no structural condi-
>   tions can be placed on them (i.e., they
>   must apply freely).
>
>   (II) Widen the scope of possible output condi-
>   tions to include the appropriate constraints

on the occurrence of pronoun-antecedent
pairs.

If the theory of grammar is changed in this way, then it will
follow that no transformational rule could follow that point
in the grammar where pronominalization constraints are stated.
This is a much stronger claim than simply saying that the con-
straints are part of the pronominalization rule and that the
rule just happens to be the last one in the grammar of English.

So far, I have shown that the constraints on pro-
nominalization may be stated at the very end of the grammar of
English. I have not shown that they must be stated there. How-
ever, there does exist very strong evidence to that effect. The
evidence concerns stress. As is well known, stress interacts
with pronominalization. Whenever an NP serves as the antecedent
to a pronoun, both the NP and the pronoun must be unstressed.
Consider the following sentences, pointed out by David Perlmutter.

(87) When he entered the room, Mary kissed John.
(88) *When he entered the room, Mary kissed John.

Direct objects normally take stress, but as (88) shows, a
direct object cannot both be stressed and serve as an antecedent.
This is true not only with pronoun-antecedent pairs, but also
when a noun phrase is used anaphorically to refer back to
another noun phrase.

(89) When Harry entered the room, Mary kissed
the bastard.

(90) *When Harry entered the room, Mary kissed the bastard.

In these examples, the bastard can refer to Harry only if it is unstressed, although a direct object would normally be stressed in that position. The same is true in the following cases.

(91) When Harry entered the room, Mary kissed the president.

(92) *When Harry entered the room, Mary kissed the president.

(93) When Harry entered the room, Mary kissed Harry.

(94) *When Harry entered the room, Mary kissed Harry.

This is true not only when a pronoun or noun phrase is used anaphorically, but also when the anaphoric expression is null.

(95) That Mary was going to marry someone else bothered John.

(96) That Mary was going to marry someone else bothered John.

In (95) the fact that John is unstressed indicates that it is being used as an antecedent. Thus someone else in that sentence refers to someone other than John. That is, someone else has

within it an understood anaphoric expression, which has no pho-
netic representation. In (95) John is its antecedent. However,
in (96), where John has stress and therefore cannot be used as
an antecedent, someone else is understood as someone other than
an unspecified NP (which cannot be John). Thus an NP must be
unstressed if it is to take part in any type of anaphoric rela-
tionship. [6]

Now consider sentences like (38).

(38) Mary hit him, before John had a chance
to get up.

Compare (38) with (97).

(97) *Mary hit him, before John got up.

in (38) and (97), John and him are in the same structural posi-
tions relative to one another. The only difference is that in
(38) the verb phrase that follows John is long and in (97) it is
short. This is true not only in these cases, but in general.
The longer the VP, the relatively more acceptable these sentences
become: the shorter the VP, the less acceptable they become.
For example,

(98) *Mary hit him, before John left.

(99) *Mary hit him, before John ate supper.

(100) *Mary hit him before John left town.

(101) *Mary hit him, before John could leave.

but,

(102) Mary hit <u>him</u>, before <u>John</u> left in his Rolls
        Royce for a dinner engagement at the Ritz.

(103) Mary hit <u>him</u>, before <u>John</u> ate supper with
        the president of the company that his
        father had bought the previous week.

(104) Mary hit <u>him</u>, before <u>John</u> left town to
        visit his aged grandmother in a small
        village at the foot of Baldface mountain.

(105) Mary hit <u>him</u>, before <u>John</u> could leave for
        the opening night of the play that had
        been reviewed so **favorably** in the Times.

And, as would be expected, such sentences are of questionable
acceptability if the VP is of intermediate length.

(106) ?Mary hit <u>him</u>, before <u>John</u> left in his
        Rolls Royce.

(107) ?Mary hit <u>him</u>, before <u>John</u> ate supper
        with the queen.

(108) ?Mary hit <u>him</u>, before <u>John</u> left town
        on a visit.

(109) ?Mary hit <u>him</u>, before <u>John</u> could leave
        town.

If one pronounces these sentences, one can see that the length
of the following verb phrase has **an** affect on the stress level
of the subject. The normal English stress rule will assign

John secondary stress in sentences like the above. But a later
phonetic rule (which is probably universal) will reduce this
stress further, depending on the length of the following VP.
The longer the VP, the lower the stress on John. In (38), the
stress on John is made low enough for John to be considered as
possible antecedent. But in (97), John retains secondary stress,
which is too high to permit a noun phrase to be considered as
a possible antecedent. If this interpretation of the data is
correct, it would seem that possible pronoun-antecedent rela-
tionships are in part determined by a phonetic stress rule.
This rule would apply after all the syntactic transformations
and after all the phonological rules as well. It applies as
close to the output of the grammar as any rule I know of. If
the phonetic stress reduction is really what is involved here,
then we have a very strong argument for treating constraints
on pronoun-antecedent pairs as being stated in output conditions,
since the information necessary for stating these conditions
would be available only in the output of the grammar (after all
the syntactic and phonological rules have applied).

Though pronoun-antecedent constraints seem to
involve stress, they cannot, of course, be stated only in terms
of stress contours. As we have seen, such syntactic notions as
subordinate clause and main clause are involved in these con-
straints. The above examples show that pronominalization can
go backwards into a main clause from a subordinate clause just

in case the antecedent NP has low stress. However, pronominali-
zation cannot usually go backwards, no matter how low the
stress on the antecedent. For example, consider (110).

> (110) *He said that John had left town to visit
> his aged grandmother in a small village
> at the foot of Baldface Mountain.

But not only must such syntactic notions as subordinate clause
be mentioned in these constraints, but as we saw earlier, the
notion subject must also be mentioned. As we saw, pronominali-
zation can go backwards from subordinate to main clauses if
the antecedent has low stress--but only if the pronoun is not
a subject! If the pronoun is the subject of the main clause
involved, backwards pronominalization is impossible no matter
how low the stress or how lengthy the intervening subject
matter. For example, compare (102) with (111).

> (111) *He was hit by Mary, before John left in
> his Rolls Royce for a dinner engagement
> at the Ritz.

Moreover, increasing the length of the VP following he does not
improve the sentence.

> (112) *He was hit by Mary with a baseball bat
> found in a cellar in Roxbury, before
> John left in his Rolls Royce for a dinner
> engagement at the Ritz.

So it seems that the notion subject must also be mentioned in the output condition that states pronoun-antecedent constraints. The examples mentioned in section 1.2 above provide further evidence for this.

It is interesting that the question of phonetic stress reduction enters into pronoun-antecedent constraints in exactly those places where the subject-nonsubject distinction is needed to state such constraints. This is true not only of backwards pronominalization into a main clause, but also of the cases discussed earlier of preposed adverbs, topics, and cleft sentences. Akmajian and Jackendoff have pointed out that if the length factor is taken account of in these constructions, then the possibilities for pronominalization will vary with length, as in the sentences just discussed.

Adverb Preposing

(14) *In John's apartment, he smokes pot.

(113) In John's apartment near the railroad tracks in the Pamrapo district of Bayonne, N.J., he smokes pot.

Topicalization

(52) *Bill's apartment, he always talks to Mary about it.

(114) Bill's apartment in that neighborhood of the Bronx where so many important literary figures grew up, he always talks to Mary about it.

Cleft Sentences

(72) *It was John's dog that he bit.

(115)? It was John's dog with the large fangs

and the unspeakably terrifying growl

that he bit.

It may be accidental that the two cases known to me where phonetic stress reduction plays a role in pronominalization constraints are exactly the cases where the subject-nonsubject distinction plays a role. If this is not just a coincidence, then the theory of grammar must be changed in a way which I cannot at present imagine in order to account for the correlation. Pending further research on the subject, I will assume that it is sheer coincidence.

1.1.5 Changes in the Theory of Output Conditions

1.1.5.1 Some additions

If certain of the constraints on pronominalization are to be stated as output conditions, then the theory of output conditions will have to be broadened to include:

(i) Variables

(ii) A definition of main clause and subor-

dinate clause

(iii) A definition of subject and nonsubject

(iv) A specification of phonetic stress level

(v) A means of indicating identity of intended

reference

(vi) The notion command

(vii) A limited use of quantifiers

A specification of the output condition needed to block the appropriate sentences containing preposed adverbs and topics would have to contain at least the following information.

(116) Structural description:

$$X - NP - X - NP - X$$

$$1 - 2 - 3 - 4 - 5$$

The sentence is unacceptable if:

(a) 2 has the same reference as 4

and (b) 2 commands 4

and (c) 4 is [+PRO] and [-REL]

and (d) 2 is above the appropriate stress level

and (e) 4 is a subject

and (f) There is at most one S node which dominates

4 but does not dominate 2

Condition (f) is necessary, since forward pronominalization is blocked only if the pronoun is the subject of the highest sentence in question. Thus, (116) will block (117), but not (118).

(117) *John's house, he always talks about it.

(118) John's house, Mary says that he always

talks about it.

To my knowledge, the constraints in (116) will
handle the cases where forward pronominalization is blocked
for preposed adverbs, topics, and cleft sentences. (116)
states the constraints in terms of structural conditions.
However, there may be a different generalization at work here.
Preposed adverbs, topics and clefted elements are all elements
that are being focussed upon by the speaker, or given special
prominence. Thus, it is possible that the appropriate output
conditions should mention elements that are being given
special prominence, assuming that some notion such as
prominence can be formally specified. The theory of output
conditions would then have to be broadened to include:

(viii) The notion prominence with respect to a
given S-node. One might think that if one includes the notion
prominence in the the theory of output conditions, one might
be able to avoid the use of quantifiers in stating output con-
ditions. Condition (f) could then be done away with and re-
placed by a new condition which mentions prominence. Unfor-
tunately such a new condition would also have to use quantifiers.
Thus, (116) could be replaced by (119).

(119) Structural description:

$$X - NP - X - NP - X$$
$$1 - 2 - 3 - 4 - 5$$

The sentence is unacceptable if:

(a) 2 has the same reference as 4

and (b) 2 commands 4

and (c) 4 is [+PRO] and [-REL]

and (d) 2 is above the appropriate stress level

and (e) There exists an S_i such that 4 is the

subject of S_i and 2 is dominated by a

node which is prominent with respect to S_i.

(119) would, like (116), rule out (117), while permitting (118). In (117), John would be term 2 and he would be term 4. John's house would be prominent with respect to the S_i, he always talks about it. Since he (term 4) is the subject of S_i and since John (term 2) is dominated by a node (the NP dominating John's house) which is prominent with respect to S_i, Condition (e) would be met and (117) would be blocked.

In (118), John would again be term 2 and he would be term 4. But in (118), John's house would be prominent with respect to the S_i, Mary says he always talks about it. Thus, Mary is the subject of S_i, and he (term 4) is not. Therefore, condition (e) cannot be met, and (118) is not blocked. As should be clear from this example, quantifiers are needed to guarantee that the S with respect to which prominence is defined is the same as the S that 4 is the subject of. Thus, the addition of the notion prominence would add a new device to the theory of output conditions without allowing us to get rid of any of the old ones.

1.1.5.2 The Anaphora Hierarchy

As we mentioned above, full noun phrases can be used as anaphoric expressions just as pronouns can. And these sometimes obey the same output conditions as pronouns do.

> (120) Mary kicked him, when Fat Max insinuated
>   that she had been sleeping with Algernon
>   for several months.
>
> (121) Mary kicked the bastard, when Fat Max in-
>   sinuated that she had been sleeping with
>   Algernon for several months.
>
> (122) *He was kicked by Mary, when Fat Max in-
>   sinuated that she had been sleeping with
>   Algernon for several months.
>
> (123) *The bastard was kicked by Mary, when Fat
>   Max insinuated that she had been sleeping
>   with Algernon for several months.

Here the full NP, the bastard, obeys the same constraints as those on backwards pronominalization from subordinate clauses into main clauses. In such examples, the bastard must act like a pronoun and cannot act like an antecedent, and Fat Max must act like an antecedent and cannot act like a pronoun.

> (124) Mary kicked Fat Max, when the bastard in-
>   sinuated that she had been sleeping with
>   Algernon for several months.

       (125)   Fat Max was kicked by Mary, when the

                bastard insinuated that she had been

                sleeping with Algernon for several

                months.

(125) is grammatical since the bastard acts like a pronoun and
since forward pronominalization is possible in that environment.

      The question arises as to exactly when a full NP
can act like a pronoun and when it cannot. One might think that
NP's that can act as pronouns are limited to epithets like
bastard, bum, bitch, schmuck, etc.; however, I believe that any
definite description can function in that way.

       (126)   Mary slugged Dirksen, when the Illinois

                Republican insinuated that she had voted

                for Lyndon Johnson.

       (127)   Mary slugged the Illinois Republican, when

                Dirksen insinuated that she had voted for

                Lyndon Johnson.

       (128)   Dirksen was slugged by Mary, when the

                Illinois Republican insinuated that she

                had voted for Lyndon Johnson.

       (129) *The Illinois Republican was slugged by

                Mary, when Dirksen insinuated that she

                had voted for Lyndon Johnson.

Here the Illinois Republican is a definite description used as

a pronoun. Lest readers consider this just another example of
an epithet, let us consider some more innocuous examples.
Assume that Dirksen is wearing a blue suit.

> (130) Mary slugged Dirksen, when the man in the
>   blue suit insinuated that she like Lyndon
>   Johnson.
>
> (131) Mary slugged the man in the blue suit,
>   when Dirksen insinuated that she liked
>   Lyndon Johnson.
>
> (132) Dirksen was slugged by Mary, when the man
>   in the blue suit insinuated that she
>   like Lyndon Johnson.
>
> (133) *The man in the blue suit was slugged by
>   Mary, when Dirksen insinuated that she
>   liked Lyndon Johnson.

Here the man in the blue suit is clearly a definite description
and not an epithet.

The generalization concerning the conditions under
which an NP can serve as an anaphoric expression involves a
distinction among four types of noun phrases.

> (134) 1. proper names (e.g. Dirksen)
>   2. definite descriptions (e.g. the man
>   in the blue suit)
>   3. epithets (e.g. the bastard)

4. pronouns (e.g. he)

These types of noun phrases form a hierarchy as given in (134). In general, an NP with a lower number in the hierarchy may be an antecedent of an NP with a higher number, but not vice versa. An NP cannot be the antecedent of an NP with the same number, unless one is a repetition of the other or unless both are pronouns. For example,

> (135) Napoleon entered the room and Napoleon
> announced that Jean-Luc would hang.
>
> (136) *Napoleon entered the room and Bonaparte
> announced that Jean-Luc would hang.

(135) and (136) show that a proper name can be an antecedent of another proper name, only if the two are identical. As further examples, consider the following:

> (137) Napoleon entered the room and the emperor
> announced that Jean-Luc would hang.
>
> (138) *The emperor entered the room and Napoleon
> announced that Jean-Luc would hang.
>
> (139) Napoleon entered the room and the bastard
> announced that Jean-Luc would hang.
>
> (140) *The bastard entered the room and Napoleon
> announced that Jean-Luc would hang.
>
> (141) Napoleon entered the room and he announced
> that Jean-Luc would hang.

(142) *He entered the room and <u>Napoleon</u>

announced that Jean-Luc would hang.

Although (138), (140) and (142) are all unacceptable, (138) is better than (140), which is better than (142). That is, there is a hierarchy of unacceptability here which mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the less acceptable the sentence.

```
best -- (138) --- .... the emperor .... Napoleon ... ⎞ ungram-
                        2                1           ⎟ matical
middle -- (140) ---... the bastard .... Napoleon ... ⎬ sent-
                       3                1            ⎟ ences
worst -- (142) --- ... he ............. Napoleon ... ⎠
                      4                  1
```

Just as there is a hierarchy of unacceptability here, so there is a hierarchy of acceptability as well. Though (137), (139), and (141) are all grammatical, (141) is the most acceptable, (139) less so, and (137) somewhat less. Again, the acceptability hierarchy mirrors the hierarchy of (134). The greater the difference in numbers with respect to the hierarchy of (134), the more acceptable the sentence.[7]

```
best -- (141) --....Napoleon .........he....... ⎞ gram-
                    1                 4         ⎟ matical
middle - (139)--....Napoleon .....the bastard.. ⎬ sent-
                    1             3             ⎟ ences
worst -- (137)--....Napoleon .....the emperor.. ⎠
                    1             2
```

Let us now turn to definite descriptions. According to the hierarchy of (134), definite descriptions can be

antecedents of epithets and pronouns, but epithets and pronouns
cannot be antecedents of definite descriptions.

(143) The emperor entered the room and the
       bastard announced that Jean-Luc would
       hang.

(144) *The bastard entered the room and the
       emperor announced that Jean-Luc would
       hang.

(145) The emperor entered the room and he
       announced that Jean-Luc would hang.

(146) *He entered the room and the emperor
       announced that Jean-Luc would hang.

Moreover, the hierarchy of (134) predicts that definite des-
criptions cannot be antecedents of definite descriptions,
unless they are identical.

(147) The man with his hand in his vest
       entered the room and the man with his
       hand in his vest announced that Jean-
       Luc would hang.

(148) *The man with his hand in his vest entered
       the room and the emperor from Corsica
       announced that Jean-Luc would hang.

Epithets also follow the hierarchy of (134).

Epithets may be antecedents for pronouns, but pronouns may not be antecedents for epithets.[8]

   (149) The bastard entered the room and he spat

       on the floor.

   (150) *He entered the room and the bastard spat

       on the floor.

And, as the hierarchy predicts, epithets may be antecedents of other epithets only if they are identical.

   (151) The bastard entered the room and the

       bastard spat on the floor.

   (152) *The bastard entered the room and the bum

       spat on the floor.

However, two different epithets referring to the same person may occur in the same sentence, provided that there is another noun phrase in the sentence that serves as an antecedent to both of them.

   (153) After we let Sam into the house, the

       bastard entered the living room and

       the bum spat on the floor.

In (153), Sam is antecedent to both the bastard and the bum. This works not only for epithets, but for definite descriptions as well.

(154) *The Illinois Republican entered the living

room and then the man with the silver

hair began to make a speech.

(154) is unacceptable since a definite description cannot be

the antecedent of another definite description. (155) is

acceptable if we understand Dirksen to be the antecedent of

both the Illinois Republican and the man with the silver hair.

So, in (153) and (155) we have the following situation.

```
.......Sam.....the bastard......the bum........
      ↑↖_____↲
.......Dirksen......the Illinois Republican....the man with
      ↑↖_____↲
          silver hair......
```

The same is true with pronouns.

(157) After we let Dirksen into the house, he

entered the living room and then he

began to make a speech.

Here both occurrences of he refer back to Dirksen, as in (158).

```
(158) ...Dirksen .........he.......he........
         ↑↖_____↲    ↲
```

This situation arises not only within sentences, but also across

sentence boundaries.

(159) We let Dirksen into the house. He entered

the living room and then he began to make

a speech.

> (160)   We let <u>Dirksen</u> into the House. <u>The Illinois</u>
>   <u>Republican</u> entered the living room and
>   then <u>the man with the silver hair</u> began
>   to make a speech.
>
> (161)   We let <u>Sam</u> into the house. <u>The bastard</u>
>   entered the living room and <u>the bum</u>
>   spat on the floor.

Thus sentences like (152) and (154) are unacceptable only if it
is assumed that one of the underlined noun phrases is the ante-
cedent of the other. If, instead, we assumed that both are
anaphoric expressions referring back to an antecedent in a
previous sentence, then these sentences are acceptable. So
sentences like (162)

> (162)   <u>He</u> entered the room and then <u>he</u> spat on
>   the floor.

are acceptable if both occurrences of <u>he</u> are understood as
referring back to some person in a previous sentence. The first
<u>he</u> cannot be understood as the antecedent of the second <u>he</u>.

1.1.5.3 The general notion "antecedent of"

The examples in the previous section indicate
anaphoric noun phrases in general can be subject to the same con-
straints as pronouns. This means that output conditions must be

stated not just for pronouns but for anaphoric noun phrases of
all sorts. As we saw in the previous section, one cannot tell
just from the form of a single noun phrase whether it is
anaphoric. Instead, one must be able to pick out antecedent-
anaphoric pairs by a principle based on the hierarchy of (134)
and output conditions must be formulated in terms of this
principle. We can define the general notion "antecedent of"
as follows:

> (162) Given two coreferential NP's, NP_i and
> NP_j, we will say that NP_i is the ante-
> cedent of NP_j, if (a) NP_i ranks higher
> than NP_j in the hierarchy of (134) or
> if (b) NP_i and NP_j are identical in
> form and NP_i precedes NP_j.

(162b) is necessary for cases like (163).

> (163) Dirksen was kicked by Mary, when Dirksen
> insinuated that she had voted for
> Lyndon Johnson.

In (163) the first occurrence of Dirksen must be considered the
antecedent of the second occurrence of Dirksen. In the case of
repeated noun phrases, the first is always considered the ante-
cedent of the second.

With a definition of "antecedent of", we can state
the output condition for cases (120) - (133) and similar cases.

(164) Structural description: $x - NP_i - X - NP_i - X$
$1 \quad 2 \quad\;\; 3 \quad\;\; 4 \quad\;\; 5$

The sentence is unacceptable if:

(a) There exist S_a and S_b such that S_b is sub-
ordinate to S_a, and

(b) S_a dominates 2 and S_b dominates 4 and S_a
does not dominate 4 and S_b does not
dominate 2, and

(c) 4 is the antecedent of 2, and either

(d) 2 is the subject of S_a , or

(e) 4 is stressed, or both

(e) and (f) hold.

(164) will handle all the cases I know about of backwards
anaphora from a subordinate clause to a main clause.[9]

Similarly, we can account for the unacceptability
of backwards anaphora in coordinate clauses, as in (135) - (154),
with an output condition like (165).

(165) Structural description: $X - NP_i - X - NP_i - X$
$1 \quad 2 \quad\;\; 3 \quad\;\; 4 \quad\;\; 5$

The sentence is unacceptable if:

(a) There exist S_a and S_b such that S_a and S_b
are coordinate, and

(b) S_a dominates 2 and S_b dominates 4 and S_a
does not dominate 4 and S_b does not
dominate 2, and

(c) 4 is the antecedent of 2

There are still other cases where the general notion of antecedent is necessary. (166) is an example of an output condition that applies only to anaphoric noun phrases that are not pronouns.

(166) Structural description: $X - NP_i - X - NP_i - X$
$$1 \quad 2 \quad 3 \quad 4 \quad 5$$

The sentence is unacceptable if:

(a) 2 is the antecedent of 4

(b) 2 commands 4 and 2 does not command 4, and

(c) 4 is not a pronoun

(166) will account for the following sentences:

(167) *Johnson thinks that Johnson is popular.

(168) *Johnson thinks that the Texan is popular.

(169) *Johnson thinks that the bastard is popular.

(170) Johnson thinks that he is popular.

(171) *Johnson likes people who like Johnson.

(172) *Johnson likes people who like the Texan.

(173) *Johnson likes people who like the bastard.

(174) Johnson likes people who like him.

As (166) is stated, it will apply only when the antecedent precedes the anaphoric noun phrase. However, that same constraints hold when the anaphoric noun phrase precedes its antecendent.

(175)?That Johnson is unpopular bothers Johnson.

(176) *That the Texan is unpopular bothers Johnson.

(177) *That the bastard is unpopular bothers

Johnson.

(178) That he is unpopular bothers Johnson.

(179) People who know Johnson hate Johnson.

(180) *People who know the Texan hate Johnson.

(181) *People who know the bastard hate Johnson.

(182) People who know him hate Johnson.

Note that (179) is grammatical, since by the definition of
antecedent in (162), the first occurrence of Johnson is the
antecedent of the second. Because of this, condition (166) is
not met, and thus it cannot rule out (179). Thus, (179) is
acceptable for the same reason as (183) and (184), where the
anaphoric noun phrase commands its antecedent.

(183) People who know Johnson hate the Texan.

(184) People who know Johnson hate the bastard.

(175) is not subject to condition (166) for the same reason as
(179) is. In (175) the anaphoric noun phrase commands its
antecedent. In my idiolect I find (175) of questionable
acceptability, which is also true of (185) and (186), which
share the same condition.

(185)? That Johnson is unpopular bothers the Texan.

(186)? That Johnson is unpopular bothers the bastard.

(164), (165), and (166) show that the notion "ante-
cedent of" is necessary for the general statement of output

conditions. To my knowledge, the definition of <u>antecedent</u> given in (162) is universal, as is the hierarchy of (134).

1.1.6 Dialect Variations

As I have pointed out above, the constraints we are dealing with are subject to some dialectal and idiolectal variation. Actually, there is a considerable amount of variation, more than I have mentioned so far. I noted that, in my speech, (186) is unacceptable but (187) is acceptable.

> (186) *<u>He</u> was kicked by Mary, before <u>John</u> had
>   a chance to get up.
>
> (187) Mary kicked <u>him</u>, before <u>John</u> had a
>   chance to get up.

Though the majority of the speakers I've asked share this view, there are some who find (186) and (187) both ungrammatical, and there are some isolated individuals who find both of them grammatical.[10]

I mentioned above that many people find (34), (67), and (75) grammatical. These individuals do not have the constraint that backwards pronominalization can go into topicalized elements only from subjects. Instead, they permit free backwards pronominalization into topicalized elements.

Another case of such variation has been reported

by Stanley Peters. Apparently there is a Texas dialect where
sentences∧(188) are grammatical.
         like

      (188) It bothered him that John was sick.

Variations like these can be described in terms of a theory
of output conditions like that proposed in §1.1.5. If one
can pick out the structures in which the variation occurs,
they can be listed as extra conditions in statements like
(116).

      Paul Postal has pointed out an even more interest-
ing case of variation from speaker to speaker. Some speakers
find (189) acceptable, although it is unacceptable in my
speech.

      (189) His mother hates John.

I have found that the same speakers who accept (189) will
accept (190)

      (190) In John's apartment, he smokes pot.

These speakers will reject, as will all the speakers I have
asked, (191) and (192).

      (191) *He hates John's mother.

      (192) *Near John, he saw a snake.

And these speakers like all others will accept (193) and (194).

(193)   Women who know <u>him</u> hate <u>John</u>.

(194)   In the apartment which <u>John</u> rents,

        <u>he</u> smokes pot.

If one groups speakers who accept (189) and (190) into what we
will call Group A and put those who do not accept them into Group
B, and if we pick out as the relevant NP the leftmost underlined
NP in the above sentences, one gets the following distribution:

(195)

Relevant NP	Group A	Group B
Head NP	no good	no good
Unembedded modifier NP	okay	no good
Embedded NP	okay	okay

The distinction between the two dialects seems to be a matter
of how far down in the tree the relevant NP must be. Group B
requires that it be embedded in a subordinate clause, while
Group A will allow it to be an unembedded modifier. Since two
different conditions are involved, this indicates that output
conditions should include some notion like "sufficiently far
down on the tree", which can vary from speaker to speaker in
its exact definition, but would not vary from condition to
condition.

If the constraints on pronominalization are to be
stated as output conditions, then it is not at all surprising
that they should vary from speaker to speaker, since other
output conditions (see Ross, 1967b, Chapter 3) are known to be

subject to such variation.

1.2 Transformational Conditions

1.2.1 On the Noncyclic Nature of English Pronominalization

In Section 1.1 I argued that certain constraints on pro-
nominalization could not be handled by rule ordering and had
to be handled by output conditions of the Ross-Perlmutter
variety. I also showed that it is false that forwards pro-
nominalization is always possible in English and claimed that
no known pronominalization constraints depend on the ordering
of a rule of pronominalization with respect to other rules of
the grammar. To my knowledge, the only apparent counterexamples
to this claim are involved in Ross' elegant argument that pro-
nominalization must be a cyclic rule. In this section, I shall
argue that

> (a) Ross' examples do not show that pronominalization
>   is a cyclic rule
>
> (b) Ross' examples cannot be handled by an output con-
>   dition
>
> (c) Ross' examples cannot be handled by a constraint on
>   deep structure
>
> (d) Ross' examples cannot be handled by a constraint on
>   the pronominalization rule
>
> (e) Therefore they must be handled by a transformational
>   constraint not attached to the rule of pronominali-
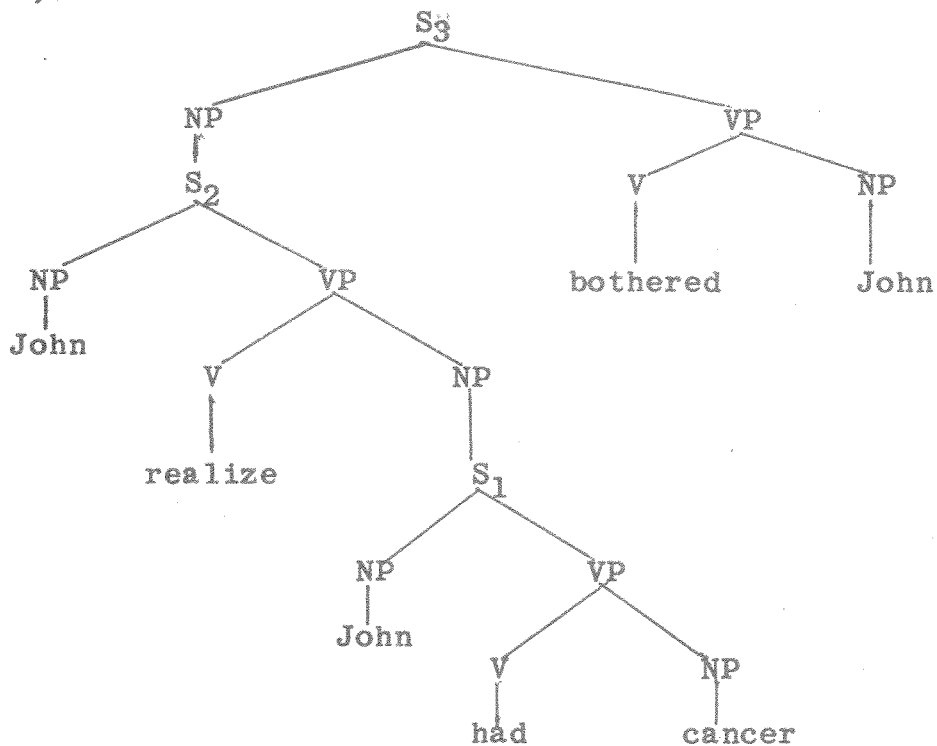>   zation.

Ross (1967a) argued that the following sentences indicated

that pronominalization was a cyclic rule.

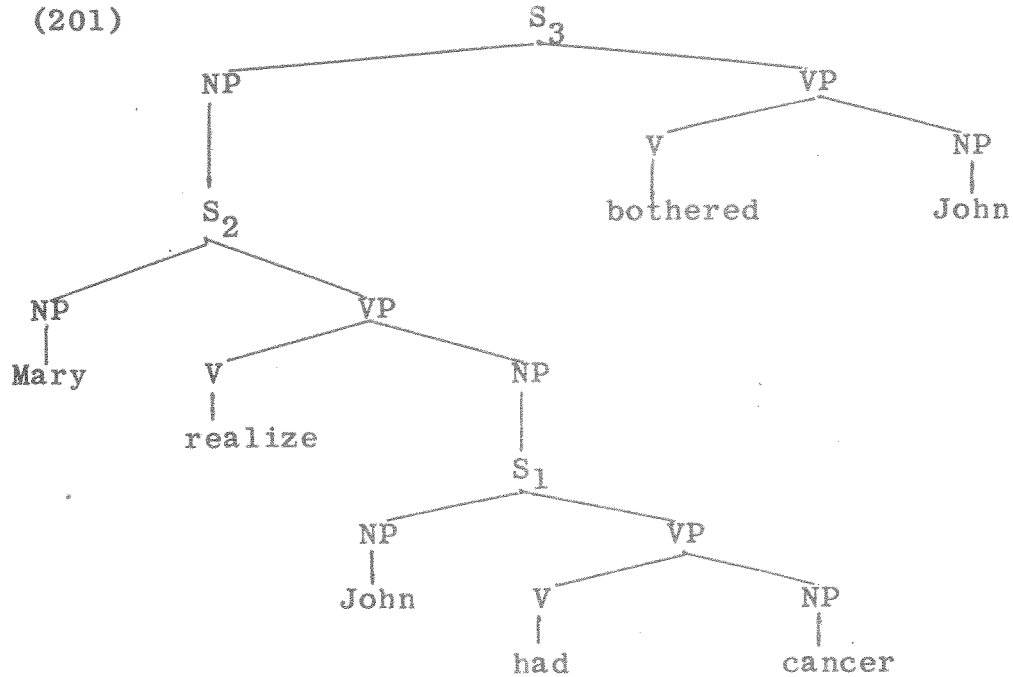(196)   Realizing that he had cancer bothered John.

(197) *Realizing that John had cancer bothered him.

(198)

(199)   Mary's realizing that he had cancer bothered John.

(200)   Mary's realizing that John had cancer bothered him.

(201)

```
                                S₃
              NP                          VP
               |                     V          NP
               |                     |           |
              S₂                  bothered      John
         NP          VP
          |       V        NP
        Mary      |         |
               realize     S₁
                      NP          VP
                       |       V        NP
                     John      |         |
                              had      cancer
```

In (197), pronominalization cannot go forward, whereas in (200),
which differs only by the presence of the subject Mary, it can.
If pronominalization were cyclic and obligatory, Ross argued,
this fact could be explained beautifully. Cyclic pronominaliza-
tion in the (196) - (197) cases would have to apply first to the
embedded sentence, S_2.

    (202) John realized that John had cancer.

If pronominalization were obligatory it would apply to (202)
to yield

    (203) John realized that he had cancer.

but not

    (204) *He realized that John had cancer.

On the next cycle (on S_3), the subject of (203) would be deleted
by Equi-NP-deletion under identity with the object of bother,

thus yielding (196). (197) could never be generated because
(204), a necessary intermediate stage, could not be generated.
If John is the subject of realize, then John cannot occur unpro-
nominalized in the complement of realize.

This explanation of the ungrammaticality of (197) accounts,
at the same time, for the grammaticality of (200). Since John
is not the subject of the embedded subject clause of (200),
John may occur unpronominalized in the object complement of
realize. Since the intermediate stage (205) is grammatical,

(205) Mary realized that John had cancer.

it follows that the source of the ungrammaticality in (197)
is not present in (200).

The appeal of Ross' argument is that it purports to show
that a strange, anomalous, complex, and apparently isolated
fact (the ungrammaticality of (197) actually follows from a
well-known and relatively simple fact, the ungrammaticality of
(204). (Compare (3) - (6)). Moreover, it shows how what would
have to be a new constraint on forwards pronominalization can
be eliminated in favor of an independently needed constraint
on backwards pronominalization.

It should be noted that the facts of (196) - (200) can be
described without assuming that pronominalization is cyclical.
One could simply add the following ad hoc constraint on the
pronominalization rule:

(206) Pronominalization cannot go forward out of a

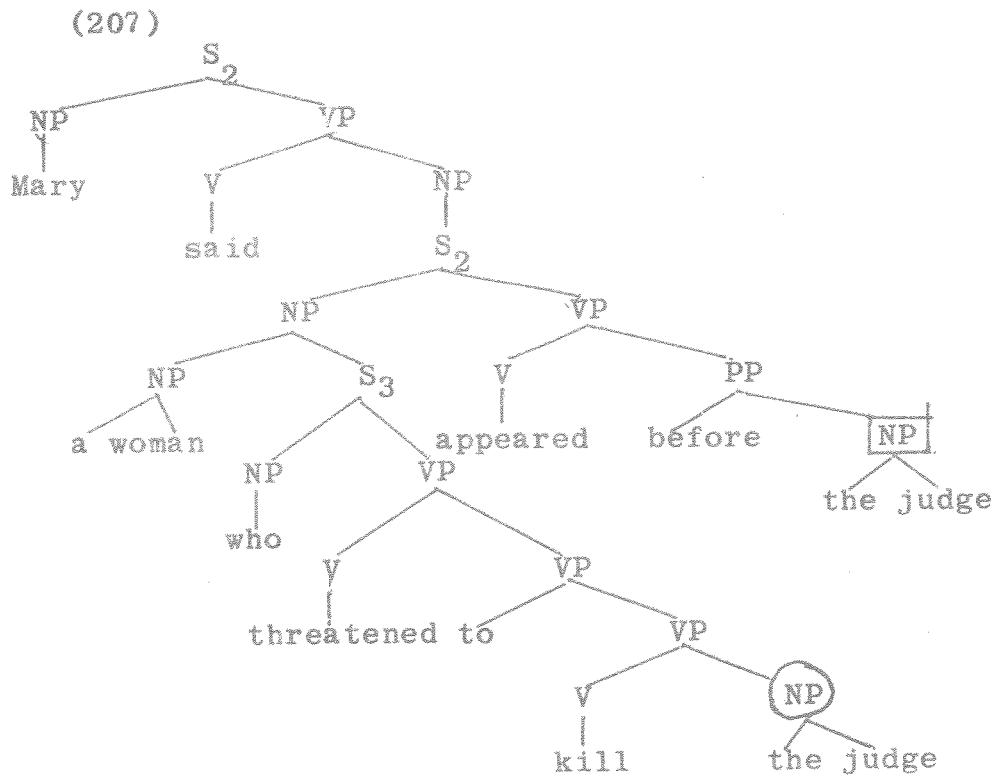subject complement which has no superficial
subject.

Putting aside the question of the formal status of (206), it
is clear that for the examples cited so far, (206) could des-
cribe the facts without the assumption that pronominalization
is cyclic. Since, in (197), realizing has no superficial sub-
ject, (206) would rule (197) out, while permitting (200).

It is clear why, on the basis of the examples considered
thus far, Ross' account is preferable to (206). The reason is
that Ross' account seems to reveal a relationship between
apparently unrelated phenomena, and seems to show that (206)
can be eliminated in favor of an independently motivated con-
straint on backwards pronominalization. According to (206),
(197) and (200) are entirely unrelated facts; and (206) has
nothing to do with backwards pronominalization. Since Ross'
description relates phenomena which (206) does not, it has
greater explanatory value--especially since it obviates the
necessity for (206). Here is a case where one chooses between
descriptions on the basis of their explanatory value.

Shortly after Ross discovered this explanation for (197),
two classes of anomalies which did not accord with cyclic pro-
nominalization were discovered. The first involved reordering
transformations that could not be cyclic, but had to apply only
on the last cycle. For example, Extraposition of relative

clauses must be last-cyclic since it cannot apply before the last-cyclic rule of question formation. (See Ross, 1967b, § pp.   ). Consider (207).

(207)

```
                        S_2
               /                 \
             NP                   VP
              |              /          \
            Mary           V             NP
                           |              |
                         said            S_2
                                   /              \
                                 NP                VP
                            /         \        /    |      \
                          NP          S_3    V      PP
                           |         /    \  |    /    \
                       a woman     NP     VP appeared before  [NP]
                                   |    /    \                 |
                                  who  V      VP           the judge
                                       |    /    \
                               threatened to    VP
                                            /        \
                                           V         (NP)
                                           |        /    \
                                          kill     the judge
```

If S_3 does not extrapose, then forward pronominalization can apply, turning the boxed NP to 'him'.

(208) Mary said that a woman who threatened to
        kill the judge appeared before him.

Now suppose that pronominalization is cyclic; then it would have applied on S_2, yielding (209).

(209)   A woman who threatened to kill the judge

appeared before him.

Since extraposition is last-cyclic, it can apply only on the

S_1-cycle--after pronominalization has applied on the S_2-cycle

(no matter where in the rules it is ordered). If extraposition

(which, of course, is optional) applies after (209) has been

produced on the S_2-cycle, then we will get the ungrammatical

(210).

(210) *Mary said that a woman appeared before him

who threatened to kill the judge.

If pronominalization is cyclic, there is no way of avoiding

such wrong results. In fact, cases like this will arise with

every last-cyclic rule that moves one NP to the right over

another NP. It should be noted that no such difficulty arises

if pronominalization is a last-cyclic rule or if the constraints

on pronominalization are stated in output conditions.

The second anomaly (noticed by Postal) involves

question formation. Consider (211).

(211)
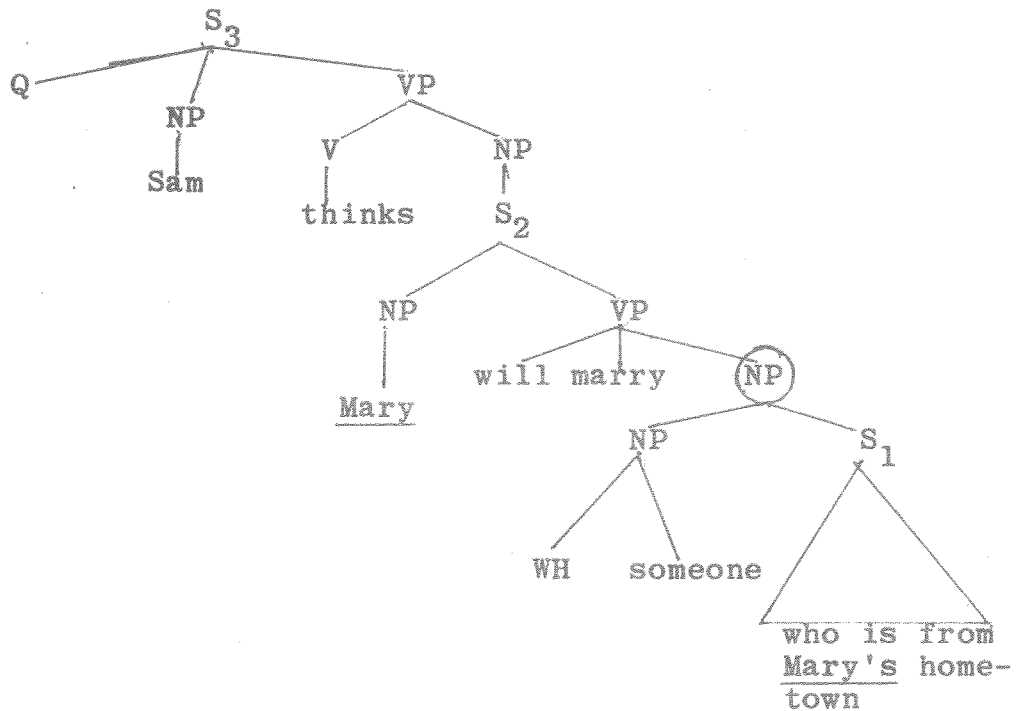
Assuming that pronominalization is cyclic, it will apply on
S_2 yielding (212).

(212) Mary will marry WH someone from her hometown.

Note that pronominalization applying on S_2 cannot yield (213)

(213) *She will marry someone from Mary's hometown.

Since Q is at the topmost level in (211), the rule of question
formation cannot apply until the cycle on S_2 is finished.
Assuming that (212) was produced on the S_2-cycle, question for-
mation, applying later, will yield (214).

(214) Who who is from her hometown does Sam think

that Mary will marry.

Although extraposition of relative clauses would be obliga-
tory in (214) for some speakers, there are many speakers
for whom (214), with its unextraposed relative clause, is
grammatical. For these speakers, Postal pointed out, (215)
is also grammatical.

(215) Who who is from Mary's hometown does
       Sam think
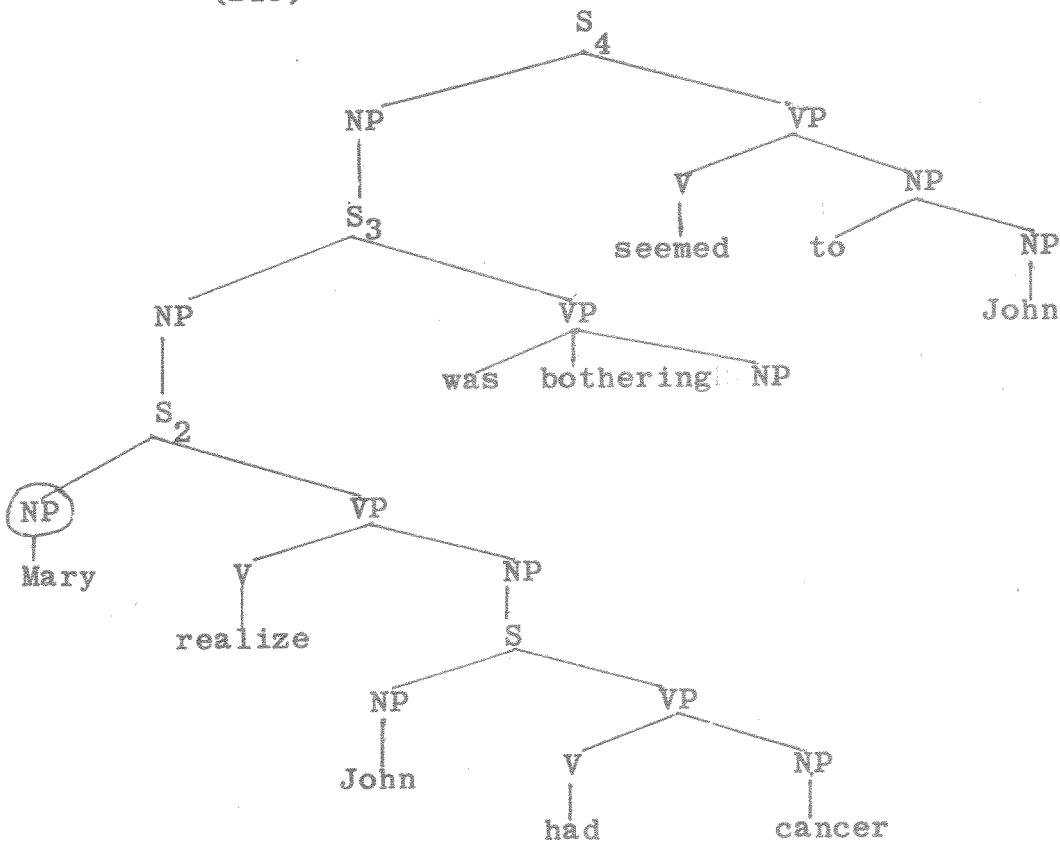
that <u>she</u> will marry.

But, if pronominalization is cyclic, (215) cannot be derived, since in order to derive it we would have to first derive the impossible intermediate stage of (213). (215) could be handled only if pronominalization were a last-cycle rule or if the permissible occurrences of pronouns were determined by output conditions, as I have suggested.

These arguments provide very strong counterevidence to Ross' proposal. The latter argument of Postal's is especially damning, and I cannot imagine any way around it. In view of such arguments, one might be willing to give up Ross' explanation in favor of the rather uninteresting description of (206). Still there is a lingering doubt that perhaps Ross was right. The following examples, should, however, remove all such doubts. Consider (216) and (217).

> (216) *Realizing that <u>John</u> had cancer seemed to
>   <u>him</u> to have been bothering Mary.
> (217) My realizing that <u>John</u> had cancer seemed
>   to <u>him</u> to have been bothering Mary.

(218)

$$S_4$$

The tree (218):

- S_4
  - NP
    - S_3
      - NP
        - S_2
          - NP (circled) — Mary
          - VP
            - V — realize
            - NP
              - S
                - NP — John
                - VP
                  - V — had
                  - NP — cancer
      - VP
        - was bothering NP
  - VP
    - V — seemed
    - NP
      - to
      - NP — John

The difference between (216) and (217) is just the difference
between (197) and (200). When the subject of realizing has
has been deleted, pronominalization cannot go forwards. The
same phenomenon is operating in both cases. But in (216),
the understood subject of realizing is 'Mary' not 'John'.
Therefore, Ross' cyclic pronominalization theory could not
account for (216): the intermediate S_2 stage (see (218)),
'Mary realized that John had cancer', is fully grammatical.
If the same thing is going on in both (216) and (197), then
Ross' theory is wrong since it cannot account for both phenomena.

The constraint on forward pronominalization stated in (206)
can describe (216) as well as (197). But despite its explana-
tory value in accounting for (197), Ross' cyclical theory
cannot even describe the parallel case of (216). We must
discount the cyclical pronominalization theory both because
there is decisive evidence against it and because it does not
do the job that it was set up to do.

With the cyclical theory out of the way, it is natural
to turn to some output condition such as (206) to account
for facts like (216) and (197). But although (206) can
account for these sentences, there are similar sentences that
it cannot account for. Consider (218) and (219).

(218) The realization that he had cancer
       bothered John.

(219) *The realization that John had cancer
       bothered him.

(218) and (219) are parallel to (196) and (197). These examples
show that nominalized subject complements work the same way
with respect to this phenomenon as ordinary subject complements.
Since (206) refers only to subject complements and not nominali-
zations, it would have to be generalized to account for (219).
Such a generalized version of (206) might account for (218)
and (219), but it could not be extended to account for other
nominalizations. Compare realization and discovery.

Realization cannot have an unspecified subject. Consequently
(218) is unambiguous and the subject of realization in (218)
is understood to be John. Since realization cannot have an
unspecified subject, (220) is ungrammatical.

(220) *The realization that John might have
cancer was anticipated.

Compare (220) with (221), where there is a specified subject.

(221) Mary's realization that John Might have
cancer was anticipated.

Discovery, on the other hand, may take an unspecified subject
as well as a specified subject. Thus, both (222) and (223)
are grammatical.

(222) The discovery that John might have cancer
was anticipated.
(223) Mary's discovery that John might have
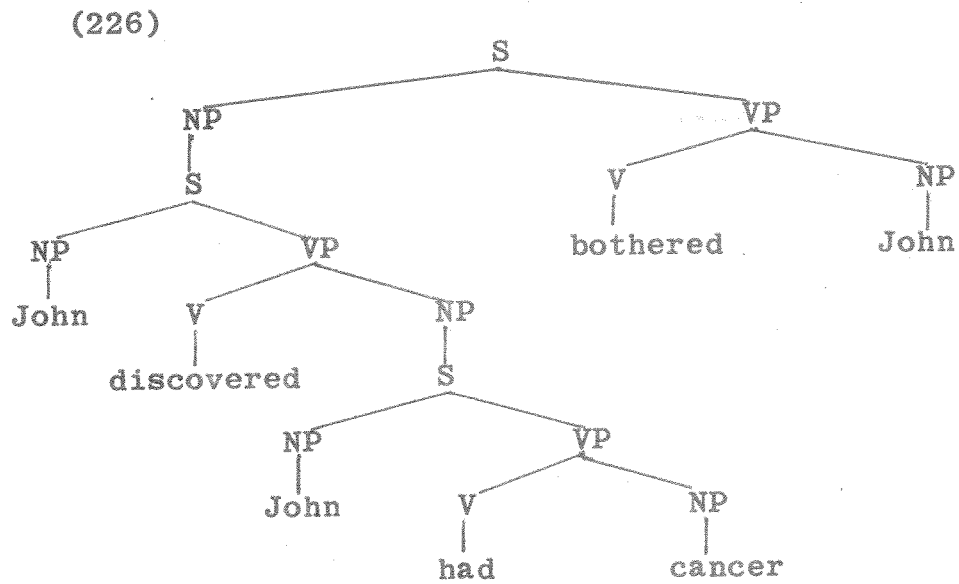cancer was anticipated.

In (222), discovery has an unspecified subject.

Because of this difference between discovery and realiza-
tion, we get rather different results when we substitute
discovery for realization in (218) and (219).

(224) The discovery that he had cancer
bothered John.

(225) The discovery that <u>John</u> had cancer bothered <u>him</u>.

(226)

(227)
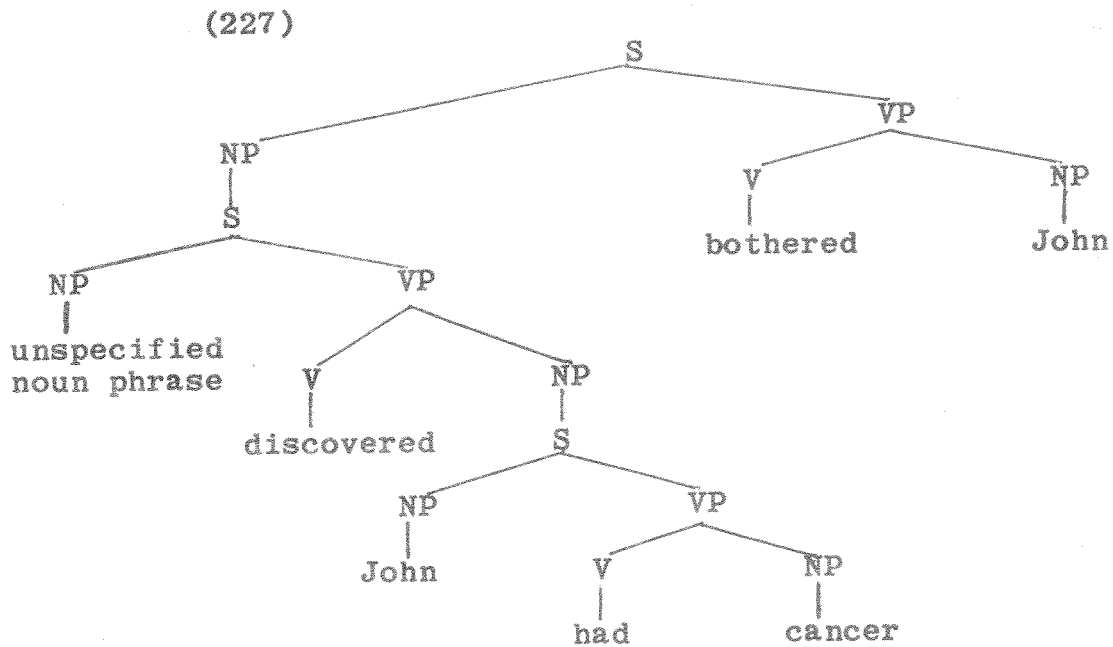
(224), unlike (218), is ambiguous; it may have either (226) or (227) as its deep structure. It may have either John or an unspecified NP as the subject of discovery. (225), unlike (219), is grammatical. But unlike (224), (225) is unambiguous. In (225), John cannot be the understood subject of discovery. Instead, discovery is understood only as having an unspecified subject. That is, the deep structure of (225) is (227), but not (226). Although (225) is grammatical, we find the same difference between (225) and (224) as we found between (219) and (218). In (225) and (219), John cannot be the understood subject of the nominalization, while in (224) and (218) it can. Thus, (225) is unambiguous for the same reason that (219) is ungrammatical; in both cases the subject John has been deleted by Equi-NP-deletion.

If (219) is ungrammatical for the same reason that (225) is unambiguous, then we would expect the same constraint to apply in both cases. That is, we would expect that in these cases there would be a single constraint forbidding the possibility that John could be the understood subject; that is, forbidding the operation of Equi-NP-deletion. But now note that this constraint, whatever it is, cannot be an output condition. Output conditions apply to surface structure, to the output of the transformational rules. But one cannot account for the lack of ambiguity in (225) by surface structure information alone. The fact that (225) is unambiguous is a fact

about the correlation of deep structure and surface structure; it is not a fact about surface structure alone. The surface structure of (225) is acceptable if its deep structure is (227), but not (226). Hence, the lack of ambiguity in (225) cannot be accounted for by an output condition. And if the same constraint holds in (219), (216), and (197), then none of those cases can be described by output conditions without the loss of a generalization.

So far it has been shown that

> (a) Ross' examples do not show that pronominaliza-
> tion is a cyclic rule

and (b) Ross' examples cannot be handled by an
> output condition.

Since (218) and (219) would presumably have the same deep structure, as would (196) and (197), it is clear that

> (c) Ross' examples cannot be handled by a con-
> straint on deep structure.

Let us now consider the possibility that these examples could be handled by some constraints on the rule of pronominalization, provided that there is such a rule. We showed above that pronominalization could not be a cyclic rule, but rather would have to apply last-cyclically.

> (i) Pronominalization is a last-cyclic rule.

As is shown in the Appendix,

> (ii) Equi-NP-deletion is a cyclic rule.

Hence,   (iii) Pronominalization must follow all occurr-

ences of Equi-NP-deletion. Now consider (225).

We must allow the deep structure of (227) to be realized as

(225), but we must stop the deep structure of (226) from

being realized as (225). The only difference between (226)

and (227) is in the subject of discover. Equi-NP-deletion

will apply to (226), deleting the subject of discover and

effectively wiping out the distinction between (226) and

(227). Since Equi-NP-deletion precedes pronominalization,

the distinction between (226) and (227) is lost before we

reach the pronominalization rule. Hence, it seems impossible

that a constraint on the pronominalization rule could account

for the fact that (227) but not (226) can be realized as (225).

Thus, it seems reasonable that

(d) Ross' examples cannot be handled by a

constraint on the pronominalization rule.

From (a) -(d), I conclude that

(e) Ross' examples must be handled by some trans-

formational constraint not associated with

the rule of pronominalization.

I do not know how this constraint works; I only know some

examples of how it does not work.

1.2.2. Postal's Crossover Principle

1.2.2.1 Crossover and Antecedents

It has been known for some time that the passive and reflexive rules are mutually exclusive. Thus, sentences like

(228) *John was shaved by himself.

are ungrammatical. Postal recognized in 1964 (in lectures at M.I.T.) that this was not an isolated fact. He proposed that there was instead some general principle referring to cases where two or more coreferential NP's appear in the same sentence. Under certain conditions, Postal claimed, an NP cannot be moved by a transformation in such a way that it passes over another NP which has the same reference. The ungrammaticality of (228) would follow as a special case of the general principle.

Since then, Postal has discussed the Crossover Principle in great detail (see Postal, forthcoming), and has convincingly demonstrated that some principle of this sort must exist. Like the mysterious constraint discussed in §1.2.1, Postal's Crossover Principle is in effect a transformational constraint on pronominalization, and it provides independent evidence that such constraints must exist. Since a thorough discussion of the subject already exists there is no need for me to review Postal's results here. However, I would like to entertain the possibility that Postal's treatment may be

incorrect in one detail. Postal claims that the crossover
phenomena involve the notion 'coreferentiality'. I would like
to suggest that instead the notion 'antecedent' is what is
involved in these cases, and that 'antecedent' and 'core-
ferentiality' are two independent notions. I will attempt to
show:

(I) (a) There are coreferential NP's such that neither
is the antecedent of the other.

(b) There are pronoun-antecedent pairs which do
not involve coreferentiality.

(II) (a) In cases like (Ia), the crossover principle
does not apply.

(b) In cases like Ib), the crossover principle
does apply.

(III) The crossover principle applies to pronoun-
antecedent pairs, rather than to pairs of
coreferential NPs.

1.2.2.1.1 Basic Crossover Cases

Let us begin by considering some typical examples of
the crossover principle. Compare (229) and (230).

(229) The man who thought that Joan would marry him
was rich.

(230) *The man who he thought that Joan would marry
was rich.

In these sentences, who is assumed to be the antecedent of he
and him, as the arrows indicate. Since the antecedent of a
definite pronoun is always coreferential with it, we also
assume that who is coreferential with he and him. (229) and
(230) would be derived from souçes like (231) and (232).

(231) The man [$_S$ Wh-det man thought that Joan would
       him$_S$] was rich.

(232) The man [$_S$ he thought that John would marry
       Wh-det man] was rich.

In (232), Wh-det man is to the right of he. Through the opera-
tion of relative clause formation, Wh-det man moves to the
front of the relative clause, crossing over he in the process,
and then changes to the relative pronoun. The result is (230),
where who is to the left of he. Since Postal's crossover
principle forbids an NP from crossing over a coreferential NP,
(230) is ungrammatical. (229), however, is fully grammatical
since the crossover principle does not apply. In (231), the
source of (229), Wh-det man is to the left of him. In the
process of relative clause formation, it does not cross over
him, and hence there is no crossover violation.

It ought to be noted that the ungrammaticality of (230)
is accounted for by both Postal's version of the crossover prin-
ciple and by the version that I am proposing, since both the
notions "coreferentiality"and "antecedent" are involved in (229)
and (230).

One might, however, object to such an account of the ungrammaticality of (230) on the following grounds. The relative clause, as it is given in (232) would be ungrammatical if it occurred by itself.

(233) *He thought that Joan would marry the man.

The ungrammaticality of (230) would then follow from the ungrammaticality of (233). What's wrong with this argument is that the ungrammaticality of (233) should be accounted for by an output condition. But the output condition that would rule out (233) would not rule out (230). Hence such an objection would not be valid. Moreover, there are examples of crossover violations where such objections cannot be raised, although these examples, unlike the one above, are subject to dialectal variation. Consider (234).

(234) *The camera which the girl who wanted it
      desperately thought that she would never get
      was given to her.

(234) would come from the source:

(235) The camera [$_S$ the girl who wanted it desperately
      thought that she would never get WH-det camera$_S$]
      was given her.

Here, the relative clause taken as a sentence in isolation would be perfectly grammatical.

(236)　The girl who wanted it desperately thought

　　　　that she would never get the camera.

Hence the above objection would not arise.　(234) would be ruled out for the same reason as (230), since Wh-det camera starts out to the right of it and then moves over it in the process of relative clause formation.

　　　　It should be noted that some speakers do find (234) grammatical, although they find (230) ungrammatical.　For these speakers, the crossover principle applies only when the NP which is being crossed over commands the NP which is being moved (just before the movement rule applies).　Since he in (232) commands Wh-det man, (232) will be ungrammatical for these speakers.　But since it in (235) does not command Wh-det camera, these speakers will find (235) acceptable. Such speakers should find the following sentences acceptable for the same reason, are unacceptable in my speech.

(237)　*The senator who girls who have dated him

　　　　hate is exceedingly rich.

(238)　*Any man who the claim that Sheila hated him

　　　　would bother has no sense of dignity at all.

These sentences seem to show that some version of the crossover principle is necessary, although the conditions under which it applies are subject to dialectal variation.

　　　　Another example of the crossover principle which

Postal cites involves the rule of about-movement.

(239) I talked to Sue about Mary.

(240) I talked about Mary to Sue.

This rule will invert the about-phrase and the to phrase in
(239) to yield (240). Since one NP is moving over another in
this rule, the crossover principle applies.

(241) I talked to John about himself

(242) *I talked about John to himself.

As in the above cases, the ungrammaticality of (242) can be
accounted for both by Postal's version of the crossover princi-
ple and by mine, since both of the notions "coreferentiality"
and "antecedent" are involved here.

1.2.2.1.2 The necessity of 'antecedent'

Postal has, however, pointed out an anomaly in his
version of the crossover principle. Consider (243).

(243) John talked to himself about himself.

Here there are three coreferential NPs. Postal's version of
the crossover principle would predict that the application of
about -movement to (243) would produce an ungrammatical sen-
tence, as in the case of (242). However, the sentence produced
turns out to be grammatical.

(244) John talked about himself to himself.

But let us now return to (243) and consider what the pronoun-
antecedent pairs would be in that sentence. By the definition
of "antecedent" in §1.1, the pronoun-antecedent pairs of (243)
would be as shown in (245).

(245) John talked to himself about himself.

John is the antecedent of both reflexive pronouns, but neither
reflexive pronoun is the antecedent of the other. Thus the
version of the crossover principle that I am proposing would
permit about-movement to apply to (245), since the two NPs
that are crossing over one another are not in a pronoun-ante-
cedent relationship. Thus we have the situation described in
(Ia) above.

(Ia) There are coreferential NP's such that neither
is the antecedent of the other.

And we see that (IIa) holds.

(IIa) In cases like (Ia) the crossover principle does
not apply.

If the crossover principle applies to pronoun-antecedent
pairs regardless of coreferentiality, then we would expect it to
apply in a case where the NPs involved are not coreferential,
but are in a pronoun-antecedent relationship. For example,

consider pronominalization with one.

(246)   The senator from Kansas met one from Missouri.

Here the pronoun one has senator for its antecedent, although
there is no coreferentiality involved. If we embed (245) as
a relative clause,

(247)   The senator from Kansas [$_S$Wh-det senator from
Kansas met one from Missouri$_S$] told Tom a
funny story.

we get (248) through the application of relative clause for-
mation.

(248)   The senator from Kansas who had met one from
Missouri told Tom a funny story.

(248) is grammatical since there is no crossover involved.
Now compare (248) with (249).

(249) *The senator from Kansas who one from Missouri
had met told Tom a funny story.

Since (249) would be derived from (250), the crossover principle
applies.

(250)   The senator from Kansas [$_S$ one from Missouri
had met Wh-det senator from Kansas$_S$] told Tom a
funny story.

In the process of relative clause formation, <u>Wh-det senator</u> crosses over <u>one</u>.

As in the case of (230), one might raise the objection that the relative clause sentence taken in isolation is ungrammatical.

> (251) *One from Missouri had met the senator from
>
> Kansas.

As in the above case, this objection is irrelevant since (251) should be ruled out by an output condition which would not rule out (249). And as in the above case, we can construct an example to get around this objection. Consider the sentences:

> (252)   The rich professor thinks that Sue will marry
>
> someone who knows a poor one.
> (253)   Someone who knows a poor one think that Sue
>
> will marry the rich professor.

Both are fully grammatical. Let us embed them as relative clauses.

> (254)   The rich professor [S Wh-det rich professor
>
> thinks that Sue will marry someone who knows a
>
> poor one S] is upset.

*

If we apply relative clause formation to (254) and (255),

*

(255) The rich professor [_S someone who knows a poor one thinks that Sue will marry Wh-det rich professor_S] is upset.

<u>professor</u> will cross over <u>one</u> in (255), but not in (254).
This accounts for the grammaticality of (256) and the un-
grammaticality of (257).

> (256) The rich professor who thinks that Sue will
>
> marry someone who knows a poor one is upset.
>
> (257) *The rich professor who someone who knows a
>
> poor one thinks that Sue will marry is upset.

It should be noted that some speakers find sentences
like (257) and (249) grammatical, though somewhat less accept-
able than (256) and (248). For these speakers, the application
of the crossover principle in the case of the nonreferential
pronoun, <u>one</u>, reduces acceptability much less than in the case
of referential pronouns like <u>he</u>. Note that the crossover
principle is still necessary to account for the reduced accept-
ability of just these cases. In my speech, I find (257) and
(249) ungrammatical, but not quite as bad as (230), (234), or
(242). In general, crossover is worse with referential pronouns.
These cases show that:

> (Ib) There are pronoun-antecedent pairs that do not
>
> involve coreferentiality.
>
> and(IIb) In cases like (Ib), the crossover principle
>
> does apply.

Taken together, (IIa) and (IIb) show that:

(III)   The crossover principle applies to pronoun ante-
        cedent pairs, rather than to pairs of core-
        ferential NPs.

1.2.2.2   Crossover and Equational Sentences

1.2.2.2.1   Indeterminate cases

Consider the following:

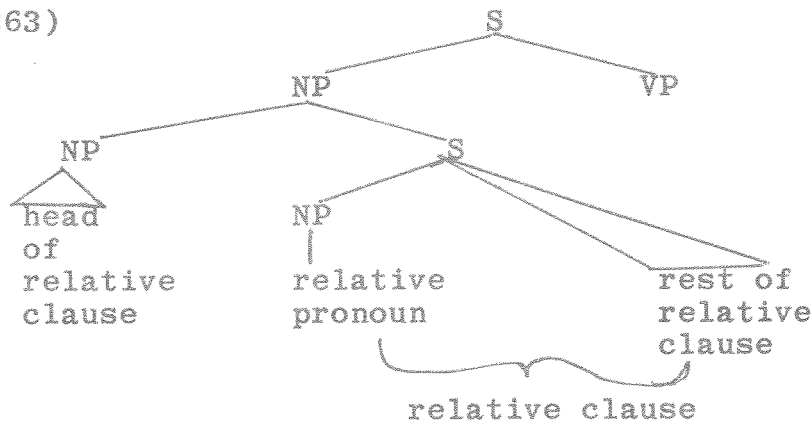(258)   The man who thought that Sue liked him was tall.

(259)   The man who thought that Sue liked Sam was tall.

(260) *The man who thought that Sue liked Sam was tall.

(261) *The man who thought that Sue liked the emperor
        was tall.

(262) *The man who thought that Sue liked the bastard
        was tall.

(263)

(258) - (262) all have the form of (263). In the relative clauses
of these sentences, as in all relative clauses, the relative pro-
noun both precedes and commands all of the other elements of the
relative clause. In particular, who precedes and commands him

in (258) and who precedes and commands Sam in (260). In (258), who is the antecedent of him. There is nothing strange about this; in general, a pronoun may be preceded and commanded by its antecedent. The strange cases are those like (230) and (234), where crossover applies and this is impossible. Now compare (258) and (260). Where there is a pronoun (him) in (258), there is a proper noun (Sam) in (260). But whereas who and him are in an antecedent-pronoun relationship in (258), there can be no such relationship between who and Sam in (260). Who cannot be the antecedent of Sam nor can Sam be the antecedent of who. This is true not only of Sam in (260), but also of the emperor in (261) and the bastard in (262). That is, it is true not just of proper nouns, but of all full NPs (nonpronouns). These facts follow from two independently motivated output conditions, which I state informally here.

(264) An anaphoric NP may not both precede and command its antecedent (except in the adverb preposing and topic cases cited in §1.1).

(265) A full NP (nonpronoun) cannot both be preceded by and commanded by its antecedent. (This is the same as (166).)

(264) will rule out cases like:

(266) *He thinks that Sam is sick.

(267) *The bastard thinks that Sam is sick.

(268) *The emperor thinks that Sam is sick.

(265) will rule out cases like:

(269) *Sam thinks that the emperor is sick.

(270) *Sam thinks that the bastard is sick.

Now consider (260) again. (264) rules out the possibility that
Sam might be the antecedent of who, since who both precedes and
commands Sam . (265) rules out the possibility that who might
be the antecedent of Sam, since Sam is a full NP and would then
be both preceded by and commanded by its antecedent. The same
is true of the emperor and the bastard in (261) and (262).

Because it is possible for a relative pronoun to serve
as the antecedent of a pronoun inside its relative clause
(as in (258), it was possible for us to find pairs of sentences
like (229) and (230) which provided empirical evidence in favor
of the crossover principle. In such cases, crossover made the
antecedent relationship impossible; while where there was no
crossover, it remained possible. But in cases like (260)-(262),
where there is a full NP rather than a pronoun inside the
relative clause, it is impossible to confirm (or to disconfirm)
the crossover principle, since the antecedent relationship is
impossible in all such cases. For example, consider (271).

(271) *The senator who girls who have dated the bastard
        hate is exceedingly rich.

(271) is ruled out both by output condition (265) and by the

crossover principle. But since (265), which is independently
motivated, will rule out (271), it is not obvious that the
crossover principle contributes to the ungrammaticality of the
sentence. Compare (271) with (237).

> (237) *The senator who girls who have dated him
>   hate is exceedingly rich.

(237) is ruled out only by the crossover principle and so does
provide evidence for that principle. Hence we see that because
of the interaction between output conditions and the crossover
principle, it cannot be determined whether or not the crossover
principle applies in certain classes of sentences.

1.2.2.2.2. The presupposition versus the assertion of core-
            ferentiality
1.2.2.2.2.1 The relationship between 'coreferentiality' and
            'antecedent'

We have seen cases where two NPs may be coreferential,
but not take part in an antecedent relationship, and where two
NPs may take part in an antecedent relationship but not be
coreferential. However, the notions of 'coreferentiality' and
'antecedent', though independent, are not unrelated. The relation-
ship between them is given by the following principle.

> (272) Given two NPs, NP_a and NP_b:

If NP_a is the antecedent of NP_b and if NP_b is definite.
then NP_a and NP_b are presupposed to be coreferential.

Note that this is not an if-and-only-if statement; (245) would
be a counter example to such a statement.

(245)   John talked to himself about himself.

In (245), the two occurrences of himself are presupposed to be
coreferential, but neither is the antecedent of the other.
Similar counterexamples are given in §1.1.5.2 (e.g., (153)).

(272) accounts for cases like the following.

(273)   John thinks that he is sick.

(274)   Johnson entered the room and the president spat
        towards the spitoon.

(275)   A thief broke into my house and the bastard
        stole my wok.

And (272) rules out coreferentiality in cases like:

(276)   A model from Boston met one from New York.

In (276), NP_b is not definite.

(272) will not apply in cases like the following where
NP_a is not the antecedent of NP_b.

(277)   The emperor entered the room and Napoleon spat
        $\quad\quad NP_a \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad NP_b$
        on the floor.

(278) Napoleon hates the emperor.
       $\underline{\text{NP}}_a$ $\underline{\text{NP}}_b$

(279) A thief broke into my house and a thief stole
       $\underline{\text{NP}}_a$ $\underline{\text{NP}}_b$

       my wok.

In (277) the possibility that NP_a is the antecedent of NP_b
is ruled out by output condition (165). In (278), the possi-
bility that NP_a might be the antecedent of NP_b is ruled out
by output condition (166). The possibility of an antecedent
relationship in (279) is ruled out by a condition on the
definition of 'antecedent' that we have not stated yet;
namely, a full indefinite NP (nonpronoun) may not be anaphoric.

1.2.2.2.2.2 Equational sentences

    Compare (280) and (281).

(280) A thief broke into my house and he stole
       my wok.

(281) The thief who broke into my house was Max.

The principle of (272) applies in (280). A thief is the
antecedent of he, and he is presupposed to be coreferential
with a thief. In (281), on the other hand, there is no pre-
supposition of coreferentiality; instead, the sentence is an
assertion of coreferentiality. We will call such a sentence
an 'equational sentence'. The basic fact about equational
sentences is that they assert, but do not presuppose,

coreferentiality between the subject and the predicate nominal. It is important to note that the fact that there is no presupposition of coreferentiality in (281) is consistent with the fact that the subject and the predicate nominal are not in an antecedent relationship. Thus, the thief who broke into my house cannot be the antecedent of Max, because of the antecedent hierarchy (cf. §1.1.5.2). And Max cannot be the antecedent of the thief who broke into my house because of an output condition which we have not stated yet, but which is independently needed to block cases like:

(282) *The bastard hit Max.

(283) *The thief who broke into my house hit Max.

The difference between (280) and (281) may be summarized briefly as follows. Nonequational sentences like (280) may involve a presupposition of coreferentiality and, with it, the occurrence of an antecedent relationship between the two coreferential NPs. Equational sentences like (281) involve an assertion of coreferentiality, where the two coreferential Nps are not in an antecedent relationship.

The difference between equational and nonequational sentences is important because of cases like the following, which have been occasionally brought up as apparent counter-examples to Postal's version of the crossover principle.

(284) The man <u>who</u> <u>Sam</u> thought Sue would marry was
Sam himself.

Compare (284) with (285).

(285) *The man <u>who</u> <u>he</u> thought Sue would marry was tall.

In (284) <u>who</u> and <u>Sam</u> are not in an antecedent relationship,
since (i) <u>Sam</u> cannot be the antecedent of <u>who</u> since a pronoun
cannot both precede and command its antecedent and (ii) <u>who</u>
cannot be the antecedent of <u>Sam</u> because of the antecedent
hierarchy. Yet <u>who</u> and <u>Sam</u> are coreferential for the following
reasons. <u>Who</u> and <u>man</u> are presupposed to be coreferential, are
is usual with relative clauses. The two occurrences of <u>Sam</u>
are presupposed to be coreferential as is usual in the
emphatic reflexive construction. The emphatic reflexive,
himself in (284), is possible only with a repeated NP, as
the ungrammaticality of (286) shows.

(286) *The man who Eddie thought Sue would marry was
Sam himself.

When <u>Eddie</u> replaces the leftmost <u>Sam</u> in (284) the sentence
becomes ungrammatical. Thus we have the following situation.

PRESUPPOSITION (relative clause): man = who

PRESUPPOSITION (emphatic reflexive): Sam = Sam (himself)

But now the main assertion of (284) is that <u>man</u> is coreferential

with <u>Sam himself</u>.

ASSERTION: man = Sam (himself)

Hence,

Sam   = Sam (himself) = man = who
   (on left)

The leftmost <u>Sam</u> in (284) is coreferential with <u>who</u>. Thus,
if crossover were defined in terms of coreferentiality, one
would expect (284) to be ungrammatical, since <u>who</u> crosses
over <u>Sam</u> just as <u>who</u> crosses over <u>he</u> in the derivation of
(285). Thus, we have further evidence that the crossover
principle cannot just be based on simple coreferentiality.
What distinguises (284) from the other cases we have con-
sidered is that it contains an assertion of coreferentiality,
rather than a presupposition of coreferentiality that is
involved in the notion 'antecedent'. Thus it is no surprise
that the crossove principle should not apply in cases of
asserted coreferentiality.

One might consider a revised version of Postal's cross-
over principle, which would involve presupposed coreferential-
ity, rather than just any sort of corefereniality. This would
permit (284), while blocking (285), since in these cases it
would be equivalent to a version of the crossover principle
based on the notion 'antecedent'. Of course, such a revised
version would still fail for cases like (244) and (249),

which require the notion 'antecedent'.

It should be noted that there is some difficulty with
the notion of 'presupposed coreferentiality'. This notion,
as it might be used in a revision of Postal's crossover
principle or as it appears in (272), is set up to account
for cases of coreferentiality where there is no equational
sentence in surface structure. The difficulty arises because
there are cases of surface structure equational sentences
which are presupposed to be true. Although such sentences,
would, strictly speaking, involve the notion 'presupposed
coreferentiality', the antecedent relationship does not
obtain and there is no coreferentiality. For example,

> (287) Sheila regretted that the man who Sam thought
> Sue would marry was Sam himself.

In (287) we have (284) embedded as the object of the verb
regret. Since the object of the verb regret is always pre-
supposed to be true, we have the case of a presupposed
equational sentence. Here it is presupposed, not asserted,
that man and Sam himself are coreferential. Since (287),
like (284), is fully grammatical, the crossover principle is
not at work in this sentence. Thus, the crossover principle
(and the notion 'antecedent' in these cases) must involve
more than simply presupposed coreferentiality. The appropriate
notion seems to be something like: 'presupposed

coreferentiality which is not given by a surface structure
equational predicate.' Horrible as this may seem, my guess
is that it will be essentially correct when made precise in
the appropriate fashion. I will leave the issue at this
point and return in Chapter 4 to discuss the general problem
in detail.

1.2.2.3 The elimination of coreferentiality

In §1.1.5, it was assumed that the notion 'coreferential-
ity' had to be mentioned in the statements of output conditions.
For example, in (116), condition (a) reads "2 has the same
reference as 4" and in (164) terms 2 and 4 are represented
as "NP_i" to indicate that they have the same referential
index, i. Recall that principle (272) related the notions
'coreferentiality', 'antecedent', and 'definiteness', by an
if-then relationship.

(272) Given two NPs, NP_a and NP_b:
       If NP_a is the antecedent of NP_b and if NP_b
       is definite, then NP_a and NP_b are presupposed
       to be coreferential.

Given (272) it is possible for us to eliminate the notion
'coreferentiality' altogether from output conditions, in favor
of the notions 'antecedent' and 'definiteness'. For example,
in (116) we could replace condition (a) by condition (a'):

(116) (a') 2 is the antecedent of 4 and 4 is definite.

By principle (272), this will entail that 2 and 4 are co-referential. It should be noted that in (164), (165), and (166) the notion 'antecedent' is needed anyway. One can eliminate coreferentiality from these conditions simply by indicating that the anaphoric NP must be definite.

It is important to note that although 'coreferentiality' can be eliminated in favor of 'antecedent', the converse is not true. The notion 'antecedent' is needed in syntax whether or not the notion 'coreferentiality' is used. This can be seen in output conditions (164)-(166) and in the case of the crossover principle. This raises the question as to whether the notion 'coreferentiality' can be totally eliminated from syntax in favor of 'antecedent' and 'definiteness'

We will see in Chapter 2 that (272) as presently form-ulated will not quite work in one case. But, as we will see in Chapter 4, (272) can be reformulated to avoid that pitfall. It is my opinion that some version of (272) can be formulated so that 'coreferentiality' can be eliminated at least from output conditions and perhaps from all syntactic rules. As it turns out (cf. Chapter 4), this must be done in the case of output conditions.

Footnotes to Chapter 1

1
  In these examples, the underlined noun phrases are assumed to
refer to the same individual. (4) is ungrammatical if he is
understood as referring to John. It is, of course, grammatical
if he is understood as referring to some other person not
mentioned in the sentence. Thus, we are not discussing whether
the sentence, taken in isolation, is grammatical or not.
Instead, we are discussing whether the sentence with the inter-
pretation imposed upon it by the underlining is grammatical.

2
  Some speakers will differ with my judgments as to the accept-
ability of these sentences and of many others that will be dis-
cussed below. This should not be surprising, since the con-
straints we are discussing are subject to dialectal and idio-
lectal variation. This variation will be discussed, though
not in much detail, in section 1.1.6.

3
  I find this sentence of marginal acceptability. Of the
people I have questioned, some agree with my judgment, some
find it fully acceptable, and some find it unacceptable. The
notations '?' and '?*' will be used below to indicate such mar-
ginal sentences.

4
See Ross, 1967 b, Chapter 3.

5
See Perlmutter, 1968.

6
Essentially the same observation was made independently by
Akmajian and Jackendoff (1968).

7
This hierarchy makes a claim with respect to possible dialect
differences in the acceptability of these sentences. There are
some people for whom (137), the 'worst'case, is ungrammatical.
That is, some people will consider as ungrammatical sentences
which I consider as grammatical but perhaps somewhat awkward,
like (137). But I know of no cases where someone will reject
(139) as unacceptable, while accepting (137). People will
never reject what I call the 'middle' cases while accepting the
'worst' cases. To this extent the hierarchy limits the range
of possible dialectal and idiolectal variation in these cases.

8
One might think that epithets can only be used anaphorically
and can never appear as antecedents. However, as Robin Lakoff
has pointed out, this is not so.

> (a) Some bastard broke into my house and he
>
>   drank up all my beer.

As R. Lakoff notes, these cases are especially interesting
since in a sentence like

(b)   Some bastard drank up all my beer.

the reason that I am calling that person a bastard is contained

in the sentence, namely, because he drank up all my beer.   This

is not the case with definite epithets, as in (149).   One might

then conclude that only indefinite epithets can appear as ante-

cedents and that definite epithets must be anaphoric.   But,

as (c) shows, this is false.

(c)   The cops caught <u>the bastard who drank up</u>

<u>all my beer</u> and they locked <u>him</u> up.

9
  In (164), (165), and (166) the notation 'NP$_i$' in the structural

description is used to indicate that the two NP's are to be

understood as having the same reference.   No great significance

should be attached to this choice of notation.

10
  Since I have not done an extensive serious study of these vari-

ations, the facts I present in this section can only be considered

anecdotal.   I think it is important that this subject matter

be studied seriously and I consider this section only as indica-

ting a direction that such studies might take.

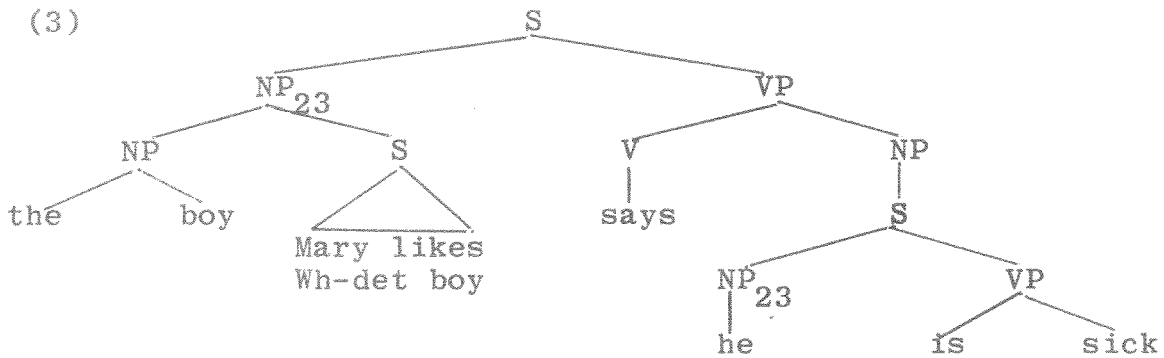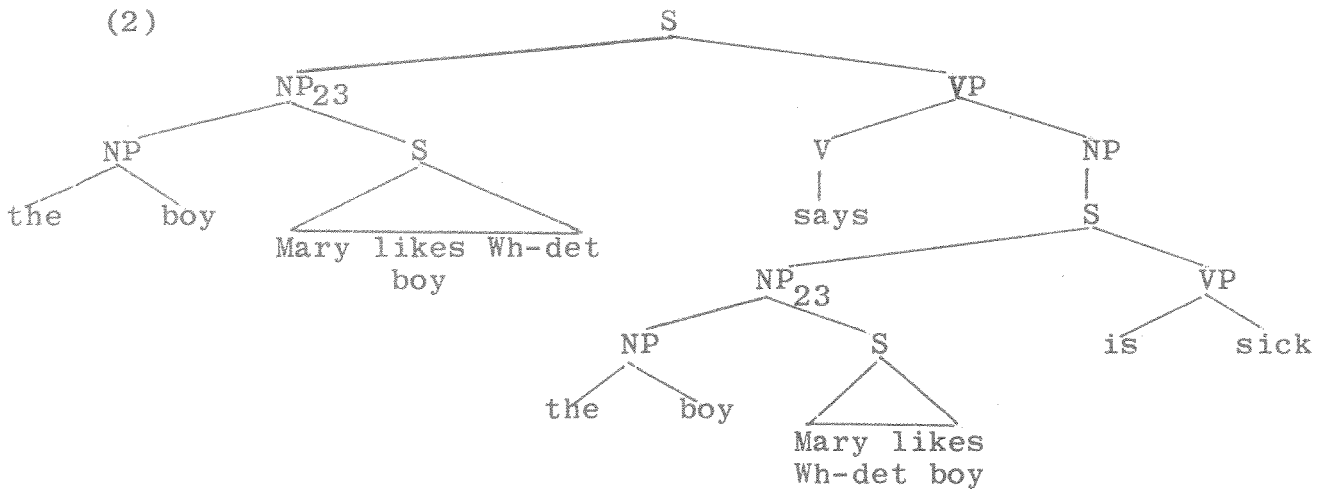## Chapter 2   Types of Linguistic Identity

2.0   Introduction

In this chapter we will be concerned with several related questions concerning pronominalization and deletion operations in general. In the preceding chapter we assumed that pronouns were derived by transformation from the full noun phrases to which they referred. This was assumed to be the case in most early work on transformational grammar. Langacker and Ross also made the assumption that there existed a rule of pronominalization, and discussed the question of where that rule might be ordered and whether it had to be ordered cyclically. In chapter 1 we saw that all of the proposed arguments for the ordering of a pronominalization rule with respect to other transformational rules were faulty, and that there was no known evidence at all for the ordering of such a rule. Moreover, we saw that the constraints that were assumed to be part of the pronominalization rule could not be stated as part of any such rule. Either they had to be stated in output conditions or they had to involve other transformational rules. In short, we found that there was no syntactic evidence whatever that pointed to the existence of a rule of pronominalization. This might lead one to question the existence of such a rule, especially since there are alternative ways of handling pronominalization and since there is no a priori reason to choose
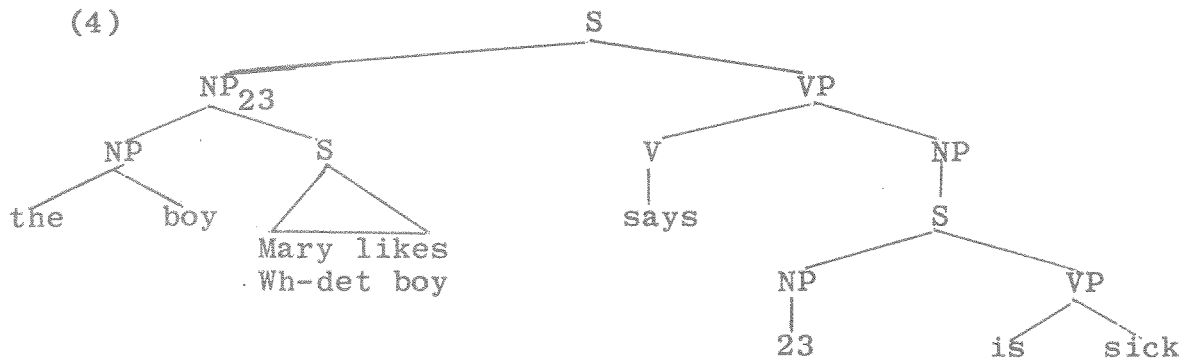
one over the other.

Let us consider three possible ways of handling pro-
nominalization.

(1) The boy who Mary likes says that he is sick.

Assuming that deep structure determines semantic representa-
tion, we might choose any one of the following three methods
of representing the deep structure of (1).

(2)

```
                               S
              NP₂₃                             VP
      NP             S                  V              NP
  the     boy                         says            S
              Mary likes Wh-det
                      boy                    NP₂₃              VP
                                        NP         S       is      sick
                                    the    boy
                                              Mary likes
                                              Wh-det boy
```


(3)

```
                              S
             NP₂₃                            VP
     NP             S                 V             NP
  the    boy                        says           S
             Mary likes
             Wh-det boy                     NP₂₃          VP
                                             he        is     sick
```

(4)

```
                                    S
              NP₂₃                              VP
        NP          S                    V              NP
     the   boy    ╱ ╲                   says             S
               Mary likes                          NP        VP
              ·Wh-det boy                           23      is  sick
```

In (2), we assume that the pronoun _ne_ of (1) is derived from the full NP to which it refers. In order to indicate in deep structure that the two occurrences of the boy who Mary likes refer to the same individual we will adopt Chomsky's suggestion of tagging the two NPs with the same referential indices, in this case, an arbitrarily chosen integer, say 23. Two NPs with the same index would be assumed to be coreferential, and two NPs with different indices would be assumed to be nonco-referential. Under this assumption, the only deep structure difference between (1) and (5) would reside in the referential indices.

    (5)   The boy who Mary likes says that the boy who Mary likes is sick.

In the deep structure of (5), the second occurrence of the boy who Mary likes would have a different index than the first occurrence. Together with these assumptions about deep structure, we need to assume that there is some rule of pro-nominalization that converts a repeated NP into the appropriate

pronoun, leaving behind features indicating the gender, number, and person of the original NP.

We could just as well make the assumption that (3) is the deep structure of (1). Since he in (3) has the same referential index as the boy who Mary likes, the two NPs would be assumed to be coreferential and, as a result, (3) would have the same semantic reading as (2). The fact that pronouns have to agree with their antecedents in gender, number, and person could be stated in at least two ways, either as an output condition or a deep structure constraint: if any pronoun-antecedent pairs do not agree in these properties, the sentence would be blocked.

(4) is similar to (3), and differs from it only in that the gender, number, and person of the pronoun is not indicated in deep structure. Stripped of these properties, all that is left of the NP is the index. The gender, number, and person would be supplied by an agreement transformation, making the pronoun agree in these properties with its antecedent.

In the discussion that follows, the difference between (4) and (3) will not matter. We will group the two together as representing the no-full-NP hypothesis. (2) will examplify the full-NP-hypothesis. There are a number of possible other variations on these hypotheses, but they are irrelevant to the discussion that follows. Similarly, we have been inexplicit with regard to many details of (2), (3), and (4). A full

treatment would account for details such as those discussed
in Postal (1966). I ignore them here since they are irrelevant
to the issues to be discussed.

In this chapter we will consider some evidence that
supports the full-NP hypothesis and some that supports the
no-full-NP hypothesis. The full-NP hypothesis, if true, would
require there to be a rule of pronominalization that in effect
would delete a noun phrase if it is identical to its antecedent.
As we shall see, the notion 'identical to' is not an obvious
one, Moreover, we shall see that there is no single notion of
'identical to' that is used in transformational rules; instead
there are a number of types of linguistic identity.

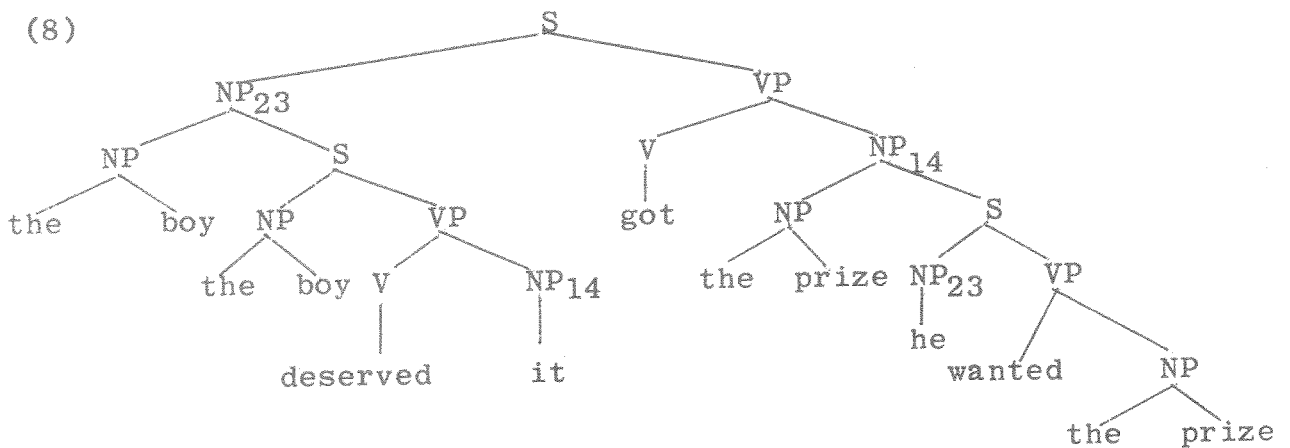2.1   The Bach-Peters Paradox

2.1.1 Definite Pronouns

Bach and Peters (see Bach, 1967) showed that the full-NP
hypothesis led to a paradox in the case of definite pronouns.
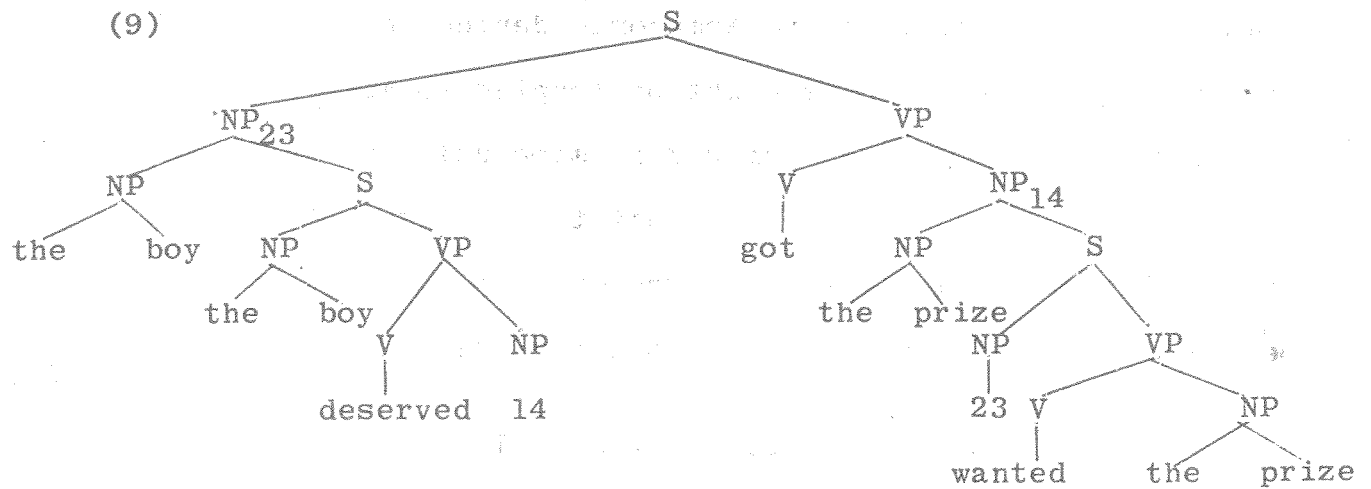Consider (6).

(6)   The boy who deserved (it) got the prize (he) wanted.

If the pronouns in (6) are derived transformationally from the
full NPs to which they refer, then (6) cannot have a finite deep
structure. Thus, if one tries to construct a deep structure for
(6) by replacing the pronouns with the full NPs, one would get
(7).

(7)   The boy who deserved the prize (he) wanted got the

prize that the boy who deserved (it) wanted.

Here the same encircled pronouns appear again. If we try
once more to substitute the appropriate NPs for the pronouns,
we get an even bigger sentence where the same two pronouns
show up again. And so on, ad infinitum. The conclusion is
that these pronouns cannot be derived by transformation from
the NPs to which they refer. If meaning is to be determined
at the level of deep structure, then there must be some way
of indicating which pronouns refer to which NPs, say by the
use of reference indices. Thus, the deep structure of (6)
might be represented as in (8) or (9), which resemble (3) and
(4).

(8)

(9)

```
                                    S
                        /                      \
                     NP_23                      VP
                   /       \                  /      \
                 NP         S               V        NP_14
               /   \      /    \           got      /      \
            the    boy  NP      VP                 NP        S
                      /   \    /   \             /    \    /    \
                   the   boy V      NP        the  prize NP     VP
                           deserved 14                   23  V      NP
                                                            wanted the  prize
```

The Bach-Peters example shows that for definite pronouns, which are the most fundamental of anaphoric devices, the full-NP hypothesis leads to a paradox, which seems to be avoidable under the no-full-NP hypothesis. Since the no-full-NP hypothesis does not require a pronominalization rule which deletes one NP under identity with another, then it would seem that there is no one rule where constraints on pronominalization could be stated. Thus the no-full-NP hypothesis gives further support to the claim in Chapter 1 that pronominalization constraints must be handled either by output conditions or transformational constraints such as the crossover principle which are not associated with any rule of pronominalization.

2.1.2 Propredicates

One might be tempted to conclude that since one anaphoric device, definite pronouns, cannot be derived by a deletion

transformation, therefore no anaphoric devices can be derived in that way. That is, one might be tempted to assume that anaphoric devices must be derived in some uniform manner. However, it is not at all clear that this is true, since it can be shown that at least one type of anaphoric device must be transformationally derived. Consider the following.

(10) If Max buys a car, Mildred will

(11) If Max does, Mildred will buy a car.

(12) Mildred will buy a car, if Max does.

(13) *Mildred will, if Max buys a car.

In the above sentences, the absence of a VP following the auxiliaries will and does, acts as an anaphoric deivce, referring to the VP buy a car in the other clause. The missing VP acts just like an anaphoric pronoun. And in (13) we see that it obeys basically the same constraint as anaphoric pronouns: The anaphoric expression cannot appear in a main clause when its antecedent appears in a following subordinate clause. This is essentially the same constraint as: Pro-nominalization cannot go backwards into main clauses. Compare (3) - (6) in §1. Clearly these are related phenomena, and (13) should be blocked by the same constraint that blocks (4) in §1. Thus, it would seem that this constraint should be stated by an output condition which accounts for the operation of anaphoric devices in general.

It does not seem very surprising that different types of anaphoric devices are subject to the same surface constraints. This fact, however, becomes more interesting when one realizes that definite pronouns and omitted VPs have deep structure sources of an entirely different nature. The Bach-Peters case seems to show that definite pronouns cannot be derived from the full VPs to which they refer. However, the omitted VPs must be derived from the full VPs to which they refer. The omitted VP cannot just be represented by a blank or a reference index in deep structure. Though definite pronouns cannot be derived by a transformational rule, the missing VPs must be.

The reason for this is fairly obvious. Missing VPs can refer to VPs that are derived by transformation and are not present in deep structure. For example, consider the following:

(14) If John is shot by Max, Harry will be.

(15) If John is expected by Sam to be shot by Max, Harry will be.

(16) If Shakespeare translates easily into Japanese, Marlowe will.

(17) If John is likely to leave, Bill will be.

All of the underlined VPs in the above examples are transformationally derived; they do not occur as such in deep structure.

Since they are not even constituents in deep structure, there is no way to refer to them on that level of analysis. Thus, there is no way of indicating in deep structure what the missing VP will refer to. So a solution for missing VPs parallel to the no-full-NP solution for definite pronouns (see (8) and (9)) is not possible.

It is interesting to note, in this respect, that no sentences like the Bach-Peters case (6) are possible with omitted VPs. That is, one cannot construct sentences of the form:

(18)
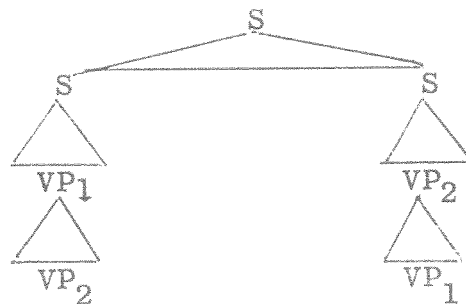
Where VP_2 is a missing VP referring to VP_2 and VP_1 is a missing VP referring to VP_1.

For example, in (19)

(19) *The boy who mentioned that Bill will saw the girl who announced that someone had.

The omitted VP after _will_ cannot be _announce that someone had_ while the omitted VP after _had_ cannot be _mention that Bill will_.

So far we have given arguments for the following:

(I)   Some anaphoric devices (definite pronouns)
      must be introduced in deep structure, while
      others (missing VPs) cannot be.

(II) Certain constraints apply to both of these
      anaphoric devices.

(II) suggests that there must be some general notion of
'anaphoric device' in the theory of grammar. (I) shows that
this notion cannot be defined exclusively on the level of
deep structure or exclusively by the notion 'pronominalization
transformation'. The theory of grammar at present has no way
of defining the notion 'anaphoric device'.