RULES OF ENGLISH NOUN COMPOUNDS:

IMPLICATIONS FOR A THEORY OF THE LEXICON

by

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(11)

abstract

This thesis evaluates two competing linguistic
theories by examing their claims about the grammar of noun
compounds. Noun compounds are used as support for an early
transformational theory (Lees, 1960). Recently some of
the nominalizations also described in this grammar have become
a focus for the competing claims of the lexicalist and
transformationalist theories. It is shown in this thesis
that by widening the range of nominals to include noun
compounds, the lexicalist position receives further support.
It is demonstrated that there is considerable counter-
evidence to both strong and weak forms of the transformational
position while a strong form of the lexicalist position
gives a systematic account of noun compounds.

To my parents.

"In the evolution of scientific thought, one fact has become increasingly clear: there is no mystery of the physical world which does not point to a mystery beyond itself. All highroads of the intellect, all byways of theory and conjecture lead ultimately to an abyss that human ingenuity can never span. For man is enchained by the very condition of his being, his finiteness and involvement in nature. The farther he extends his horizons, the more vividly he recognizes the fact that, as the physicist Niels Bohr puts it, "we are both spectators and actors in the great drama of existence." Man is thus his own greatest mystery. He does not understand the vast veiled universe into which he has been cast for the reason that he does not understand himself. He comprehends but little of his organic processes and even less of his unique capacity to perceive the world around him, to reason and to dream. Least of all does he understand his noblest and most mysterious faculty: the ability to transcend himself and perceive himself in the act of perception."

Barnett, (1957), p.117.

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CHAPTER I

Preliminary Remarks

.1 Framework

In this thesis I assume the framework of a transformational generative grammar of a type outlined in Chomsky (1965) and updated along lines found in Dougherty (1968), Jackendoff (1969), Emonds (1970) and Chomsky (1970); a theory generally termed "the extended standard theory". As this thesis deals chiefly with competing claims about the syntactic component of such a grammar I will hold as constant the standard assumptions about the phonological and semantic components of such a grammar except where I explicitly depart from them.

.2 The lexicalist hypothesis.

Chomsky's "standard theory",(Chomsky, 1965), enables two alternative answers to be given to a number of questions in syntax. The mechanism of lexical entries with syntactic features enables one type of statement of syntactic relationship to be made and at the same time syntactic relationships can also be accounted for using transformational mechanisms. Each of these two ways of accounting for syntactic relationships has different consequences. Chomsky demonstrates these differences by comparing two sets of syntactic relationships in his "Remarks on Nominalization",(Chomsky, 1970, pp.184-221.) This paper deals with three types of structures: simple sentences, gerundive nominals and derived nominals, as illustrated in the following examples of Chomsky's:

　　1) a) John is eager to please.

　　　　b) John has refused the offer.

c) John criticised the book.

2) a) John's being eager to please

   b) John's refusing the offer

   c) John's criticising the book

3) a) John's eagerness to please

   b) John's refusal of the offer

   c) John's criticism of the book

Chomsky notes that gerundive nominals, as exemplified by 2), and derived nominals, as exemplified by 3), differ in a number of significant ways.

> "Derived nominals... are very different (from gerundive nominals) in all these respects. Productivity is much more restricted, the semantic relations between the associated propositions and the derived nominal are quite varied and idiosyncratic, and the nominal has the internal structure of a noun phrase. ...
> They raise the question of whether the derived nominals are, in fact, transformationally related to the associated propositions."
> (ibid, p.188.)

For the reasons quoted above, derived nominals appear to Chomsky to exemplify a type of syntactic structure which is not adequately accounted for by considering them as related to simple propositions. Instead he shows that structures exemplified by 3) correspond to base structures, with the derived noun being related to its corresponding item in 1) by rules of the lexicon. Gerundive nominals of 2), on the other hand are shown to be best related to their corresponding propositions by transformations. These two alternatives are termed the lexicalist and transformationalist position.

In this thesis I will investigate whether noun compounds can be related to underlying propositions by transformations or whether they are best generated in the lexicon. In other words, this thesis evaluates the lexicalist and transformationalist positions as they relate to noun compounds. In adopting the framework presented in the previous section I make no commitment to either position with regard to noun compounds. It is an open question whether, given the extended standard theory, noun compounds are lexically or transformationally derived.

.3 Preliminary remarks about transformations.

In this thesis I assume that transformations are subject to the structure-preserving constraint as it is presented in Emonds, (1970). Emonds' hypothesis states that transformations which move constituents are of three types: Root transform-ations which permit the permutation of nodes immediately dominated by a root S, that is, an S which is either the highest S in the tree, an S immediately dominated by the highest S in the tree, or the S which dominates the reported S in direct discourse; Structure-preserving transformations which are transformations "such that i) the structural description specifies the location in trees of two nodes B_1 and B_2 bearing the same label X, and ii) the structural change moves B_2 and all material dominated by it into the position of B_1, deleting B_1." (ibid, p.28.) ; and Minor movement rules which "move a specified constituent B over

a single adjacent constituent C." (ibid, p.158.)
These constraints can be re-phrased to state that phrase
structure rules define the class of possible surface
structures except where permutation of constituents is
permitted by root transformations and minor movement rules.

Emonds also distinguishes among three node types as
follows, "those that are never pre-terminal and under which
a certain amount of recursion occurs, the phrase nodes;
the heads of phrase nodes, the lexical category nodes; and the
other nodes, the function category nodes." (ibid, pp.184-185.)
These types are exemplified as follows:

    phrase nodes: S, NP, VP, AP, PP.

    lexical nodes: N, A, V, Prep., Modal.

    function category nodes: DEG, DET, PRT, TENSE, CL, NEG,
COMP, RT, etc.

I adopt Emonds' proposals in order to place strong and
well motivated constraints on the power of transformations.[1]
If descriptive adequacy can be attained by a grammar of noun
compounds which retains these constraints without increasing
the power of other components unnecessarily, this grammar will
make a stronger, and thus a more interesting, claim than one which
requires the removal of any, or all, of these constraints.

It could be argued that it is not legitimate to assume
Emonds' proposals on the grounds that they constitute an
empirical hypothesis and that, by assuming them, they are no
longer a hypothesis but an axiom. There is some justice in

this argument in that, if it' is shown that noun compounds
cannot be generated by structure-preserving transformations,
two possible conclusions may be drawn: either noun compounds
are not transformationally derived or the structure-
preserving constraint is incorrect. Stated like this,there
is no way to choose between these two alternatives.
However this is only a partial statement of the two alternative
conclusions. A full statement would read; either noun
compounds are not transformationally derived and the
structure-preserving constraint is correct or the structure
preserving constraint is incorrect and noun compounds are
transformationally derived.

In this thesis what is in question is whether noun
compounds are transformationally derived. Therefore the
structure-preserving constraint can be assumed except
where there is compelling evidence to reject it. Emonds has
already presented a good deal of evidence in favour of its
adoption and this suggests (to reiterate) that if descriptive
adequacy can be attained by a grammar of noun compounds which
retains this constraint without increasing the power of other
components unnecessarily, this grammar will make a stronger and
thus a more interesting,claim.

I adopt precisely the same attitude to the question of
whether transformations are meaning-preserving. It is a well
motivated hypothesis that transformations are meaning-
preserving. However, in certain specified instances

this hypothesis has been shown to be false. (see Partee, 1971, for some examples.) This means that transformations belong to one of two classes, those which are meaning-preserving and those which are not. I therefore assume that, except for that given set which are not meaning-preserving, transformations _are_ meaning-preserving unless there is compelling evidence which suggests otherwise. The question of this thesis is whether noun compounds are transformationally derived. Any answer to this question would be weakened if the question, of whether the specific transformations which might account for noun compounds were meaning-preserving, were prematurely answered. But it seems in no way to prejudice the outcome of my investigation to assume, on the basis of previous work, that the transformations which might be held to generate noun compounds are meaning-preserving. Furthermore, there would need to be very good evidence from the grammar of noun compounds before the meaning-preserving hypothesis were abandoned for a grammar of noun compounds. Again a grammar which retains this hypothesis will be stronger, all other things being equal, than one which abandons it.

Thus both the assumptions that transformations are subject to the structure-preserving constraint and that transformations are meaning-preserving are to be taken in this thesis as working hypotheses. This seems to me to be a perfectly normal way to do science and not in any way to prejudice the outcome of the investigation.

.4 Preliminary remarks about semantics.

In this thesis I adopt a stance towards semantics which can best be defined in relation to two parameters which are given in the following quotations:

> "... semantic considerations provide empirical conditions of adequacy which must be met by syntactic rules,"
> (Chomsky, 1970, p.185.)

> "... it seems clear that explanatory adequacy for descriptive linguistics requires ... the development of an independent semantic theory (analogous, perhaps, to the general theory of grammar described above) that deals with questions of a kind that can scarcely be coherently formulated, in particular, with the question: what are the substantive and formal constraints on systems of concepts that are constructed by humans on the basis of presented data?"
> (Chomsky, 1964, p.936.)

I take it that the first quotation represents the situation to which linguistic theory aspires and the second, the situation as it exists. Furthermore I take it that there are two major problems which have not yet been tackled satisfactorily. The first concerns the type of questions which a scientific theory of semantics might put. The second deals with the empirical interpretation of theories in semantics. It seems to me far from clear what the empirical interpretation of theories of semantics would be. I also take it that:

> "without a systematic specification of the intended empirical interpretation of a theory, it is not possible in any sense to evaluate the theory as part of science."
> (Suppes, 1967, p.56.)

I therefore adopt a conservative attitude to questions of meaning, accepting the theory of semantics advanced

in Chomsky, (1965). Where semantic considerations appear to
be relevant to the grammar I present, they will always be
dealt with as clearly as possible, but in a pre-scientific mode,
and I will place as little reliance on them as seems possible,
always bearing in mind the two parameters given above.

.5 Towards a preliminary taxonomy of noun compounds.

In this section I shall look at some general characteristics
of noun compounds to provide some preliminary determination
of the bounds of this thesis.

.51 Attributive adjectives and adjectives in noun
compounds.

The contrasts between attributive adjectives and adjectives
which function as left hand element in noun compounds
illustrate some of the general properties of noun compounds.

.511 Stress.

Attributive adjectives and their noun heads generally
take different stress patterns from noun compounds consisting
of an adjective and a noun.[2]

<u>attributive adjective</u>

<u>unrestrictive</u>	<u>restrictive</u>
1) the $\overset{3}{\text{gr}}$een $\overset{1}{\text{ho}}$use	the $\overset{1}{\text{gr}}$een $\overset{2}{\text{house}}$
2) the o$\overset{3}{\text{d}}$d fe$\overset{1}{\text{ll}}$ow	the o$\overset{1}{\text{dd}}$ $\overset{2}{\text{fellow}}$
3) the $\overset{3}{\text{broad}}$ $\overset{1}{\text{jump}}$	the $\overset{1}{\text{broad}}$ $\overset{2}{\text{jump}}$

<u>adjective in a compound</u>

the gr$\overset{1}{\text{e}}$enh$\overset{3}{\text{o}}$use

the $\overset{1}{\text{o}}$ddf$\overset{3}{\text{e}}$llow

the $\overset{1}{\text{b}}$road$\overset{3}{\text{j}}$ump

.512 $\overline{\text{N}}$ deletion and $\overline{\text{N}}$ gapping

In Dougherty (1968) and Chomsky (1970) it is suggested that there is a node $\overline{\text{N}}$ which dominates all of the post-determiner structure of the NP.[3] Jackendoff (1971) proposes two transformations which refer to this node. The first rule, called $\overline{\text{N}}$ deletion, deletes $\overline{\text{N}}$:

4) I like Bill's yellow shirt but not Max's.

The second, called $\overline{\text{N}}$ gapping, gaps $\overline{\text{N}}$:

5) Bill's funny story about Sue and Max's about Kathy both amazed me.

Jackendoff notes that if all the $\overline{\text{N}}$ except an attributive adjective is deleted or gapped, the $\overline{\text{N}}$ is substituted for by <u>one</u>:

6) I like Bill's yellow shirt but not Max's blue one.

7) Bill's funny story about Sue and Max's silly one about Kathy both amazed me.

$\overline{\text{N}}$ deletion and $\overline{\text{N}}$ gapping do not take place if the adjective is the left hand constituent of a noun compound:

8) *I like neither Ray's blackbird nor George's blue one.

9) *Ray's broadjump at Brandeis and George's high one at Stanford both amazed me.

.513 The speaker's tacit knowledge.

Another distinction which can be made between noun compounds containing adjectives and syntactic structures containing attributive adjectives is that the speaker's tacit knowledge of noun compounds is specific whereas his knowledge of syntactic structures is general. For example, a speaker of English who knows the meaning of greenhouse knows that greenhouses are buildings generally made of glass in which plants are grown. However, if the speaker has never come across this compound then he will not be able to infer this information in a rule-governed manner. However, a speaker who hears the syntactic structure the green house for the first time is able to understand it by a normal rule of semantic interpretation, a rule which is constant for all structures containing attributive adjectives and their heads.

.52 What is a noun compound?

In the previous section I noted three ways in which one type of noun compound differed from a corresponding syntactic structure. In this section I will see how far those characteristics go towards delimiting a class of noun compounds which is in line with traditional definitions.[4]

.521 Stress.

The criterion of stress cannot be used as a set membership criterion of noun compounds generally, for a number of reasons. First, the criterion of stress is not applicable where there is more than one word boundary in the

compound. This is so for compounds containing both syntactic fragments, e.g. <u>ship to shore radio</u> and further compounds, e.g. <u>toilet bowl cleanser</u>. Second, it is not generally applicable when lexical items other than adjectives occur as left hand constituent of noun compounds because most of these lexical items do not occur in contrasting syntactic structures. However, it is interesting that some nouns appear to function both as attributives and as left hand constituent in noun compounds. Where this is the case, there is stress contrast, e.g. <u>stone wall</u> c.f. <u>stonemason</u> .

.522 $\bar{N}$ deletion and $\bar{\bar{N}}$ gapping.

$\bar{N}$ deletion and $\bar{\bar{N}}$ gapping as illustrated in 6) and 7) do not generally take place for noun compounds:

10) *John's paper bags and **Ethel's shopping** ones impressed me.

11) *The longhouse at Bellacoola and the out one at Marbella both amused me.

This fact bears out the difference between <u>stone wall</u> and <u>stonemason</u> described above:

12) John's brick wall and Jim's stone one touch.

13) *Montreal's monumental masons and Toronto's stone ones meet every Friday.

However, this fact cannot be regarded as a set membership criterion for noun compounds because in many cases there is no contrasting syntactic structure where $\bar{N}$ deletion and $\bar{\bar{N}}$ gapping <u>do</u> occur: e.g. <u>slow down</u> and <u>shoot out</u>.

Furthermore some cases where the left hand constituent is a syntactic fragment do undergo $\bar{N}$ deletion and $\bar{N}$ gapping:

14) Russia's ground to air missiles and the U.S.A.'s air to air ones face each other.

15) Karin's out of sorts feeling on Saturday and Elsie's in the mood one on Sunday made for a terrible weekend.

Thus $\bar{N}$ deletion and $\bar{N}$ gapping look like being a characteristic of only some noun compounds.

.523 The speaker's tacit knowledge.

All noun compounds share the characteristic of being unlike syntactic structures in that the speaker's knowledge of them is specific; that is, a distinction can be drawn between those compounds the speaker knows and those he does not know. In this they are unlike syntactic structures, which the speaker is able to interpret although he may never have heard them before. I gave one brief example in section .513. Take as a second example the compound <u>pontoon bridge</u> which is discussed at some length in Lees, (1960), p.123. Lees asserts that this compound is syntactically ambiguous because "the following interpretations might occur to us:

bridge supported by pontoons

bridge floating on pontoons

bridge made of pontoons

pontoons in the form of a bridge.

The following two interpretations, while quite possible, are

not in general use as names of anything:

bridge of a pontoon

bridge for pontoons."

I believe that it is a misleading line of argument to suppose that the first set of paraphrases represents a case of syntactic ambiguity and that the distinction between the first and second sets is a matter of usage. What is revealed by the first set of paraphrases is not the speaker's knowledge of the grammar of pontoon bridge but his factual knowledge of pontoon bridges. Thus a speaker who knows what a pontoon bridge is can provide any or all of the first set of paraphrases but will not provide any of the second set whereas a speaker who did not know what a pontoon bridge was might provide any of the above paraphrases randomly. Such a speaker could invent a great many paraphrases for pontoon bridge. This seems to me to be analogous to asking the speaker the meaning of blik, with the proviso that the readings of noun compounds are usually partially conditioned by the readings of their constituents. (I discuss this point in greater detail in Chapters IV and VI.)

Furthermore, the first set of paraphrases differ only in so far as they are different ways of describing the same class of objects. They do not reveal a systematic syntactic ambiguity. If they did, then the speaker would be expected to infer that set and only that set of readings for pontoon bridge regardless of whether he had heard this compound previously.

.53 It is clear from the discussion of this section
that there are no unequivocal formal criteria (using those
words in the structuralist sense) for characterising the class
of noun compounds. However, these will give some indicat-
ions of the characteristics of what have traditionally been
called "noun compounds" or "compound nouns". They will
suffice until a formal theory of noun compounds is presented
in Chapter VI.

Notes.

1.   The importance of such constraints is discussed in
     Peters, S and R.W. Ritchie, (forthcoming), and Chomsky,
     (1971). Briefly stated, a transformational theory with
     the general characteristics of the "standard theory" must
     have such constraints before it can make interesting
     claims. Without constraints on the power of transform-
     ations such a theory would be too powerful to make claims
     which are empirically interesting.

2.   I indicate stress patterns using the same system as Chomsky
     and Halle, (1968). Note also that this fact is discussed
     in Chomsky and Halle,(1968). They also point out,
     (ibid, p. 156) that there are exceptions to this
     generalization.
          Note further that these stress patterns are to be
     taken as those of the author, i.e. the stress pattern of
     a speaker of the New Zealand dialect of English. The
     same dialect considerations hold for judgements of
     grammaticality expressed in this thesis.

3.   This node is labelled NOM in some earlier work, e.g.
     Emonds, (1970).

4.   For example:
     "A combination of two or more words so as to function
     as a word, as a unit."
                              (Jespersen, 1961, Vol.6, p.134.)
     "A combination of words is called a compound when it
     forms a unit, either from a formal or a semantic point
     of view or from both."
                              (Kruisinga, 1932, Vol. 2, p.4.)

CHAPTER II

The Surface Structure of Noun Compounds.

This chapter will examine some of the regularities and irregularities of the surface structure of noun compounds. Such an examination will provide the observational basis for theories of noun compounds.

.1 The binary constituent structure of noun compounds.

In surface structure noun compounds always consist of two immediate constituents.[1] This can be demonstrated by the fact that complex noun compounds, that is, noun compounds whose immediate constituents are one or both noun compounds, have immediate constituents which are always binary. Bracketing will suffice to demonstrate this point.

1) ((volume feeding)(management success) award)

2) (((volume feeding) management)(success award))

3) (((((volume feeding) management) success) award)

Each of these,(and there are probably others), appears to be a possible surface structure of this noun compound.[2] Accepting that noun compounds always consist of two constituents, it is possible to set up a taxonomy of noun compounds on the basis of the categorial classes to which these constituents belong. Such a taxonomy will indicate the surface structures which a grammar of noun compounds will have to generate to be observationally adequate. Initially I will limit this examination to simple compounds, that is compounds which do not have compounds as constituents. In many cases I make arbitrary decisions about the categorial class of the constituents of noun compounds. It appears to be a character-

istic of noun compounds that they do not provide overt means of identifying the categorial class of their constituents.[3] An explanation of this fact is offered in Chapter VI. I will not justify all decisions made as to categorial class membership in this chapter.

.2 Categorial classes functioning as right hand constituent in simple noun compounds.

Three categorial classes appear to function characteristically as right hand constituent, (hereafter R.H.C.), in simple noun compounds: nouns, verbs, and prepositions.[4]

.21 Nouns as R.H.C. in simple noun compounds.

When nouns function as R.H.C. in simple noun compounds a large number of categorial classes function as left hand constituent (hereafter L.H.C.). These will be examined each in turn.

.211 Nouns as L.H.C.

e.g. knife-edge, water sprite, teapot, sawdust.

.212 Adjectives as L.H.C.

e.g. blackbird, greenhouse, fathead.

.213 Prepositions as L.H.C.

e.g. overcoat, under-secretary, outhouse.

.214 Pronouns as L.H.C.

e.g. he man, she wolf, it girl.

.215 Conjunctions as L.H.C.

e.g. but clause, because reply.

.216 Numerals as L.H.C.,

e.g. <u>six gun</u>, <u>twelve bore</u>, <u>eight ball</u>, <u>two wood</u>.

.217 Verbs as L.H.C.

Usually where verbs function as L.H.C. of simple noun compounds, they have identical noun forms.

e.g. <u>flow chart</u>, <u>cut rate</u>, <u>process cheese</u>, <u>reply coupon</u>. Verbs which do not have an identical noun form do not usually function as L.H.C. of simple noun compounds.

e.g. *grow cycle c.f. growth cycle

  *see test   sight test

  *write society   writing society

  *admire society   admiration society

These facts suggest that verbs as such do not function as L.H.C. of simple noun compounds.

.218 Units larger than one word which function as L.H.C. of simple noun compounds.

Some syntactic structures function as L.H.C. of simple noun compounds. For the sake of convenience I will call such constituents "syntactic fragments."

.2181 Coordinate conjoined nouns as L.H.C.

e.g. <u>stock and station agent</u>, <u>chicken and egg war</u>, <u>prices and incomes commission</u>.

.2182 Paratactic coordinate conjoined nouns as L.H.C.

e.g. <u>boy girl relationship</u>, <u>parent teacher association</u>.

.2183 Coordinate conjoined verbs as L.H.C.

e.g. <u>hit and run driver</u>, <u>smash and grab raid</u>.

.2184 Paratactic coordinate conjoined verbs as L.H.C.

e.g. <u>stop go tactics.</u>

.2185 Coordinate conjoined prepositions as L.H.C.

e.g. <u>up and down escalator</u>, <u>up and under kick</u>.

.2186 Paratactic coordinate conjoined prepositions as L.H.C.

e.g. <u>on off switch.</u>

.2187 N̄s as L.H.C.

e.g. <u>ship to shore radio</u>. <u>ground to air missile</u>, <u>hole in the corner affair</u>.

.2188 Prepositional phrases as L.H.C.

e.g. <u>in the mood feeling</u>, <u>out of sorts mood</u>.

.2189 Ss as L.H.C.

e.g. <u>shoot to kill order</u>, <u>may I be excused period</u>,

There are probably other phrase nodes which function in this position. However, the above examples will suffice to illustrate their diversity.

.22 Verbs as R.H.C. in simple noun compounds.

Where verbs function as R.H.C. of simple noun compounds they appear always to have identical noun forms.

e.g. <u>offshoot</u>, <u>outcast</u>, <u>overkill</u>, <u>overdrive</u>.

Verbs which do not have identical noun forms do not appear to function as R.H.C. of simple noun compounds.

e.g.   *ingrow   c.f.   ingrowth

        *outpour   outpouring

        *insee   insight

*offscour   c.f.   offscourings

There seem to be some exceptions:e.g. inlet, outlet.

It might be argued that in some or all of these cases
there is a formative boundary rather than a word boundary
between the two constituents, i.e. that these prepositions
are prefixes of verbs and that these are therefore de-verbal
nouns.   I see no syntactic motivation for anything other
than a word boundary in all these cases except the exceptions.
I take it, therefore, that in all cases where a verb functions
as R.H.C. the verb has an identical noun form, that is, no
lexical item marked [+V] which is not also marked [+N]
functions as R.H.C. of simple noun compounds.

It is possible, for the purposes of this taxonomy, therefore,
to regard there as being only two classes of R.H.C.: nouns
and prepositions.   A subclass of those compounds having
nouns as R.H.C. would be the class where the N is also a V.
In this subclass all the L.H.C.s appear to be prepositions.

.23 Prepositions as R.H.C. in simple noun compounds.

Noun compounds with prepositions as R.H.C. can be
divided into two subgroups.   The first of these has a verb
of identical structure :[5]

    e.g. hold up, turn out, take off, take over.
These can be regarded as nouns derived directly from verbs.
The second group does not have an identical verb form:

    e.g. love in, fall out, lean to.

In all cases where the R.H.C. of a simple noun compound

is a preposition the L.H.C. is a verb.

.24 Constraints on the surface structure of simple noun compounds.

It appears that the R.H.C. of noun compounds can be only one of three categorial classes: nouns, verbs and prepositions with the constraint that any verb which appears as R.H.C. is also a noun. Compounds with verbs as R.H.C. have only prepositions as L.H.C.[6] and compounds with prepositions as R.H.C. have only verbs as L.H.C. However, in the case of compounds with nouns as R.H.C. there appear to be very few constraints on what may function as L.H.C. One constraint does suggest itself and that is that no NP functions as L.H.C.

There are two classes of apparent counter-examples. The first is exemplified by such compounds as <u>twenty goal season</u>, <u>twenty game winner</u>, <u>eighteen hole course</u>. The second by such compounds as <u>black board eraser</u>, <u>Swedish furniture manufacturer</u> <u>silent movie era</u>. Each of these has surface structure bracketing as follows:

((twenty game) winner) , ((silent movie) era)

In both cases the L.H.C. could be taken as an exponent of NP. The first class consists of a numeral and a noun, the second of an adjective and a noun. I will deal with each class in turn.

.241 Evidence against the L.H.C. of noun compounds of the type exemplified by <u>twenty game winner</u> being an NP.

a) The NP cannot take a determiner.

e.g. *a the twenty game winner, *anOrioles' twenty game winner.

b) There is no plural or genitive inflection possible internal to this type of compound:

e.g. *a twenty games winner, *a twenty game's winner.

This constraint is general in noun compounds but presents special problems here because after numerals greater than one, the head noun of an NP normally takes a plural automatically.

I will therefore analyse this class as follows:

$$(_N(_N(_{Nu.}20)_{Nu.}(_N game)_N)_N(_N winner)_N)_N$$

This analysis avoids the problems above and reduces them to the problems encountered generally with noun compounds consisting of numerals followed by nouns.[7]

The second class, those consisting of adjectives and nouns, are analysed by Chomsky and Halle, (1968), pp.20-21, as follows:

$$(_N(_{NP}(_A black)(_A board)_N)(_{NP} eraser)_N)_N$$

I will argue that this bracketing should be:

$$(_N(_{\bar{N}}(_A black)(_A board)_N)(_{\bar{N}} eraser)_N)_N$$

Evidence against the L.H.C. being NP:

a) The NP cannot take a determiner:

e.g. *the a black board eraser, *John's the black board eraser.

b) The NP cannot take a plural inflection :

e.g. *<u>black boards eraser</u>.

c) These L.H.C.s have the structure of $\bar{\bar{N}}$s

d) No other forms of NP appear as L.H.C. of simple noun compounds.

e) Other forms of $\bar{N}$ appear as L.H.C. of simple noun compounds.

I will take it then that no NPs function as L.H.C. of simple noun compounds.

.3 Relationships between R. and L.H.C.s of simple noun compounds.

The compounds which were examined in section .2 fall into two subclasses when the relationship between R. and L.H.C. is examined. Those with nouns as R.H.C. have the noun as head of an endocentric structure, whereas those with prepositions as R.H.C. have have the L.H.C. as head of an endocentric structure. Lees, (1960), notes two classes of exceptions to these observations. I will deal with each in turn.

.31 Kennings. [8]

Lees views kennings such as <u>redskin</u>, <u>longhair</u>, <u>fathead</u>, as exocentric because:

> "the exocentric <u>redskin</u>, ... , substitutes in for such animate nouns as <u>man, Indian</u>, etc. Thus while we can still say that the relationship within <u>redskin</u> is that of the subject and predicative adjective of; the skin is red,, clearly the transform must be substituted in for nouns other than the subject."
>
> (ibid, p.128.)

I follow this view and take it that the exocentric properties
are a function of the compound as a whole and not a function
of the relationship existing between the R. and L.H.C. of this
type of compound.

.32 Coordinate conjoined R. and L.H.C.s

This class is exemplified by compounds like <u>priest-king</u> ,
<u>prince-archbishop</u>, <u>washer-drier</u>, <u>fighter-bomber</u> and perhaps
<u>gin and tonic</u>, <u>whiskey and soda</u>. I will term the first set
"paratactically coordinated". Some of these compounds have
a normal endocentric reading. For example, <u>washer-drier</u>
can have the paraphrase "a drier for washers", as well as
the paraphrase "washer and drier". However, the two readings
have different stress:

Endocentric	Coordinated
1 3	2 1
washer drier	washer-drier

If we accept Chomsky and Halle's theory of stress assignment,
(Chomsky and Halle, 1968.), then these two cases must have
different surface structure.[9]

The case of coordinate conjoined L. and R.H.C.s seems to
provide the only clear case of a non-endocentric structure
for simple noun compounds.

.4 Complex noun compounds.

Complex noun compounds exhibit a much more restricted
range of categorial classes as L. and R.H.C. than do simple
noun compounds. At this stage I will merely state these

restrictions without discussing them further.[10]

.41 Restrictions on the R.H.C. of complex noun compounds.

If the L.H.C. of a noun compound is a noun compound itself, then the R.H.C. must be a noun, or a noun compound.

 e.g. ((lighthouse) keeper), ((petrol pump) attendant)

  *((lighthouse) in), *((petrol pump) easy).

.42 Restrictions on the L.H.C. of complex noun compounds.

If the R.H.C. of a noun compound is a noun compound itself, then the L.H.C. must be either a noun compound, a noun, or a syntactic fragment.

 .421 Complex noun compounds with noun compounds as L.H.C.

 e.g. <u>downtown police officer</u>, <u>City Council by-election</u>,

 .422 Complex noun compounds with nouns as L.H.C.

 e.g. <u>motel room service</u>, <u>harbour lighthouse</u>.

 .423 Complex noun compounds with syntactic fragments as L.H.C.

 e.g. <u>smash and grab bank raid</u>, <u>touch and go situation comedy</u>, <u>prices and incomes stabilization committee</u>, <u>ground to air guided missile</u>.

 .424 Complex noun compounds with adjectives as L.H.C.

Such compounds do not occur. Where an adjective functions left of a noun compound it is always attributive. None of the following examples are noun compounds:

 e.g. <u>new housekeeper</u>, <u>black boarderaser</u>, <u>tall window cleaner</u>. This can be shown by the fact that they undergo the $\bar{N}$ deletion and $\bar{N}$ gapping characteristic of attributive

adjectives.[11]

    e.g. John's new housekeeper and Jack's old one

5C's black board-eraser and 4A's white one

    .425 Prepositions as L.H.C. of complex noun compounds.

Prepositions do not function as L.H.C. of complex noun

compounds.

    e.g. *over raincoat, *under by-pass, *through traffic tunnel.

    .426 Numerals as L.H.C. of complex noun compounds.

Numerals do not function as L.H.C. of complex noun

compounds.

    e.g. *eight poolball, *seven golfclub.

    .427 Pronouns as L.H.C. of complex noun compounds.

Pronouns do not function as L.H.C. of complex noun

compounds.

    e.g. *he wolfcub, *she school-teacher.

    .428 Conjunctions as L.H.C. of complex noun compounds.

Conjunctions do not function as L.H.C. of complex noun

compounds.

    e.g.*because reply-coupon .

    .5 The internal morphology of noun compounds.

    .51 Simple noun compounds.

    .511 Simple noun compounds with prepositions as R.H.C.

These compounds do not take plural or possessive inflection

internally although the L.H.C. of such compounds is always an

N and might therefore be expected to take inflection.

e.g. *sits in, *shoots out, *holds up.

*sit's in, *shoot's out, *hold's up.

There are a few cases where the L.H.C. is a gerund which takes
two alternative forms of the plural:[12]

layings in   laying ins

crossings out   crossing outs

.512 Simple noun compounds with nouns as R.H.C.

Such compounds do not take internal inflection generally:

*brooms cupboard, *trees roots, *elephants manure.

*broom's cupboard, *tree's roots, *elephant's manure.

*brooms' cupboard, *trees' roots, *elephants' manure.

However, there are exceptions to this observation for both
plurals and genitives:

cacti garden, data processing, alumnae association,

standards bureau, signals officer,

potter's wheel, Parkinson's disease, men's room,

thieves' kitchen, liars' dice.

Adjectives which function as L.H.C. of simple noun
compounds do not generally inflect for comparative and
superlative:

*blackerbird, *biggestwig, *longershoreman.

Note however, best man.

Pronouns which function as L.H.C. of simple noun compounds
do not take inflection generally:

*they group, *your party, *ours home.

Note however, his and hers bathrooms.

Syntactic fragments appear to have the same loose restrictions on internal inflection that are general for the other L.H.C.s.

*hit and ran driver, *smashed and grabbed raid,

*stocks and stations agent, *chickens and eggs war,

*stock's and station's agent, *chickens' and eggs' war,

But note, prices and incomes commission.

.52 Complex noun compounds.

These also appear not to take internal inflectional morphology:

*lighthouses keeper, *hot-rods racing, *townhall's clock.

.6 The external morphology of noun compounds.

This section deals with the morphology that noun compounds exhibit in their functioning within the noun phrase.

.61 Inflection for number and case.

Noun compounds inflect in exactly the same way as nouns regardless of their internal structure with the one exception of those gerund-plus-preposition compounds mentioned in section .511. Where the R.H.C. has an irregular plural, the noun compound takes the inflectional form that the R.H.C. has on its own.

e.g. plough oxen, school alumnae, house mice.

.62 Derivational morphology of noun compounds.

Normally noun compounds do not seem to take derivational morphology.

    e.g. *policemanliness, ?golf widowhood.
However, there are cases where noun compounds do take derivational morphemes.

    e.g. trade unionism, little leaguer, trade unionist, greenbacking, loansharking, black marketeer.[13]

.7 Evidence that noun compounds are Ns.

In this section I show that the node dominating noun compounds is N and not NP or $\bar{N}$.

.71 Evidence that the categorial symbol dominating noun compounds is not NP.

Noun compounds take determiners before them in surface structure.

Noun compounds take attributive adjectives, both restricted and non-restricted, before them in surface structure.

    e.g. the white gréenhouse, the grêen blackboard.

Noun compounds do not function as focus of the cleft transformation. Emonds, (1970), p.87 , shows that this fact is diagnostic for NP.[14]

    e.g. *It's football that John kicked the.
Of course, when the focus constituent has no overt determiner clefting is possible because the only exponent of the NP is an N.

    e.g. It's football that John plays.

Noun compounds conjoin with nouns.

e.g. <u>the many conductors and station masters</u>,

<u>my fellow teachers and head-masters</u>.

All of these facts are evidence against the NP status of
noun compounds.

.72 Evidence that the categorial symbol dominating noun
compounds is not $\bar{N}$.

According to Dougherty,(1968), the expansion rule for
$\bar{N}$ is: $\bar{N} \longrightarrow$ ([SP,N]) + N^n + ([COMP,N])
where [SP,N] rewrites as <u>fellow</u> (among other things.) However
noun compounds co-occur with <u>fellow</u>.

e.g. <u>fellow dock worker</u>, <u>fellow blackbird</u>.

In Chapter I, section .512 it was shown that noun
compounds do not delete and gap like $\bar{\bar{N}}$s but like Ns.

e.g. *<u>Bill's blackbird and Max's blue one got lost</u>.

.73 Evidence that the categorial symbol dominating noun
compounds is N.

First, if noun compounds are not dominated by NP or
$\bar{N}$ then they must be dominated by N.

Second, all the evidence presented against NP and $\bar{N}$ is
positive evidence for N.

Third, those preliminary criteria for noun compounds
discussed in Chapter I are positive evidence for noun compounds
being N.

Fourth, some noun compounds take derivational morphemes
characteristic of nouns.

We can now offer a broad surface structure definition of noun compounds. A noun compound is any surface structure dominated by N which contains one or more word boundaries.

.74 Some possible counter-evidence to the claim that noun compounds are dominated by N.

On a superficial level the fact that noun compounds contain one or more word boundaries can be taken as counter-evidence to the claim that noun compounds are nouns because nouns are one word units in most transformational grammars. However, I take it that this is only a superficial objection.

A more serious counter-example is the case of complex noun compounds. If noun compounds are Ns then those surface structures which occur with N as R. or L.H.C. should occur regardless of whether the N is a single word or a compound. As I stated in section .4 of this chapter, this is not the case. If the R.H.C. of a complex noun compound is a noun compound itself then there are restrictions on the L.H.C. which do not occur if the R.H.C. is a single word. A theory of noun compounding will have to account for the facts of section .4, preferably in such a way as to prevent them from being counter-examples to the claim that noun compounds are Ns, because the evidence in favour of this claim is too strong to be easily abandoned. If it were abandoned then a theory of compounding would have to account in some other way for the similarities between noun compounds and nouns or loose valuable generalities.

.8 The full surface structure of noun compounds.

In sections .2 and .3 of this chapter I examined the categorial status of lexical items and syntactic structures which function as L. and R.H.C.s of noun compounds. In section .7 I suggested that noun compounds are dominated by N. It has not been shown, however, that there is no structure between N and the L. and R.H.C.s of noun compounds. To show this, I will show that, where the L. and R.H.C.s are lexical nodes there are not phrase nodes directly dominating them.

.81 Simple noun compounds.

.811 The full surface structure of noun compounds with prepositions as R.H.C.

There is no evidence that the preposition which functions as R.H.C. of a noun compound is dominated by a phrase node. It cannot be dominated by PP because there is no evidence for a deleted NP following the preposition. Furthermore structures of the type:
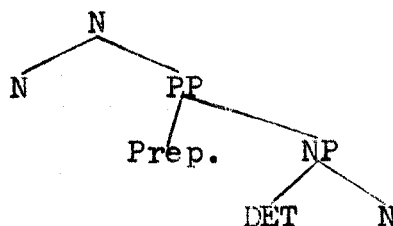
do not occur as noun compounds.[15]

e.g. <u>a sit in the park</u>, <u>a shoot out the window</u>.

It has already been noted in section .24 of this chapter that the N which functions as the L.H.C. of these

compounds is not the head of an NP. Nor is there evidence for
its being the head of an $\bar{N}$. It therefore appears that noun
compounds with prepositions as R.H.C. have no structure
between the N and the categorial symbols which dominate
the two constituents.

.812 The full surface structure of noun compounds with
nouns as R.H.C.

The R.H.C. of such noun compounds is not dominated by NP.
This can be shown by the fact that noun compounds do not take
determiners internally.

Of the L.H.C.s which occur in this type of noun compound,
prepositions, adjectives and nouns could be dominated by
phrase nodes. None of these are, however, dominated by phrase
nodes for the following reasons:

Prepositions which occur here are not the initial
preposition of a prepositional phrase because there is never
an "understood" NP following them which can be regarded as
having been deleted. For example, in a case such as <u>outcast</u>
there is obviously no deleted NP after <u>out</u>.

That adjectives which appear as L.H.C. are not heads of
adjective phrases can be shown by the fact that they never
take intensifiers like <u>very</u> or modifying adverbs.

e.g. *<u>a very greenhouse</u>, * <u>a wonderfully blackbird</u> .

Nouns are not dominated by phrase nodes for the same reasons
as those mentioned in section .811.

When syntactic fragments function as L.H.C. of these

noun compounds, they obviously all have phrase nodes dominating
them.

.82 Complex compounds.

I take it that complex compounds present no additional
problems as far as their surface structure is concerned, since
the constituents of complex noun compounds are Ns and
syntactic fragments.

Notes:

1. At this stage, this assertion is merely an observation. It will be maintained as an empirical hypothesis in Chapter VI of this thesis.

2. The example is taken from Gleitman and Gleitman, (1970).

3. See Doculil, (1964), p.24. for a discussion of this fact.

4. I ignore for the moment a number of small classes having adjectives and quantifiers as R.H.C., e.g. speakeasy, cupful, knowall. The productivity of these classes is very low. I have been able to find only these two adjectives as R.H.C. and only all as a quantifier.

5. Such verbs are termed "prepositional verbs" by Strang, (1962), pp.157-159.

6. With the exception of the classes mentioned in note 4.

7. I return to this problem in Chapter VI.

8. These are termed "bahuvrihi compounds" by Lees, (1960). I prefer to use the term "kenning". This term is used to refer to coinages in Old English poetry exemplified by such noun compounds as whale-road to designate the sea.

9. Or, if we accept the alterations to this theory proposed by Bresnan, (1970), then these two cases may have different deep structures.

10. Here again these are merely observations at this point. I will propose them as constraints on a theory of compounding in Chapter VI.

11. See Chapter I, section .522.

12. These two alternative forms are also found in words ending in -ful , e.g. cupsful, cupfuls.

13. I am grateful to Ron Packman for first pointing some of these cases out to me.

14. That is, I am supposing a structure as follows:

```
              NP
           /      \
        DET        NP
         |          |
        the      football
```
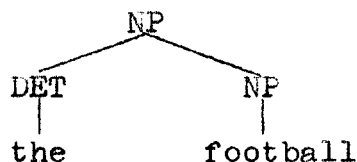
and a cleft transformation which would extrapose the lower

NP. As such clefting is not possible I take it that
<u>football</u> is not an NP.

Joseph Emonds has suggested, (personal communication),
that there may be a general constraint against moving
constituents over an NP boundary. If such a constraint
exists this would negate my argument here.

15.   It might be objected that the following are noun compounds
under the definition given in section .73 of this chapter;
e.g. <u>toad in the hole</u>, <u>bolt out of the blue</u>, <u>bun in the
oven</u>. Each of these has an idiomatic reading such as is
characteristic of noun compounds. However, each of these
examples also has normal syntactic structure generable
by phrase structure rules. Noun compounds as I have
exemplified them in this chapter, do not have a syntactic
structure which is generable by normal phrase structure
rules. I therefore make an arbitrary decision to
exclude idioms such as the above examples from the defini-
tion of noun compounds. The definition for noun compounds
would now read, a noun compound is any structure dominated
by N which contains more than one word boundary and which
has a structure not generable by normal phrase structure
rules.

I will return to the problem of idioms briefly in
Chapter VI.

CHAPTER III

The strong form of the transformational hypothesis.

This chapter and the next will be concerned with transformational theories of noun compounding.[1] Such theories would claim that noun compounds are transformationally derived. I will deal with the general class of such theories rather than with one specific theory. There are a number of reasons for this. First, I am aware of only one formal transformational theory of noun compounding and that is the theory advanced by Lees, (1960). This theory was advanced when transformational-generative grammar was in its infancy and because of this, it is now obsolete as Lees himself has acknowledged.[2] There is therefore no point in attacking this specific theory. Second, in order to advance the theory of compounding which I do, it is necessary to refute transformational theories of noun compounding in general in so far as this is possible.

Transformational theories of noun compounding can take two forms: a strong form which would hold that all noun compounds are transformationally derived, (Lees, (1960), tentatively advances this position), and a weak form which would hold that some specific class of noun compounds is transform-ationally derived. In this chapter I show that the strong form of this hypothesis is untenable by showing that the class of noun compounds which has gerunds as R.H.C. and nouns as L.H.C. is not transformationally derived. In the next chapter I suggest that the evidence which can be produced in favour of the weak form of the hypothesis is inconvincing and that there is convincing evidence against this hypothesis. I will therefore hold a strong hypothesis that no noun compounds are transformation-

ally derived.

.1 Introduction.

In this chapter I show that the class of noun compounds with gerunds as R.H.C. and nouns as L.H.C. cannot be derived from:

a) the class of gerundive nominals of Chomsky, (1970).

b) the class of action nominals of Lees, (1960), p.68, Chomsky, (1970) and Fraser, (1970).

c) non-derived NPs

and I show that there is no other acceptable base marker from which this class of noun compounds can be satisfactorily derived.

I use this particular class of noun compounds in this chapter because they seem, on the face of it, to be likely candidates for having a transformational derivation. The gerund could be derived from a corresponding verb and the L.H.C. noun seems, in some cases, to correspond to a deep structure object. For example, elephant shooting could be plausibly related to somebody shoots elephants. Furthermore, if these noun compounds are derived from Ss, then the S needs to be dominated by an NP because noun compounds are dominated in deep structure by NP. Such structures are available in the form of gerundive nominals and, possibly, action nominals.

A second possibility is that these noun compounds are derived directly from deep structure NPs which do not dominate

S.   Both these possibilities are examined in this chapter.

In showing that this class of noun compounds is not transformationally derived, I have taken a strong contender for the transformational hypothesis as well as one which offers a number of possibilities for a transformational source.

It might be objected that this chapter is a "straw man" argument where I set up putative sources and putative transformations and then attempt to refute them. There is some justice in this objection. However, two points must be made by way of a reply. First, there is no option open other than to present my own analysis of possible sources and transformations as there is no accepted transformational theory of noun compounds that I know of. Second, I attempt to present the strongest case for the transformational hypothesis given the framework of the extended standard theory. It is therefore an empirical matter whether this analysis is correct or incorrect and not one of dialectics.

.2   Are noun compounds with gerunds as R.H.C. and nouns as L.H.C. derived from gerundive nominals?

.21 Gerundive nominals are characterised by being freely derived from base markers underlying sentences:e.g.

1) John's being easy to please

from 2) John is easy to please.

One might make the claim that the base marker underlying these structures also underlies a class of noun compounds.

Look for example at the following sets:

    3) Mary's spinning wool ...

    4) John's eating fish ...

    5) Henry's knotting ...

and

    6) Mary's wool spinning ...

    7) John's fish eating ...

    8) Henry's rope knotting ...

Superficially there is something to recommend setting up a transformational relationship between these two sets of structures. First, both are NPs. Second, the two sets seem to be synonymous or nearly so. Third, the relationship appears to be regular. To investigate the possibility of this being a transformational relationship, I will set up possible transformations which might be responsible for the derivation.

The first would be a minor movement rule under the broad conditions on such rules.[3] It would move the object NP over the main verb as follows:

```
                    NP
                    |
                    S
                  /   \
                NP     VP
                 |    /  \
                 |   V    NP
                 |   |    |
              Mary's spinning wool

                 1     2    3

   ⟹            1     3    2
```
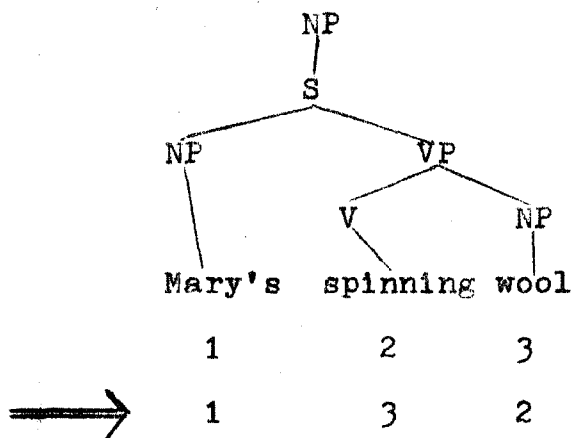
I will label this transformation $T_{comp.1}$.

The second and third would be structure-preserving transformations. They would move the N under the object NP to an empty node either under V or VP as follows:

```
                        NP
                        |
                        S
            NP                      VP
            |                 V            NP
            |                 |            |
            |                 N            N
          Mary's            △   spinning  ┌──────┐
                            ↑             │ wool │
                            └─────────────└──────┘

            1                 2      3         4
   ⟹        1                 4      3         ∅
```

I will label this transformation $T_{comp.2}$.

```
                      NP
                      |
                      S
           NP                    VP
           |              N      V       NP
           |              |      |       |
           |              △   spinning   N
         Mary's           ↑           ┌──────┐
                          └───────────│ wool │
                                      └──────┘

           1              2      3        4
   ⟹       1              4      3        ∅
```
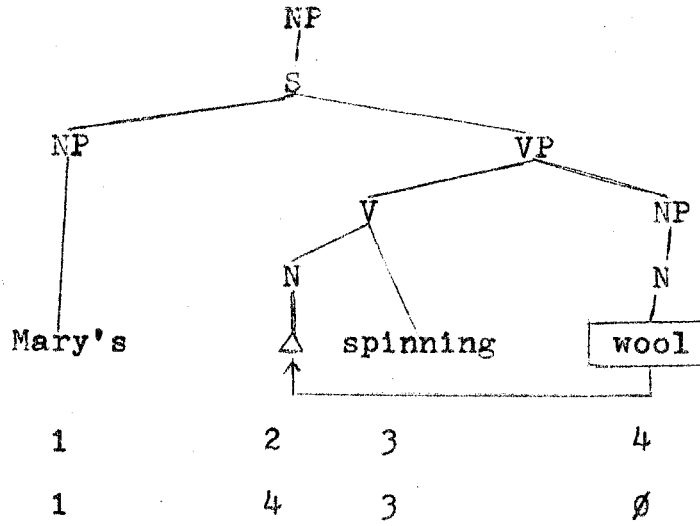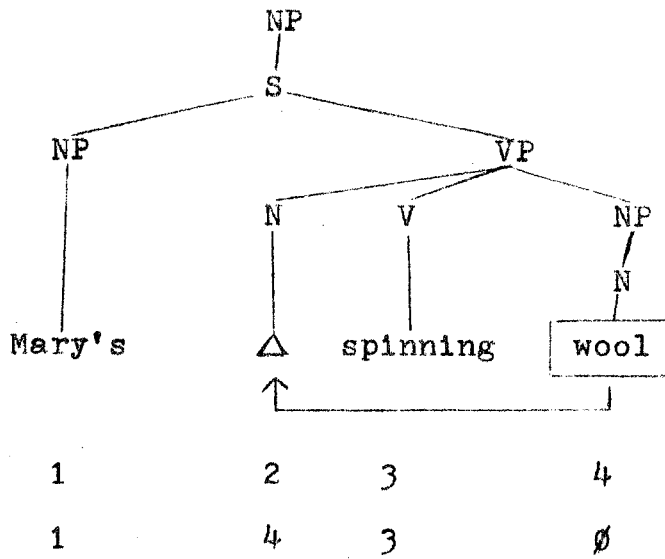
I will label this transformation $T_{comp.3}$.

The fourth would be a structure-preserving transformation which would move the verb to an empty node under the object NP.

```
                        NP
                        |
                        S
              NP              VP
              |           V        NP
              |                   N      V
            Mary's    [spinning] wool    △
                         |_____↑

              1           2      3      4
    =====>    1           Ø      3      2
```
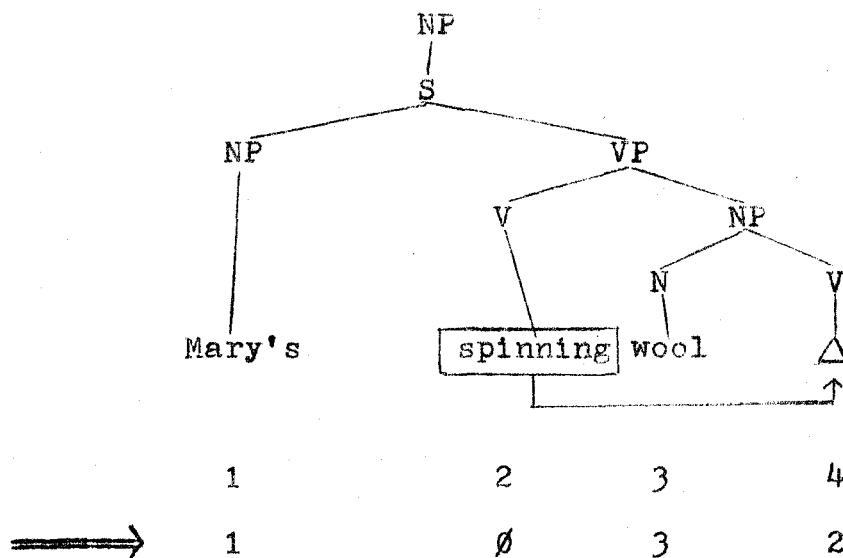
I will label this transformation $T_{comp.4}$.

This appears to exhaust the possibilities for formalising this transformational relationship.[4]

.22   The structure of noun compounds with gerunds as R.H.C. and nouns as L.H.C.

I noted in Chapter II, section 2 that where verbs function as R.H.C. of simple noun compounds, they are also nouns. I also proposed that NPs never function as L.H.C. of simple noun compounds. These facts present problems for $T_{comp.1}$, because the structural index on this transformation moves an NP over a V which is not an N to form the noun compound. Furthermore, I noted in Chapter II, section .8, that noun compounds are dominated by N. After the application of $T_{comp.1}$ we are left with a structure dominated by VP. Thus every node

of the resulting structure is incorrect.

Similar problems are apparent with $T_{comp.2}$ and $T_{comp.3}$. They produce the following two surface structures, both of which are incorrect:

```
       VP                              V
      /  \                            / \
     N    V                         N     \
     |     \                       /        \
   wool   spinning              wool      spinning
```
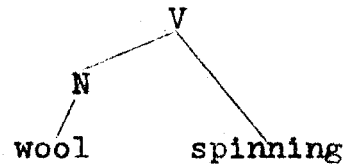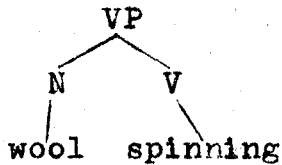
$T_{comp.4}$ also produces the wrong surface structure:

```
          NP
         /  \
        N    V
       /      \
     wool   spinning
```
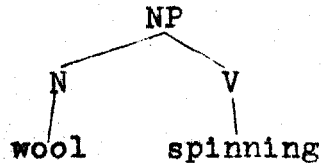
Furthermore, all of the last three transformations would require additional phrase structure rules of a kind that are not needed for any other part of syntax.

Also, as noted in Chomsky, (1970),p.189., gerundive nominals have the internal structure of Ss. However, noun compounds of the type we are trying to derive have the internal structure of NPs,as can be shown by their ability to replace the initial NP with a determiner and their patterning with quantifiers :[5]

9) Mary's wool spinning ...

10) John's fish eating ...

11) Henry's rope knotting ...

12) the wool spinning ...

13) the fish eating ...

14) the rope knotting ...

c.f.

15) *the spinning wool

16) *the eating fish ...

17) *the knotting rope ...

18) some of Mary's wool spinning ...

19) all of John's fish eating ...

20) much of Henry's rope knotting ...

c.f.

21) *some of Mary's spinning wool ...

22) *all of John's eating fish ...

23) *much of Henry's knotting rope ...

.23 The productivity of any putative transformation for deriving noun compounds from gerundive nominals.

The productivity of any putative transformation for deriving noun compounds from gerundive nominals is sharply restricted. It can apply only under the following conditions:

a) That the VP of the gerundive nominal has no auxiliary, i.e. that no tense, aspect or modal appears in the base marker. Of these, the restrictions on tense, modals, and the BE + ing expansion of the aspect are also present for gerundive nominals.

24) Mary's having spun wool ...

25) John's having eaten fish ...

26) Henry's having knotted rope ...

27) *Mary's wool having spun ...

28) *John's fish having eaten ...

29) *Henry's rope having knotted ...

b) That the V of the gerundive nominal is not a prepositional verb:

30) Mary's figuring out the problem ...

31) John's taking to butter ...

32) Henry's coming across water ...

33) *Mary's problem figuring out ...

34) *John's butter taking to ...

35) *Henry's water coming across ...

c) That the NP object of the gerundive nominal is expanded only to N.^{6}

36) Mary's spinning the wool ...

37) John's eating a fish ...

38) Henry's knotting some rope ...

39) *Mary's the wool spinning ...

40) *John's a fish eating ...

41) *Henry's some rope knotting....

42) Mary's spinning wool which is black ...

43) John's eating fish from the sea ...

44) Henry's knotting rope made of wire ...

45) *Mary's wool which is black spinning ...

46) *John's fish from the sea eating ...

47) *Henry's rope made of wire knotting ...

d) That the N under the object NP be [-proper] .

48) Mary's loving Brooklyn ...

49) John's hating Simpsons Sears ...

50) Henry's thumping Richard ...

51) *Mary's Brooklyn loving ...

52) *John's Simpsons Sears hating

53) *Henry's Richard thumping ...

e) That the N under the object NP be [+generic] .

This feature accounts for the difference in interpretion of

the elephant in

54) The elephant almost killed John.

and   55) The elephant is considered a dangerous species.

Any N which functions as L.H.C. of noun compounds is [+generic].

For example the apple in apple pie is the universal class of

apples rather than one or more specific apples.

f) Probably also that the N under the object NP be

[+concrete].[7]

56) Mary's hating indolence ...

57) John's considering action ...

58) Henry's praising virtue ...

59) ??Mary's indolence hating ...

60) ??John's action considering ...

61) ??Henry's virtue praising ...

g) That the N under the object NP is not plural.

62) Mary's spinning synthetics ...

63) John's eating mandarins ...

64) Henry's knotting ropes ...

65) *Mary's synthetics spinning ...

66) *John's mandarins eating ...

67) *Henry's ropes knotting ...

These constraints on productivity pose severe problems for making a transformational statement of the relationship between   noun compounds and gerundive nominals. It is not generally the case that the structural index of a transformation specifies the syntactic features of nodes to which it refers. Nor does it require statements of the kind that would be needed to account for the restriction in b).[8]

.24 Selectional properties of gerundive nominals and noun compounds.

Gerundive nominals and the noun compounds which might be derived from them appear to have different selectional properties in two areas: what verbs they will pattern with in a full sentence and what adverbials or adjectives they will pattern with.[9]

.241 Selectional properties with main verbs.

Note the following differences in selectional restrictions.

    68) John's polo playing improved over the years.

    69) Ethel's wool spinning carried on until dark.

    70) John's hay making finished last week.

    71) Brunhilde's grouse shooting bored her to tears.

    72) *John's playing polo improved over the years.

    73) *Ethels spinning wool carried on until dark.

    74) *John's making hay finished last week.

    75) *Brunhilde's shooting grouse bored her to tears.

If noun compounds were derived from gerundive nominals we would expect them to have the same selectional restrictions on mainverbs.

    .242 Selectional properties with adverbials.

Gerundive nominals take a full range of adverbials.
Time adverbials:

    76) Mary's spinning wool yesterday ...

    77) John's eating fish at noon ...

    78) Henry's knotting rope while the show went on ...

Manner adverbials:

    79) Mary's spinning wool quickly ...

    80) John's eating fish in a leisurely manner ...

    81) Henry's knotting rope most frantically ...

Place adverbials:

    82) Mary's spinning wool indoors ...

    83) John's eating fish at home ...

    84) Henry's knotting rope in his parents' house ...

The corresponding noun compounds do not take a full complement of adverbials. Their patterning with time adverbials seems odd, if not ungrammatical.

85) ?Mary's wool spinning yesterday ...

86) ?John's fish eating at noon ...

87) ?Henry's rope knotting while the show went on ...

They do not take manner adverbials at all although they can take the equivalent adjective pre-nominally.

88) *Mary's wool spinning quickly ...

89) *John's fish eating in a leisurely manner ...

90) *Henry's rope knotting most frantically ...

91) Mary's quick wool spinning ...

92) John's leisurely fish eating ...

93) Henry's most frantic rope knotting ...

Their patterning with place adverbials again seems odd.

94) ?Mary's wool spinning indoors ...

95) ?John's fish eating at home ...

96) ?Henry's rope knotting in his parents' house ...

.25 Semantic interpretation.

I suggested at the beginning of this chapter that noun compounds and gerundive nominals were synonymous or nearly so. However, when we look more closely at the semantics of these two classes, they do appear to differ in an important respect. The gerundive nominal has the structure of a simple proposition with a subject, a verb, and an object. However, in the noun

compound the constituents which correspond to the verb and direct object have a somewhat different grammatical relation. In the noun compound a corresponding sentence is implied as follows:

97) <u>Mary's wool spinning</u>   implies   Mary spins wool.

98) <u>John's fish eating</u>   implies   John eats fish.

99) <u>Henry's rope knotting</u>   implies   Henry knots rope.

However, <u>wool spinning</u> is a type of spinning and <u>fish eating</u> is a type of eating. The L.H.C. and R.H.C. are, in other words in a modifier-head relationship which is not present in the gerundive nominal.

At this point I want to do no more than observe that these differences exist and to suggest that because they exist any putative transformation which would derive noun compounds from gerundive nominals would not be meaning-preserving.

.26 Conclusion.

The facts I have presented in section .2 appear to support the conclusion that noun compounds having a noun as R.H.C. and gerund as L.H.C. are not transformationally derived from gerundive nominals.

.3 Are noun compounds with gerunds as R.H.C. and nouns as L.H.C. transformationally derived from the class of action nominals?

.31 Action nominals look very like gerundive nominals except that they contain <u>of</u>:

Gerundive nominal: <u>John's eating fish</u> ...

Action nominal: <u>John's eating of fish</u> ...

The differences between these two types of nominal are dealt with in detail in Chomsky, (1970), and Fraser, (1970) and I do not intend to outline them except where they relate to the topic of this section.

This class of nominals looks at first sight like a more attractive candidate for source of the noun compounds of this chapter. They seem to have the same recommendations as gerundive nominals and they do not fall victim to a number of the objections I raised in the previous section.

a) There appears to be a regular relationship between action nominals and noun compounds: e.g.

100) Alfred's examining of moss ...

101) Jose's grinding of corn ...

102) Ethel's disposing of sewage ...

103) Alfred's moss examining ...

104) Jose's corn grinding ...

105) Ethel's sewage disposing ...

b) The two structures appear to be synonymous or nearly so.

c) Action nominals appear to have, at least in part, the structure of NPs. They take determiners where gerundive nominals do not: e.g.

106) The examining of moss ...

107) the grinding of corn ...

108) the disposing of sewage ...

They pattern with quantifiers where gerundive nominals do not.

109) much of Alfred's examining of moss ...

110) many of Jose's crossings of the river ...

111) all of Ethel's disposing of sewage ...

The gerund seems to be an N in that those gerunds which are capable of taking a plural inflection can do so in this construction.

112) Josiah's crossings of the river ...

113) The cinema's showings of the film ...

114) The company's readings of the agreement ...

I will take it that action nominals have the structure of NPs.

To investigate the possibility that there might be a transformational relationship between action nominals and noun compounds I will set up four transformations which might be responsible for the derivation.

The first would be a minor movement rule under the broad conditions for such rules. It would move the prepositional phrase complement over the head N and then delete the preposition.

$$1 \quad 2 \quad 3 \quad 4$$
$$\Longrightarrow \quad 1 \qquad 3 \quad 4 \quad 2$$
$$\Longrightarrow \quad 1 \qquad \emptyset \quad 4 \quad 2$$
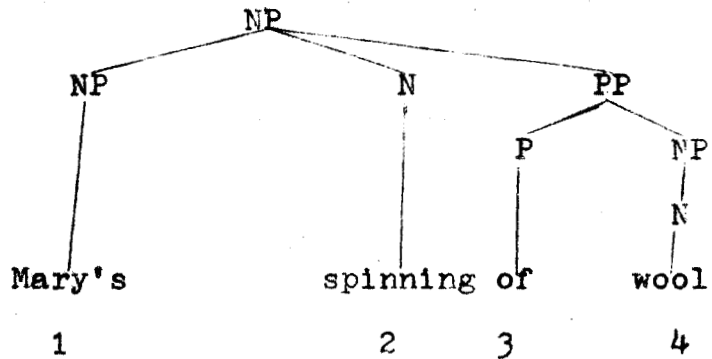
I will label this transformation $T_{comp.5}$.

The second and third would be structure-preserving transformations. The second would move the N under the PP complement to an empty node under NP and the third would move the same node to an empty node under the head N as follows:
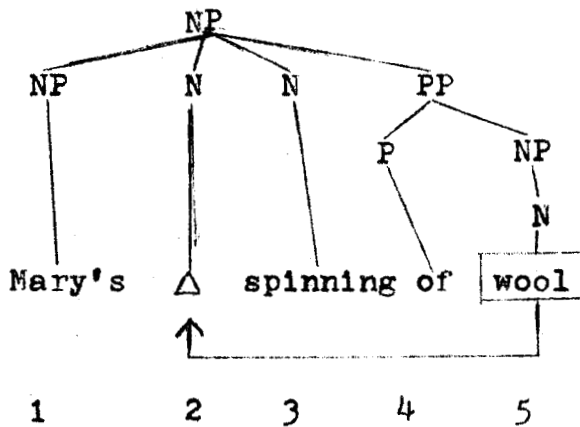
$$1 \quad 2 \quad 3 \quad 4 \quad 5$$
$$\Longrightarrow \quad 1 \quad 5 \quad 3 \quad 4$$

This would be followed by the deletion of the preposition:

$$\Longrightarrow \quad 1 \quad 5 \quad 3 \quad \emptyset$$

I will label this transformation $T_{comp.6}$.
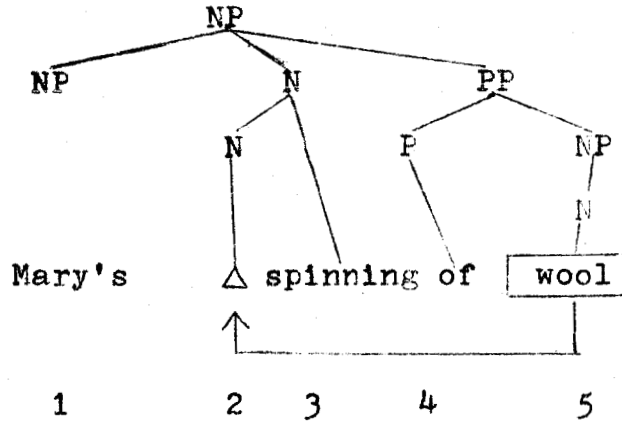
```
                    NP
        NP          N              PP
                    N          P        NP
                                         N
     Mary's      △ spinning of     | wool |
                   ↑_____|

        1          2    3    4         5

  ⟹     1          5    3    4

  ⟹     1          5    3    ∅
```

I will label this transformation T_comp.7.

   The fourth would be a structure-preserving transformation which would move the head N under an empty node under the PP complement.
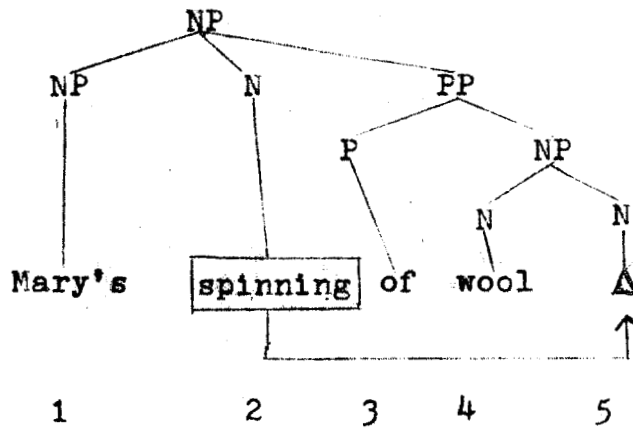

```
                 NP
        NP       N            PP
                         P          NP
                                 N      N
     Mary's   | spinning |  of  wool    △
                 |_____↑

        1        2         3    4        5

  ⟹     1                  3    4        2
```

This would be followed by the deletion of the preposition.

  ⟹   1   ∅   4   2

I will label this transformation T_comp.8.

These transformations will suffice to demonstrate the properties of putative transformations which might be set up to account for a transformational relationship between noun compounds and action nominals.

.32 The structure of noun compounds with gerunds as as R.H.C. and nouns as L.H.C.

I noted in Chapter II, section .8 that noun compounds are nouns and not NPs. Only $T_{comp.7}$ provides an appropriate N node. The other three transformations all have the noun compound dominated by NP.[10] Furthermore, the last three transformations again require new phrase structure rules, which are not required for any other part of syntax, to be added to the grammar. I will examine these transformations in greater detail in the section .4 of this chapter.

If we suppose that noun compounds are derived from action nominals which are in turn derived from Ss, we are faced with a dilemma in that such noun compounds could only be derived from action nominals if the noun compound were preceded by NP's and not when it is preceded by any other determiner. That is, Mary's wool spinning could be derived from Mary's spinning of wool but the wool spinning could not be derived from an action nominal because action nominals equivalent to this noun compound would have to be derived from subjectless Ss; a situation which is impossible under Emonds' constraints.[11] It seems to be an intolerable situation to have Mary's wool spinning derived from one source and the wool spinning derived

from another.

We may well ask at this juncture whether action nominals are transformationally derived. If they are, then noun compounds do not appear to be derived from them. If they are not, then the question of whether noun compounds of the type discussed in this chapter are transformationally derived is reduced to the question of whether noun compounds of this type are transformationally derived from underived NPs.

.33 The productivity of any putative transformation for deriving noun compounds from action nominals.

The productivity of any putative transformation for deriving noun compounds from action nominals is restricted by many of the same factors as restrict transformations linking noun compounds to gerundive nominals.

a) That the head N of the action nominal cannot be derived from prepositional verb.[12]

115) Mary's figuring out of the problem ...

116) *Mary's problem figuring out ...

b) That the NP under the PP complement is expanded only to N.

117) Mary's spinning of the wool ...

118) *Mary's the wool spinning ...

c) That the N under the PP complement is [-proper].[13]

119) Mary's crossing Ohio ...

120) *Mary's Ohio crossing ...

d) That the N under the PP complement is [+generic].

e) That the N under the PP complement is not plural.

   121) Mary's spinning of textiles   ...

   122) *Mary's textiles   spinning ...

Again these constraints pose problems for making the required transformational statement of relationship. If action nominals are transformationally derived from Ss then constraint a) would require a statement of what Lakoff calls "global derivational constraints".[14] Such constraints are not statable within the revised standard theory. If action nominals are not transformationally derived then stating this constraint would require a statement of which node dominates which below the constituent to which the transformation refers. Such statements are also not possible within the framework of the revised standard theory. And last, the structural index of a transformation does not usually refer to the content of a complex symbol. This would be required to state restrictions c) and d).

   .34 Selectional properties of action nominals and noun compounds.

Action nominals and noun compounds appear to have different selectional properties in the adverbials they will pattern with. Action nominals appear to pattern with a full range of adverbials.

Time adverbials:

123) Alfred's examining of algae yesterday ...

124) Jose's grinding of corn in the afternoon ...

125) Ethel's disposing of sewage while the show went on ...

Manner adverbials:

126)?Alfred's examing of algae quickly ...

127) Jose's grinding of corn in a leisurely manner ...

128)?Ethel's disposing of sewage very frantically ...

Place adverbials:

129) Alfred's examining of algae indoors ...

130) Jose's grinding of corn at home ...

131) Ethel's disposing of sewage at the townhall ...

As I noted in section .24 the corresponding noun compounds do not take a full complement of adverbials. The examples and comments of section .24 will serve to illustrate this point.

.35 Conclusion.

I conclude from the above facts that the evidence in favour of deriving noun compounds from action nominals is not great and that there are many problems with this proposal. I therefore assume that noun compounds are not derived from action nominals.

.4 Are noun compounds with gerunds as R.H.C. and nouns as L.H.C. transformationally derived from deep structure NPs?

If noun compounds with gerunds as R.H.C. and nouns as L.H.C. are transformationally derived from base structure NPs then the two constituents of the noun compound must be

generated by some combination of the following base rules.

a) $\overset{\approx}{\text{N}}$ $\longrightarrow$ [SPEC, NP] + NP^n + [COMP, NP]

b) NP $\longrightarrow$ [SPEC, $\overline{\text{N}}$] + $\overline{\text{N}}^n$ + [COMP, $\overline{\text{N}}$]

c) $\overline{\text{N}}$ $\longrightarrow$ [SPEC, N] + N^n + [COMP, N]

Where [SPEC] refers to specifiers and [COMP] refers to

complements of various kinds.[15] These are the only phrase

structure rules which introduce the category symbol N. As the

R.H.C. of the noun compounds of this chapter is its head and

the only N which occurs as head in the above rules is the N

in rule c), the L.H.C. must originate in either a specifier or

a complement. Only one specifier expands to dominate an N:

d) [SPEC, $\overline{\text{N}}$] $\longrightarrow$ NP's

i.e. the determiner structure which has been used throughout

this thesis. Of the complements only [COMP, N] expands to

dominate an N.   These complements are the post-nominal

PPs and Ss which are explored in Chomsky, (1970).

e) [COMP,N] $\longrightarrow$ (PP) (S)

The suggestion of deriving noun compounds from N + [COMP,N]

structures is by no means new. In fact the majority of sources

for noun compounds in Lees, (1960), are, if the modifications

to the grammar since its time of writing are taken into account,

of the type N + [COMP, N]

The question which introduced this section can now be re-

phrased to read: are noun compounds with gerunds as R.H.C. and

nouns as L.H.C. derived from NP's + N or from N + [COMP, N?

The first of these is not a serious contender because it comes

up against many very serious objections right at the outset.
Let us propose, for example, to derive the noun compound
Parkinson's disease, from the noun phrase Parkinson's disease.
ie.   from

```
        N                              NP
       / \                            /  \
      N   N                         DET   N
      |   |                          |    |
Parkinson's disease                 NP    |
                                     |     |
                              Parkinson's disease
```
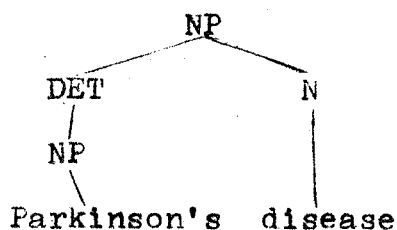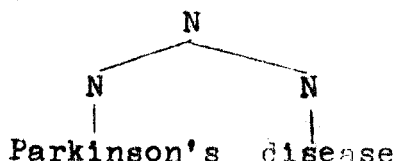
The crucial objection to such a proposal would be that it would
mean that structures such as John's Parkinson's disease would
be impossible.because the determiner of the source NP
has been shifted to form part of the compound. Further objections
such as the fact that the source and the compound do not have
the same meaning, that there is no N node available to shift
the NP's under, make a very good case for rejecting this source.

However, the N + [COMP, N] source has rather more to
recommend it. The recommendations have already been made in the
previous section where I took it that action nominals had the
structure of noun phrases. I will not repeat this evidence
here. But, since I argue against this proposal I will present
a full case against it.

.41 Putative transformations for deriving noun compounds
which have gerunds as R.H.C. and nouns as L.H.C. from base
marker NPs.

The transformations which might be set up to derive
noun compounds from base structure NPs are, in first instance,

of the same general class as those four transformations which were set up to account for the relationship between noun compounds and action nominals. I will deal with each of these possible cases in turn. As stated in section .3 of this chapter, $T_{comp.5}$. moves the $[COMP,N]$ over the head noun and then a deletion transformation deletes all but the N which the $[COMP,N]$ dominates. I said in section .2 and .3 that this complement moving transformation was a minor movement rule under the broad condition on such rules in Emonds, (1970). This condition states that:

a) "A minor movement rule is a transformation which moves a specified constituent B over a single adjacent constituent C."

(ibid, p.158.)

However, there are supplementary conditions on minor movement rules which are most important. These state that:

b) "B and C are mutually in construction ..."

c) "B is not a lexical node (N,A, V, P, M, ...)"

d) "C is not a function category node (DEG, DET, PRT, TENSE, NEG, ...)"

e) "Neither B or C are PP or S ..."

f) "A minor movement rule may not move a phrase node."

(ibid, p.185.)

It is obvious that if a) were the only condition on minor movement rules, then transformations of this type would have the power to produce all left to right permutations of elements in the base marker. This would produce surface structure configurations such as the following:
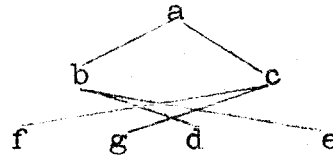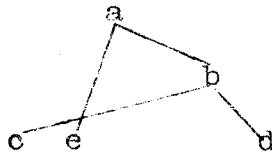
The introduction of condition b) reduces the power of minor movement rules to the extent that left to right permutation of constituents would be permitted so long as it did not cross constituent boundaries, that is, they would be able to change any right to left ordering of phrase structure rules. This would produce surface structure configurations such as the following:

If these were the only two conditions on minor movement, rules, they would still be rules of considerable power. So much so that they would eliminate the distinction between root transformations and minor movement rules in the sense that these would have the same power, (although not the same generative capacity.) It is therefore essential that further conditions be placed on minor movement rules, (that is if Emonds' constraints are to survive as a claim on weak as well as on strong generative capacity.)

The complement moving transformation, $T_{comp.5}$, meets conditions a) to d). As evidence for this transformation is not great, this failure to meet conditions e) and f) which

are otherwise well motivated constraints, is another important piece of evidence against it.

If all conditions a) - f) are made to apply it can be shown that no minor movement rule can derive the type of noun compounds being examined in this chapter. First, any type of complement movement would be impossible because [COMP,N] expands to dominate only phrase nodes thus breaking condition f) and these phrase nodes are either PP or S thus breaking condition e). Second, any minor movement rule is ruled out by the fact that the phrase structure rules used in this grammar do not generate two Ns as sister constituents under N, except where the two Ns are coordinate conjoined Ns. This case will be examined in Chapter IV.

The other three transformations, T_{comp},6,7, and 8, are all structure-preserving transformations. The structure-preserving constraint states that:

"A structure-preserving movement rule is a transformation such that; i) the structural description specifies the location in trees of two nodes B_1 and B_2 bearing the same label X and ii) the structural change moves B_2 and all the material dominated by it into the position of B_1 deleting B_1."

(Emonds, 1970, loc. cit.)

Thus for noun compounds to be generable by structure-preserving transformations the base rules need to be augmented so as to generate the structure of potential noun compounds. As I stated in section .3 of this chapter, none of the structures resulting from the operation of T_{comp}, 6,7 and 8 is the correct surface structure of the noun compounds under discussion. Furthermore the base rules which would have to be

added to the phrase structure rules of the grammar are not ones
which are required for other syntactic processes. To produce
the correct surface structure a rule for the expansion of N
has to be introduced such that:

$$N \longrightarrow N + N$$

A structure-preserving transformation could then be set up
as follows:
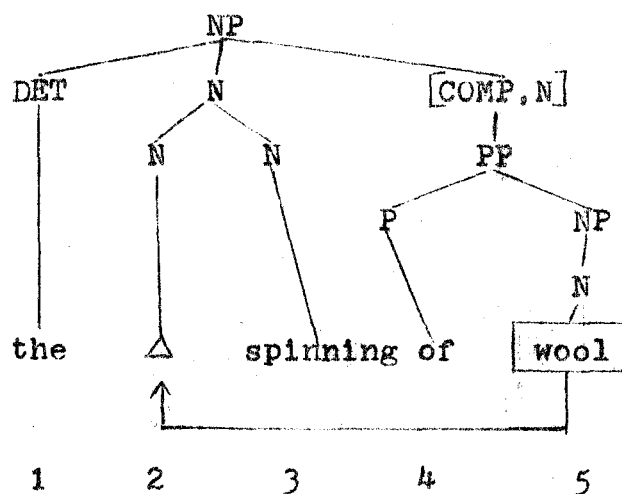
$$\longrightarrow \quad 1 \quad 5 \quad 3 \quad 4$$

This would be followed by the deletion of the preposition:

$$\longrightarrow \quad 1 \quad 5 \quad 3 \quad \emptyset$$

I will label this transformation $T_{comp,9}$.

    This proposal has a certain appeal in that it provides
the correct surface structure and does so using a formally
admissible transformation. However, these two sources of this
proposal's appeal are deceptive. First, the phrase structure
rules have been augmented so as to provide the correct
surface structure and second, the transformation has been set
up to be admissible under Emonds's conditions. Thus these

recommendations for $T_{comp,9}$ are a result of ad hoc manipulation rather than empirical motivation.

One empirical constraint which does bear on this proposal is Emonds suggestion that lexical nodes not take recursion.[16] If the rule given above for expanding N is added to the grammar then this constraint is broken. I shall have more to say about this in the next chapter.

A final possible transformational source for the noun compounds of this chapter could come from a rule for expanding N as follows:

$$N \longrightarrow S$$

so that, for example, <u>wool spinning</u> might be derived from
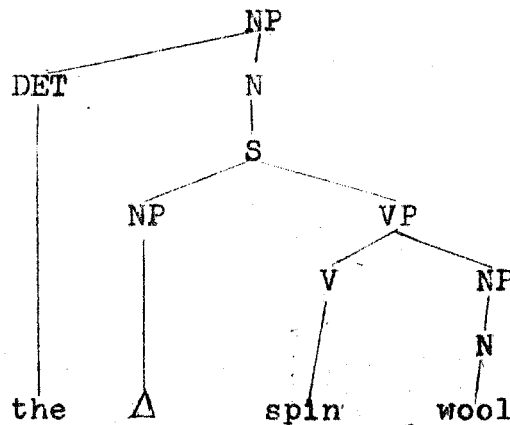
Over and above all the problems of how to motivate all the transformations which would be required to produce the correct surface structure, this proposal runs into two crucial objections if we accept Emonds' constraints on transformations. First, the rule allows for recursion below a lexical node and second, it has an empty node which is not filled at any time during the derivation.[17]

I therefore reject this proposal.

.42 The structure of noun compounds with gerunds as R.H.C. and nouns as L.H.C.

An interesting fact about the noun compounds under · discussion in this chapter is that when they are [+generic] they do not take a determiner: e.g.

132) Elephant hunting takes place in June.

133) Coffee grinding should be done before dinner.

134) Car washing is a boring job.

If these compounds are derived from some N + [COMP,N] structure, such sources are ungrammatical without an initial determiner:

135) *Hunting of elephants takes place in June.

136) *Grinding of coffee should be done before dinner.

137) *Washing of cars is a boring job.

Furthermore, in all these cases the L.H.C. of the compound has a plural in the source. Both of these facts could only be got round by resorting to ad hoc devices.[18]

.43 The productivity of putative transformation for deriving noun compounds from NPs.

Again a number of the facts of productivity mentioned in sections .2 and .3 can be brought to bear on the question of whether noun compounds are transformationally derived from NPs.

a) The head of the NP cannot be derived from a prepositional verb.

b) The L.H.C. N has to be [-proper] in the source NP.

c) The L.H.C. N has to be [+generic] in the source NP.

d) The L.H.C. N cannot be plural in the source NP.

These constraints again pose identical problems for these transformations as they did in section .33. d) poses the additional problem that for many noun compounds a semantic paraphrase   suggests that the source structure must have a plural noun, that is if the meaning-preservation hypothesis is to remain in effect. For example ski jumping, fist fighting, dog food, and many more must take a plural on the L.H.C. in a semantic paraphrase: e.g.

138) Jumping with skis ...

139) Fighting with fists ...

140) Food for dogs ...

There are other cases where one would expect a plural for lexical reasons. Nouns like trousers, pants, scissors take a plural morpheme generally. However in noun compounds this plural form is often absent: e.g. trouser outfit, pant coat. This presents insuperable difficulties to a transformational theory of compounding.[19]

.44 The semantics of noun compounds and their putative NP sources.

So far we have encountered a large range of problems in trying to give a transformational account of the noun compounds of this chapter. So much so that it appears the transformational enterprise should be abandoned. This negative conclusion

receives confirmation when the semantics of these noun compounds and their putative sources are examined. In this section I will examine a small number of noun compounds and their possible sources to see if the meaning-preservation hypothesis holds systematically between them.

[COMP,N] can re-write as either PP or S or some combination of these. I will examine only PPs here as they are sufficient to demonstrate the nature of the semantic relations being examined. Take for example the following paraphrase pair:

N	[COMP,N]	noun compound
acting <u>on the stage</u>		<u>stage acting</u>

Notice that both structures can take a PP complement,

<u>acting on the stage at home</u>   <u>stage acting at home</u>

In the source structure the PP complements are read in such a way that the location of the first mentioned place is within that of the second. In the noun compound this is not the case. To re-phrase, the source structure has the implication that the stage is within the home whereas the noun compound structure does not have this implication. Where this implication that one place is within the other is not possible, the source structure is semantically anomalous:e.g. <u>acting on the stage in the wings</u> whereas the noun compound is not, <u>stage acting in the wings</u>.

The same phenomenon can be observed when the PPs have time reference. For example, <u>driving in the weekend during the week</u> is semantically anomalous whereas <u>weekend driving</u>

<u>during the week</u> is acceptable. This indicates that the source and the compound are not synonymous.

There are a number of noun compounds for which it is difficult to postulate sources at all. I will examine a few of these.

a) <u>Parachute jumping</u>

For this compound the paraphrase which comes most readily to mind is "jumping with a parachute". However, a better paraphrase would be "jumping with a parachute on" or jumping with a paraphute on out of an aeroplane" or better still "jumping out of an aeroplane while it is up in the air with a paraphute on one's back or front." Of all these paraphrases only the last two seem an adequate paraphrase of what the native speaker knows about <u>parachute jumping</u>. However, having the base marker which underlies either of these two paraphrases as source for <u>parachute jumping</u> is patently absurd. One need only contemplate the number of obligatory deletions needed for this to be obvious. Furthermore, some native speakers will vary in their knowledge of the semantics of this compound. Some speakers will know that parachute jumping entails having a parachute on but they will not know whether the parachute is on one's back or front. Other speakers will know that it can be either. Still others will think that the parachute is on one's back, and so on.

These facts would make the setting up of a plausible source for this compound very difficult.

b) skydiving

This compound creates the same problems as parachute jumping in that a paraphrase which incorporates what the native speaker knows about skydiving would require a very long source which would vary from speaker to speaker.

However, there is a second problem when one attempts to paraphrase skydiving which has to do with the indeterminacy of the preposition in the PP complement of the source. The sky in skydiving is paraphrasable by some kind of complement PP which refers to place but it is impossible to tell, either from the grammar of noun compounds or the real world facts of skydiving whether the preposition is in , "diving in the sky" or from, "diving from the sky". It could be maintained that skydiving is two ways ambiguous and that it therefore has two sources, one with each of the two prepositions. But this would obscure the fact that the relationship between sky and diving is vague rather than ambiguous. Or it could be maintained that there is a pro-form node in the deep structure which just indicates that the PP complement refers to place. However, this would obscure the fact that skydiving is not paraphrasable by all the possible PPs which could refer to place but only by specific PPs.

c) shoplifting

A search for an adequate paraphrase of this compound would probably come up with something like "the lifting of merchandise from shops." However, lifting here has the reading of stealing.

There are some dialects in which the verb <u>lift</u> has this reading
in isolation. However there are others in which it doesn't.
For these dialects this reading is only possible in this
compound. There is thus no transformational source possible
for <u>shoplifting</u> in these dialects.

Furthermore, the two other constituents in the paraphrase
are inserted on the basis of the strict subcategorization
features of the verb <u>lift</u> meaning "steal". This verb takes an
obligatory object and the preposition <u>from</u> for the location
or party from which something is stolen. Therefore, lexical
facts are, in this case, the motivation for setting up the
source.

Each of these three examples is a paradigm case which can
be multiplied many times over. It is not necessary to do this
because these three examples have shown that the meaning-
preservation hypothesis does not hold in all cases where
putative sources are set up for noun compounds which have
gerunds as R.H.C. and nouns as L.H.C.

.5 Conclusion.

I have shown in this chapter that there is a wide range
of facts which argue against the strong form of the
transformational hypothesis of noun compounds. Specifically,
I have argued that noun compounds are not derived from gerundive
nominals, action nominals and deep structure NPs. The facts
which I have brought to bear on this question cover the

structure of the compounds and their putative sources, the structure and admissibility of the putative transformations which might be set up to account for these noun compounds, the productivity of such transformations, the selectional restrictions of the compounds and their sources, and the semantics of both. I conclude that there is sufficient good evidence to indicate that noun compounds with gerunds as R.H.C. and nouns as L.H.C. are not transformationally derived.

Notes:

1. By "transformational theories of noun compounding" I mean
    theories which hold that a given surface structure is
    transformationally derived. This sense of "transform-
    ational theory" is not to be confused with "transform-
    ational theory" as a label for the general theory of
    transformational-generative grammar.

2. In Lees, (1970), pp.137-141.

3. See Chapter I, section .3.

4. There is one further possibility for a transformation
    which would move the main V to an empty node under the N.
    However, this transformation runs into the same problems
    as $T_{comp.2}$.

5. Such quantifiers are an expansion of the node [SPEC, NP]
    in Dougherty, (1968), and in this position they are
    diagnostic for NP.

6. Examples 39) to 41) may be considered trivial on the
    grounds that NP's and atricles occupy the determiner
    position in the NP and they cannot both occupy this
    position. However, it is not necessarily the case that
    the following structure is ungrammatical :
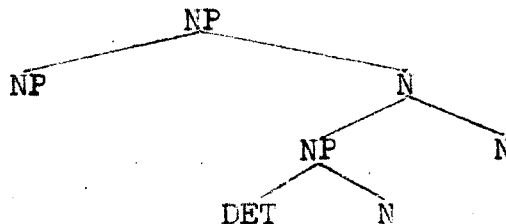
    In fact, I have gone to some lengths in Chapter II, section
    .24 to try to motivate the constraint that NPs do not
    occur as L.H.C. of noun compounds.

7. Speakers differ on the acceptability of these examples.
    These represent my judgements.

8. Provided that the structure of such constructions is
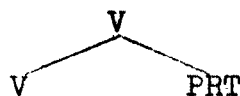
    the structural index of a transformation would have to
    specify which nodes are dominated by one of the nodes
    which is moved by the transformation in order to account

for this constraint. This would be an inovation in the theory of transformations.

9.   Speakers again appear to differ on the acceptability of some of these examples. These represent my judgements.

10.   Or $\bar{N}$. I have left this node out of consideration because inserting it would not materially alter the argument.
       There is a fifth transformation possible analogous to the one described in note .4. This transformation would move the head N to an empty node dominated by the N under the complement PP. This transformation runs foul of the same problems as $T_{comp.7}$.

11.   Emonds, (1970), permits empty nodes in trees so long as such a node is filled at some time during the derivation, (ibid, p.29.)

12.   I take no stand here on whether these are, in fact, transformationally derived or whether they are derived by lexical rules of the type outlined in Chapter VI of this thesis.

13.   This fact is also interesting when one notes that many action nominals cannot take [+proper] objects:
     e.g. *Ethel's loving of Brooklyn...
           *John's kicking of Henry...
This fact supports the conclusion of Stockwell et al., (1968), that action nominals are not transformationally derived.

14.   See, for example, Lakoff, (1970).

15.   These rules are taken from Dougherty, (1968), and they subsume all the phrase structure rules which are used in grammars of the revised standard theory to generate the base marker NP.

16.   See Chapter I, section .3.

17.   See note 11.

18.   Dick DeArmond has suggested to me that the definite article deletion could possibly be related to a putative rule which would delete definite articles before proper nouns when these are not followed by a noun complement.
     e.g. The Bill I knew in L.A. is in town.
         *The Bill is in town.

19.   Unless one resorted to ad hoc deletion.

CHAPTER IV

The weak form of the transformational hypothesis.

In this chapter I evaluate the weak form of the transformational hypothesis of noun compounding. Such a hypothesis would hold that some specified class of noun compounds is transformationally derived.[1] This evaluation is a more difficult task than that undertaken in the previous chapter because disconfirming a weak hypothesis is analogous to proving a strong hypothesis. In the case of noun compounds, this task is made more difficult by the wide range of structures I have defined as noun compounds.

It would be a singularly arduous task to attempt to refute any possible transformational theory of noun compounding by attempting to refute all such theories one by one. Instead I shall show that the evidence for such theories is, in principle, insufficient to establish a need for them. I will then show that transformational theories of noun compounding are, in principle, unable to explain the facts of noun compunding.

.1 Paraphrase evidence for noun compounds being transformationally derived.

The strongest evidence which has been brought forward to champion the transformational position on noun compounding is paraphrase evidence. Lees, (1960) can be used as a model for the use of paraphrase evidence in setting up a transformational hypothesis of noun compounding.

of grammatical form in nominal compounds may be, we might
note the following miscellaneous examples:

puppydog	(= dog which is a puppy)
bulldog	(= dog which is like a bull)
shepherd's dog	(= a shepherd's dog)
watchdog	(= dog which watches something)
police dog	(= dog which is used by the police)
sheep dog	(= dog which herds sheep)
prairie dog	(= dog which inhabits the prairie)
hang dog	(= one who hangs a dog)
fog dog	(= "dog" which is seen in the fog)
lapdog	(= dog for the lap)
hunting dog	(= dog with which one hunts)
codfish	(= fish which is a cod)
blackfish	(= fish which is black)
weaverbird	(= bird which weaves (a nest) or
	= bird like a weaver)
redwing	(= (bird which has a) red wing)
zebrafish	(= fish like a zebra)
pronghorn	(= (sheep with a) horn like a prong)
Croton bug	(= bug named after Croton)
stingray	(= ray which stings (people))
howling monkey	(= monkey which howls)
Eskimo dog	(= dog used by Eskimo)
field mouse	(= mouse which inhabits the field
night owl	(= owl which flies at night)
rattlesnake	(= snake with a rattle)
riding horse	(= horse for riding)
wood pecker	(= (bird which) pecks wood)
leaf-hopper	(= (bug which) hops on a leaf
talking machine	(= machine which talks)
fishing village	(= village in which they fish)
laughing gas	(= gas which causes laughing)
eating apple	(= apple for eating)
baking powder	(= powder for baking (with))

The expressions which follow these examples of nominal
compounds indicate roughly the differences in grammatical form
embedded within the compounds, and in most cases, as we shall
see, these expressions will serve as the sources for
transformational rules to generate the compounds. If this
seems at first sight to be a rather improbable profusion of
grammatical form in compounds, we must keep in mind that, as is
shown by these examples, English nominal compounds incorporate
the grammatical forms of many different sentence types, and of
many different internal grammatical relations within sentences,
such as subject-predicate, subject-verb, subject-object, verb-
object, etc. Thus the variety of grammatical form in compounds
must compare with that found within different sentences, and
from this point of view the profusion would not seem too great.

(ibid, pp.118-119.)

In order to see whether placing such weight on paraphrase
facts is warranted I will briefly examine the notion "paraphrase"
and its place in transformational theory.

.11   Considerations in the use of paraphrase evidence
in syntax.

The notion "paraphrase" derives from a Greek word meaning
"to say the same thing in different words." The notion may
therefore be broken down for the sake of convenience into two
parts:

a) saying the same thing

b) in different words.

It follows from this definition that two structures which are
paraphrases must be synonymous. I will refer to such structures
as semantic paraphrases. In <u>Syntactic Structures</u> Chomsky
shows that in order to develop a formal account of those
semantic paraphrases which are systematically related
transformational mechanisms are needed. Thus two different
surface structures which are related in this way (I shall
refer to these as systematic paraphrases) are in turn related
to a common underlying form by transformations.

However, although the transformational component does
provide an explication of systematic paraphrase, this is not
the primary motivation for setting up this component nor do
intuitions about paraphrase constitute primary evidence for
a particular transformation. This point is succinctly made
in Chapin, (1967):

"Syntactically demonstrable relatedness between sentences
can explain paraphrase, but paraphrase can not of
itself predict syntactic relatedness."
(ibid, p.62.)

This is borne out quite clearly in <u>Syntactic Structures</u> where

the primary evidence for setting up both the transformational

component and individual transformations has motivation

independent of paraphrase.

The most general use made of paraphrase by transformational

grammarians is as a hueristic device which can suggest

derivational origins of structures and common underlying forms

for semantic paraphrases. This attitude to paraphrase is made

explicit in Katz and Postal, (1964):

"We have tacitly made use of the principle whose explicit
formulation could have hueristic value for those engaged
in investigating syntactic structure ... The principle
can be stated as follows: given a sentence for which a
syntactic derivation is needed; look for simple
paraphrases of the sentence which are not paraphrases
by virtue of synonymous expressions. On finding them
construct grammatical rules that relate the original
sentence and its paraphrases in such a way that each of
these sentences has the same sequence of underlying P
markers. Of course, having constructed such rules it is
still necessary to find independent syntactic justification
for them."
(ibid, p.157.)

Note that Katz and Postal explicitly exclude semantic paraphrases

which are not also systematic paraphrases.[2]

Recently it has been suggested that even in cases where

a systematic paraphrase relation has some independent syntactic

support, this is still insufficient to force the adoption of

a transformational derivation.[3] I will take it,therefore, that

paraphrases of noun compounds have to be shown to be systematic

to qualify as hueristically useful in suggesting derivational origins for noun compounds and that any theory making use of this hueristic aid will require independent syntactic justification.

.12 Claims about noun compounds and their paraphrases.

The strongest claim that can be made on the basis of paraphrase evidence is that grammatical relations underlie noun compounds. For example, it might be claimed that the relation of verb-object underlies the compound wife beating because a partial paraphrase of this compound is "somebody beats his wife". Looking at possible paraphrases of noun compounds such as those by Lees quoted earlier, one possibility for a grammatical relation underlying noun compounds does present itself and that is that noun compounds are derived from N + [COMP,N] structures. The relationship of this structure is a modifier-head relationship such as is common to most noun compounds.[4] The exception to this generalization is the class of coordinate conjoined noun compounds. I will take it therefore as a hypothesis that some noun compounds are transformationally derived from N + [COMP,N] structures. It remains to be seen now how reliable the paraphrase indications for this hypothesis are and what syntactic justification can be found for it.

.13 Problems with paraphrases.

.131 Kennings.

I have refered briefly in Chapter II to a class of noun
compounds I called kennings. This class creates problems when
one tries to find adequate paraphrases for it, and thus,
indirectly, also creates problems for the transformational
theory of noun compounds. I have noted in Chapter II that the
internal structure of kennings is like that of other noun
compounds in that a relationship of modifier to head exists
between the R. and L.H.C.s. What distinguishes kennings from
other noun compounds is that they have idiomatic semantic
readings. For example, redskin has the idiomatic reading
"North American Indian". And, although the native speaker
can provide paraphrases of kennings, there is no systematic
paraphrase relation between these compounds and their para-
phrases.

.132 Idiomatic readings of noun compounds.

Besides kennings there are other noun compounds which have
partially idiomatic semantic readings. I noted some of these
in Chapter III, section .43. Further examples can be found in
Lees' list quoted earlier; in fact each of the compounds in
this list is idiomatic in its semantics. This can be seen by
the fact that it is not possible to predict systematically
what the paraphrases of each of these might be on the basis
of   their structure and the lexical meaning of the two
constituents. Also the paraphrases each contain
choices of structure and lexis which are idiosyncratic to
that compound and perhaps one or two other compounds.

The only common feature is that the paraphrases are all of the form N + [COMP,N].

Furthermore there is a systematic difference between the compounds and their paraphrases. This difference concerns the truth values associated with assertions about the noun compound and its associated paraphrase. Using Lees' examples again, the following examples will illustrate this point.

1) This is a dog which is like a bull but this is not a bulldog.

2) This is a dog which watches something but this is not a watchdog.

3) This dog is used by the police but this is not a policedog.

4) This is a dog which herds sheep but this is not a sheep dog.

5) This is a mouse which inhabits the field but this is not a field mouse.

None of these sentences are necessarily contradictory. If the paraphrases were truly synonymous then these sentences would be necessarily contradictory. It seems that there is no noun compound for which this is not possible. Look again at the example parachute jumping examined in the last chapter. To say I went jumping out of an aeroplane while it was up in the air with a parachute on my back is not necessarily to say I went parachute jumping.[5]

The distinction I am drawing here may appear to be a fine

one but it is none the less real and it will be explained further
in Chapter VI. Speaking rather loosely one could say that
noun compounds appear to have a degree of idiomaticity built
into them just by virtue of their being noun compounds. This
suggests that it is unlikely that a perfect semantic paraphrase
for noun compounds can be found, let alone a systematic one,
and, consequently that a meaning-preserving transformation can
be formulated to express the relation between noun compounds
and their paraphrases.

.133 Ambiguity in noun compounds.

Lees, (1960), makes the observation that many noun compounds
are ambiguous because they have more than one possible para-
phrase. However, he picks one paraphrase for each compound he
deals with. This inconsistency mirrors a dilemma which has to
be faced when looking at noun compounds and their paraphrases.
A native speaker when asked to paraphrase a noun compound he
knows will tend to give one characteristic paraphrase. However,
when asked to paraphrase a noun compound he does not know
he will be able to produce a number of different paraphrases.
The paraphrases quoted from Lees,(1960), at the beginning of
this chapter represent the characteristic responses one might
get from a typical native speaker. But potentially each of
these compounds is paraphrasable in a number of different ways.
Apart from the coordinate conjoined noun compounds, noun
compounds have two identifiable characteristics in their para-
phrases. The paraphrase can always be put in the form

N + [COMP.N] and it is always semantically plausible. However, the native speaker knows that only certain of all the possible paraphrases are correct.

The question therefore arises, should all possible paraphrases be incorporated somehow into the grammar of noun compounds? Or, to put it a different way, are noun compounds syntactically ambiguous? If the answer is affirmative it will be necessary to incorporate into the grammar transformational mechanisms which will generate the same noun compound X from all of its n semantically plausible paraphrases. But how many plausible paraphrases does a given noun compound have and how plausible is plausible? These questions do not have easy answers. However, an example will illustrate the problem. Take the compound <u>cathedral advertisement</u>. Possible paraphrases of it are:

a) "advertisement by the cathedral"

b) "advertisement for the cathedral"

c) "advertisement of the cathedral"

d) "advertisement outside the cathedral"

e) "advertisement inside the cathedral"

f) "advertisement on top of the cathedral"

g) "advertisement which looks like a cathedral"

These paraphrases become less and less plausible but none is utterly implausible. Nor does the list finish here. With a little ingenuity it is possible to dream up any number of further paraphrases. It would seem that instead of asserting

that <u>cathedral advertisement</u> is N ways ambiguous it would be more accurate to say that one did not know the meaning of this compound although it could be given by any of its n semantically plausible paraphrases.

.134 Vagueness of noun compounds.

The question of vagueness is closely related to the discussion of the previous section. There are some noun compounds which the native speaker knows but for which he cannot give an adequate paraphrase incorporating both the L. and R.H.C.s because the relationship between them is vague. In Chapter III I noted <u>sky diving</u> as an example of this. Some further cases would be: <u>house arrest</u>, <u>room service</u>, <u>bathroom</u>, <u>foothold</u>, <u>lifeline</u>. The only ways this vagueness can be accounted for is by listing these as items in the lexicon or by re-structuring the semantic component in some way so as to read these compounds differently from others. There does not seem any way in which this fact about some compounds lends support for the transformational hypothesis of noun compounding.

.135 Lexical ambiguity of constituents of noun compounds.

Another closely related phenomenon is the fact that, in many cases, the speaker's knowledge of a compound is such that he chooses one reading of a potentially ambiguous constituent rather than another. I noted the case of <u>shoplifting</u> in Chapter III. The speaker who knows the meaning of this compound understands that <u>lift</u> in this compound means "steal" and not <u>lift</u> in the sense of "raise". He also knows that

a briefcase, (to borrow an example from the cartoon strip BC),
is not "a trial where the jury gets together and forms a
lynching party", i.e. a legal case which is of brief duration
but "a case for holding briefs."

.136 The intrusion of facts relating to material
culture in the paraphrases of noun compounds.

Lees, (1960), states that "... to explain these various
ways in which compounds are understood we cannot simply
allude to the speaker and hearer's common knowledge of their
material culture." (ibid, p.117.) However, it is my contention
that the speaker's understanding of noun compounds as revealed
by paraphrase would indicate that elements relating to material
culture frequently enter into his choice of paraphrase. This is
quite obviously the case with the paraphrases of Lees quoted
earlier. To give some substance to this claim I will examine
some of these paraphrases.

a) bulldog and sheepdog

These two compounds are paraphrased differently by Lees.
But why are they paraphrased differently? Bull and sheep
both have the same syntactic feature composition but native
speakers of English know that some speakers of English character-
istically use dogs to herd sheep but not to herd bulls. He also
knows that sheepdogs are used, characteristically, to herd
sheep whereas bulldogs are not so used to herd bulls. This
seems to me to be the reason why these two compounds are
paraphrased the way they are and it seems to me to involve such

knowledge of material culture' as would be unwelcome in the syntactic component of a transformational grammar.

b) police dog

The native speaker's knowledge of his material culture also involves knowledge that police use dogs and that such dogs are usually called police dogs. Furthermore he knows that dogs are not usually used to herd police and that dogs are not like police in any clearly defined way.

c) prairie dog

The native speaker may also know that a prairie dog is not a dog which lives on the prairie, (although there is no reason why it should not be), but that it is actually a type of rodent.

This type of reasoning can be carried on at some length; stage actors act on the stage but screen actors do not, elk hounds were once used to hunt elk but Bassett hounds were never used to hunt Bassetts. It seems to me that, in very many cases, knowledge of the speaker's material culture enters into his paraphrasing of noun compounds.

.14 Conclusion.

The indications from this investigation of the paraphrases of noun compounds are that there are no systematic paraphrases of noun compounds apart from some minor exceptions. The paraphrases have suggested that the relationships between the R. and L.H.C.s of noun compounds are idiosyncratic.

.2 Structural evidence.

.21 Structural evidence in favour of the transformational
hypothesis of noun compounding.

The only fact which stands out from the structure of the
paraphrases of noun compounds is that they always take the form
N + [COMP,N] , except for the class of coordinate conjoined
compounds briefly described in Chapter II, section .42. I
will deal with the exception first.

.22 Coordinate conjoined noun compounds.

This class is an exception because members of it can not be
paraphrased by N + [COMP,N] structures. Instead they always
have a systematic paraphrase of the from "N and N". I will
regard this class, tentatively, as a form of coordinate conjoined
structure. As such it is subject to the claims of Dougherty,
(1968), that all coordinate conjoined structures are generated
by phrase structure rules. Whether or not these compounds
are in fact generated by Dougherty's rules will be investigated
in Chapters V and VI. For the moment I will take it that this
class is not transformationally derived.

.23 Structural evidence against the transformational
hypothesis of noun compounding

.231 The structure of complex compounds.

In Chapter II, I noted that noun compounds which have
noun compounds as constituents have different structural
characteristics from simple compounds; I summarised these as
"if the L.H.C. of a noun compound is a noun compound itself,

then the R.H.C. must be a noun or a noun compound. If the R.H.C. of a noun compound is a noun compound itself, then the L.H.C. must be either a noun, a noun compound or a syntactic fragment." On the face of it, these facts are counter-evidence to the claim that noun compounds are nouns. I suggested tentatively in Chapter II, section .74 that the rules of complex compounding might provide a way round this fact being a counter-example to the hypothesis that noun compounds are Ns. I will show here that the adoption of a transformational hypothesis will not circumvent the problem which these facts present and that the facts of complex compounding do not, therefore, provide any support for the transformational position.

.2311 The type of rule needed for complex compounding.

It is apparent from the statement made above about the restrictions on complex compounding that, if the rule for complex compounding is to be related to the rules for simple compounding, a rule of transformational power is required for complex compounding.

> "If the rules are expressible only in terms of operations
> on constituent structure then the rules are transformation-
> al. If it is expressible entirely in terms of the
> inherent characteristics of the formatives involved,
> say their systematic phonemic representation, context
> free re-write rules would suffice. Or perhaps some
> regularity is involved which can't be expressed in either
> of these ways."
>
> (Chapin, 1967, p.16.)

Let us suppose that noun compounds are generated by a context free re-write rule which re-writes N as follows:

Rule a)　　　　N ⟶ N + [COMP,N]

and a second rule which would re-write [COMP,N]:

$$\text{Rule b)} \qquad [\text{COMP},N] \longrightarrow \left\{ \begin{array}{l} N \\ A \\ Nu \\ Prep \\ Conj \\ PP \\ \frac{S}{N} \\ etc. \end{array} \right\}$$
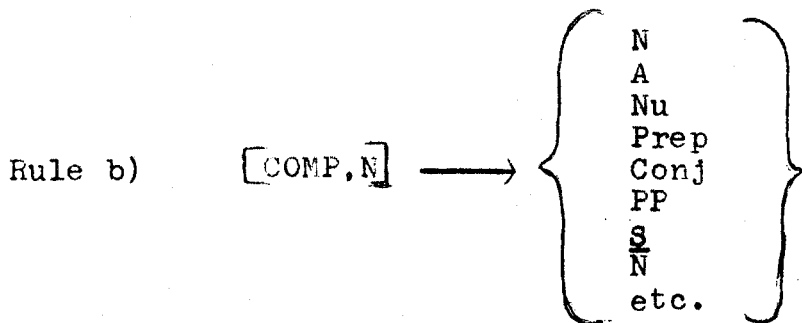
A transformational rule would then be required to shift the required part of the complement to the left of the N head. These rules will be dealt with in detail later in this chapter. Here it suffices to note that rules of this general kind would be the required ones if a transformational solution for noun compounds **was** put forward.

Rule a) above has to be recursive if the hypothesis that noun compounds are Ns is to be retained. If the rule is applied recursively we get ungrammatical structures because of the restrictions on compounding mentioned at the outset of this section. The only way to avoid this situation is to make rule b) context sensitive i.e. sensitive to the presence of an N + [COMP,N] structure on its left.

The introduction of a context sensitive rule at this point might be taken as counter-evidence to our claim that no noun compounds are transformationally derived. However, it will be noticed that making rule b) context sensitive is not quite equivalent to introducing a normal transformational rule. Rule b) is a re-write rule which introduces category symbols. If it is made to introduce certain symbols only in a specified

environment, it becomes a rule unlike other transformational rules which are restricted to moving or deleting symbols except in the case of the strict subcategorization rules for verbs.) [6]

A further argument against this solution is that the source structures for complex compounds appear to be ungrammatical. Such structures would be of the form:

```
              N
            /   \
          N      [COMP,N]
        /   \
      N      [COMP,N]
```
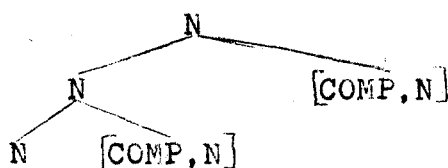
e.g.

1)*((apples on the table) in the house) ...

2) *((a boy who lives down the road) who eats oats) ...

Thus the transformational theory of noun compounding leaves a question mark over the categorial status of noun compounds. It appears that the facts of complex noun compounding offer no firm support for the transformational theory of noun compounding.

.232 The constraints on noun compounds which have prepositions as R.H.C.

I stated in section .24 of Chapter II that noun compounds with prepositions as R.H.C. have only verbs as L.H.C. <u>and</u> these verbs have identical noun forms. This latter constraint cannot be stated by a transformational theory of noun compounds. The lexical nodes of a base tree are single category symbols. The above constraint would require a double category to occupy one node position. This is not possible under present constraints

on grammars. This fact again gives no support to a transform-
ational theory of noun compounds.

.233 The structure of syntactic fragments.

If noun compounds are transformationally derived then
we are faced with the problem of how to account for the fact that
a number of syntactic fragments which function as L.H.C. of
noun compounds are ungrammatical. For example, in
smash and grab raid neither verb can take tense or aspect.
Furthermore, the verb smash is strictly subcategorized to
take an object; and neither of the verbs has a subject. These
facts could only be accounted for in an ad hoc manner by
a transformational theory of noun compounding.

I will now go on to examine some problems which were
examined in the previous chapter to show that they present
problems to the general theory that noun compounds are
transformationally derived.

.234 The dominance of noun compounds by N.

It has been established in Chapter II that noun compounds
are dominated by N and, as stated in section .24 of that chapter,
"no base structure provides a configuration where N dominates
N ". This statement can be profitably enlarged to include the
fact that no base structure provides a configuration where
N dominates anything other than dummy element, i.e. N never
dominates any of the R. or L.H.C.s of noun compounds. This
fact is a partial argument against a transformational theory

of noun compounding in that no other syntactic process appears to require a rule for the expansion of N.

However, surface structures with N dominating further structure do occur and they may be transformationally derived. If they are, it is clear that the phrase structure rules for the expansion of N must be changed to include the possibility of N dominating N. The most likely candidate for this is Rule a) of section .2311 of this chapter. I have noted some objections to this rule already. There are others. This rule would make N into a phrase node in that it dominates a head and a modifier. According to Emonds, (1970),p.185, N is a lexical node. It would be an unfortunate consequence if, as a result of adopting one particular theory of noun compounding, N should be a **phrase** node when it dominates a noun compound and a lexical node when it dominates a simple noun. Thus the fact that N dominates noun compounds is a problem for the transformational theory and provides no support for it.

.235 The internal morphology of noun compounds.

I referred in the previous chapter to the fact that where the L.H.C. of a noun compound is a noun, it cannot generally take a plural. This morphological fact argues against the transformational hypothesis of noun compounding in those cases where the meaning-preservation hypothesis of transform-ations would require a plural for some source structure.

.2351 Cases where plural is lexically necessary.

e.g. <u>pant suit</u>, <u>pant outfit</u>, <u>trouser outfit</u>. <u>Pant</u> and <u>trouser</u> are both lexically marked as taking an obligatory plural. However, when they occur as L.H.C. of a noun compound, they do not always retain this plural morpheme.

.2352 Pairs.

e.g. <u>eyebrow pencil</u>, <u>glove compartment</u>, <u>ski rack</u>, <u>foot bath</u>, <u>hand towel</u>. In each case paraphrases of the compound require a plural for the L.H.C. because such items as eyebrows, gloves, skis, feet and hands characteristically occur in pairs. A source for these compounds would therefore be expected to have a plural on the L.H.C.

.2353 "Foreign" plurals.

e.g. <u>alumnae association</u>, <u>cacti garden</u>, <u>data processing</u>. Some nouns with non-native plurals appear able to take these forms freely in noun compounds.

A transformational hypothesis of noun compounds has no principled way to explain these facts. [7]

.3 The putative transformations for deriving noun compounds.

.31 Base rules.

In order to examine the validity of the transformational hypothesis it is necessary to postulate some new phrase structure rules first. I will suppose that rules a) and b) presented earlier in section .2311 approximate to the required

phrase structure rules. The exact form of these rules will be discussed in the next chapter. However, it is possible to discuss these rules in principle as sources for noun compounds.

.32 Transformations.

In Chapter III I outlined a number of transformations which might derive noun compounds of a specified kind from various structures. The transformations which are hypothesised to derive noun compounds from action nominals can also be used here, because the structure of action nominals and the N + [COMP,N] structure, which I have hypothesised as source of compounds, generally are very similar. I will recall the two major possibilities. The first is a minor movement rule which would shift the complement to the left of the head. It would be followed by rules to delete any constituents other than the required L.H.C. The arguments which I presented against this proposal in Chapter III were quite general and therefore apply here also.

There area number of further objections. First, the [COMP,N] which functions here cannot be the same [COMP,N] which is appears right of N in the re-write rule for $\bar{N}$. Only PPs and Ss are exponents of this category. In many cases these cannot be sources for the L.H.C.s of noun compounds. For example, it is difficult to envisage how these two nodes could account for the numerals which function as L.H.C. of some noun compounds. Even in those cases where the L.H.C. of a noun compound is a

PP or S, this transformation cannot give rise to the correct structure because the sources are ungrammatical. e.g.

   3) *a feeling in the mood   an in the mood feeling

   4) *an order which is shoot to kill

                             a shoot to kill order

   5) *a feeling out of sorts   an out of sorts feeling.

This leaves the possibility that noun compounds are derived by structure-preserving transformations. In order for this to be the case, the phrase structure rules have to be expanded to include re-write rules of N which would generate all the possible surface structures of noun compounds. These rules would therefore generate all the required surface structures anyway. This possibility is examined in the next chapter. However, it is still possible that noun compounds are generated by structure-preserving transformations. Note that this possibility means that all potential L.H.C.s of noun compounds must be generated in noun complements which are either PPs or Ss.[8] For example, pin cushion could be derived as follows:
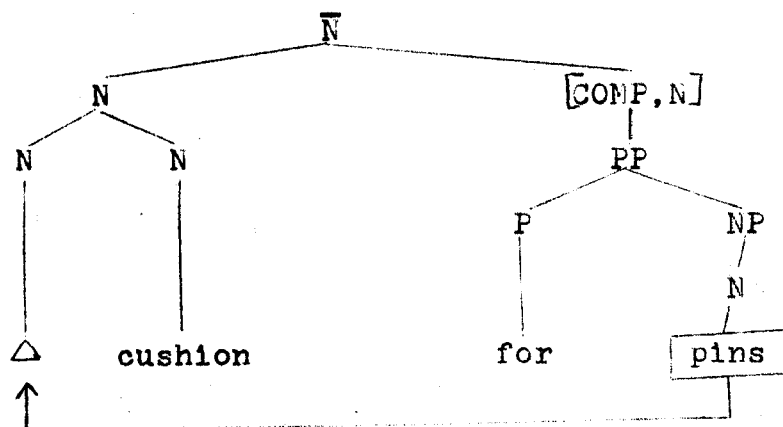
However, even in a simple case such as this the semantic component would not be able to interpret this deep strucure with the reading that the word <u>pin cushion</u> has because the meaning of <u>pin cushion</u> is idiomatic.

If we also include the class of noun compounds which have prepositions as R.H.C., further problems arise. Obviously these compounds are not generated from base structures of the type N + [COMP,N.] e.g. <u>fall out</u> from <u>fall which is out</u> or some other complement. In fact it is difficult to find any source for these compounds.

.33 The productivity of putative transformations for deriving noun compounds.[9]

It is a characteristic of transformational rules that they apply generally to deep structures which have the appropriate configuration to match the structural index on the transformation. However, it is a characteristic of noun compounds that some surface structure configurations occur a great deal more frequently than others. For example, noun compounds with nouns as both L. and R.H.C. are very frequent whereas noun compounds like <u>speakeasy</u> which consist of a verb and an adjective are very rare. This would normally not be any sort of an argument if we were discussing syntactic structures. However, I suggested in Chapter I that noun compounds are characterised by being either known or not known by the native speaker. The matter of productivity is therefore relevant to a discussion of compounds; so much so that we must ask

whether it is appropriate to derive noun compounds transformationally at all. If the native speaker knows some noun compounds and not others then the set of noun compounds which he knows must be finite. It is not a characteristic of transformational rules that they generate finite sets.

.4 Conclusion.

I have suggested in this chapter that the evidence for noun compounds being transformationally derived is not great. I have also shown that there is a good deal of evidence against such a proposal. I propose, therefore, to abandon the transformational hypothesis of noun compounding as this hypothesis appears to offer neither a gain in insight nor even a principled accomodation of the facts.

Notes:

1.   I take it that very little has been achieved by showing that one or two individual compounds can be transformationally derived and that, to make any claim at all, a well defined class of noun compounds must be shown to be transformationally derived.

2.   It must be noted that not all semantic paraphrases are systematic paraphrases or vice versa. Look, for example, at the definition of lexical items. The semantic paraphrase of a single lexical item often requires structures of considerable length. Any dictionary will furnish examples of this. These paraphrases do not constitute facts of syntax.

3.   Chomsky, (1970), shows that although there is some syntactic evidence for relating derived nominals to their associated propositions by transformations, the evidence is not sufficient to force the adoption of a transformational hypothesis of derivational processes.

4.   See Chapter II, section .3.

5.   (I could be trying to commit suicide and only going through the pretense of parachute jumping.)

6.   Chomsky, (1965), p.90 ff.

7.   The theory of compounding presented in Chapter VI would explain these facts as follows. _Pant_ is [+PLURAL] lexically but the -s morpheme is added transformationally whereas the -ae on _alumnae_ is lexically added. The theory of compounding which I present would predict that the morphological form of the plural is available to the rules of compounding in the latter case but not in the former. See Chapter VI, section .332.

8.   That is, for all noun compounds with Ns as R.H.C.

9.   I will not repeat here the problems with productivity which have already been mentioned in Chapter III. Many of these were quite general and therefore apply here.

CHAPTER V

<u>The phrase structure rule hypothesis</u>

<u>of noun compounding.</u>

In this chapter I briefly examine the possibility that
noun compounds are generated by the context-free re-write
rules of the base component. This suggestion has not, to my
knowledge, been made elsewhere but it is not prima facie an
impossible suggestion. The most likely contender for this
suggestion is the class of coordinate conjoined noun compounds
which I identified in Chapter II.[1]

.1 Are coordinate conjoined noun compounds generated
by phrase structure rules?

Coordinate conjoined noun compounds provide an interesting
test case for the phrase structure rule hypothesis because they
are subject to the claims of Dougherty, (1968), that "in an
optimal grammar ... , all conjunction must be generated by
the phrase structure rules of the base." (ibid, p.v.) In order
to demonstrate this contention Dougherty sets up two general
phrase structure rules:

$$X \longrightarrow \begin{bmatrix} +\text{exhaustive} \\ \pm\text{totality} \\ \pm\text{individual} \\ \pm\text{disjunctive} \\ \mp\text{negative} \end{bmatrix}$$

$$\begin{bmatrix} X \\ +\text{exh.} \\ +\text{tot.} \\ \pm\text{ind.} \\ +\text{dis.} \\ \mp\text{neg.} \end{bmatrix} \longrightarrow [\text{SPEC},X] + X^n + [\text{COMP},X]$$

where X represents any of the major categries NP, VP, S and
their heads; [SPEC,X] represents the specifiers of these

structures, e.g. [SPEC,NP] rewrites as quantifiers; [COMP,X] represents the complements of these structures, e.g.[COMP,N] rewrites as the PP and S complements of nouns.

Dougherty also uses a new bar notation to **represent** the degree of dominance by one node over another. The number of bars indicates the degree of dominace of one node over a node with fewer bars. For example $\bar{N}$ dominates Ns, and NP, which Dougherty writes $\bar{\bar{N}}$, dominates $\bar{N}$ at one remove and N at two removes.

The features of the first general rule account for the type of conjunction which is being used to coordinate the structures, and the co-occurence restrictions among the conjunction, the specifiers and the complements.

The index ^{n} over the major category in the second rule indicates the number of structures which have been conjoined.

One further inovation of Dougherty's must be mentioned and that is his "feature percolating mechanism." This mechanism copies the features of a node onto the nodes which it dominates.

"The features of the node X n bar are duplicated on [SP,X] n-1 bar, X n-1 bar, and [COMP,X] n-1 bar."
(ibid, p.146.)
"This feature percolating mechanism is equivalent to the statement: a node is marked for all the features of its head element."
(ibid, p.148.)

The feature percolating mechanism has many functions in Dougherty's grammar which need not concern us here. However one of its functions can be illustrated by showing how it operates to give the correct selectional restrictions between a conjunction and the distributive adverbs which can function as

[COMP,X]. For example, when or conjoins two structures the distributive adverb together does not occur:

1)*John or Jim together caught fish.

Here the node which dominates the conjoined NPs has the feature [+disjunctive].However,together belongs to the class of distributive adverbs which are [-disjunctive]. When the feature percolating mechanism copies the [+disjunctive] feature onto the complement node this takes care of the selectional restriction of 1).

I now note that coordinate conjoined noun compounds like priest-king cannot be generated by the rules of Dougherty, (1968), because this grammar contains no phrase structure rules for the expansion of N. As these compounds are Ns, Dougherty's grammar is deficient in not being able to generate them. However, this is not a serious matter if Dougherty's rules schema outline above can be naturally enlarged to include a rule for the expansion of N. In order to conform to the general pattern which Dougherty lays down for phrase structure rules, the required rule would have to be:

$$N \longrightarrow ([SPEC,\overline{N}^1]) + \overline{N}^{1^n} + ([COMP,\overline{N}^1])$$

where the bar minus one indicates that these nodes are dominated by N. This rule can be interpreted by supposing that $\overline{N}^1$ represents noun stems and that $[COMP,\overline{N}^1]$ is the source of all the L.H.C.s in the class of noun compounds which has a modifier-head structure.[2] This rule would generate all the coordinate conjoined noun compounds. However, there are problems.

First, there are no exponents of $[SPEC,\bar{N}]^1$. No determiner or quantifier functions directly before noun compounds.

Second, this class of compounds only occurs with two constituents. For example both of the following are ungrammatical with the paraphrase "N and N and N":

2) *fighter bomber glider

3) *priest king archbishop

Third, the two constituents have a conventional order:

3) <u>priest king</u>   but not   <u>king priest</u>

4) <u>fighter bomber</u> but not   <u>bomber fighter</u>

Fourth, there are no coordinate conjoined noun compounds which are understood as disjunctively coordinated, i.e. where the conjunction is understood as <u>or</u> or <u>neither nor</u>. This means that the rule for the expansion of N would have to read:

$$N \longrightarrow \begin{bmatrix} +\text{exhaustive} \\ +\text{totality} \\ +\text{individuality} \\ -\text{disjunction} \\ -\text{negative} \end{bmatrix}$$

Fifth, there are some coordinate conjoined noun compounds which do not have an overt conjunction. Thus there either has to be obligatory deletion of <u>and</u> or a blocking of the rule for the lexicalization of the conjunction in just these cases.

Sixth, the feature percolating mechanism does not appear to operate across the node N. The above restrictions on the re-write rule for N would suggest that feature conflicts would occur if features other than these were percolated across N. However, structures where such a violation does take place are

perfectly grammatical.

5) I ordered neither a gin and tonic nor a whiskey and
soda.

None of these objections is insuperable. The rules for
the expansion of N can be re-written with the appropriate
features present, the specifier can be omitted, and the index
on the $\bar{N}^1$ can be specified as 2. The feature percolating
mechanism can also be stopped at N. However, this would make
for a rather unconvincing case considering that each of these
changes is wholly ad hoc. Furthermore, the resulting
rules are very different from those which Dougherty uses to
generate coordinate conjoined structures higher in syntax.

I shall make a case in the next chapter for including
a rule very like the one proposed above in the lexicon. I
thus reject the hypothesis that the class of coordinate conjoined
noun compounds is generated by phrase structure rules.

.2 Are other noun compounds generated by phrase structure
rules?

Other noun compounds could be generated directly by a
phrase structure rule which would look something like this:

$$N \longrightarrow \left\{ \begin{matrix} N \\ A. \\ Prep. \\ Conj. \\ Nu. \\ N \text{ and } N \\ V \text{ and } V \\ PP \\ etc. \end{matrix} \right\} + N$$
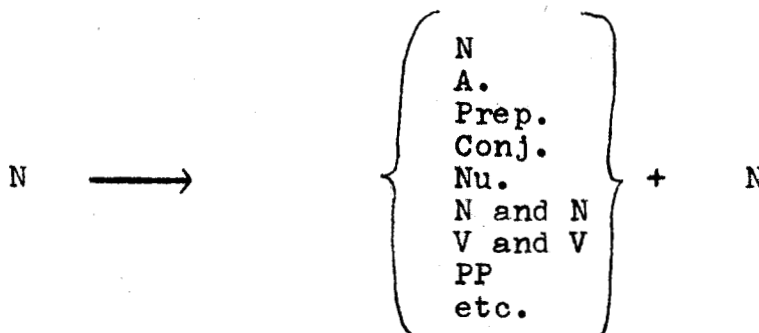
The noun compounds which have prepositions as R.H.C. could be generated by a rule such as the following:

$$N \longrightarrow V + Prep.$$

There are a host of objections to this proposal many of which will be apparent from discussions in the previous two chapters. I will re-state a number of these briefly.

.21 Kennings and idiomatic readings.

If the phrase structure rule proposal is adopted we are faced with the problem of how to give a semantic interpretation to noun compounds. It is possible to postulate a general rule of semantics which will read the R.H.C. N as head of a modifier-head structure for noun compounds which have N as R.H.C. and which will read the V the same way for compounds which have prepositions as R.H.C. However, it is not possible to see how a grammar would give an adequate semantic interpretation to compounds generated by the above two rules where the compounds have an idiomatic reading. Furthermore a semantic component would have no way to sort idiomatic compounds from non-idiomatic ones.

.22 The structure of noun compounds.

.221 The structure of syntactic fragments.

If syntactic fragments are generated by phrase structure rules this raises the problem of how to account for such ungrammatical fragments as <u>smash and grab</u> operating as L.H.C. in <u>smash and grab raid</u> which is not ungrammatical.

.222 The dominance of noun compounds by N.

If the phrase structure rule hypothesis is adopted then there must be two re-write rules for N. One would re-write N as dummy element and the other would be rules like those proposed in section .2 of this chapter. This still means that N is a lexical node when the first of these rules operates and a phrase node when the second type operates.

.223 Constraints on noun compounds with prepositions as R.H.C.

A phrase structure rule hypothesis gives no way to state the constraint that the L.H.C. of these noun compounds has an identical noun form.

.224 Complex compounds.

I have shown in Chapter IV, section .231, that the constraints on noun compounding can only be stated by context sensitive rules. Such rules do not form part of the phrase structure rules.

.23 Productivity.

The general facts of productivity which I mentioned in section .33 of Chapter IV i.e. that some compound structures occur much more frequently than others, are a definite problem for a phrase structure rule hypothesis of noun compounding because the phrase structure rules normally generate structures of great generality.

Furthermore the idiosyncracies of plural and genitive inflection, the restrictions on the syntactic feature

composition of the L.H.C. of noun compounds which have nouns as
R.H.C.,all seem to argue against the adoption of a phrase
structure rule hypothesis.

.3 Conclusion.

It appears that there is little or no support for a
phrase structure rule hypothesis of noun compounding and that
there is sufficient evidence to dismiss such a theory.

Notes.

1.   Chapter II, section .2311.

2.   This makes a rule very like the rule a) of Chapter IV,
      .32.

CHAPTER VI

A lexical hypothesis of noun compounding.

In this chapter I will outline an alternative hypothesis to both the transformational and phrase structure rule hypotheses. This new hypothesis states that noun compounds are generated in the lexicon by a set of context free and context sensitive re-write rules which relate lexical entries to lexical entries. These rules are located in the same section of the lexicon as that which contains the rules of derivation.[1] I will show that much of the evidence which argues against the transformational and phrase structure rule hypotheses favours this hypothesis. I also show that it has some interesting consequences.

.1   Some evidence that noun compounds are derived in the lexicon.

.11   Coordinate conjoined noun compounds.

In the previous chapter I dealt briefly with the class of coordinate conjoined noun compounds. This class is an exception to the rules of compounding if these rules are regarded as syntactic rules. In this section I advance the hypothesis that, if these compounds are generated in the lexicon then much of their irregular behaviour is explained.

.111   Coordinate conjoined noun compounds and the feature percolating mechanism.

In Chapter V it was noted that coordinate conjoined noun compounds provide a counter-example to the claim of Dougherty, (1968), that the features which account for coordinate

conjoined structures are re-written compulsorily under each
successive node down a base tree. I want to examine this
counter-example more closely. Take,for example, the following
sentence:

1)   Neither the priest-king nor the prince-archbishop came.
According   to Dougherty, (if we extend his rules to provide
the appropriate re-write rule for N), the base structure of the
subject of this sentence would be as follows:

$$
\overline{\overline{\overline{N}}}
\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}
$$

[SPEC,NP] $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$
NP $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$
NP $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$

[SPEC,$\overline{N}$] $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$
$\overline{N}$ $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$
[SPEC,$\overline{N}$] $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$
$\overline{N}$ $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ +\text{dis.} \\ +\text{neg.} \end{bmatrix}$

neither   the

N $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ -\text{dis.} \\ -\text{neg.} \end{bmatrix}$
the
N $\begin{bmatrix} +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ -\text{dis.} \\ -\text{neg.} \end{bmatrix}$

$\overline{N}^1$ $\overline{N}^1$ $\overline{N}^1$ $\overline{N}^1$

priest   king   prince   archbishop

It is obvious that the features under N are different from those
under higher nodes. This means that the feature percolating
mechanism cannot be reponsible for the features under N.
There is in fact a feature violation. The features under N
account for the fact that the noun compounds which are dominated
by N are coordinate conjoined by _and_. If the feature
percolating mechanism were to re-write features under N then
this would create a feature violation.

This fact might lead us to abandon the feature percolating
mechanism. However this seems a bad move to make because the
mechanism has ample motivation higher in the tree. Instead I
propose to limit the operation of the feature percolating
mechanism so that it does not operate below N. This is an
ad hoc modification of theory at this point. However I will
show in this chapter that the boundary for the operation of
the feature percolating mechanism is also the boundary between
syntax and lexicon. I am proposing that the features under N
are inserted by a lexical rule.

.112 Rule types.

Further confirmation for the above proposal can be found
by examining the nature of the rule which is required to
generate coordinate conjoined noun compounds. In Chapter V
it was pointed out that there were considerable differences
between the rules required by Dougherty to generate coordinate
conjoined structures and a rule of the same general type which
might be hypothesised to generate coordinate conjoined noun

compounds. First the rule does not take a specifier. Second,
the index on the head is 2. Third, no noun compounds are
disjunctively coordinated with the result that the features
on the rule are wholly specified. Fourth, some of these
compounds do not have an overt conjunction. And fifth, the two
constituents have a conventional order. These differences
suggest that the rule required to account for coordinate
conjoined noun compounds is not a phrase structure rule.

However, the rule suggested in the previous chapter for
generating these compounds:

$$
\begin{bmatrix} N \\ +exh. \\ -tot. \\ +ind. \\ -dis. \\ -neg. \end{bmatrix} \longrightarrow \overline{N}^{1^2} + [COMP, \overline{N}^1]
$$

is the correct rule in many respects for generating this class
of compounds. First, it captures the fact that the semantic
paraphrase of these compounds is completely systematic. Second,
it does fit Dougherty's thesis that coordinate conjoined
structures are generated by context free re-write rules. And,
although the above rule does not meet the requirements of
Dougherty's schema in the ways outlined above, there are still
significant similarities between the above rule and the
general rule schema which do capture significant generalities
about coordination. The rule also explains a semantic
property of these compounds, that is that they refer to single
entities. This can be demonstrated by looking at the way these

compounds take plurals. Pri̇est-king takes a normal noun
inflection for plural; priest-kings. This can be compared
with coordinate conjoined $\bar{N}$s which have the same referential
property:

2) This pharaoh was a proud priest and powerful king.

3) These pharaohs were proud priests and powerful kings.
In the case of the noun compound, the plural is on the N
and not on either of the $\bar{N}_1$ s whereas the conjoined $\bar{N}$s with the
same referential property have to take plurals on both of the
conjoined constituents.

Because of this referential property of coordinate conjoined
noun compounds, both constituents have the same syntactic
features. Thus we do not get the following: *priest-tractor,
*elephant-king, *fighter-sincerity, with the reading "N and N".

A further positive characteristic of the above rule is
that it is not recursive. If the $\bar{N}_1$ was not used the rule
would be recursive. So far, I have found no case where this
type of compound has more than two constituents.[2]

.113 Lexical characteristics of coordinate conjoined
noun compounds.

Placing the rule for generating coordinate conjoined
noun compounds in the lexicon can be further justified by noting
that these compounds have a number of lexical characteristics.
Most notable of these is the conventional order. It is typical
of lexical items that they have arbitrary and conventional
characteristics. The compounding rule does not set down this

order, it merely states that noun compounds have the structure generated by the rule. It is up to the individual lexical entry to specify what the order for any given compound is. The limitation of the rule to two lexical items is also arbitrary in that it is uncharacteristic of coordinated structures to have a finite limit.

.12 Kennings.

It seems that there is also justification for generating kennings in the lexicon. Two things which are characteristics of kennings need to be accounted for:

a) the endocentric relationship of the constituents

b) the idiosyncratic reading of the compound.

Of these b) can only be given in a lexical entry. a) can be conveniently accounted for by making use of the [COMP,N] node. Doing this would mean that the semantic rule which interprets complements higher in the tree could give the appropriate reading here. In the case of redskin, for example, $\bar{N}^1$ would lexicalise as skin and [COMP,N] as red after which a complement moving rule could invert the constituents.[3]

.2 A hypothesis: that noun compounds are generated in the lexicon.

In this section I outline a hypothesis which extends the power of the lexicon to cover compounding processes.

.21 Lexical processes.

In Chomsky, (1970), a model of the lexicon is proposed

in which derivational processes are entered in the lexicon as a set of rules which refer to individual lexical entries. This model is described by Jackendoff, (1969), as follows:

"... part of the lexicon is a set of derivational rules. For example, the nominalisation system would contain the following morphological rules for -tion and -ment along with more for other productive affixes such as -al, -ism, -er etc.

M1:   V + tion ⟶ N
M2:   V + ment ⟶ N

Associated with these would be at least the following semantic derivation rules, which give the range of possible interpretations of nominalisations (underlined words are to be take to stand for their semantic interpretations.);

S1:   act of Ving ⟶ N
S2:   thing Ved ⟶ N
S3:   thing transferred in act of Ving ⟶ N

Under the usual assumptions about the lexicon a lexical entry will have the form:

location number
phonological representation
syntactic features
semantic representation

The location number is simply a way of identifying the item in the lexicon.

To show how the derivational rules are used in the lexicon, take the verbs compensate and consign, which will have lexical entries as follows, (using arbitrary location numbers) :

$$
\begin{bmatrix}
73 \\
\text{COMPENSATE} \\
+V \\
+NP \text{ ——NP for NP} \\
\underline{\text{compensate}}
\end{bmatrix}
\begin{bmatrix}
67 \\
\text{CONSIGN} \\
+V \\
+NP \text{ —— NP to NP} \\
\underline{\text{consign}}
\end{bmatrix}
$$

The cost of these lexical items would be (more or less) the number of features it takes to build up the lexical entry. Now for their nominalisation compensation and consignment it is not necessary to spell everything out. All we need is the following:

$$
\begin{bmatrix}
540 \\
\text{derived from 73} \\
\text{using M1,} \begin{Bmatrix} S1 \\ S2 \end{Bmatrix}
\end{bmatrix}
\begin{bmatrix}
765 \\
\text{derived from 67} \\
\text{using M2,} \begin{Bmatrix} S1 \\ S2 \end{Bmatrix}
\end{bmatrix}
$$

The crossreferences to the verbs supply the basic
phonological, syntatic and semantic information. Then the
crossreferences to the derivational rules tell us how to
alter the verb's entry to produce the noun."

(ibid, pp.31-33.)

Some further consequences of this approach are explored in

Starosta, (1971). Starosta shows that relationships involving

case which exist between lexical items can be captured by

lexical rules.

"The rules I propose are essentially a subtype of lexical
redundancy rule, and thus constitute part of the lexicon
in the base component of an Aspects-style generative
grammar. They differ from the usual type of redundancy
rule in that, instead of only adding redundant features
to the matrices of lexical items, they predict the
existence of new lexical items on the basis of items
already present."

(ibid, p.85.)

"I would like to illustrate the form and operation
of lexical derivation rules with some examples from Sre,
Sora, Tagalog, Kusaien, and English....

In Sre, a Mon-Khmer language of Vietnam, causative
verbs can be derived from transitive or intransitive verbs
by adding the prefix tən-.

1. caw $\begin{bmatrix} +NM \\ +AGT \end{bmatrix}$ pu? ?añ $\begin{bmatrix} +0 \\ +OBJ \end{bmatrix}$ People beat me.

   1   2   3   1   2 3

2. khay $\begin{bmatrix} +NM \\ +AGT \end{bmatrix}$ tənpu? ?añ $\begin{bmatrix} +0 \\ +OBJ \end{bmatrix}$ He caused-to-beat me

   1   2   3   1   2   3

The verbs thus differ from the corresponding underived
verbs in ways which can be predicted on the basis of
an underlying case relationship between subject and
verb. Example (1.) for example, is a common transitive
sentence. In (2.), identical to (1.) but with a causative
verb, the object of the beating is still the direct
object but the person actually administering the beating
cannot be grammatically expressed at all. Instead the
person causing the beating to be administered must appear
as the subject. This relationship can be expressed by

Derivational Rule 1, which states that for every
transitive verb with an agent subject ($[+NM]$, 'nominative',
refers to subject), there is another transitive verb
taking the same direct object but a new agent subject.

$$
\text{DR-1:} \begin{bmatrix} +V \\ + \begin{bmatrix} +NM \\ +AGT \\ \alpha F_1 \end{bmatrix} \\ \gamma F_m \end{bmatrix} \longrightarrow \begin{bmatrix} +O \\ +OBJ \\ \beta F_j \end{bmatrix} \Longrightarrow \begin{bmatrix} +V \\ +CAUS \\ + \begin{bmatrix} +NM \\ +AGT \end{bmatrix} \\ \gamma F_m \end{bmatrix} \longrightarrow \begin{bmatrix} +O \\ +OBJ \\ \beta F_j \end{bmatrix}
$$
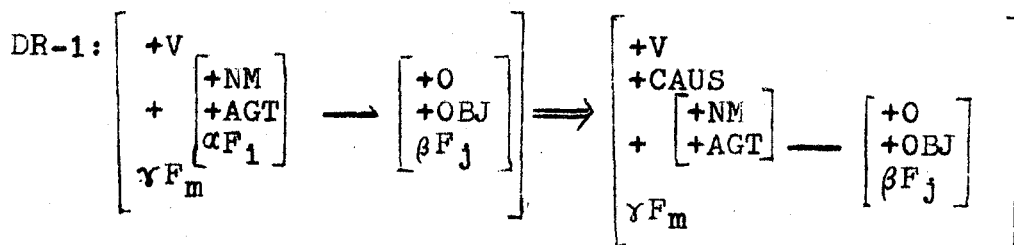
The $[\alpha F_1]$ and $[\beta F_j]$ can be interpreted as either referential
or as the set of selectional features imposed on the
actant by the verb. In DR-1 the fact that the $[+OBJ]$
constituents in the underived and derived verbs are both
marked $[\beta F_j]$ indicates that they both occupy the same
semantic role with respect to the verb, in this case the
role of the victim of the beating. The fact that the
Agent of the new verb is not marked $[\alpha F_1]$ indicates that it
does not have the same role as the Agent of the underived
verb. The remaining features $[\alpha F_m]$ of the underived verb,
including other case frame features are derived directly
from the underived version, except that the feature
$[+CAUS]$ has been added. This feature accounts for the
difference in meaning, if any, that is felt by native
speakers; it allows the formal characterization of the
notion 'causer' of an action as agent of a $[+CAUS]$ verb;
and it acts as the trigger of the morphophonemic rule
that prefixes <u>tan-</u> to every causative verb. This rule
has been given in an abbreviated form as MR-1.

MR-1: $V[\longrightarrow V[t\text{ə}n \quad / \; \underline{\quad} \; [+CAUS]$ "

(ibid, pp.87-89.)

To sum up, the lexicon which I assume is one having
lexical entries of the kind outlined by Jackendoff and a set of
rules, both context-free and context-sensitive which predict
the existence of new lexical items on the basis of items already
present. The rules are located in a sub-component which I will
call the "lexical formation component".

.22 The extension of the lexical formation component to
cover noun compounding.

On the strength of the preliminary arguments presented
in section .1 of this chapter I now propose to extend the
scope of the lexical formation component so that the rules in
it also specify the formal nature of lexical entries on the
basis of more than one other lexical entry already present in
the lexicon, and so specify the formal nature of lexical entries
not yet present in the lexicon. More specifically I propose
that the rules of the lexical formation component be extended
so that they perform the processes of noun compounding.

.221 The rule for generating coordinate conjoined noun
compounds.

In section .1 of this chapter I continued to assume that
coordinate conjoined noun compounds were generated by a rule of
the type:

$$X \longrightarrow Y + Z$$

i.e. a phrase structure rule. It is clear from the above out-
line of the lexicon that this type of rule is not to be found
in the lexicon. The rules of the lexicon generate single, new
lexical entries. In the case of noun compounds they would
generate noun compounds with the categorial feature [+N] by
refering to two or more other lexical entries which are the
constituents of the compound. Thus the rules should be of the
form:

$$Y + Z \longrightarrow X$$

where Y and Z represent given lexical entries and X the compound.

The rule proposed in section .1 was:

1) $N \longrightarrow \bar{N}^{1^2} + \cdot [COMP, \bar{N}^1]$

Re-writing this rule in the required form we get:

2) $\bar{N}^{1^2} + [COMP, \bar{N}^1] \longrightarrow N$

Paraphrasing this rule we might say, noun stem coordinated with a second noun stem plus the complement of noun stems re-writes as N. If we ignore the complement structure for the moment, since we are dealing only with coordinate conjoined compounds, the rule can be re-phrased as:

3) $\bar{N}^1 + \bar{N}^1 \longrightarrow N$

That is, a noun stem coordinated to a second noun stem re-writes as N. To make the type of coordination explicit I introduce the features for <u>and</u> coordination under the N:

4) $\bar{N}^1 + \bar{N}^1 \longrightarrow$ N
$$\begin{bmatrix} +exh. \\ -tot. \\ +ind. \\ -dis. \\ -neg. \end{bmatrix}$$

I have also noted in section .11 that coordinate conjoined noun compounds have constituents whose syntactic features match and the compound itself has the syntactic features of its constituents. These facts can be accounted for using the $[\alpha F_m]$ copying device used by Starosta in the section I quoted in section .21 of this chapter. This device states that m features with signs of α, β, γ, etc which are collectively given as α, are matched by another constituent or copied on to another constituent:

5) $\overline{N}^1 \atop [\alpha F_m]$ $+$ $\overline{N}^1 \atop [\alpha F_m]$ $\longrightarrow$ N $\begin{bmatrix} \alpha F_m \\ +\text{exh.} \\ -\text{tot.} \\ +\text{ind.} \\ -\text{dis.} \\ -\text{neg.} \end{bmatrix}$

Paraphrasing this rule it reads; a noun stem with m syntatic features with signs α, β ,γ , etc plus another noun stem with the same feature re-writes as a coordinate conjoined noun compound with identical syntactic features to its two constituents.

It has been shown earlier in this chapter and in Chapter V that there are significant empirical differences between what we have called $\overline{N}^1$ (tentatively identified as noun stem) and N. This now needs re-evaluation in the light of the hypothesis I am presenting. $\overline{N}^1$ refers in this section and in the hypothesis I am presenting, to a lexical entry with the categorial feature [+N], whereas N is a symbol introduced by phrase structure rules as a lexical node in a phrase structure derivation. Rule 5) is therefore still incorrect because it predicts the occurrence of a lexical node N. The hypothesis I am presenting is that all the material under N is introduced from the lexicon. In the case of a single word N, this would be the appropriate complex symbol. In the case of a noun compound, this would be a structure which would in turn dominate complex symbols. This situation is analogous to the case of derived nouns where the lexical insertion transformation introduces structure below word level. For example, many of the surface structures used

in Chomsky and Halle, (1968), show the internal structure of
derived nouns and verbs. This structure comes from the lexicon.

It is now obvious that the difference between N and $\bar{N}^1$ is
interpretable as the difference between a lexical entry and a
lexical node. Rule 5) does not introduce lexical nodes. It
relates lexical entries to lexical entries. It can therefore
be re-formulated to read:

$$6) \quad \begin{matrix} N \\ [\alpha F_m] \end{matrix} + \begin{matrix} N \\ [\alpha F_m] \end{matrix} \longrightarrow \begin{matrix} N \\ \begin{bmatrix} \alpha F_m \\ +exh. \\ -tot. \\ +ind. \\ -dis. \\ -neg. \end{bmatrix} \end{matrix}$$

That is, a lexical item marked $[+N]$ and with syntactic features
of $[\alpha F_m]$ plus a similarly marked entry re-write as a lexical
entry with the features $[+N, \alpha F_m, +exh., -tot, +ind., -dis, -neg.]$.

This rule still does not meet observational adequacy in that
it is recursive. Given a lexical entry with the features
$[+N, \alpha F_m]$ where $[\alpha F_m]$ includes the features $[+exh., -tot., +ind.,$
$-dis., -neg.]$ this entry could be one of the left hand Ns in the
above rule. However, coordinate conjoined noun compounds have
a maximum of two constituents. Therefore the rule which
generates them cannot be recursive. I propose to overcome this
inadequacy by introducing a feature which differentiates a single
word lexical entry from entries for compounds. This is the
feature $[\pm compound]$. The sign of this feature in the lexical
entry is predictable from the operation of compounding rules
as follows. By a universal convention all lexical entries which
have not been generated by compounding rules will be marked

[-compound]. The sign of this feature is then changed for any lexical entry which has been generated by a compounding rule. The cost of this feature is, therefore very low because the presence of the feature is a function of universal grammar and the sign of the feature is completely predictable.

It might be argued at this point that the introduction of this feature is entirely ad hoc. It will be demonstrated later in this chapter that this feature is needed to explain other facts of noun compounding and that it does so at very little cost, in this case, cost in terms of the number of features required to make up a lexical entry.

It might also be argued that the introduction of this feature entails making a distinction between single Ns and compound Ns, a distinction which contradicts the assertion in Chapter II that single words and noun compounds are both Ns in syntax. However, this objection can easily be laid aside. Both single word Ns and noun compounds have the categorial feature N and function as Ns in syntax. The feature [±compound] makes a distinction which is relevant to compounding processes and not to syntactic ones.[5]

The rule for generating coordinate conjoined noun compounds can now be given in its final form.

Compounding rule 1.

$$
\begin{bmatrix} \text{N} \\ \text{-comp.} \\ \alpha F_m \end{bmatrix} + \begin{bmatrix} \text{N} \\ \text{-comp.} \\ \alpha F_m \end{bmatrix} \longrightarrow \begin{bmatrix} \text{N} \\ \text{+comp.} \\ \alpha F_m \\ \text{+exh.} \\ \text{-tot.} \\ \text{+ind.} \\ \text{-dis.} \\ \text{-neg.} \end{bmatrix}
$$
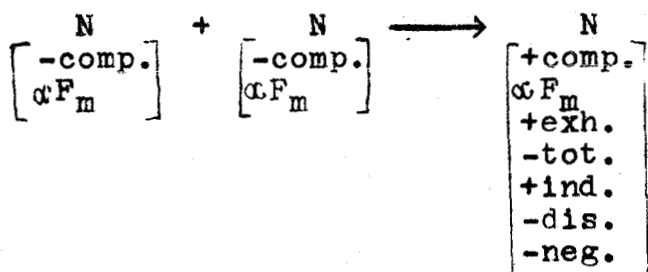
We can now set up a lexical entry using this rule. Take for example, the entry for priest-king. Using arbitrary location numbers, upper case type to represent the phonological representation and lower case type underlined to represent the semantic representation, the entries for priest and king would be as follows:

$$
\begin{bmatrix} 898 \\ \text{PRIEST} \\ \text{+N} \\ \text{+human} \\ \underline{\text{priest}} \end{bmatrix} \qquad \begin{bmatrix} 370 \\ \text{KING} \\ \text{+N} \\ \text{+human} \\ \underline{\text{king}} \end{bmatrix}
$$

CR-1 can refer to these entries because all the conditions for its application are fulfilled.

At this stage it is necessary to introduce a further convention. CR-1 does not impose any order on the constituents of the compound. But I have noted earlier that the constituents of coordinate conjoined noun compounds do have a conventional order. The lexical entry for priest-king has to specify this order. I therefore introduce the convention that the lexical entry of a noun compound refers to the R.H.C. first. This is completely arbitrary and of no consequence for a particular grammar. It can thus be made a convention of a universal grammar.[6]

The lexical entry for <u>priest-king</u> can now be given as follows:

$$\begin{bmatrix} 2935 \\ \text{from } 370 \\ \text{and } 898 \\ \text{by CR-1} \end{bmatrix}$$

Nothing more is needed. By the cross-reference to the nouns, CR-1 gives the phonological form of the new entry, its feature composition and semantic reading.

It is obvious that such an entry is very cheap in terms of a reasonable evaluation measure for the lexicon. This is a highly desirable consequence of handling these compounds in this way. We would want these compounds to be cheaper because many more of their characteristics can be predicted than can be predicted for single word lexical entries.

The cross-reference to a rule can be regarded as a positively specified rule feature. I noted earlier that it was necessary to introduce the feature [+compound] in just those cases where the lexical item is a compound. If the cross-reference to the compounding rule was marked in the lexical entry as a positively specified rule feature then the sign of the [*compound] feature is completely predictable from the sign of of the rule feature. This again reduces the cost of the mechanisms I have introduced in that the sign of the feature [* compound] is now completely predictable.

Derivational rules in the lexicon could also be handled the same way in lexical entries. Coordinate conjoined noun compounds appear to have matching derivational morphology in

their constituents: e.g. _washer-drier_, _fighter-bomber_. If
the cross-reference to derivational rules is recorded in the
lexical entry in the form of rule features then the $[\alpha F_m]$
matching on the left hand constituents of CR-1 would explain
this fact. Also the $[\alpha F_m]$ copying onto the right hand
constituent receives some intuitive support from these
facts in that where the semantic rules associated with a
certain derivational affix are the same e.g. _drier_,"thing which
dries" and _washer_ ,"thing which washes" , the reading of the
compound generated by CR-1 has the same rule of semantic
interpretation associated with it as though it were, in this
case, V + V er, "thing which washes and dries."

.222 Lexical entries for kennings.

I suggested in section .12 of this chapter that there was
sufficient evidence to warrant placing kennings in the lexicon.
I also suggested that they might be generated by the rule:

$$N \longrightarrow \bar{N}^1 + [COMP, \bar{N}^1]$$

This rule can now be revised in line with the revisions made
to the rule for coordinate conjoined noun compounds and for the
same reasons.

$$[COMP, N] + \underset{[-comp.]}{N} \longrightarrow \underset{[+comp.]}{N}$$

This rule I will label Compounding Rule 2.

In the case of _redskin_, the rule required to re-write
[COMP,N] would be:

$$[COMP, N] \longrightarrow \underset{[-comp.]}{Adj.}$$

I will label this rule Compounding Rule 3.

Some properties of these rules can now be noted. First, CR-2 predicts the endocentric relationship between the constituents and the direction of the modifier-head relationship. Second, the use of the feature [*compound] receives support from the fact that compound adjectives such as blue-grey do not appear as L.H.C. of noun compounds.

CR-2 and CR-3 appear to generate all the general characteristics of kennings. Those features which are idiosyncratic to individual lexical items now have to be listed in individual lexical entries. Looking again at redskin, what needs to be given is that this item has the syntactic feature [+human] and the semantic representation of North American Indian. To build up the lexical entry I again make use of the convention of listing the R.H.C. first. It will be seen that, in this case, the convention is most felicitous because CR-2 and CR-3 are ordered by their formal structure in the same way that phrase structure rules are ordered.[7] CR-2 refers to only one lexical item which is the R.H.C. of the compound and CR-2 refers to only one lexical item which is the L.H.C. of the compound. The convention for cross-reference to lexical items in the lexical entry of compounds mirrors this order.

Using the same abbreviatory devices as previously the lexical entry for redskin can now be given as follows:

$$\begin{bmatrix} 397 \\ \text{RED} \\ +\text{A} \\ \underline{\text{red}} \end{bmatrix} \qquad \begin{bmatrix} 472 \\ \text{SKIN} \\ +\text{N} \\ +\text{concrete} \\ \underline{\text{skin}} \end{bmatrix}$$

$$\begin{bmatrix} 487 \\ \text{from } 472 \\ \text{and } 397 \\ +\text{CR-2} \\ +\text{CR-3} \\ +\text{human} \\ \underline{\text{North American Indian}} \end{bmatrix}$$

The lexical entries for kennings will be more costly than those of coordinate conjoined noun compounds in that their syntactic features and semantic representation have to be stated in the entry. However, this is a desirable outcome of the theory I propose because this cost is reflected most naturally in the lexicon since the cost of kennings is closer to that of single word entries than that of entries for coordinate conjoined noun compounds. It seems that this is the most economical way of stating both the generalities and idiosyncracies of kennings in a naturally revealing manner.

Although I have dealt with only one example it is clear that other kennings can be dealt with in a similar manner. Not all kennings are generated by CR-2 and CR-3 in quite this form. However, I propose to deal with other rules of compounding in the next section. Those compounds which are also kennings can then be entered in the lexicon using the devices I have suggested in this section.

.223 Further compounding rules.

In this section I will cover those cases where the compound is neither coordinate conjoined nor a kenning. Here CR-2 applies with some modification in those cases where the R.H.C. of the compound is a noun. In such compounds the compound has the syntactic features of the head N. CR-2 can therefore be modified to accomplish this using the $[\alpha F_m]$ copying device which as introduced in the section on coordinate conjoined compounds, as follows:

CR-4: $[\text{COMP,N}]$ + $\underset{[\alpha F_m]}{N}$ $\longrightarrow$ $\underset{[\alpha F_m]}{N}$

So, for example, catbox has the syntactic features of box and not those of cat.

This fact and the formal means I have used to express it offer some confirmation for the use of the $[\text{COMP,N}]$ node in rules CR-2 and CR-4. If the rules of compounding were to be, for example, of the form:

$$N \quad + \quad N \quad \longrightarrow \quad N$$

there would be no principled reason why the head should not be either of the left hand Ns. By separating the two constituents of the compound into two successive rules the $[\alpha F_m]$ can be placed on the first rule where the only lexical item being refered to is always an N. The L.H.C. introduced by CR-3 is only sometimes an N and thus the $[\alpha F_m]$ copying device cannot be made to operate on the $[\text{COMP,N}]$ node generally.

I have given no formal distinction so far between kennings and non-kennings. The $[\alpha F_m]$ copying device provides such a

distinction. Where it is present, as in CR-1 and CR-4, we have non-kennings. Where it is not present, as in CR-2, kennings are generated. This distinction gives us a class membership criterion which is admittedly too narrow. There are other kennings, in the notional sense, which have the same features as the R.H.C., for example, the Old English kenning whaleroad which I quoted in Chapter II would not be a kenning under this definition. An inclusive definition of the notion "kenning" requires a more adequate account of the nature of semantic representations than is available at the moment. We might, for example, choose to label as kennings any lexical entries which have an unpredictable semantic representation. This would require an investigation into what constitutes a predictable semantic representation. For the moment, I will leave the above definition, inadequate as it is, to stand for kennings.

So far, the only re-write of [COMP,N] I have offered in CR-3 is Adj. It is obvious from Chapter II that there are more L.H.C.s of noun compounds whose R.H.C. is an N than adjectives. Of the lexical node categories all appear able to function as L.H.C. except, perhaps, V. I presented some evidence against V appearing here, in Chapter II. However, it is in practice, very difficult to decide whether a given word is marked [+N] or [+V] when it appears as L.H.C. in noun compounds. I will therefore allow V to appear as a re-write symbol of [COMP,N].

As far as I can tell, no function category nodes appear as L.H.C. in noun compounds. They appear to appear here in the

meta-language of linguistics.' However, this is an illusion.
It is **not** the node itself but the name of the node which functions
as L.H.C. In this case, the node can be regarded as a normal
noun. I will therefore exclude function category nodes
from the right hand side of the re-write rule for $[\text{COMP,N}]$.

CR-3 can therefore be expanded to read:

$$[\text{COMP,N}] \longrightarrow \begin{Bmatrix} \text{N} \\ \text{A} \\ \text{V} \\ \text{Prep.} \\ \text{Nu.} \\ \text{M} \end{Bmatrix}$$

Phrase nodes also appear able to function as L.H.C. in
this class of noun compounds. I have mentioned PP and S
as candidates: e.g. <u>in the mood feeling</u>, <u>shoot to kill order</u>.
The only restriction I have been able to find on the class of
phrase nodes functioning here is that NP does not do so. If, as
I am suggesting, noun compounds are generated in the lexicon,
there is a problem about generating the compounds which have
phrase nodes as L.H.C. in that the P nodes which are re-write
symbols of CR-3 have to be expanded. This could be done by
introducing all the required rules into the lexicon or by
opening a loop to the phrase structure rules in just the case
where CR-3 re-writes as a P node. I see nothing in favour
of the first suggestion. I therefore adopt the second. This
keeps rules which are formally different in different components.[8]
Furthermore, the cost of such a loop to the grammar is negligible.[9]
It would open automatically in just those cases where CR-3

re-writes as a P node. The appropriate phrase structure rules would then expand the P node normally and a second pass through the lexicon would be made. This solution receives some intuitive support when we note that phrase nodes which function as L.H.C. of noun compounds can in turn contain noun compounds: e.g. an in the dog-house situation. This is explained by the loop device in that, on the second pass through the lexicon, an N which is generated by compounding rules can again be inserted.[10]

We can now extend CR-3 to:
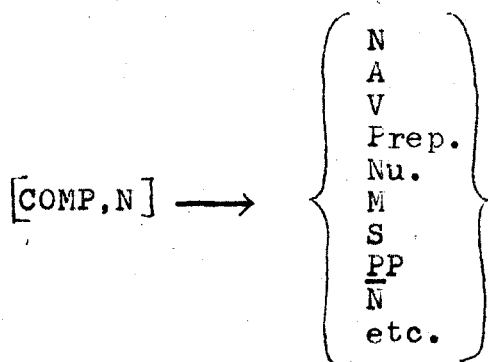
$$[\text{COMP,N}] \longrightarrow \left\{ \begin{array}{l} \text{N} \\ \text{A} \\ \text{V} \\ \text{Prep.} \\ \text{Nu.} \\ \text{M} \\ \text{S} \\ \underline{\text{PP}} \\ \overline{\text{N}} \\ \text{etc.} \end{array} \right\}$$

There is, however, a further set of noun compounds which cannot be generated by CR-2 and CR-4. This is the set of noun compounds which has a preposition as L.H.C. This class can be generated using a rule very similar to CR-4:

CR-5:   V   +   [COMP,V] $\longrightarrow$ N

I have suggested in Chapter II, section .4 that type of compound occurs only when the V has an identical noun form. This constraint can be stated very simply by using the categorial feature [+N].

CR-5: $\underset{[+N]}{\text{V}}$ +   [COMP,V] $\longrightarrow$ N

A second possible way to express this constraint is to suppose that the noun form is derived from the verb form by a derivational rule. This could then be given as a positive rule feature under V. I see no reason for supposing, however, that such a derivational rule necessarily exists. I will thefore adopt the former suggestion.[11]

We now need a rule to expand $[COMP,V]$.[12] In the case of these compounds $[COMP,V]$ is always a preposition:

CR-6: $[COMP,V] \longrightarrow$ Prep.

The addition of CR-5 and CR-6 to the grammar necessitates making changes to the convention for cross-reference which I have used so far. It will be noticed that, if the cross-references to lexical items are given using the convention of referring to the R.H.C. first, the cross-references are out of step with the order of rules CR-5 and CR-6. This suggests that the arbitrariness of the convention can be partly removed by letting the rules themselves specify the order in which the lexical entry will refer to the lexical items which are its constituents. For example, in the case of shootout, the rules which generate it are CR-5 and CR-6 in that order. CR-5 in turn refers to shoot and CR-6 to out. By convention, this will be the order of the items in the lexical entry. In the case of coordinate conjoined noun compounds, the order will be the left to right order in which the rule CR-1 refers to the lexical items, i.e. in the case of CR-1 generating priest-king the cross-reference convention will mean that the lexical entry

for this compound will refer first to the entry for priest
and then to the entry for king.

.224 Complex compounds.

In the preceding section I have outlined the general
properties of the compounding rules which are to be found in
the lexicon and outlined some compounding rules in particular.
It is now possible to investigate whether noun compounds
which have noun compounds as constituents follow these rules.

Earlier, CR-4 was given as:

$$[\text{COMP},\text{N}] \quad + \quad \begin{array}{c}\text{N}\\ \begin{bmatrix}-\text{comp.}\\ \alpha\, F_m\end{bmatrix}\end{array} \quad \longrightarrow \quad \begin{array}{c}\text{N}\\ \begin{bmatrix}+\text{comp.}\\ \alpha\, F_m\end{bmatrix}\end{array}$$

This rule can be made to account for complex noun compounds by
being altered to read:

$$[\text{COMP},\text{N}] \quad + \quad \begin{array}{c}\text{N}\\ \begin{bmatrix}\pm\text{comp.}\\ \alpha\, F_m\end{bmatrix}\end{array} \quad \longrightarrow \quad \begin{array}{c}\text{N}\\ \begin{bmatrix}+\text{comp.}\\ \alpha\, F_m\end{bmatrix}\end{array}$$

But, where the rule refers to an N which is [+comp.], not all
exponents of [COMP,N] apply. CR-3 therefore has to be
altered to become context sensitive as follows:

CR-3:
$$[\text{COMP},\text{N}] \quad \longrightarrow \quad \begin{array}{c}\text{N}\\ [+\text{comp.}]\end{array} \Big/ \quad \underline{\quad\quad} \quad \begin{array}{c}\text{N}\\ [+\text{comp.}]\end{array}$$

Paraphrasing this situation, we can say that CR-4 in its altered
form specifies that the complement of N plus an N which has
syntactic features given by $[\alpha F_m]$ and which either a noun
compound or a simple noun re-writes as a compound noun having
the syntactic features $[\alpha F_m]$. CR-3 then applies and states that

[COMP,N] re-writes as either a noun compound or a simple noun when the head N of the compound generated by CR-4 is a noun compound. These two rules state the restrictions on complex compounding which were explored in Chapter II, section .4.

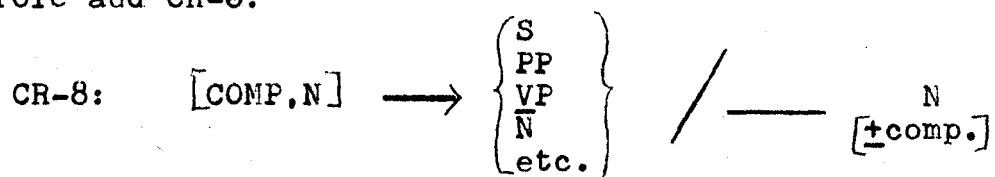The introduction of the change to CR-4 necessitates further re-writing to CR-3 to account for the case where the head N is [-compound]. It seems that only lexical nodes function exclusively in this environment:

CR-7:

$$[\text{COMP},N] \longrightarrow \left\{ \begin{matrix} N \\ [\text{-comp.}] \\ V \\ [\text{-comp.}] \\ A \\ [\text{-comp.}] \\ \text{etc.} \end{matrix} \right\} \quad / \underline{\qquad} \quad \begin{matrix} N \\ [\text{-comp.}] \end{matrix}$$
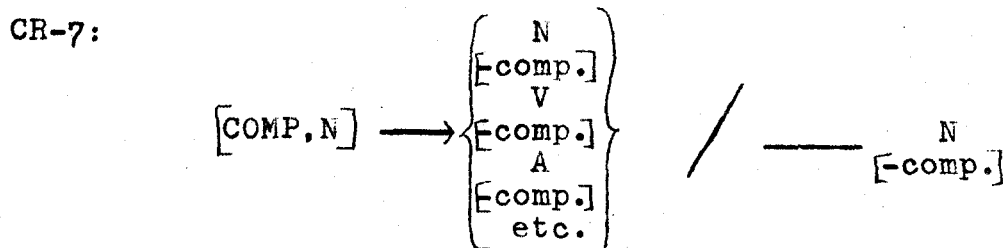
I have also noted in Chapter II that syntactic fragments can function as L.H.C. whose R.H.C. is a compound, e.g. <u>ground to air guided missile</u>, <u>ship to shore radio telephone</u>. It appears that phrase nodes can occur before both [±compound] Ns. I therefore add CR-8:

CR-8:

$$[\text{COMP},N] \longrightarrow \left\{ \begin{matrix} S \\ PP \\ VP \\ \overline{N} \\ \text{etc.} \end{matrix} \right\} \quad / \underline{\qquad} \quad \begin{matrix} N \\ [\text{±comp.}] \end{matrix}$$

These changes to the compounding rule provide evidence in favour of the formal features for compounding rules which were introduced earlier. The utility of the feature [±compound] is demonstrated in that without it the correct restrictions on complex compounding could not be stated so easily. Also its consequences in its use for individual lexical entries is

favourable in that the lexical entries for complex compounds

cost no more than those for simple compounds. Furthermore,

the introduction of the L.H.C.s of compounds which have nouns as

R.H.C.s under the node $[COMP,N]$ is shown to have the favourable

consequence that it allows the restrictions on complex

compounding to be stated in a simple and natural way.

By handling the rules for complex compounding in this way,

the grammar has been complicated to the extent that three rules

have been made context-sensitive. This is a minimal complication

considering the facts of the matter. Furthermore, the

consequences of these changes are very favourable for

individual lexical entries in that lexical entries are not

complicated in any way.

One further problem remains to be dealt with and that is

how to set up lexical entries for complex compounds whose

L.H.C. does not occur independently. Assuming that structures

like <u>eighteen hole course</u> are noun compounds,[13] they can be

accounted for by setting up a lexical entry within a lexical

entry. If we suppose the the entry for <u>course</u> has a location

number of 287, <u>hole</u> a location number of 765, and that numerals

have lexical entries at least as far as the numeral 20, the

lexical entry for the compound could be given as:

$$
\left[
\begin{array}{l}
4678 \\
\text{from } 287 \\
\text{and } \left[
\begin{array}{l}
\text{from } 765 \\
\text{and } \text{ Nu. } 18 \\
\text{+CR-4} \\
\text{+CR-7}
\end{array}
\right] \\
\text{+CR-4} \\
\text{+CR-7} \\
\underline{\text{eighteen hole course}}
\end{array}
\right]
$$

This type of entry has the desirable outcome that though it is
more expensive than normal entries, it adds no complications
to the grammar, and furthermore, the cost of the lexical
entry mirrors the fact that the L.H.C. of the compound does
not occur independently.[14]

.225 Syntactic fragments.

There are a number of problems with syntactic fragments
which I have so far ignored but which have to be faced. They
fall into two different areas. First there is the problem of
stating in the lexical entry which lexical items function
in the syntactic fragment. It is necessary to make such a
statement because for any compound which the speaker knows
he knows the specific constituents. For example, speakers
who know the compound <u>stock and station agent</u>, know that the
two nouns which are conjoined are <u>stock</u> and <u>station</u>. Second,
there is the problem that some syntatic fragments are ungrammat-
ical. This ungrammaticality is always a function of the lexical
items which are inserted into the base marker underlying the
fragment and not a function of the phrase structure of the
fragment. For example, in <u>smash and grab raid</u> , the

ungrammaticality is a function of the sub-categorization of
smash. These two problems can be illustrated by looking at
the question of how to generate the L.H.C.s which are coordinate
conjoined structures.

It might appear at first glance that CR-1 would take care
of such cases as parent teacher association where there is no
overt conjunction between the left hand Ns, and cases such as
stock and station agent where there is an overt conjunction.
However, CR-1 does not generate these L.H.C.s. First, these
L.H.C. do not occur independently as noun compounds although
some of them occur independently as syntactic structures e.g.
prices and incomes as in prices and incomes commission. Second,
they do not refer to a single referent. Third, this type of
L.H.C. can have more than two constituents:e.g. a cake, cookies
and sweets stall.

We could therefore regard them as normal coordinate conjoined
Ns. They could then be inserted into the compound by the loop
to phrase structure rules which was suggested earlier. There
are a number of problems with this proposal. First, no specifier
or complement occurs with any of these L.H.C.s. This entails
placing arbitrary limits on the $\bar{N}$ expansion. Second, the type
of coordination is restricted to and coordination. In cases
where one might expect an or there is an and: e.g. bread and
meat slicer. This could be overcome by placing arbitrary
limits on the features under $\bar{N}$. Third, there is the problem
that some of the L.H.C.s have an overt conjunction and some do
not. This can be overcome by making the lexical insertion

transformation optional below N. This already is the case for compounds generated by CR-1.

Each of these problems is really just a general case of a more specific problem and that is that, for a given lexical entry of a compound which has a syntactic fragment as L.H.C., the exact expansion of the phrase node has to be given. For example, in the case of parent teacher association, the speaker knows that there are only two Ns from the infinite possible number of Ns which can be a result of the expansion of $\bar{N}$. Furthermore, he knows that in this specific case there is no lexicalization of the conjunction. These idiosyncratic facts must be noted in the lexical entry for this compound.

This raises the question of whether the limits on coordinate conjoined Ns acting as L.H.C. of noun compounds are general limits or only apparent limits resulting from from the fact that given noun compounds have given limits on the coordinate conjoined structures which function as their L.H.C.s. I cannot answer this question satisfactorily. It seems that the question of what is a possible noun compound can only be answered unequivocally in certain clear cases and that there is an area such as here with coordinate conjoined L.H.C.s where clear answers are not available.

The question which can be answered is whether parent teacher association is a compound of English. Speakers of English, at least in North America, know that this is a compound of English and they know what its constituents and structure are.
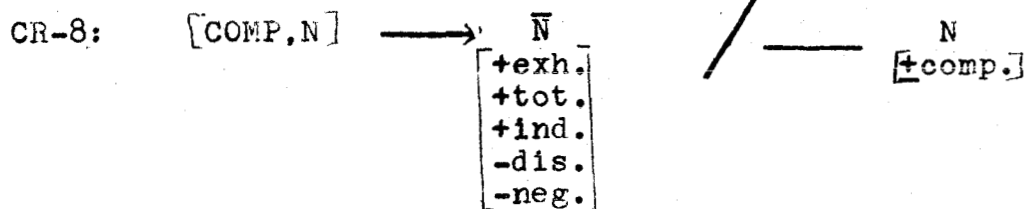
By refering to the rule for the expansion of $\bar{N}$ and placing the required constraints on that rule, the lexical entry can supply the required information.

I will take it that the arbitrary constraints which I suggested for the rule for the expansion of $\bar{N}$ are general constraints on this rule when it supplies L.H.C.s for noun compounds. These constraints may be too strong. I await clear cases to show this.

The problem of ungrammatical constituents such as smash and grab in smash and grab raid seem always to be a function of incorrect lexical insertion. However, since the lexical entry for such compounds has to specify the lexical insertions arbitrarily, this does not appear to be a problem. In other words, the lexical entry mechanisms which have been set up for noun compounds permit the setting up of ungrammatical constituents which cease to be ungrammatical when they are constituents of noun compounds.

The way I have handled syntactic fragments seems to me to be observationally adequate at best. However, I can see no other solution which would be any better.

This leaves the problem of formulating the required rules. I have said that the restriction on the type of coordination can be stated by specifying the features under $\bar{N}$. This can be done as follows:

CR-8: [COMP,N] $\longrightarrow$ $\bar{\text{N}}$ $\begin{bmatrix} +\text{exh.} \\ +\text{tot.} \\ +\text{ind.} \\ -\text{dis.} \\ -\text{neg.} \end{bmatrix}$ $\Big/$ —— N [±comp.]

The same restriction can be placed on $\bar{\text{V}}$.

The optionality of the lexicalization for the conjunction
can be dealt with in the same way as for coordinate conjoined
noun compounds by specifying whether or not it occurs.

I can think of no satisfactory way to specify the generality
that specifiers and complements do not occur in coordinate
conjoined L.H.C.s of noun compounds, although, of course, the
fact that there is no specifier or complement will be specified
in given lexical entries.

.226 Internal morphology.

One problem still to be dealt with is that of the
inflectional morphemes which occasionally occur internally
in noun compounds. I suggested in Chapter II that such morphemes
rarely occur. The problem is that they do occur and in all
inflectional categories:

$\begin{bmatrix} +\text{plural} \\ -\text{genitive} \end{bmatrix}$ Graduate Studies Committee

$\begin{bmatrix} +\text{plural} \\ +\text{genitive} \end{bmatrix}$ men's room
                          ladies' man

$\begin{bmatrix} -\text{plural} \\ +\text{genitive} \end{bmatrix}$ Parkinson's disease
                          artist's model

Whatever the rules of compounding are, they will have to
account for these possibilities. It seems to me that the
appearance or non-appearance of a given inflection is entirely

arbitrary. It has no connection with the semantics or syntax of the compound, with the exception that where a plural occurs the paraphrase of the compound has a plural reading for the N on which the plural is found.

I propose to treat this as a problem of productivity.[15] If we add, as a component of all the [COMP,N] re-write rules where [COMP,N] re-writes as N the following features:

$$[COMP,N] \longrightarrow \begin{array}{c} N \\ \left[\begin{array}{c} \alpha \text{ pl.} \\ \beta \text{ gen.} \end{array} \right] \end{array}$$

then α and β are both minus unless a given lexical entry specifies them as plus. Although this solution appears ad hoc, it does explain what little there is to explain. First, by adopting this convention, lexical entries for noun compounds which do not have internal morphology are cheaper than those which do. This is desirable because the most general case is that where neither inflection occurs. Second, by stating the inflectional categories in the lexicon, their arbitrary nature is explained. Third, such a device is already required for those nouns which have obligatory plurals like scissors and it is required here for very similar reasons.

An entry for a noun compound displaying internal inflection can now be given. Supposing that the lexical entry for man had a location number of 4231 and that of room the number 7654, the lexical entry for men's room would be given as:

$$\begin{bmatrix} 9876, \\ \text{from } 7654 \\ \text{and } 4213 \\ \text{+CR-4} \\ \text{+CR-7, } (\alpha \rightarrow +, \beta \rightarrow +) \\ \underline{\text{washroom for men}} \end{bmatrix}$$

.227 Compounds and idioms.

At this point I wish to digress briefly and discuss the distinction I made earlier between idioms and compounds.[16] Fraser, (1970a), has suggested that idioms can be accounted for by permitting their syntactic base structures to be generated by normal phrase structure rules and then inserting them into a base marker by a lexical insertion transformation. Their idiosyncratic behaviour with transformations and their idiomatic semantic reading can be taken care of by the exception machinery which is possible within a lexical entry.[17]

It is evident that the distinction I made earlier can now be given some status in transformational theory. Idioms and compounds are both introduced into a base marker as lexical items. The "syntax" of idioms is generated by phrase structure rules and the "syntax" of compounds is generated by compounding rules.[18]

.228 A summary of proposals.

1) Lexical rules relate lexical entries to lexical entries.

2) Derivational rules and compounding rules are lexical rules.

3) Compounding rules are context-free and context-

sensitive re-write rules.

4) Compounding rules relate two lexical entries or a syntactic structure and a lexical entry to a third lexical entry.

5) The lexical entries of noun compounds contain positively specified rule features which indicate the rule(s) by which the compound is related to other lexical entries.

6) Where a lexical entry is positively specified for a given lexical rule it also contains cross-references to other lexical entries.

7) The cross-references to other lexical entries appear in the lexical entry in an order governed by the convention that they appear in the order that the rules make use of them, either in left to right order, or in the order of application of the rules to which the entry refers.

8) Lexical entries which are not positively specified for a compounding rule have the feature [-compound] by convention. Lexical entries which are positively specified for a compounding rule(s) have the feature [+compound] by convention.

9) When, as a result of the operation of a compounding rule(s), a phrase node becomes the constituent of a compound, a loop to the phrase structure rules is opened to expand the phrase node.

Compounding rules of the lexical formation component. I have re-ordered these rules slightly to bring out various similarities among the rules.

CR-1
$$\begin{bmatrix} N \\ \alpha F_m \\ -comp. \end{bmatrix} + \begin{bmatrix} N \\ \alpha F_m \\ -comp. \end{bmatrix} \longrightarrow \begin{bmatrix} N \\ \alpha F_m \\ +comp. \\ +exh. \\ -tot. \\ +ind. \\ -dis. \\ -neg. \end{bmatrix}$$

CR-2
$$[COMP, N] + \begin{bmatrix} N \\ \pm comp. \end{bmatrix} \longrightarrow \begin{bmatrix} N \\ +comp. \end{bmatrix}$$

CR-4
$$[COMP, N] + \begin{bmatrix} N \\ \alpha F_m \\ +comp. \end{bmatrix} \longrightarrow \begin{bmatrix} N \\ \alpha F_m \\ +comp. \end{bmatrix}$$

CR-5
$$\begin{bmatrix} V \\ +N \\ -comp. \end{bmatrix} + [COMP, V] \longrightarrow \begin{bmatrix} N \\ +comp. \end{bmatrix}$$

CR-3
$$[COMP, N] \longrightarrow \begin{bmatrix} N \\ +comp. \\ \alpha pl. \\ \beta gen \end{bmatrix} \Bigg/ \underline{\qquad} \begin{bmatrix} N \\ +comp. \end{bmatrix}$$

CR-7
$$[COMP, N] \longrightarrow \left\{ \begin{matrix} N \\ \begin{bmatrix} -comp. \\ \alpha pl. \\ \beta gen. \end{bmatrix} \\ A \\ [-comp.] \\ V \\ [-comp.] \\ Prep. \\ Nu. \\ M \end{matrix} \right\} \Bigg/ \underline{\qquad} \begin{bmatrix} N \\ -comp. \end{bmatrix}$$

CR-8[18] $[\text{COMP,N}] \longrightarrow \left\{\begin{array}{c} S \\ VP \\ PP \\ \underline{N} \\ \underline{V} \\ etc. \end{array}\right\} \Big/ \underline{\hspace{2cm}} \begin{array}{c} N \\ [\pm comp.] \end{array}$

CR-6 $[\text{COMP,V}] \longrightarrow \text{Prep.} \Big/ \begin{array}{c} V \\ [+N] \end{array} \underline{\hspace{2cm}}$

It will be noticed that there are considerable similarities
among these rules. An analysis of compound verbs, e.g.
sleep-walk, street walk, and compound adjectives, e.g. icecold,
pea green, might give even greater coherence to these rules and
permit generalities to be made about the nature of compounding
rules in general.[20]

.3 Support for the extended lexical formation component.

.31 Words and noun compounds.

The semantic component which I assume, makes a distinction
between lexical meaning and structural meaning. Lexical
meaning is represented in the theory by the lexical represent-
ation which is the last element in lexical entries. In this
section I will explore some similarities between the semantics of
single words and the semantics of noun compounds by examining
paraphrases of them. (I take it that paraphrases bear a
relation to semantics.)

First, lexical paraphrases are characteristically
idiosyncratic. It is impossible to predict the paraphrase of
a given word unless one knows the word. This is also the case
with compounds. Except for the generalities which have been

captured in the rules of the previous section, any plausible paraphrase of a noun compound could represent its meaning accepting, of course, that the paraphrase incorporates, somehow, the lexical meanings of the constituents of the compound.[21] It may be the case that there are logical relationships or semantic relationships of a general kind involved in paraphrases of noun compounds. For example, the following compounds could be said to involve an action and an actor in that order: <u>tennis player</u>, <u>highjump champion</u>. However, such relationships have at present no place in the revised standard theory. Nor is it possible to predict which relationship is involved in any given compound so that even if such relationships were incorporated into a semantic theory it would still be necessary to state in a given lexical entry which one was involved in that compound. This could be done in much the same way as the semantic rules associated with derivational processes are stated in lexical entries by Jackendoff,(1969) quoted in section .21 of this chapter. But the fact that such rules would have to be stated in lexical entries indicates that noun compounds are like single word lexical entries and not like syntactic structures.

Second, I have noted in Chapter IV that paraphrases of noun compounds often demand the introduction of facts relating to material culture to be an adequate representation of the speaker's knowledge of the compound. This is also true of single words.

Third, it is a characteristic of lexical items at the periphery of the lexicon that they are known by fewer speakers and also that they fall into disuse. Take for example a word like dirigible. This word has disappeared from the active lexicon of most speakers although it was probably used by most speakers during World War II. Also the word flageolet is probably known only by musicologists and people who play a lot of scrabble. Noun compounds share both these characteristics. For example, I used the example it girl in Chapter II. This compound was in use during the early part of this century and designated a girl who had "it" i.e. sex appeal. If we look at a compound like phrase marker, it is known by only a very few speakers of English.

In all these three respects noun compounds differ from syntactic structures. By accounting for compounding processes in the lexicon these similarities are given a formal explanation.

.32 Derived nouns and noun compounds.

The account of noun compounds given in section .2 of this chapter also gains support from the similarities between derived nouns and compound nouns. It has been noted that both derivational and compounding processes have varying productivity. Thus the rules which account for them do not apply generally but only where a given lexical item is positively marked for their operation. By the placing of both derivational and compounding rules in the lexicon, these similarities are brought out.

.33 Formal support for the extended lexical formation component.

It has been shown in Chapters III, IV and V that both the transformational and phrase structure rule hypotheses of noun compounding run into considerable difficulties. This increases the likelihood that some form of the lexical hypothesis will be correct.

.331 The categorial class of L.H.C.s of noun compounds which have nouns as R.H.C.

I noted in Chapter II that I made a number of arbitrary decisions about the categorial class membership of certain L.H.C.s. This is because there is no formal evidence much of the time as to which lexical class a given item belongs. This supports the theory I adopt because the L.H.C.s of these compounds are introduced by CR-3 and CR-7. CR-3 introduces only Ns, that is only lexical items marked [+N]. But CR-7 introduces lexical items which have any lexical category marking. Thus a lexical item can be marked both [+N] and [+V] and be introduced by CR-7. However, nodes in syntax can not belong to two categories. Therefore the fact that the rules of compounding allow for multiple category membership supports the hypothesis presented above. Only if the rules of compounding relate lexical items to lexical items is this possible. Thus this theory offers an independent explanation for the indeterminate nature of the categorial class membership of some L.H.C.s of noun compounds.

.332 Morphological facts.

A small but interesting piece of confirmatory evidence is to be found in the fact that non-native plurals occur quite freely on L.H.C.s of noun compounds where the item has a non-native plural: e.g. <u>alumnae association</u>, <u>data processing</u>. As such plurals are given in the lexical entry of the nouns which take them, it is not surprising that these nouns are an exception to the generalization that plurals do not occur on the L.H.C.s of noun compounds.

.4 Some consequences of adopting the extended lexical formation component.

.41 The limitations on the notion "possible lexical item".

The hypothesis I have presented to account for noun compounding gives a formal delimitation to the notion "possible lexical item of English". In an <u>Aspects</u> style grammar the only limitation on the notion "possible word of English" is provided by the phonological redundancy rules. However the introduction of derivational rules into the lexicon extends this notion by delimiting what is a possible lexical item for units greater than a formative. The rules of compounding which I have introduced provide further limits to the notion beyond a length greater than one word.

These rules therefore also explicate intuitions about classes of lexical items which are possible but which do not occur,accidental gaps; and classes of lexical items which can

not occur, systematic gaps. For example, <u>sea rhinoceros</u> is an accidental gap in the lexicon whereas <u>across easy</u> is a systematic one. The rules of compounding will not generate compounds with the categorial composition of <u>across easy</u> whereas they will generate compounds with the categorial composition of <u>sea rhinoceros</u> and the discovery of a new biological species or the invention of a new type of submarine may bring this item into the lexicon of English.

It might be argued that semantic constraints are involved in the generation of noun compounds and that, therefore, semantic relationships and features should be incorporated into the lexicon to provide an even narrower constraint on the notion "possible lexical item of English". Although it is no doubt the case that in actual situations where new compounds are coined, a speaker who coins one is making use of semantic considerations, I would argue against any proposal which would incorporate semantic constraints (even supposing that one knew what these were) into the lexical formation component for the following reasons:

1/ It seems unlikely that idiomatic readings can be accounted for systematically and many noun compounds, if not most, have idiomatic readings.

2/ The notion I introduced earlier of the plausibility of a semantic reading seems impossible to define. If one takes any unlikely sounding compound which is potentially generated by by the rules I have given, it is possible to dream up some plausible reading for it.

3/ Facts relating to the material culture of the speaker enter into the semantic readings of noun compounds.

These factors seem sufficient to reject the hypothesis that there are semantic constraints on noun compounds, at least until more is known about what the formal properties of such constraints might be.

The hypothesis presented in this chapter therefore seems to incorporate maximal constraints on the notion "possible noun compound of English".

.42 The power of the grammar.

The hypothesis of noun compounding presented in this chapter reduces the generative capacity of the grammar. A transformational or phrase structure rule hypothesis would generate an infinite number of noun compounds. This is undesirable because speakers of English know only a finite number of noun compounds. The hypothesis I put forward limits the generative capacity of the grammar in two ways. First, it generates only specified lexical entries, that is, the rules of compounding do not apply generally and because of this it generates a finite number of entries. However, the rules allow for infinite extension of the lexicon in the same way that phonological redundancy rules do. It seems to be a necessary property of the lexicon that it be both finite and infinitely extendable. However, the processes whereby the lexicon is extended cannot be introduced into a competence model because they involve extra-linguistic factors.[22]

It therefore seems that my hypothesis both reduces the generative capacity of the grammar and increases its explanatory power.

.5 Dictionaries and the lexicon of a transformational-generative grammar.

It is interesting to note, in conclusion, that the model of the lexicon which I have proposed looks very like a traditional dictionary. The entry in a traditional dictionary contains the spelling of a givenentry, its part of speech, its meaning and a number of phrases and compounds. The compounds are often given with a blank for one of the constituents, the one which heads the entry. The semantic reading of the compound is given beneath it. Some compounds are given as separate entries. Whether or not they are seems to depend on how idiomatic they are. If we adopt the suggestion of Fraser, (1970a), and also place idioms in the lexicon then the lexicon of a transformational-generative grammar begins to approximate quite closely to a traditional dictionary.

However, there are significant differences between the theory I present and both traditional dictionaries and previous transformational theories of the lexicon. These modifications centre round the introduction of the lexical formation sub-component within the lexicon. The theory of the lexicon which I propose rejects the thesis that the lexicon is solely "the full set of irregularities of the language," (Chomsky, 1965, p.142.) The lexical formation component introduces a set of

rules into the lexicon which account for processes of limited
productivity. The productivity of these rules is limited by
the convention that they operate only when they are specified
to operate in a given lexical entry. Thus these rules do
specify regularities within the lexicon.

These regularities constitute a new type of creativity
within transformational grammars. The rules of syntax are
creative in the sense that they operate automatically to
generate new and previously unheard sentences. However this
creativity is not one the speaker is conscious of in a perform-
ance situation. However, the coining of new noun compounds
i.e. the extension of the lexicon by the addition of new
lexical entries involves a creative use of the rules of
the lexical formation component of which the speaker is
conscious. For example, a speaker who designates a new
submarine as a "sea rhinoceros" is using lexical rules in
a consciously creative way. The theory I present gives some
formal explanation of this type of lexical creativity although,
as I have stated previously, the actual generation of new
lexical entries is beyond the scope of a competence grammar.

Notes:

1. These rules and their location will be examined in section
   .21 of this chapter

2. Even if it should be conclusively shown that coordinate
   conjoined noun compounds are recursive, this still means
   that these compounds would be unlike coordinate conjoined
   syntactic structures in that coordinate conjoined noun
   compounds would still have binary constituents whereas
   syntactic structures which are coordinated do not.

3. This is a tentative hypothesis which is rejected later
   in this chapter. At this stage I am merely making a
   prima facie case for generating noun compounds in the
   lexicon.

4. This constraint may be too strong. There might, for
   example, be a case such as witch-doctor mayor. However,
   I have not been able to find any clear cases of this. I
   therefore opt for the strongest constraint.
   I also note, at this point, that in cases like the above
   witch-doctor mayor it is not possible to ask whether or
   not this compound is grammatical. It is only possible
   to ask either whether it is an actual noun compound of
   English or whether it is a possible compound of English.
   This second question is a difficult one to answer. I have
   usually restricted my rules to clear cases and thus
   given the strongest constraints possible. Further
   investigation is, however, certainly warranted.

5. The only possible piece of counter-evidence to this claim
   is that some noun compounds appear to undergo a form of
   conjunction reduction:e.g. the elephant tamers and lion
   tamers going to the elephant and lion tamers. However,
   if this relationship can be formalised as some form of
   transformation, this would still be a rather trivial
   counter-example because single words obviously cannot
   undergo any type of conjunction reduction. So even here
   the feature has some kind of syntactic reflex.

6. This convention will be modified later in the chapter.

7. That is, CR-3 can only apply after CR-2 in the same way
   that the phrase structure rule for the expansion of NP
   can only apply after the rule S $\longrightarrow$ NP + VP.

8. That is, rules which expand nodes in the phrase structure
   component and rules which relate lexical entries to
   lexical entries in the lexical formation component.

9. Joseph Emonds has suggested to me that this is the case
    if we take it that all the L.H.C. P nodes are idioms.
    Idioms require such a loop if we adopt the suggestion of
    note 16 of this chapter. They also require exactly the
    same listing conventions for their lexical entries. Thus
    L.H.C. P nodes would require no additional complication
    of the grammar and would not increase its power.

10. I leave the list of syntactic fragments open because I
    have not been able to determine exactly which phrase
    nodes function as L.H.C.s of noun compounds for reasons
    mentioned in note 4 of this chapter. Nor is this a serious
    matter. The important fact is that some phrase nodes
    including those given in this rule do function as L.H.C.
    of noun compounds, and that these nodes need to be
    incorporated in CR-3. Furthermore, this thesis discusses
    the grammar of noun compounds. It does not purport to
    be a definitive grammar of noun compounds.

11. A case can probably be made for a derivational rule like
    this where the noun compound has the same form as a
    prepositional verb e.g. hold up. A definitive answer
    to this question must await the outcome of a study of
    compound verbs.

12. I have ignored here the following cases: nouns like
    cupful, gutful, etc. These can, it seems to me, be
    treated as derived forms because this structure i.e. N + A
    only seems to occur with -ful and because -ful is in use
    as a derivational suffix in cases like careful, tuneful,
    etc. Second are cases like knowall mentioned in note 4
    of Chapter II. These can be treated as idioms on the
    strength of the fact that know all is a well formed
    syntactic structure and the fact that there are no other
    compounds of the type V + Quantfier. Last there is
    speakeasy. This can also be regarded as an idiom coined
    in a dialect where adjectves function as adverbs; e.g.
    He talks good, Here we can speak easy. Again the
    productivity of this class, if we consider this a noun
    compound consisting of a verb and an adjective, would be
    highly restricted. In fact, this is the only example I
    have been able to find.

13. A second possibility for these structures is that they are
    Ns whose plural is deleted by an obligatory transformation.
    There is some merit in this suggestion. These compounds
    undergo N gapping and N deletion characteristic of
    syntactic fragments. They also occur before noun compounds
    e.g. eighteen hole golf course. However, neither of these
    facts are negative evidence for their being Ns. The
    difficulty with this proposal is motivating the plural
    deletion transformation. On the strength of this I will

continue to regard these as Ns.

13. This method of dealing with lexical items which have no independence of occurence is also used for derived forms in Jackendoff, (1969), pp.33-34.

14. A second possibility is to regard all cases which have a [+genitive] L.H.E. as idioms. For example men's room might be regarded as having a structure as follows:

```
          NP
         /  \
       NP     N
       |      |
     men's  room
```
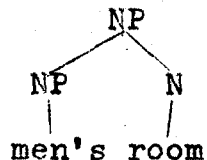
Although this may be acceptable for L.H.C.s which are [+genitive] it is not acceptable for L.H.C.s which are [+plural] . I therefore adopt the proposal of regarding these as noun compounds rather than as idioms.

15. See Chapter II, note 14.

16. "I am making the claim that an idiom and its literal counterpart should be analysed as having identical deep structure syntactic representations. All other idioms - those I've called without literal counterpart - are analysed as having a deep structure representation analogous to an expression which resembles the idiom in its surface structure representation."
                                        (Fraser, 1970a, p.31.)

17. Note, however, that stating the lexical entries for idioms in this way runs into the same problems as those of stating lexical entries for syntactic fragments which function as L.H.C. of noun compounds. See section .225 of this chapter.

18. This rule is incomplete for reasons given in section .225 of this chapter and in note 9.

19. These may not be all the rules required to generate noun compounds. However, they are sufficient to generate the vast majority of them and they are sufficient to demonstrate the use of compounding rules in the lexicon. (See also note 9.)

20. Even this condition is not met at all times. It is not met, for example, by kennings.

21. This seems to be an area where competence and performance meet. Coining new compounds is a performance ability

but stating the grammatical limits on such an ability
is part of a competence grammar.

22. ?

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