A COMMENT ON LEXICAL INSERTION

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1. Introductory remarks

In working with the generative phonology of a highly inflectional or derivational language one repeatedly faces the problem how to distinguish processes that are genuinely phonological (synchronously speaking) from what is more appropriately considered "morphological alternation", suppletion, and the like. Now, any attempt to define the limits of morphology involves an hypothesis about the nature of lexical items, including their representation in terms of marked boundaries, phonologically specified idiosyncracies, and non-phonological idiosyncracies. It goes without saying that it is difficult to discuss these matters in a meaningful way unless we know where the lexical items come from, and at which point in grammar lexical insertion takes place. Thus it is that contemporary work in syntax and in phonology has to face one and the same crucial problem: how does "lexicon" fit into a transformational grammar?

The reflexions of which some elements are presented below, were provoked as conceptual prerequisites by research on the interrelationship between morphology and phonology in languages exhibiting a high degree of morphophonemic complexity (viz. Danish and West Greenlandic Eskimo). However, the specific questions of lexical insertion on which the present paper concentrates are of a very general nature, and the subject-matter has indeed received a good deal of attention in the last few years in studies of well-known languages such as English. I have for obvious reasons (such as the advantage of using
familiar quotations for illustration) preferred to refer to examples in English although my intuitions about the idioms cited are often insufficient for a serious analysis.

I have made no attempt to survey the literature on the subject. It must be mentioned in particular that it has not been possible to include a discussion of the general literature on morphological and lexicological theory in the present paper which is to be understood only as a comment to the discussion of lexical insertion in some recent papers by McCawley (1968) and other advocates of the generative semantics trend of transformational grammar. The validity of generative semantics is not at issue here; it is the sole aim of the paper to present some, mainly morphological and phonological, evidence bearing upon the place of lexical insertion in a type of grammar in which underlying representations are assumed to be of a semantic kind.

2. The introduction of lexical items in grammar

2.1. Deep versus late insertion

According to the now classic theory of transformational grammar (see e.g. Chomsky 1965) the base component of grammar produces strings consisting of chunks of morpheme-size, which are supplied with a phonological specification. The syntactic transformations operate on these items, and in the course of these processes other phonological specifications may be introduced. That is, lexical insertion takes place essentially before the transformational component of grammar, but some of the

1) The adoption of this kind of framework does not imply a dogmatic belief in it as the only possible type of grammar. However, as long as generative semantics (in essentially the form this theory has at present) has not been shown to be inadequate in dealing with problems of syntax, it seems fruitful to explore its implications for morphology and phonology.
transformations require additional lexical information to be introduced later.

According to generative semantic theory the rules of syntax operate on an underlying semantic structure. Apparently a major part of the syntactic component is pre-lexical (in European structuralist terminology: syntax is concerned with content rather than expression). McCawley posits a whole hierarchy of sentences underlying a surface sentence like *John killed Bill*, the surface verb *kill* being derived - by successive applications of a cyclical rule called *predicate raising* or *predicate lifting* - from such predicates as *cause*, *become*, *not*, and *be alive*. This rule lifts the verb of the lowest sentence, i.e. *be alive*, to the next sentence, so that the lifted verb comes to stand adjacent to *not*, and on the next cycle it lifts the whole verb complex to the sentence above it, so that it comes to stand adjacent to *become* of the higher sentence. By lexical insertion at this point we get *die* (*become not alive*). If, however, the rule applies once more, the verb resulting from earlier applications is lifted to the highest sentence so that it comes to stand adjacent to *cause*, and by lexical insertion we get *kill* (*cause become not alive*).

It is implied by this analysis that there is not necessarily any syntactic difference between the derivational relationship of *kill* to *die* and the derivational relationship of, say, *break* in *he broke the glass* to *break in the glass broke*. Similarly, since it is obvious that the complex predicate *not alive* underlies the surface adjective *dead* (if McCawley's analysis is at all correct in detail\(^2\)), it follows that the derivational

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\(^2\) The validity of this particular analysis is immaterial to the general principles.
relationship of die to dead corresponds to that of darken to dark, etc. In each case there is a difference between arbitrary substitution of lexical material (die - kill, dead - die) and a more regular type of derivation (break - break, dark - darken), but this reduces to merely a matter of morphological irregularity: die - kill is nothing but an instance of suppletion, if we wish to formulate the relationship within the framework of derivational morphology.

The analysis of kill which I have sketchily referred to above, implies that lexical insertion must occur after cyclical rules like PREDICATE RAISING. On the other hand, it is claimed that lexical insertion occurs before some post-cyclical transformations that move constituents around, since these rules may depend on specific lexical items (I shall revert to this kind of argument later).

2.2. Cyclic versus non-cyclic insertion of lexical items

It is supposed that lexical insertion takes place either last in the transformational cycle or at the very beginning of the post-cyclical rules of the syntactic component.3 - As far as I can see the latter solution may mean that a form like kill directly replaces a lexical entry containing the semantic material CAUSE, BECOME, NOT, BE ALIVE in some configuration, after it has been brought together by PREDICATE RAISING. There may be no connection between the lexical items die and kill except that the lexical entries for these items share semantic material. - The situation is quite different if lexical

3) These alternatives were presented by McCawley at the First Scandinavian Summer School, Stockholm 1969.
insertion is cyclic. The lexical item die should, according to that conception, be inserted on some cycle, and on the next cycle PREDICATE RAISING applies to this item in its phonological form so that the higher sentence comes to contain a complex consisting of CAUSE and die. When lexical insertion applies again this hybrid configuration is taken as a lexical entry, and the item kill emerges. Lexical items like die and kill are thus very directly connected since the causative form is transformationally derived from the phonological representation of the verb die.

Obviously lexical insertion is somehow cyclic if it can be shown that this process is sensitive to the phonological shape of some of the material that makes up a lexical entry.

Lakoff (1970 p. 78-79) refers to the come-bring situation as evidence in favour of the hypothesis of lexical decomposition: "The ordinary sense of "come" is related to the ordinary sense of "bring" by a predicate of direct causation (...) In addition, there are many idiomatic expressions containing the phonological form come, whose corresponding causative has the phonological form bring (...) There are enough of such cases to require that a rule be stated relating the cases with "come" and the cases with "bring" (though there will, of course, be exceptions to any such rule). In the lexical decomposition framework, the rule of predicate-lifting will create complex predicates such as "CAUSE - come". The regularity is that "bring" substitutes for such a complex predicate."

Phenomena like this one do not prove that lexical insertion is cyclic. However, the relationship between come and bring is most easily accounted for if we assume
some kind of ordering so that the various readings of come are first replaced by a common representation, after which the causative bring is derived by a lexical rule (which is more or less insensitive to the derivational history of come). The cyclic interpretation of lexical insertion sketched above is one approach to this kind of solution.

There are other types of evidence bearing upon the question, but we shall leave this aside here.

2.3. Is cyclicality of lexical insertion phonologically plausible?

According to the cyclicality hypothesis a morphologically indivisible chunk like bring is inserted in two steps: first the form come is specified in its phonological shape (i.e. specified to the same extent as in those contexts where it appears as a surface verb), and afterwards the form bring is derived from the form come plus the element CAUSATIVE. This conception of the process seems to me inescapable if lexical insertion is to be cyclic.

There can hardly be any formal objection against the postulation of transformations that takes some phonological material plus some semantic material and replaces it all by some totally new phonological material. But it is not a particularly convincing hypothesis about what normally goes on in language. It seems awkward to introduce phonological feature matrices in syntax with the sole purpose of having a set of such matrices trigger the insertion of a new set of totally unrelated feature matrices.

This is an entirely general problem concerning suppletive morphology. In what sense can e.g. the phonologically specified stem be be said to "underlie" the forms
am, is, was? I find it questionable whether the analysis of competence can be correlated with a reasonable model of performance if we claim that non-productive, more or less atomic formations like bring or was take more derivational machinery than regular formations like (causative) break or (pret.) drown+ed. It would indeed be inexplicable why some of the most central words in language should be represented by forms exhibiting the longest paths of derivation. - It seems intuitively more satisfactory to assume that the aforementioned idiosyncratic forms are costly only in terms of lexical representation. It would not matter if they took a good deal of "space" in lexicon since these very forms are highly frequently used items. - I shall revert to this crux of morphology in section 3.1. below.

As for the relationship between specifically come - bring and die - kill it seems reasonable to assume that bring is equivalent to come plus the element of CAUSATIVE; the parallelism of die - kill is less convincing, but it is possible to see the connection. As mentioned earlier in this paper the relationship between bring and come can be considered as suppletion, since we have numerous cases where causative verb and the item from which it is derived, turn up as identical surface verbs: break, turn, etc. In other cases the item from which the causative is derived turns up as a surface adjective, cf. dry, clean (or the underlying predicate appears both as surface verb and adjective with more or less identical phonological specifications, cf. fit). It is obviously a lexical rule of English that causative verbs can be derived with no phonological change from items that occur as non-causative verbs or adjectives (the derivation come ⇒ bring, and the blocking of causative *come, must be stated as an idiosyncracy, but that poses no problem in the cyclic framework). Now, why is
kill derived from die rather than from dead (if it is at all derived from any of these)? The adjective dead obviously reflects a stative predicate, from which die is derived as a perfective verb. Thus, the above derivation involves a postulate: causative verbs are derived from inchoative rather than stative predicates (cf. the derivation of bring from COME rather than from BE THERE, or the like). If we follow this principle, the transitive i.e. causative, verb clean is not directly derived from the stative predicate reflected by the adjective clean, but it is derived from an intermediate derivation which means something like BECOME CLEAN.

How should lexical insertion be imagined if there is no surface item reflecting such intermediate derivations? In the case of clean from CAUSE TO BECOME CLEAN the obvious solution is to insert an intermediate form which is later blocked if no further derivation occurs:

(i) lexical insertion provides the entry BE CLEAN with a phonological form: clean, (ii) predicate raising applies, and lexical insertion for BECOME + clean gives an unaltered phonological specification ("zero" derivation), (iii) predicate raising applies again, and lexical insertion for CAUSE + clean gives an unaltered phonological specification ("zero" derivation once more). Output constraints block the lexical output clean in the stative sense unless it appears as an adjective, and they also block this output in the inchoative, "medial" sense, whereas the output is permitted in the causative sense. - This solution presupposes either that lexical output constraints are global rules ("remembering" the derivation) or that there is a diacritic marking of lexical items indicating what they are derived from, in order to distinguish permitted and non-permitted uses of clean.

The approach outlined above provides us with a very powerful tool, and it must be seriously asked whether it is not too powerful. In the case of kill, what prevents us from positing a "zero" derivation from an item *kill that is more or less synonymous with die? Similarly, instead of deriving bring from come, we might claim that come has a near synonym *bring, which, however, is used only if causative derivation has applied to it. This would mean that lexical insertion in the case of COME may either give come or *bring (possibly as an optional choice in some cases but not in others) and that lexical output conditions block the causative derivation if the string contains the form come, whereas they require this very derivation if the string contains the form bring. The obvious advantage of this kind of solution is that a phonological specification of the verb stem occurs only once in the above-mentioned set of derivations, and that the form of lexical entries becomes easier to state.

On the other hand, if we give up the idea that lexical insertion of bring involves the phonological specification of come, we do not really capture the regularity mentioned earlier, viz. that a great many expressions with come also occur with causative bring. It is interesting whether a generalization to this effect can be made without involving lexical transformations like come $\Rightarrow$ bring. I shall attempt to approach this problem by considering the place of "idioms" in general in grammar.

3. The identity of lexical entries

3.1. Are idiomatic expressions lexical items?

In a grammar with a deep structure idiomatic expressions like
to kick the bucket (i.e. 'to die')
to pull someone's leg
to go west (quoted as British army slang 'to die')
can be generated like other grammatical strings, and their specific use as metaphors becomes a matter of semantic interpretation (cf. the interesting discussion of "meaning rules" in Kiparsky 1970 p. 277).

In a generative semantic theory of syntax, on the other hand, the underlying structures of such expressions must reflect their metaphorical sense. It may, therefore, be assumed that the lexical entries for kick the bucket or go west are essentially similar to that for die, and that the lexical entry for pull someone's leg at least shares some properties with that for fool. If that is true, there may be no connection between the constituent structure of the string to which lexical insertion applies and the apparent surface structure of the output. A string like kick the bucket will be a lexical item just like the stem die.

It is, however, obvious that idioms like the above are not "morphemes". A sentence like

he kicked the bucket

is formed by inserting the past tense affix -ed inside the string kick the bucket, i.e. if the latter is a lexical item there must be a transformation applying after the insertion of the idiom with the effect:

he [kick the bucket] -ed ⇒ he kicked the bucket

This can be accounted for in a decently simple fashion if the idiom chunk has a lexical phrase marker associated with it, so that kick is marked as a verb and the bucket as a noun phrase. Similarly, the sentence

he pulled Tom's leg

contains an idiom whose invariant part is pull ...'s leg,
with an associated marking of phrase structure so that the
tense affix and the object noun can be put into their prop­
er places by transformations with the combined effect:

\[ \text{he \{pull ...'s leg\} -ed Tom} \Rightarrow \text{he pulled Tom's leg} \]

However, morphological idiosyncracies complicate the mat­
ter. Compare the sentences:

\[ \text{he pulled my leg} \]
\[ \text{he went west} \]

As regards "portmanteau morphs" like my and went, there are
two reasonable hypotheses: (i) that they are derived by a
morphological process after insertion of the "stem"; (ii)
that they are inserted directly as lexical items.

(i) If we assume that forms like my, went are pro­
duced in a separate, late subcomponent, i.e. morphology,
we may set up derivations like

\[ \text{he \{pull ...'s leg\} -ed me} \Rightarrow \text{he pulled me's leg} \]
\[ \Rightarrow \text{he pulled my leg} \]
\[ \text{he \{go west\} -ed} \Rightarrow \text{he go-ed west} \Rightarrow \text{he went west} \]

However, if we derive my from me+s, went from go+ed, we are
back in the problem of come - bring: it is unsatisfactory
to introduce a phonologically specified item with the sole
purpose of replacing it by something else. An alternative
conception of the relationship between lexicon and morpho­
logy is that lexical insertion rules generate sets of truly
synonymous alternants such as

\[ \text{GO} \Rightarrow \left\{ \begin{array}{l}
\text{go} \\
\text{*wend} \\
(\text{etc.})
\end{array} \right\} \]
\[ \text{PAST TENSE} \Rightarrow \left\{ \begin{array}{l}
\text{\{-ed\}} \\
\text{\{-t\}} \\
(\text{etc.})
\end{array} \right\} \]

(for sim­
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whose members may combine with each other to produce forms
like goes=*wends, *goed=went, etc., whereas morphology com­
prises a set of conditions on such forms, i.e. functions as
a filter that blocks unpermitted forms. The problem with
this latter conception is, as mentioned in section 2.3. above, that it is too powerful a device in grammar theory. In fact, the linguist is in danger of being involved in a jungle of ad hoc decisions such as a choice between *wend (cf. send) or *wean (i.e. wēn, cf. mean) as the underlying "stem" of went.

(ii) As suggested in section 2.3, we may instead take "portmanteau morphs" as specified in lexicon, so that much of what is traditionally called "morphology" comes under lexical insertion proper. This means that there are lexical entries of the form

\[ \text{GO} + \text{PAST} \]
\[ \text{I} + \text{POSS} \]

and that lexical insertion, when applying to these complexes, produces the items went and my directly.

A general evaluation of the relative merits of "morphological" and "lexical" approaches to the specification of such idiosyncracies as suppleting alternants cannot be undertaken in this paper. If, however, the latter approach is considered from the point of view of idiomatic phrases it has obvious shortcomings within the framework of the current generative semantic conception of lexical insertion. Consider the literal and metaphorical readings of the sentence he went west. On the literal reading went would be inserted directly as a lexical item, but what about the metaphor went west? If we set up go west and went west as separate lexical items, we burden the lexicon with an enormous lot of items. If, on the other hand, we have just one lexical item for the metaphorical expression, we shall have to derive irregular forms anyway after postlexical transformations.

This would fail to capture the important generalization that the pattern go-went in the idiom is the same as the inflection of the verb go in its ordinary sense.

5) It will be apparent that I do not quite agree with Kieffer (1970 p. 5) that "we may safely conclude that to treat inflectional morphology in the lexicon is completely inadequate". (I hope to expound on this elsewhere.)
This situation is unacceptable. Lexical insertion must treat the verb *go* in such idioms as *go west*, *go to hell*, etc. as the same item as the ordinary verb *go*, otherwise we shall have to state the same morphological facts several times though there can be no reasonable doubt that *go* in the different uses is mastered as the "same" verb by speakers of English. It is misleading to treat such occurrences of a verb in different idiomatic expressions as "homonymy" on a par with, say, the homonymy between *race* meaning 'species' and *race* meaning a kind of contest, but this is exactly what we should be forced to do.

### 3.2. "Idiom" formation

The evidence considered above suggests that "idioms" may not be a matter of lexical insertion only. The idiom *go west* contains the verb *go*, which is a lexical item, and the adverb *west*, which also is a lexical item. There is nothing lexically strange whatsoever about this phrase, and that conditions its effect as a metaphor (unconventional reference, cf. Reddy (1969)). Though the real nature of metaphor formation is enigmatic, I see no fatal consequences of the working hypothesis that the ambiguity of *go west*, *kick the bucket*, etc. is established "before" the insertion of phonologically specified lexical items takes place. I suggest, therefore, that there is a subset of pre-lexical rules in syntax which take inputs like *DIE* and produce outputs like *KICK THE BUCKET*. The output from such a rule will be a syntactic tree of the same kind, but its internal organization may be slightly or highly deviant from the tree structure of the input. It is to the derived tree that lexical insertion applies. There would of course be many such rules, so that we may define a whole subcomponent of syntax which functions as an **IDIOM GENERATOR**.

6) Morphology may decide on semantically doubtful cases. Cf. Weinreich (1966 p. 466): "of the two homophonous verbs *ring* (1. 'sound', 2. 'encircle'), it is to the former that the ring of ring the changes 'exhaust the variations' is related (cf. rang the changes, not ringed the changes)."
In the case of an idiom like kick the bucket the semantic input and output of the rule are quite different (although they share the property of being predicates). Pre-lexical idiom formation in grammar must mean that the "generator" takes a (derived) semantic representation and replaces it by another semantic representation. If this is to make sense, the latter must also be a derived representation which essentially fulfills conditions imposed upon semantic trees by the syntactic rules that precede idiom formation. In the particular idiom kick the bucket the representation inserted by the rule may have to be marked as metaphorical (if some of the transformations that are blocked in metaphors are later), but otherwise it will be identical with the representation of the phrase KICK THE BUCKET in its literal sense. The funny effect of many such idioms is due to the fact that they can be understood both as derived directly from the underlying representation of their literal sense and, via idiom formation, from a quite different underlying representation. If this were merely a consequence of arbitrary homonymy of lexical entries it would be hard to explain why so many metaphors are syntactically perfectly well-formed on a literal reading.

If we now return to the surface verb come in its various idiomatic uses: come about, come up (for discussion), etc., these undoubtedly have more or less different underlying representations, but the assumption would be that the idiom generator replaces them by one common representation, viz. that of the "ordinary" verb come. If this representation forms a surface verb, lexical insertion gives come, but if the element CAUSE has been lifted and included in the verb, lexical insertion gives bring. There will be one lexical entry for each of these surface verbs, which explains the regularity of the

7) Semantically this will be a mirror image of the process suggested by Weinreich (1966 p. 453); also cf. Kiparsky (1970 p. 277).
alternation come - bring.

The treatment of the different idiomatic uses of *come* will thus differ from the treatment of homonyms like *race* 'species' and *race* 'competition'. In the former case a common representation is inserted by idiom formation, in the latter case two lexical entries happen to yield identical phonological representations. It goes without saying that a distinction between these two types of derivational coalescence is extremely difficult to make in actual practice, but that is a problem which has concerned lexicologists for a long time (within more or less different frameworks of description). I have nothing useful to say about this at present, but another example may help to illustrate the difference:

In Danish there is a surface verb *træde*₁ 'tread', which also occurs in many idiomatic expressions such as *træde*₁ *spinat*en 'put one's foot in it' (literally: 'step on the spinach'). There is another verb *træde*₂ 'thread (a needle)'. The two verbs *træde*₁ and *træde*₂ have more or less similar inflections, whereas the various idiomatic occurrences of *træde*₁ have absolutely identical inflections. This suggests that *træde*₁ is mastered as one verb listed at one place in the lexicon, whereas *træde*₂ is a different verb, which just happens to be homonymous with *træde*₁ in some of its forms. But of course the internalized lexicon may be organized differently depending on the input data one has received. I remember as a child hearing *træde*₂ in the infinitive in expressions like *jeg skal lige træde nålen* 'I just have to thread the needle'. My reaction was that this must be some funny idiom containing *træde*₁, and it was not until later that I realized that it is a different verb derived from *tråd* 'thread'.

According to the model outlined above, this later statement would mean that some information was moved from the
"idiom generator" to the lexicon proper, partly because of the acquisition of data which must belong in the latter place.

4. The bipartite lexicon

According to the hypothesis outlined above a surface verb like come in such expressions as come about is inserted via two kinds of rules: (i) idiom formation, which changes the underlying predicate to the verb COME, and (ii) lexical insertion, which provides this verb with a phonological form. Both kinds of rules belong to the subject-matter that is traditionally conceived as "lexicon" in broad sense. Thus, what the hypothesis actually implies is that lexicon consists of two parts, one of which operates on derived semantic representations to produce structures that qualify as lexical entries, whereas the other performs the insertion of phonological material. For brevity I shall refer to the former part as "lexicon\(_1\)", and to the latter as "lexicon\(_2\)".

Now, at what point in grammar does lexical insertion occur? Grosu (1971 p. 42) mentions the behaviour of eject and throw out in favour of lexical insertion preceding certain post-cyclic transformations: "throw out and eject could probably replace the same semantic configuration, but only the former can be affected by the particle movement transformation". If, however, there is a distinction between lexicon\(_1\) and lexicon\(_2\) this argument may be interpreted as valid for lexicon\(_1\) if we define this subcomponent in a wider sense so that its rules do not only replace semantic material but also perform purely structural restatements of syntactic trees. It may be supposed, for example, that the rules of lexicon\(_1\) take as their input some representation of the meaning THROW OUT and produce as their output either a verb \(_v\) THROW OUT \(_v\) or verb plus particle \(_v\) THROW \(_v\) + OUT.

The relationship of these alleged processes to the word-building and semantic extension types of rules presented in Kiparsky (1970 p. 266f) cannot be treated in this paper.
If the former representation occurs as input to the rules of lexicon\textsubscript{2} we may get the phonological specification of \texttt{eject}; if the latter representation occurs we have two appropriate lexical entries, and we get the phonological specification of \texttt{throw} plus that of \texttt{out}. I.e. \texttt{throw out} will not be phonologically specified as a lexical item per se, which is exactly the kind of economy that would be desirable. (This presentation is, of course, grossly oversimplified. Firstly, \texttt{eject} and \texttt{throw out} are only synonymous on one reading; secondly, \texttt{eject} may perhaps have a complex structure for some speakers of English, cp. that its parts occur elsewhere: \texttt{emit, inject}.)

Under this assumption the rules of lexicon\textsubscript{1} are of essentially the same kind as other transformational rules of the syntactic component,\footnote{Much of lexicon\textsubscript{1} will, of course, be highly idiosyncratic, and it may seem awkward to include such material amongst other syntactic rules. Green (1970 p. 81) speaks directly against the approach outlined here: "Unpleasant implications follow from the claim that there is, for example, only one lexical entry \texttt{refuse}, and that the other meanings are derived by syntactic processes of incorporation or deletion of semantic constituents." I agree that many types of polysemy may be profitably treated in terms of related lexical entries (rather than derivational "translation" into one entry), but I do not see at the moment how this copes with the problems presented above.} and they may not form a well-defined subcomponent at all.

The particle movement argument obviously vanishes as far as lexicon\textsubscript{2} is concerned, but if it is at all valid it certainly shows that the rules of lexicon\textsubscript{1} must apply before certain post-cyclic rules. The lexical insertion rules of lexicon\textsubscript{2}, on the other hand, may well apply at a very late point in grammar, perhaps even at the very end of the syntactic component. However, further consideration of these problems requires a discussion of the internal organization of lexical rules, which is outside the scope of the present paper.
References


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