A PROPOSED TRANSFORMATIONAL RULE

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0.0   In Section 1 I shall attempt to demonstrate how the need for a transformational rule, T_{uni}, uniting features under an NP node, arises in a transformational grammar containing a certain type of deletion transformation. T_{uni} will be investigated further (formally in Section 2, informally in Section 3) and it will be seen that T_{uni} is a valuable transformational rule in more ways than those mentioned in Section 1 and may lead to simplification of the grammars of a relatively large number of languages.

1.0   Chomsky[1] has argued that only recoverable deletions are permissible in transformational grammar and since then recoverability has become a condition imposed upon all deletion transformations. This applies to transformational rules which may involve category symbols or complex symbols or both. Jacobs and Rosenbaum,[2] for example, have a transformation which deletes the auxiliary (category) symbol and the complex symbol attached to the category but preserves this information by copying the features of the auxiliary onto the verbal before the deletion occurs. The copying transformation is a necessary preliminary to the actual deletion transformation.

1.1   Vater[3] has neglected the recoverability condition in the statement, albeit informal, of his deletion transformations. In the generative-transformational grammar of German which he constructs, only the definite and indefinite articles are generated in the deep structure; the zero-article,

[1]   Noam Chomsky, *Current Issues in Linguistic Theory* (The Hague, Mouton, 1964), §. 2.2; and *idem Aspects of the Theory of Syntax* (Cambridge, Mass., M.I.T. Press, 1965), pp. 144 ff., 179-82, and fn. 1, Ch. 3.
[2]   Roderick A. Jacobs and Peter S. Rosenbaum, *English Transformational Grammar* (Waltham, Mass., Blaisdell, 1968), p. 132.
[3]   Heinz Vater, "Zur Tiefenstruktur deutscher Nominalphrasen", *Beiträge zur Linguistik und Informationsverarbeitung* 11 (1967), 53-71.

Ø, is arived at by transformations which delete the definite article. For example, the sentence *Wasser fließt* would have a deep structure phrase marker like Fig. 1.
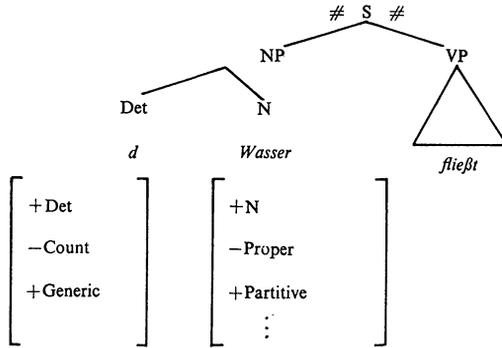

Fig. 1

A deletion transformation, applied to the NP, converts this phrase-marker into Fig. 2.
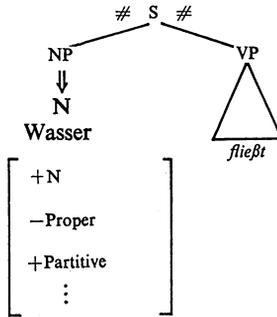

Fig. 2

No mention is made of the feature matrix which had been associated with the category of the determiner. Obviously, it is unacceptable to remove the feature matrix altogether, since *Wasser*, although appearing without an article in the surface structure, is interpreted as if the features of the article were still present. If Vater intends the feature matrix of the article to remain under the deletion transformation, he should stipulate that this be so and explain how the feature matrix of the article can be preserved and intregrated in the final string.

1.2 One way of preserving the feature matrix of the article would be to apply a copying transformation before deletion which copies features of

the article onto the noun.[4] The article may then be deleted, since its features have been amalgamated into the feature matrix of the noun. *Wasser fließt* would then be derived as in Fig. 3.
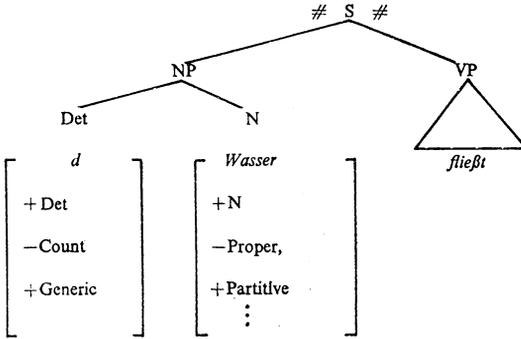

Fig. 3
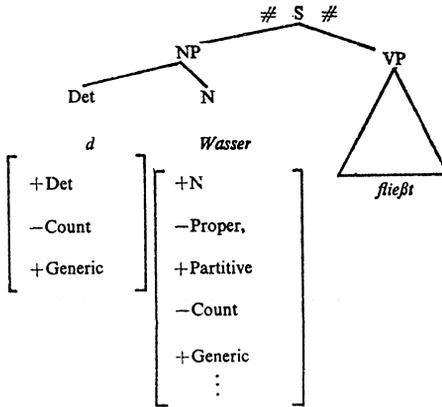
The copying transformation applies (Fig. 4).

Fig. 4

Finally, the deletion transformation applies (Fig. 5).

Theoretically, this would be a solution since it fulfils the recoverability condition, but it is here rejected because it assigns features to the noun which are not part of the subcategorization of this category. In general, a copying transformation is undesirable as it transfers features across categories and so imposes features upon categories which do not really

[4]   Cf. Paul Postal, "On So-Called Pronouns in English", in *Readings in English Transformational Grammar*, ed. by R. Jacobs and P. Rosenbaum (Waltham, Mass., Ginn, 1970), 62; and Jacobs and Rosenbaum, 1968: 84-89, where the reverse procedure is adopted.
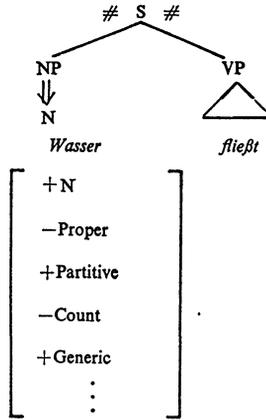
$$
\#\ S\ \#
$$

```
              #  S  #
          NP           VP
          ⇓
          N
       Wasser        fließt
```

$$
\begin{bmatrix}
+\text{N} \\
-\text{Proper} \\
+\text{Partitive} \\
-\text{Count} \\
+\text{Generic} \\
\vdots
\end{bmatrix}
$$

Fig. 5

take these features. Whereas features like $\pm$Animate, and $\pm$Human are inherent in nouns and must be assigned to nouns, features like $\pm$Count and $\pm$Generic are not inherent in nouns and should not become attached to nouns. A noun can be made to be $\pm$Count or $\pm$Generic, depending on the determiner — although some nouns are less flexible in what combinations of determiner features they allow.

1.3   Hence we devise a solution in which article features are not imposed upon the noun or vice versa. Instead, it will be a solution which allows an NP to exhibit features of both the article and the noun.[5] The article may then be deleted since the crucial features belonging to the article are captured and held by the dominating NP. Diagrammatically, the procedure is represented in Fig. 6.
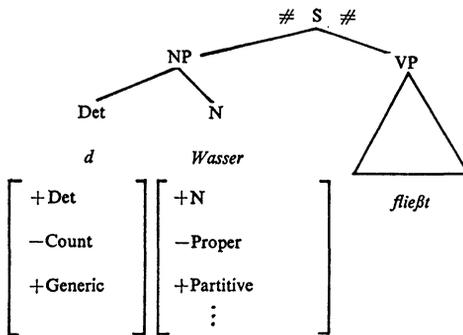
```
                    #  S  #
          NP                    VP
       Det      N
        d     Wasser          fließt
```

$$
\begin{bmatrix}
+\text{Det} \\
-\text{Count} \\
+\text{Generic}
\end{bmatrix}
\begin{bmatrix}
+\text{N} \\
-\text{Proper} \\
+\text{Partitive} \\
\vdots
\end{bmatrix}
$$

Fig. 6

[5] Cf. Noam Chomsky, "Remarks on Nominalization", in *Readings in English Transformational Grammar*, 207 ff.

A transformational rule, T_{uni}, unites features, but not category symbols, under the NP node (Fig. 7).
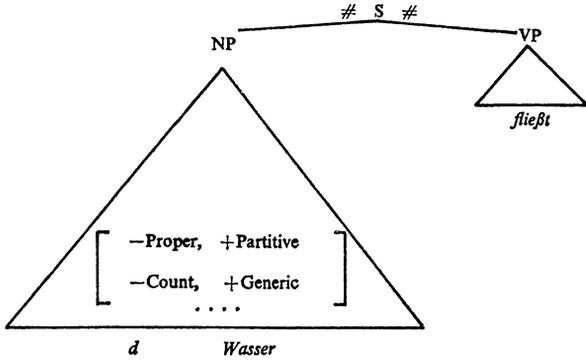

Fig. 7

Finally, a transformational rule, $T_{\emptyset}$, deletes the article from the NP (Fig. 8).
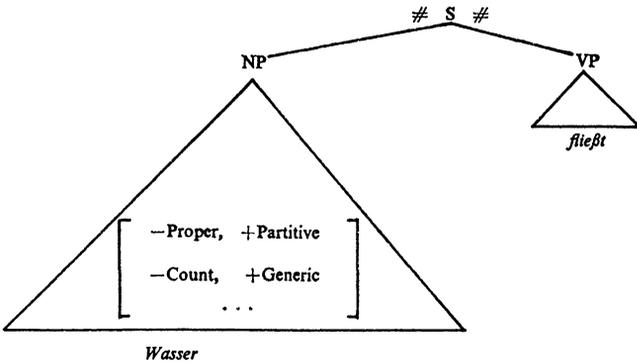

Fig. 8

By uniting features under the NP node one preserves features without having to copy them onto categories which do not include such features in their subcategorization. The category symbols need not be preserved as such, since the remaining features in the complex symbols define the category symbol and so the category symbols are recoverable from the feature configuration of the NP.

1.4 The rules, T_{uni} and $T_{\emptyset}$, may be formalised as follows:

T_{uni}: Given an analysis of a string as in Fig. 9

$$\text{Det} \quad + \quad \text{N} \, ,$$

$$\begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \end{bmatrix} \qquad \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \end{bmatrix}$$

Fig. 9

construct the matrix consisting of the union of the features of Det and N, excluding the category symbols, and assign this matrix to the dominating NP node of Det and N (Fig. 10).
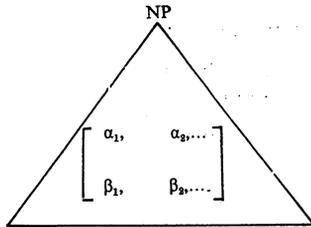
NP

$$\begin{bmatrix} \alpha_1, & \alpha_2, \ldots \\ \\ \beta_1, & \beta_2, \ldots \end{bmatrix}$$

Fig. 10

$T_{\varnothing}$: Given an analysis of a string as in Fig. 11

$$\text{Det} \quad + \quad \text{N} \, ,$$

$$\begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \vdots \end{bmatrix} \qquad \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \end{bmatrix}$$

Fig. 11

which satisfies conditions A, B, C,..., perform T_{uni} and then delete Det.

(The conditions A, B, C..., are those which must hold for the zero-article to appear.)

2.   Although designed specifically as a preliminary to $T_{\varnothing}$, T_{uni} would seem to be useful in other ways. Obviously, T_{uni} may be extended to adjective constituents of an NP and T_{uni} modified in this way has a special advantage. In many languages there is agreement among constituents of an NP regarding certain features, for example number, gender, and case. Chomsky[6] proposes an agreement transformation which applies to constituents of an NP other than the noun and puts these constituents into agreement with the number, gender, and case feature configuration of the head noun. T_{uni} conveniently performs this operation as part of the bigger operation of uniting the features of all the constituents of the NP. T_{uni} is thus a satisfactory substitute for the agreement trans-

[6]   See Chomsky, 1965: 170-75.

formation. And certainly when a language has both zero-articles and agreement in, say, number, gender, and case, then T_{uni} is to be preferred since it performs both the tasks of preserving features in an NP with zero-article and ensuring agreement in number, gender, and case; the agreement transformation does only the latter.

T_{uni} might also be extended to uniting features of the auxiliary and the main verb of sentences and this would prove to be an advantage in cases where the auxiliary segment is deleted but the features of the auxiliary remain. Jacobs and Rosenbaum[7] apply a copying transformation here before the deletion occurs; alternatively T_{uni} could be applied. Application of T_{uni}, modified in either or both of the ways suggested in this section, might also simplify the statement of selectional restrictions in a number of cases, where the restriction is best stated in terms of the feature configuration of whole NPs or auxiliaries plus verbals.

3. The idea that a whole NP can carry a feature is implicit in many of the writings on grammar and is stated explicitly by Dean:[8] "I regard the determiner constituent as simply the locus of certain features of the noun-phrase. I therefore speak of both specific, generic, etc. determiners and of specific, generic, etc. noun-phrases although never of specific, etc. nouns." It would be in accord with our linguistic intuition if NPs were to exhibit features and the grammar would be improved if it contained,
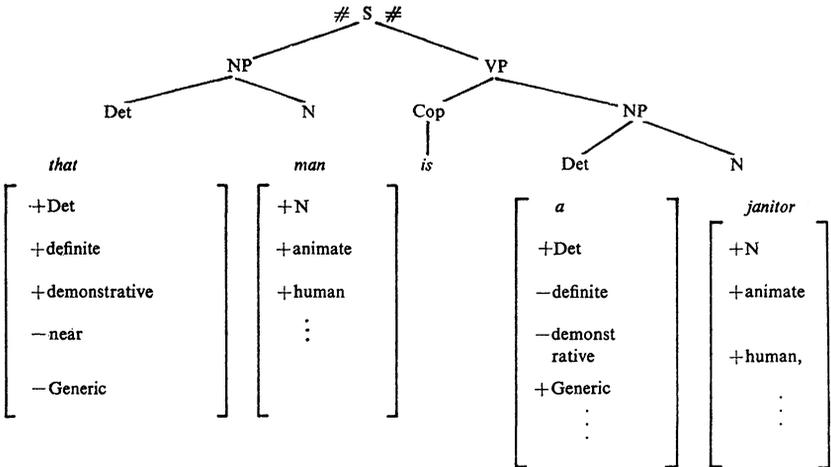
```
                          # S #
                  NP                  VP
            Det        N        Cop          NP
           that       man        is      Det       N
                                                
         ⎡ +Det      ⎤ ⎡ +N       ⎤     ⎡ a         ⎤ ⎡ janitor   ⎤
         ⎢ +definite ⎥ ⎢ +animate ⎥     ⎢ +Det      ⎥ ⎢ +N        ⎥
         ⎢+demonstrative⎥⎢ +human  ⎥     ⎢ −definite ⎥ ⎢ +animate  ⎥
         ⎢ −near     ⎥ ⎢    :      ⎥     ⎢ −demonst  ⎥ ⎢ +human,   ⎥
         ⎢           ⎥ ⎢           ⎥     ⎢   rative  ⎥ ⎢           ⎥
         ⎣ −Generic  ⎦ ⎣           ⎦     ⎢ +Generic  ⎥ ⎢    :      ⎥
                                        ⎢    :      ⎥ ⎣           ⎦
                                        ⎣           ⎦
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Fig. 12

[7] Jacobs and Rosenbaum, 1968: 131-32.
[8] Janet Dean, "Nonspecific Noun Phrases in English", Harvard University Report NSF-20 on Mathematical Linguistics and Automatic Translation (1968), fn. 1. See also Chomsky, 1970: 207 ff. and fn. 31.

in addition to a string analysis in which features are assigned to lexical categories, a string analysis in which NPs (leaving aside the possible extensions of the rule discussed in Section 2) were also assigned 'blocks' of features. T_{uni} in the transformational sub-component of a grammar thus provides for alternative analyses of a sentence such as *That man is a janitor*: One analysis in which (lexical) category symbols are individually assigned features is Fig. 12.

Another analysis in which blocks of features are attached to NPs is represented in Fig. 13.
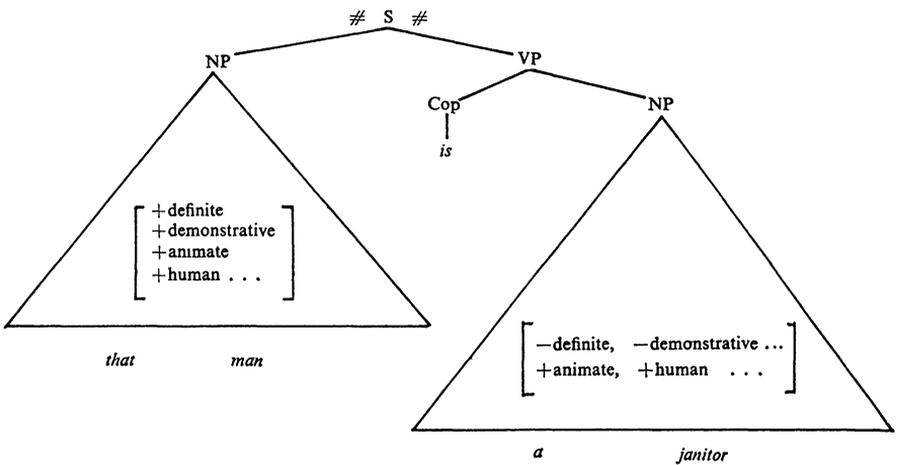

Fig. 13

A grammar which supplies alternative analyses in this way is more in accord with linguistic intuition and hence preferable to a grammar restricted to one or the other type of analysis.

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