

Robert E. Longacre, *Grammar Discovery Procedures. A Field Manual*. (Janua Linguarum, series minor, XXXIII), Mouton & Co., The Hague 1964, 162 pp.

To those who have followed Longacre's previous publications, it is hardly surprising that the present book stands in the tagmemic tradition. This distinguished school of American linguists founded by Kenneth L. Pike has made invaluable contributions towards our knowledge of many exotic languages, which, without their efforts, would have remained uncoded. Besides their descriptive interests, they have also presented certain important insights into the nature and structure of language. Accordingly, the book under review is intended primarily as a practical guide for workers in the field; but it also aims at furthering theoretical understanding of linguistic phenomena.

In addition to the introduction (p. 7–34), which is of a purely theoretical character, the book presents its users with a number of practical directives for the description of (exotic) languages. While presupposing familiarity with tagmemic descriptive methods¹, it prepares the beginning field-worker for the variety of structures he may encounter and helps him in collecting data and distilling a tagmemic description from them. Longacre even goes so far as to suggest sizes and numbers of filing slips and charts for the registration of data. He assumes a situation in which "An analyst approaches a language which either he already knows in some practical way or with which he sets about to familiarize himself – preferably in a language learning situation. The analyst's background is the sum total of his practical knowledge of other languages, his previous analytical experience, and what he has learned from the linguistic research of other people. With this knowledge of the language to be analyzed and with this background knowledge, he makes certain guesses about the grammatical structure of the language. He then submits these guesses to a series of systematic checks in which he confirms, disproves, or modifies his original guesses – and makes a few better guesses en route. This systematic evaluation is based on a theory of the structure of language, and the theory itself (while containing elements of creative thinking) is based on empirical study." (p. 12)

One should, therefore, not expect to find any sort of mechanical discovery procedure leading infallibly to a, or the, correct grammatical description of some language, but rather a systematic collection of hints and suggestions

¹ These are exposed in Kenneth L. Pike, *Language in Relation to a Unified Theory of the Structure of Human Behavior*, Glendale, Calif., 1954, 1955, 1960. See also Benjamin Elson and Velma Pickett, *An Introduction to Morphology and Syntax*. Santa Ana, Calif., 1962. (Reviewed in this issue, p. 213–7.)

based on the author's considerable experience. As such it should be of great value not only to tagmemic trainees but also to every analyst in the field.

Longacre distinguishes procedures for the analysis of clause level constructions (Ch. I), phrase level constructions (Ch. II), word level constructions (Ch. III), and sentence level constructions (Ch. IV), without imposing this order compulsively (p. 11-2). The procedures for every level are divided into four sections: preliminary procedures for the analysis of the pertinent level, analytical procedures for the level syntagmemes (i.e. types of constructions), analytical procedures for the level tagmemes, and concluding procedures for the level analysis. The whole text is interspersed with an impressive array of examples from many different languages including Latin, Greek, Biblical Hebrew, Malayo-Polynesian and American Indian languages.

In view of the suggestive character of the procedures, stressed by the author himself (p. 11-2 *et sparsim*), it is surprising to see how Longacre pretends to give rigid definitions of the syntagmemes of the four different levels that he distinguishes. He presents "definitions", on p. 35 of clause, on p. 74 of phrase, on p. 101 of word, and on p. 125 of sentence. None of these definitions, however, is really a definition in any accepted sense of the term. Take, e.g., the definition of word (p. 101): "a class of syntagmemes of a comparatively low hierarchical order, ranking below such syntagmemes as the phrase and clause and above such syntagmemes as the stem (as well as above roots which have no internal structure and are therefore not syntagmemes). It may be of greatly varied structure (single-centered: *neglected, greenhouse*; double-centered: *foot-pound, choochoo*; or non-centered: *overhead, undersea*) and express a multiplicity of relationships (compare *outcast, outcome, outdoor, outfield, and outside*). Words tend to be rigidly ordered linear sequences containing tagmemes which (aside from those manifested by stems) are manifested by closed classes of morphemes unexpandable into morpheme sequences and giving only stereotyped bits of information." One wonders how any linguist, with only this definition, will be able to determine in any satisfactory way which structures are to be labelled as words, as opposed to phrases, stems, roots, etc.

Longacre even engages in a polemic with Bloomfield, and rejects his definition of word as a 'minimum free form' (p. 102): "Rather we would term minimum free forms words only when such forms are capable of word-level expansion (e.g. by affixation). Otherwise, minimum free forms are simply roots (e.g. English *of, the, there, rather*)." Without becoming involved in the vexing question of what a word is, I should like to make two remarks here. First, if we suppose that we know what minimum free

forms are, and that we are interested to know when they are to be termed words, it is clearly circular to use the possibility of word-level expansion as a criterion, since the establishment of a word-level cannot but depend on the establishment of words. Second, as we are told by the second sentence, Longacre distinguishes between roots and words, and regards English *of*, *the*, *there*, *rather* as roots and not as words. But then, whatever his definition of word may be, it is certainly not an explication of a pre-existing intuitive concept "word". On the whole, it results clearly that it would have been more cautious on Longacre's part if he had avoided the term *definition* altogether, and also the seeming of rigor suggested by its systematic recurrence.

The book is not merely practical: its introductory chapter is purely theoretical. Here Longacre rather insists on a tripartition of linguistic description (p. 7): "It is here assumed that language is structured in three semiautonomous but interlocking modes, phonology, grammar, and lexicon (Pike's trimodalism)." On p. 8: "To describe a language exhaustively (a task as yet seriously attempted by no one), three volumes are needed: a phonological statement, a grammatical statement, and a highly sophisticated dictionary." It may be remarked here, that a semantic description is not provided for. Even though a short section (p. 23-4) is dedicated to "meaning", it does not result that an exhaustive description of a language should include also a description of meanings, in whichever form this may be given.

The phonological grammar specifies not only the phonetic realizations of the separate morphemes generated by the grammar but also syllables, stress groups, phonological words, phonological phrases and phonological sentences. The reason is that an adequate grammar should generate *all* the utterances of a language (p. 9): "No grammar, whatever its profession of being generative, that does not generate satisfactory phonological strings (syllables, stress groups, pause groups, and others) with all the fullness of the living language and that is based on anything short of an unrestricted lexicon, can generate in satisfactory and unrestricted fashion *all* the utterances of a language."

If we take him literally, Longacre pretends that a grammar should generate not only all well-formed sentences of a language, but also the whole mass of half-finished, contaminated, interrupted, stuttered etc. products that occur normally in the speech of every member of a linguistic community. He speaks of "the fullness of the living language". This, I am afraid, is a deplorable metaphor, since linguists know, since a century or so, that whatever one's definition of language may be, it is never a living organism. It is those who use language that are living organisms. Such a metaphor is apt to blur the issue. It occurs to me that in this connection it is wise to follow

Chomsky, who distinguishes² between a theory of linguistic competence (which will include a grammar) and a theory of linguistic performance (about which at present little or nothing is known). In this way all linguoid gibberish is ruled out from the domain of grammar, since a grammar only accounts for competence, not for performance.

"Our approach", says Longacre (p. 10), "is frankly analytic and taxonomic", and he defends such an approach against possible scorn from other linguists. It is true that the procedures of grammatical discovery are genuine analytic procedures and they are also taxonomic in the sense in which Longacre uses the term *taxonomy*. His term *taxonomy* is directly borrowed from biology, where it stands for the systematic classification into species. For Longacre taxonomy is the systematic classification of linguistic specimens (p. 11): "... it seems obvious that the various units and relations of a language can be laid out, classified, and labelled in a manner not unlike the cataloguing of flora and fauna with labelled identification of their functioning parts." He goes on contending that there is no conflict between taxonomy and the generative concept of grammar, since analysis and labelling are necessary preliminaries to any generative grammar. There is also no conflict between taxonomy in this sense and transformational generative grammar (p. 16): "The various patterns and pattern points of a language are not a loose inventory available to the speaker but comprise a system. How many relations among patterns be shown? Generative grammar has brought forcibly and commendably to our attention the usefulness of grammatical transforms (transformations? S.) as one means of expressing relations between sentences."

So far so good. But one wonders why Longacre is so emotional here. Although he does not state this explicitly, his defense is obviously directed against the Chomskian school of linguists, who are the object of vehement and not always necessary criticism throughout the introductory chapter. To my knowledge it is Lees who introduced the term *taxonomy* to the linguistic forum.³ Chomsky too uses the term⁴, borrowing it, apparently, from biology: "It is, incidentally, interesting to take note of a curious and rather extreme contemporary view to the effect that true linguistic science must necessarily be a kind of pre-Darwinian taxonomy concerned solely with the collection and classification of countless specimens, while any attempt to formulate underlying principles and to concentrate on the kinds of data that shed some light on these is taken to be some novel sort of

² Noam Chomsky, *Current Issues in Linguistic Theory*, The Hague, 1964, p. 10.

³ Robert B. Lees, *The Grammar of English Nominalizations*, Bloomington-The Hague, 1960¹, 1964³, p. XIX sqq.

⁴ Noam Chomsky, 'The Logical Basis of Linguistic Theory'. *Proceedings of the Ninth International Congress of Linguists, Cambridge, Mass., August 27-31, 1962*, The Hague, 1964, p. 916. Id., *Current Issues*, p. 11.

“engineering”.”⁵ So far it seems that there is no conflict between the opinions of Longacre and those of the Chomskians: The former states that taxonomic work is a necessary preliminary to the construction of a grammar, whereas the latter say that a linguist should not be content with the mere collection and ordering of data.

But when speaking of the ‘taxonomic model’ of grammatical description, Chomsky refers to a quite different sort of ‘taxonomy’. A taxonomic grammar is not an ordered list of linguistic specimens from which a grammar is to be extracted, but a form of grammar weakly equivalent to what is usually called *phrase structure grammar* (PSG). Such a grammar takes into account only surface structures and does not accept deep, or underlying, structures accounting for regularities and analogies of surface structures that would otherwise remain unexplained. One may admit that, perhaps, Chomsky’s term *taxonomic grammar* is unhappily chosen, but one should not forget to distinguish between these two sorts of ‘taxonomy’. Chomsky’s opposition is, of course, not directed at the analytic and taxonomic gathering of data, but at the taxonomic model as an adequate model of grammatical description.

Longacre closes the exposition of his introductory chapter with a section *Symbols and Rewrite Operations* (p. 24–32), followed by *Acknowledgements* for references, help and suggestions (p. 32–3), and an *Appendix: Summary of Rewrite Operations on Formula of Trique Intransitive Clause* (p. 33–4). In this last expository section of the introduction he proposes a generative apparatus for tagmemic grammatical descriptions (which falls somewhat outside the general frame of the book, to which it seems to have been added as a separate corpus, since no reference to it is made in the other chapters). It will be interesting to see whether this new generative apparatus is, perhaps, superior in any sense to what was named by Chomsky the taxonomic model, or whether it still suffers from taxonomic, or phrase structure, limitations, as was maintained by Postal for non-generative tagmemic descriptions.⁶

Longacre’s exposition of the sort of generative device he proposes is not as explicit as one would wish for a formal apparatus. But I hope I shall not do him injustice in interpreting his text as I do. The generation of sentences starts with the presentation of one or more formulas which are considered fundamental for the language in question. These formulas represent sentence level syntagmemes, each symbol standing for a tagmeme of the syntagmeme. The formulas are given preferably in a consolidated notation defined by a consolidation definition \mathcal{R} . Longacre gives \mathcal{R} as an

⁵ Noam Chomsky, *The Logical Basis*, p. 922.

⁶ Paul Postal, *Constituent Structure: A Study of Contemporary Models of Syntactic Description*. *International Journal of American Linguistics* 30 (1964) 1, Indiana University, Bloomington, 1964, p. 33–51.

operation (p. 25) "whereby a particular *reading* of a formula is obtained", but it is, perhaps, more correct to interpret it as a definition of a consolidated notation.⁷ If any particular reading of a sentence level syntagmeme allows for some permutation, this possibility must be defined, in every separate case, for a permutative operation \mathcal{P} . It is not made clear by Longacre how a \mathcal{P} is to be defined within the frame of his formal generative apparatus, but we may assume that it is possible to give some formal definition for every \mathcal{P} .

The number and order of the sentence level tagmemes of the sentence to be generated has been established now. The grammar may proceed to the next stage of generation, in which the slots are filled by an operation \mathcal{E} , which replaces the symbols of the sentence level tagmemes, first by labels, next by formulas, of the lower level syntagmemes that are going to occupy the slots of the replaced higher tagmemes. Any syntagmeme generated here goes through a set of rules ordered in a way analogous to the rules for the original sentence level syntagmeme. I.e., if it is given in a consolidated form, one reading is chosen; if any permutation is allowed, one variety is chosen; the tagmemes are replaced by labels for and formulas of lower level syntagmemes. These again go through rules ordered in the same three stages, etc., until a semiterminal string is obtained by the selection of lexical items from the lexicon. This semiterminal string serves as input to the (semiautonomous) phonological grammar, which will have a terminal string as its output.

The system of generative rules presented here corresponds to Chomsky's 'central syntactic component' of the grammar.⁸ It is best illustrated by the *Appendix* on p. 33-4, where it is applied to describe Trique intransitive clauses. Although it is true that this generative system allows for an infinite number of (semiterminal) strings, since it does not exclude recursive rules (cf. note 21 on p. 25-6), it should be recognized that, with the exception of permutative operations, it suffers from the same descriptive limitations as the phrase structure model. \mathcal{R} , as has been said above, does not differ from a consolidating definition. \mathcal{E} is a regular expansion of nodes. Only \mathcal{P} is not expressible in phrase structure rules.⁹ In fact, the miniature grammar of the *Appendix* (where no permutation is effected) can be directly reformulated in phrase structure rewriting rules (without, however, the principle of binary branching being observed):

⁷ Paul Postal, *Constituent Structure*, p. 38. For consolidated notations see also Noam Chomsky, *The Logical Structure of Linguistic Theory*. Unpublished, 1955, Ch. III: 'Simplicity and the Form of Grammars'.

⁸ Noam Chomsky, *Current Issues*, p. 9.

⁹ Cf. Paul Postal. *Constituent Structure*, p. 13-5.

- (1) (i) $\text{Intr. Clause} \rightarrow P + S(L) (L) (T) (T)$
- (ii) $P \rightarrow Ph_{1i}$
- (iii) $S \rightarrow Ph_{11}$
- (iv) $L \rightarrow Ph_{41}l$
- (v) $T \rightarrow Ph_{31}$
- (vi) $Ph_{1i} \rightarrow (adv) (Aux) Mn (Md) (r)$
- (vii) $Ph_{11} \rightarrow (i) (q) H (A) (d)$
- (viii) $Ph_{41}l \rightarrow R + Ax$
- (ix) $Ph_{31} \rightarrow U + Or \text{ etc.}$

(I limit myself to a rendering of Longacre's rules 1. through 4.)

If any permutation had been incorporated in the rules of the *Appendix*, this little grammar would have exceeded the limitations of the phrase structure model in an essential way, since only the permutation operations of Longacre's apparatus correspond to transformations. Only here do we recognize an underlying structure which is reduced to a surface structure by a transformational rule. It is, therefore, the more regrettable that Longacre does not tell us how a permutation operation can be given in formal terms. On p. 27 he describes in non-formal English the possible permutations of the tagmemes of Trique intransitive clauses, but nothing of a formalism is to be found. In the *Appendix*, where Longacre exemplifies his attempt to give a formal descriptive symbolism, the only rule in which \mathcal{P} occurs, is 3.: " $\mathcal{P} (PSLT) = PSLT$ (identity permutation)". In the consecutive series of rewriting through readings, permutations and exponentiations, the only allowed permutation is the identity permutation, but it is mentioned nowhere. It is thus seen that, although the *Appendix* is just weakly equivalent to a *PSG*, the apparatus set forth in the preceding pages contains at least a suggestion for a more powerful sort of grammar. It should be noted, however, that even with formally correct permutation operations the generative capacity, and with it the adequacy, of Longacre's device is inferior to the Chomskian transformational model, since besides pure permutations there are also other transformational operations, viz. replacement, expansion, addition, and deletion¹⁰, which serve to express general relations of underlying structures to surface structures.

Although it is seen that tagmemic rewriting rules have, in general, the same weak generative capacity as the well known Chomskian *PSG*, there are some important differences between the two, which are well worth considering. In his appraisal of tagmemic descriptions (see note 6 above), Postal recognizes the equality of weak generative power of both sorts of description (Postal p. 36), but he criticizes tagmemics for imposing on grammar-

¹⁰ Cf. Emmon Bach, *An Introduction to Transformational Grammars*. New York, 1964, p. 74-82.

ical rules a condition which, according to him, "will enormously complicate the description" (Postal p. 36). This condition is stated on p. 35 as Condition (5):

"If $XAY \rightarrow XZY$ and $Z = B_1 B_2 \dots B_n$ (n greater than 1), then $B_j \rightarrow U$ (where U is a single symbol, terminal or non-terminal)."

Condition (5) states that, whenever a tagmemic formula is presented, its tagmemic slots must be filled by one single symbol first, which in its turn may be expanded into a tagmemic formula. A tagmemic formula is a representation of a syntagmeme, which consists of a number of tagmemes. A tagmeme is a functional point in a syntagmeme, a slot that may be filled by a class of linguistic elements, or, as it is frequently put, a slot-class-correlation. If, e.g., a tagmemic analyst discerns in some language a frequently recurring pattern *subject – verb – object* (or, if he surmises that this pattern underlies many manifest surface structures), he will set up a tagmemic formula consisting of three representations of tagmemes (S, V, O). Suppose that the slots of subject and object may both be filled by noun phrases (np), and the verb slot by verb phrases (vp), this will be expressed in the following tagmemic formula:

S:np V:vp O:np

where the colons indicate the slot-filler relation of each tagmeme. Each noun phrase and each verb phrase, however, corresponds again to a syntagmeme with a number of tagmemes. If sentences are developed in this way, from one initial symbol to a terminal product, by a system of PSG-rules, then it is easy to see why Condition (5) holds for tagmemic descriptions: every slot-name must be "rewritten" into the symbol for its filler-class (np, or vp), after which the latter symbol can be expanded in turn.

Condition (5) holds for Longacre's generative system too (Longacre p. 28): "...operation \mathcal{E} may be considered to proceed in two stages: (1) substitution of exponential labels; and (2) substitution of the formula corresponding to the label." He adds a footnote: "Such substitution in two stages does not of itself indicate two nodes in the tree of a construction. There is but one node, viz. a grammatical point with this particular construction manifesting it. From this node there is multiple branching as indicated in the formula of the included construction." This footnote can be taken as a reply to Postal who asserts (Postal p. 36): "The general effect of Condition (5) is to necessitate the recognition of roughly twice the number of nodes per sentence as would be recognized by constituent analysis without this restriction. Since, all other things being equal, this will enormously complicate the description, it is necessary to ask for the motivation for the imposition of this constraint on linguistic description."

To sustain his contention that the description will grow about twice as

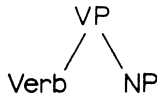
large as is necessary, he compares, in his note 62, the 'ordinary' rule

$$VP \rightarrow \text{Verb} + NP$$

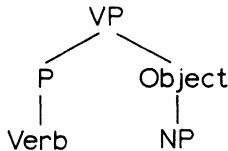
with its supposed tagmemic equivalent

$$\begin{aligned} VP &\rightarrow P + \text{Object} \\ P &\rightarrow \text{Verb} \\ \text{Object} &\rightarrow NP \end{aligned}$$

This would correspond to an 'ordinary' tree diagram



and its tagmemic counterpart



It is true that the number of rules (and, with it, of nodes in diagrams, or, the amount of structure) is much larger than necessary, when a tagmemic description is "translated" into a *PSG*. In (1) e.g. the same generative power would result if rules (ii) through (v) were dispensed with, and the right part of rule (i) would read:

$$Ph_1i + Ph_{11}(Ph_{41}l) (Ph_{41}l) (Ph_{31}) (Ph_{31})$$

(Longacre, in his footnote quoted above, obviously does not have in mind such a "translation" into phrase structure terms, but supposes tree diagrams in which the slot-filler-correlation is somehow differently expressed. Consequently, he is quite justified in discarding the objection of an excess number of nodes, although one might wish to learn what these tagmemic diagrams will look like.) On the other hand, if an ordinary *PSG*, with predominantly binary branching, is reformulated so as to fulfill Postal's Condition (5), the generative result will remain the same, whereas the number of rules will be unduly large.

Nevertheless, there are other differences besides Condition (5) between *PSG* and tagmemic descriptions. One of these, which has not escaped Postal's attention (Postal p. 34), but the relevance of which for the present argument he has failed to mention, consists in the preference for bipartite structures manifested by Bloomfield¹¹, and taken over a.o. by Wells¹² and

¹¹ Leonard Bloomfield, *Language*, New York, 1933, esp. p. 161.

¹² Rulon S. Wells, 'Immediate Constituents', *Language* 23 (1947) 81-117.

Chomsky's school. Tagmemicists search for patterns, or constructions, in the sentences of a language and for representations of these patterns through tagmemic formulas. The question whether the patterns happen to be two- or many-membered does not particularly concern them. In fact, they recognize multiple memberships in most patterns. Whether this is simply an accidental difference or whether something essential is connected with the regular acceptance of more than two immediate constituents, is a question still to be answered. For the moment one only observes the fact that all PSG display an unambiguous prevalence of bipartite analyses (although many-membered constructions are frequently found in transforms). In fact no existing definition of PSG excludes multiple branching, but it should be noted that the introduction of many-membered constructions has a strong rule-saving effect. Postal's criticism that tagmemic descriptions grow unwieldy beyond necessity thus loses much of its force, since in practice a PSG built along tagmemic principles – i.e. with observance of Condition (5) – often proves to be even shorter than its equivalent containing predominantly binary IC-analyses.

To state the two positions impartially: Tagmemic descriptions conform to Condition (5), which increases the amount of structure, but contain predominantly multiple splittings, which produces the opposite effect. PSG save structure through non-acceptance of Condition (5), but the prevalence of binary analyses increases the structure. The position the linguist chooses will depend on the decision of these two issues: (1) is there an external motivation for imposing Condition (5), and (2) is there an external motivation for preferring either multiple or binary branching. If both questions are answered negatively, the linguist will choose the most economical intersection of the two positions. That is, he will not conform to Condition (5), and will incorporate as many multiple cuttings as he finds possible.

Since no arguments have been found, apart from economy of description, in favor of either binary or multiple analysis, the question remains whether Condition (5) can be motivated. An argument can be raised, in fact, in favor of Condition (5), and, with it, of tagmemic devices. This argument does not imply that tagmemics provides an adequate model for overall syntactic description; but it suggests that tagmemic devices deserve serious attention as a possible alternative to PSG. What tagmemic writers intend to describe are primarily surface structures; their devices, however, are intrinsically insufficient to do so adequately. But whatever their reasons are for conforming to Condition (5) in describing surface structures, we may investigate whether there is any justification for its being imposed on the description of underlying structures, i.e. structures that PSG are designed to describe.

It is the introduction of grammatical functions such as *subject*, *object*, *verb*, which makes Postal's Condition (5) hold for all tagmemic descriptions. If there is any justification for these functions, there is one, too, for Condition (5). Chomsky shows that in a PSG these functions are not explicitly given, but can be read from the rules¹³: If we have the rule

$$S \rightarrow NP + VP,$$

then we can associate with it the grammatical functions [NP,S] and [VP,S], to be read as "noun phrase is *subject* of sentence" and "verb phrase is *predicate* of sentence". Chomsky says further: "The important point is that a phrase structure grammar need not be supplemented in any way so as to assign these properties to the strings it generates." (Topics, p. 52). This point is motivated by Chomsky in *Current Issues* (p. 60-5), where he concludes: "The primary motivation for the theory of transformational grammar lies in the fact that the significant grammatical functions and relations are expressed, in a natural way, only in underlying elementary Phrase-markers."

The difficulty is that we find no natural expression of these significant grammatical functions in P-markers generated by PSG. In fact, they are not expressed at all. They are only implied and can be extracted by some subsidiary set of defined functions. On p. 61 of *Current Issues* we read: "It is the great merit of Pike's recent work in tagmemics to have focussed attention on the importance of these traditional notions, although the tagmemic method of analysis of the relational notions is both redundant and (since it is a strictly categorial interpretation) not adequate – see Postal (1964, section VII)." As we have seen above, Postal asserts that it is Condition (5), that is, the explicit introduction of names for grammatical functions, which makes tagmemic descriptions redundant. It is difficult to see what is "the importance of these traditional notions", if a grammatical description is considered redundant when these notions are introduced. Perhaps, the charge of redundancy is not well founded; perhaps, the significance of grammatical functions in a grammatical description, mentioned by Chomsky, can be made more explicit.

The products of the grammatical component, PSG or other, that generates underlying structures (let us call it, with Chomsky¹⁴, *base component*), must go through the transformational component in order to reach the status of semiterminal strings. Grammatical functions such as *object*, *subject*, *verb*, are indeed relevant for many, though not all, transformations. In the passive

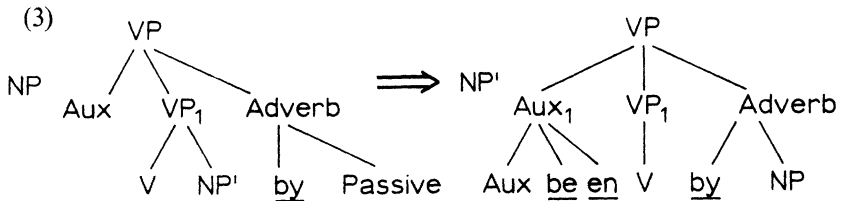
¹³ See Noam Chomsky, *Topics in the Theory of Generative Grammar*, Preliminary version, Harvard, 1964, p. 51-2.

¹⁴ Noam Chomsky, *Topics*, p. 44.

transformation in English, for example, the object is transformed into subject, the subject becomes part of a prepositional phrase *by* + —, the verb is made passive with the additional auxiliary *be*, and the auxiliary is then made to agree with its new subject. In Chomsky's grammar this transformation is phrased¹⁵:

- (2) Structural Description: NP – Aux – V – NP – *by* – Passive
 Structural Change: $X_1 - X_2 - X_3 - X_4 - X_5 - X_6 \Rightarrow$
 $X_4 - X_2 + be + en - X_3 - X_5 - X_1$

As Bach correctly remarks (o.c. p. 80–1), this is not a satisfactory formulation, since transformations are defined as operations mapping P-markers onto P-markers, and it is not clear what shape a derived P-marker of a passive sentence will take. He therefore suggests to state this transformation in some such form as this (amended version):



Without detracting from the ingenuity of this transformation and the system in which it is framed, one might wonder whether a simpler way could be found to obtain the same result. In traditional grammatical teaching this transformation is worded in terms of *subject*, *object*, and *verb*. The suggestion, therefore, to make use of these notions in a formalized transformational grammar, presents itself naturally. Although this is not the appropriate place to enlarge on this suggestion, we can imagine a base component that generates, according to tagmemic principles, an underlying structure such as

- (4) $S[a] - V[Aux(b) + verb(c)] - O[d] - by - Passive$
 (where *a*, *b*, *c*, and *d* are variables for lexical items). A passive transformation might be formulated, e.g., as follows:

- (5) $S[a] - V[Aux(b) + verb(c)] - O[d] - by - Passive \Rightarrow$
 $S[d] - V[Aux(b) + be + en + verb(c)] - by - [a]$

There is little point, of course, in insisting on the exact formulation of a transformation like (5), since it has not been embedded in a comprehensive system. But the principle of making formal use of grammatical functions

¹⁵ Chomsky's latest emendation of this transformation (with the dummy element *Passive*), as given in *Topics*, p. 59 sqq., has been incorporated here. Cf. also Jerrold J. Katz and Paul M. Postal, *An Integrated Theory of Linguistic Descriptions*, Cambridge, 1964, p. 34 sqq.

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such as *subject*, *object*, *verb*, etc., should emerge clearly. One notices, incidentally, that the notions of underlying and derived P-markers need not create difficulties, if transformations are not said to map P-markers onto P-markers, but rather to map underlying structures onto derived structures.

The derived structure of a passive sentence can thus be represented by something like the right part of (5).

All this serves to show that Longacre's attempt to create a generative apparatus according to tagmemic principles, although defective in many respects, certainly deserves our serious consideration.

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