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THOMAS A. SEBEOK

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EDITOR'S INTRODUCTION

The Committee on Linguistic Information – the origins and some early activities of which were mentioned in the Editor's Introduction to the initial volume of this series – now functions as an advisory body to the Center for Applied Linguistics. *Current Trends in Linguistics* is, of course, only one of several coordinated avenues through which our Committee attempts to carry out its basic mandate: to facilitate the spontaneous circulation of information amid linguists throughout the world, as well as between linguists on the one hand and consumers both from related segments of the scholarly community and, more widely, from among the interested lay public on the other. In her generous and gratifying review of Vol. 1, *Soviet and East European Linguistics* (1963), Olga Akhmanova underlined "the fact that international scholarly communication is a bilateral affair. It implies *cross*-communication and *cross*-fertilization" (*Word* 21.180f. [1965]). This is a just characterization of the direction of our efforts and points to a primary impulse for launching the series.

In an informal talk "On Linguistic Information", delivered at Georgetown University, Charles A. Ferguson, Director of the Center and, since 1963, also Chairman of the Committee, discussed the implications of this expression within the scope of which he explicitly included "general statements of theory, how language works, or formalized or semi-formalized theories that have to do with one language or part of a language or all of human behavior" (*Monograph Series on Languages and Linguistics* 17.203 [1964]). The contents of this third volume are in keeping with this emphasis on *Theoretical Foundations*.

The following is an outline of the master plan for the *Current Trends in Linguistics* series, given here to indicate the position of the present volume in the cycle as this has been developed so far.

Vol. 2, concurrently in press, is devoted to *Linguistics in East Asia and South East Asia*, and has been prepared with the collaboration of Associate Editors Y. R. Chao (University of California, Berkeley), Richard B. Noss (Foreign Service Institute), and Joseph K. Yamagiwa (University of Michigan); John R. Krueger (Indiana University) served as the Assistant Editor.

Vol. 4, to appear next year, is devoted to *Ibero-American and Caribbean Linguistics* and being prepared in collaboration with Associate Editors Robert Lado (Georgetown University), Norman A. McQuown (University of Chicago), and Sol Saporta (Uni-

versity of Washington); Yolanda Lastra (Georgetown University) serves as the Assistant Editor.

Vol. 5, scheduled for publication in 1967, will deal with *Linguistics in South Asia*. The Associate Editors are Murray B. Emeneau (University of California, Berkeley) and Charles A. Ferguson; the Assistant Editors are Gerald B. Kelley (Cornell University) and Norman H. Zide (University of Chicago).

Vol. 6, scheduled to appear in 1968, will deal with *Linguistics in South West Asia and North Africa*. The Associate Editors are Charles A. Ferguson, Carleton T. Hodge (Indiana University), and Herbert H. Paper (University of Michigan); the Assistant Editors are John R. Krueger and Gene M. Schramm (University of Michigan).

Vols. 7 and 8 are expected to cover, respectively, *Linguistics in Sub-Saharan Africa* and *Linguistics in Oceania*; the editorial boards for these two have not yet been selected. Future volumes under consideration include one on *Linguistics of North America*, another on *Linguistics of Western Europe*, and perhaps two more, afterwards, to complete the first cycle: one assessing the scholarly literature on extinct languages not discussed in previous volumes, and another examining the impact of linguistics on related fields and vice versa (i.e., psycholinguistics and sociolinguistics, stylistics and metrics, the information sciences and documentation, language learning and teaching, animal communication, and the like).

Although the fundamental organizing principle of this series has been geopolitical – chiefly for reasons of convenience in arranging and displaying the data – several volumes with a theoretical instead of an areal orientation have been envisaged from the beginning, as was announced in the first volume and is exemplified in this third. The seven principal chapters which follow are, in fact, consolidated and expanded versions of talks delivered in the Trends in Linguistics Lecture Series at the 1964 Linguistic Institute of the Linguistic Society of America, held at Indiana University. During that summer, seven visiting linguists, each, spent one week lecturing at the Institute and informally discussing with students and faculty the content of their formal presentations: Noam Chomsky spoke on "Topics in the Theory of Generative Grammar", June 22, 23, 25, 26; Kenneth L. Pike on "Recent Developments in Tagmemic and Matrix Theory", June 29, 30, July 2, 3; Yakov Malkiel on "Problems in the Diachronic Analysis of Word Formation", July 6, 7, 9, 10; Uriel Weinreich on "Explorations in Semantic Theory", July 13, 14, 16, 17; C. F. Hockett on "The Stratificational View", July 23, 24, 27, 28; Joseph H. Greenberg on "Problems in the Study of Universals", August 2, 4, 6, 7; and Mary R. Haas on "The Genetic Relationship of Languages", August 10, 11, 12. On June 23, Robert Godel spoke on "F. de Saussure's Theory of Language", now published as Appendix I; and, on July 31, Edward Stankiewicz gave the Collitz Lecture, on "Slavic Morphophonemics in its Typological and Diachronic Aspects", included here as Appendix II. (For a complete listing of the 1964 Linguistic Institute special lectures – virtually all of which are appearing in several books now in press – see the Director's Report in *Bulletin* 38 of the Linguistic Society.)

The 1964 Linguistic Institute's Trends in Linguistics Lecture Series and, therefore, the production of this book were financed by a grant (GN313) from the National Science Foundation to the Indiana University Research Center in Anthropology, Folklore, and Linguistics, through the Indiana University Foundation. This assistance is acknowledged with pleasure.

The undersigned – in consultation with Ferguson (who was also Associate Director of the Linguistic Institute) and Albert Valdman (who served as its Assistant Director) – was responsible for the selection of the seven principal contributors to *Theoretical Foundations*, each of whom, however, had complete freedom of choice as to topic and the manner of its treatment. The coverage aimed at was, of course, in no sense meant to be exhaustive; obviously, there are other important currents in linguistic theory that are hardly alluded to in this volume and will need to be presented subsequently. The Editor is much obliged to Professors Godel and Stankiewicz for their permission to append the written version of their respective lectures to this book and the double opportunity thus afforded to expand its horizons beyond its original limits.

The Index of Names and the Index of Terms were prepared under Ferguson's supervision, the latter by Rose Nash. Lucia Sauer facilitated the transformation of manuscripts into print with such extraordinary success that she herself underwent, in the process, a metamorphosis from Assistant to the Editor into employee of the publisher; Indiana's loss is The Netherlands' gain.

The suggestion to make available selected chapters of this volume in separate, inexpensive booklets – particularly for the use of students – was first broached with the Editor by M. A. K. Halliday, and realized with the publishers through the co-operation of Cornelis H. van Schooneveld. Inquiries concerning this alternative format may be directed to Mouton & Co.

Bloomington, November 1, 1965 THOMAS A. SEBEOK

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TOPICS IN THE THEORY OF GENERATIVE GRAMMAR*

NOAM CHOMSKY

I

My original intention was to use these lectures to present some recent work on general linguistic theory and on the structure of English, within the general framework of transformational generative grammar. However, a sequence of recent publications has indicated that many points that I had hoped to take for granted are widely regarded as controversial, and has also indicated misunderstanding, on a rather substantial scale, of the general framework I had expected to presuppose — in particular, a misunderstanding as to which elements of this framework express substantive assumptions about the nature of language and are, therefore, matters of legitimate controversy and rational discussion, and which, on the other hand, relate only to questions of goals and interests and are therefore no more subject to debate than the question: is chemistry right or wrong? In the light of this, it seems advisable to change my original plan and to spend much more time on background assumptions and general questions of various sorts than I had at first intended. I still hope to be able to incorporate an exposition (much abbreviated) of some recent work, but I will lead up to it more slowly, in the following steps:

1. discussion of general background assumptions and goals that underlie and motivate much of the work in generative grammar of the past decade;
2. discussion of various objections to this general point of view that seem to me to be based on error, misunderstanding, or equivocation of one sort or another;
3. presentation of a theory of generative grammar of a sort exemplified, for example, in N. Chomsky, *Syntactic structures* (The Hague, 1957), R. B. Lees, *The Grammar of English nominalizations* (Bloomington, 1960), M. Halle, "Phonology in a generative grammar", *Word* 18.54-72 (1962), and J. Katz and J. Fodor, "The Structure of a semantic theory", *Lg.* 39.170-210 (1963);
4. discussion of various real inadequacies that have been exposed in this position in work of the past half-dozen years; and

* This work was supported in part by a grant from the National Institutes of Health, No. MH-05129-04, to Harvard University, Center for Cognitive Studies, and in part by a grant from the American Council of Learned Societies.

5. sketch of a refined and improved version of this theory, designed to overcome these difficulties.

I will try to cover these points in the first three sections, concentrating largely on syntax. Section I will deal with the first point, section II with the second, and section III with the third, fourth and fifth.

In the final section I will discuss an approach to the study of sound structure that has been gradually evolving since Chomsky, Halle, and F. Lukoff, "On accent and juncture in English", *For Roman Jakobson*, eds. M. Halle, H. Lunt, and H. MacLean 65-80 (The Hague, 1956) and has been presented in various stages of development in publications of Halle's and mine (listed in the bibliography below) since then, and will, hopefully, soon emerge to full light of day in a book that is now in active preparation. In the course of this presentation, I will also discuss a few criticisms of this approach. The discussion of criticisms will be very brief, however, since Halle and I have discussed most of them, insofar as they are known to us, in considerable detail elsewhere.[1]

In general, this article contains no new or original material. It is intended only as an informal guide to other books and papers,[2] in which questions touched on here are dealt with more thoroughly, and as an attempt to clarify issues that have been raised in critical discussion.

In the course of this paper I will also make a few remarks about historical backgrounds for the position that will be outlined.[3] Quite a few commentators have assumed that recent work in generative grammar is somehow an outgrowth of an interest in the use of computers for one or another purpose, or that it has some other engineering motivation, or that it perhaps constitutes some obscure branch of mathematics. This view is incomprehensible to me, and it is, in any event, entirely false. Much more perceptive are those critics who have described this work as in large measure a return to the concerns and often even the specific doctrines of traditional linguistic theory. This is true — apparently to an extent that many critics do not realize.[4] I

[1] In particular, see Chomsky, *Current issues in linguistic theory* 31, 105-7 (The Hague, 1964), which deals with criticisms in C. A. Ferguson's review of Halle, *The sound pattern of Russian* (The Hague, 1959); and in Chomsky and Halle, "Some controversial questions in phonological theory", *Journal of Linguistics* 1.97-138 (1965), which deals with objections raised by F. W. Householder jr., "On some recent claims in phonological theory", *Journal of Linguistics* 1/1 (1965).

[2] E.g. Katz and P. Postal, *An integrated theory of linguistic description* (Cambridge, Mass., 1964); Chomsky, *Current issues in linguistic theory*, and *Aspects of the theory of syntax* (Cambridge, Mass., 1965).

[3] This matter is discussed in more detail in Chomsky, *Current issues in linguistic theory*, § 1, in *Aspects of the theory of syntax*, Ch. 1, § 8, and in *Cartesian linguistics* (to appear).

[4] To cite just one example, consider A. Reichling, "Principles and methods of syntax: cryptanalytical formalism", *Lingua* 10.1-17 (1961), who asserts that obviously I could not 'be said to sympathize with such a "mentalistic monster" as the "innere Sprachform"'. But in fact the work that he is discussing is quite explicitly and selfconsciously mentalistic (in the traditional, not the Bloomfieldian, sense of this word — that is, it is an attempt to construct a theory of mental processes), and it can, furthermore, be quite accurately described as an attempt to develop further the Humboldtian notion of 'form of language' and its implications for cognitive psychology, as will surely be evident to anyone

differ from them only in regarding this observation not as a criticism, but rather as a definite merit of this work. That is, it seems to me that it is the modern study of language prior to the explicit study of generative grammar that is seriously defective in its failure to deal with traditional questions and, furthermore, to recognize the essential correctness of many of the traditional answers and the extent to which they provide a fruitful basis for current research.

A distinction must be made between what the speaker of a language knows implicitly (what we may call his *competence*) and what he does (his *performance*). A grammar, in the traditional view, is an account of competence. It describes and attempts to account for the ability of a speaker to understand an arbitrary sentence of his language and to produce an appropriate sentence on a given occasion. If it is a pedagogic grammar, it attempts to provide the student with this ability; if a linguistic grammar, it aims to discover and exhibit the mechanisms that make this achievement possible. The competence of the speaker-hearer can, ideally, be expressed as a system of rules that relate signals to semantic interpretations of these signals. The problem for the grammarian is to discover this system of rules; the problem for linguistic theory is to discover general properties of any system of rules that may serve as the basis for a human language, that is, to elaborate in detail what we may call, in traditional terms, the general *form of language* that underlies each particular realization, each particular natural language.

Performance provides evidence for the investigation of competence. At the same time, a primary interest in competence entails no disregard for the facts of performance and the problem of explaining these facts. On the contrary, it is difficult to see how performance can be seriously studied except on the basis of an explicit theory of the competence that underlies it, and, in fact, contributions to the understanding of performance have largely been by-products of the study of grammars that represent competence.[5]

Notice, incidentally, that a person is not generally aware of the rules that govern sentence-interpretation in the language that he knows; nor, in fact, is there any reason to suppose that the rules can be brought to consciousness. Furthermore, there is no reason to expect him to be fully aware even of the empirical consequences of these internalized rules — that is, of the way in which signals are assigned semantic interpretations by the rules of the language that he knows (and, by definition, knows perfectly). On the difficulties of becoming aware of one's own linguistic intuitions,

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familiar both with Humboldt and with recent work in generative grammar (for explicit discussion, see the references cited above).

I will not consider Reichling's criticisms of generative grammar here. The cited remark is just one illustration of his complete lack of comprehension of the goals, concerns, and specific content of the work that he was discussing, and his discussion is based on such gross misrepresentation of this work that comment is hardly called for.

[5] For discussion, see G. A. Miller and Chomsky, "Finitary models of language users", *Handbook of mathematical psychology*, Vol. II, eds. R. D. Luce, R. Bush, and E. Galanter (New York, 1963); Chomsky, *Aspects of the theory of syntax*, Ch. 1, § 2.

see the discussion in Chomsky, *Aspects of the theory of syntax*, Ch. 1, § 4. It is important to realize that there is no paradox in this; in fact, it is precisely what should be expected.

Current work in generative grammar has adopted this traditional framework of interests and concerns. It attempts to go beyond traditional grammar in a fundamental way, however. As has repeatedly been emphasized, traditional grammars make an essential appeal to the intelligence of the reader. They do not actually formulate the rules of the grammar, but rather give examples and hints that enable the intelligent reader to determine the grammar, in some way that is not at all understood. They do not provide an analysis of the 'faculté de langage' that makes this achievement possible. To carry the study of language beyond its traditional bounds, it is necessary to recognize this limitation and to develop means to transcend it. This is the fundamental problem to which all work in generative grammar has been addressed.

The most striking aspect of linguistic competence is what we may call the 'creativity of language', that is, the speaker's ability to produce new sentences, sentences that are immediately understood by other speakers although they bear no physical resemblance to sentences which are 'familiar'. The fundamental importance of this creative aspect of normal language use has been recognized since the seventeenth century at least, and it was at the core of Humboldtian general linguistics. Modern linguistics, however, is seriously at fault in its failure to come to grips with this central problem. In fact, even to speak of the hearer's 'familiarity with sentences' is an absurdity. Normal use of language involves the production and interpretation of sentences that are similar to sentences that have been heard before only in that they are generated by the rules of the same grammar, and thus the only sentences that can in any serious sense be called 'familiar' are clichés or fixed formulas of one sort or another. The extent to which this is true has been seriously underestimated even by those linguists (e.g. O .Jespersen) who have given some attention to the problem of creativity. This is evident from the common description of language use as a matter of 'grammatical habit' [e.g. O. Jespersen, *Philosophy of grammar* (London, 1924)]. It is important to recognize that there is no sense of 'habit' known to psychology in which this characterization of language use is true (just as there is no notion of 'generalization' known to psychology or philosophy that entitles us to characterize the new sentences of ordinary linguistic usage as generalizations of previous performance). The familiarity of the reference to normal language use as a matter of 'habit' or as based on 'generalization' in some fundamental way must not blind one to the realization that these characterizations are simply untrue if terms are used in any technical or well-defined sense, and that they can be accepted only as metaphors — highly misleading metaphors, since they tend to lull the linguist into the entirely erroneous belief that the problem of accounting for the creative aspect of normal language use is not after all a very serious one.

Returning now to the central topic, a *generative grammar* (that is, an explicit grammar that makes no appeal to the reader's 'faculté de langage' but rather attempts to incorporate the mechanisms of this faculty) is a system of rules that relate signals to

semantic interpretations of these signals. It is *descriptively adequate* to the extent that this pairing corresponds to the competence of the idealized speaker-hearer. The idealization is (in particular) that in the study of grammar we abstract away from the many other factors (e.g., memory limitations, distractions, changes of intention in the course of speaking, etc.) that interact with underlying competence to produce actual performance.

If a generative grammar is to pair signals with semantic interpretations, then the theory of generative grammar must provide a general, language-independent means for representing the signals and semantic interpretations that are interrelated by the grammars of particular languages. This fact has been recognized since the origins of linguistic theory, and traditional linguistics made various attempts to develop theories of universal phonetics and universal semantics that might meet this requirement. Without going into any detail, I think it would be widely agreed that the general problem of universal phonetics is fairly well-understood (and has been, in fact, for several centuries), whereas the problems of universal semantics still remain veiled in their traditional obscurity. We have fairly reasonable techniques of phonetic representation that seem to approach adequacy for all known languages, though, of course, there is much to learn in this domain. In contrast, the immediate prospects for universal semantics seem much more dim, though surely this is no reason for the study to be neglected (quite the opposite conclusion should, obviously, be drawn). In fact, recent work of Katz, Fodor, and Postal, to which I return in the third section, seems to me to suggest new and interesting ways to reopen these traditional questions.

The fact that universal semantics is in a highly unsatisfactory state does not imply that we must abandon the program of constructing grammars that pair signals and semantic interpretations. For although there is little that one can say about the language-independent system of semantic representation, a great deal is known about conditions that semantic representations must meet, in particular cases. Let us then introduce the neutral technical notion of 'syntactic description', and take a syntactic description of a sentence to be an (abstract) object of some sort, associated with the sentence, that uniquely determines its semantic interpretation (the latter notion being left unspecified pending further insights into semantic theory)[6] as well as its phonetic form. A particular linguistic theory must specify the set of possible syntactic descriptions for sentences of a natural language. The extent to which these syntactic descriptions meet the conditions that we know must apply to semantic interpretations provides one measure of the success and sophistication of the grammatical theory in question. As the theory of generative grammar has progressed, the notion of syntactic description has been clarified and extended. I will discuss below some recent ideas on just what should constitute the syntactic description of a sentence, if the theory of generative grammar is to provide descriptively adequate grammars.

[6] Working in this framework then, we would regard a semantically ambiguous minimal element as constituting two distinct lexical entries; hence two syntactic descriptions might differ only in that they contain different members of a pair of homonymous morphemes.

Notice that a syntactic description (henceforth, SD) may convey information about a sentence beyond its phonetic form and semantic interpretation. Thus we should expect a descriptively adequate grammar of English to express the fact that the expressions (1)-(3) are ranked in the order given in terms of 'degree of deviation' from English, quite apart from the question of how interpretations can be imposed on them [in the case of (2) and (3)]:

(1) the dog looks terrifying
(2) the dog looks barking
(3) the dog looks lamb

A generative grammar, then, must at least determine a pairing of signals with SD's; and a theory of generative grammar must provide a general characterization of the class of possible signals (a theory of phonetic representation) and the class of possible SD's. A grammar is descriptively adequate to the extent that it is factually correct in a variety of respects, in particular, to the extent that it pairs signals with SD's that do in fact meet empirically given conditions on the semantic interpretations that they support. For example, if a signal has two intrinsic semantic interpretations in a particular language [e.g., (4) or (5), in English], a grammar of this language will approach descriptive adequacy if it assigns two SD's to the sentence, and, beyond this, it will approach descriptive adequacy to the extent that these SD's succeed in expressing the the basis for the ambiguity.

(4) they don't know how good meat tastes
(5) what disturbed John was being disregarded by everyone

In the case of (4), for example, a descriptively adequate grammar must not only assign two SD's to the sentence but must also do so in such a way that in one of these the grammatical relations of *good*, *meat*, and *taste* are as in 'meat tastes good', while in the other they are as in 'meat which is good tastes Adjective' (where the notion 'grammatical relation' is to be defined in a general way within the linguistic theory in question), this being the basis for the alternative semantic interpretations that may be assigned to this sentence. Similarly, in the case of (5), it must assign to the pair *disregard-John* the same grammatical relation as in 'everyone disregards John', in one SD; whereas in the other it must assign this very same relation to the pair *disregard-what* (*disturbed John*), and must assign no semantically functional grammatical relation at all to *disregard-John*. On the other hand, in the case of (6) and (7) only one SD should be assigned by a descriptively adequately grammar. This SD should, in the case of (6), indicate that *John* is related to *incompetent* as it is in 'John is incompetent' and, that *John* is related to *regard* (*as incompetent*) as it is in 'everyone regards John as incompetent'. In the case of (7), the SD must indicate that *our* is related to *regard* (*as incompetent*) as *us* is related to *regard* (*as incompetent*) in 'everyone regards us as incompetent'.

(6) what disturbed John was being regarded as incompetent by everyone.
(7) what disturbed John was our being regarded as incompetent by everyone.

Similarly, in the case of (8), the grammar must assign four distinct SD's, each of which specifies the system of grammatical relations that underlies one of the distinct semantic interpretations of this sentence:

(8) the police were ordered to stop drinking after midnight.

Examples such as these should suffice to illustrate what is involved in the problem of constructing descriptively adequate generative grammars and developing a theory of grammar that analyzes and studies in full generality the concepts that appear in these particular grammars. It is quite evident from innumerable examples of this sort that the conditions on semantic interpretations are sufficiently clear and rich so that the problem of defining the notion 'syntactic description' and developing descriptively adequate grammars (relative to this notion of SD) can be made quite concrete, despite the fact that the notion 'semantic interpretation' itself still resists any deep analysis. We return to some recent ideas on semantic interpretation of SD's in section III.

A grammar, once again, must pair signals and SD's. The SD assigned to a signal must determine the semantic interpretation of the signal, in some way which, in detail, remains unclear. Furthermore, each SD must uniquely determine the signal of which it is the SD, (uniquely, that is, up to free variation). Hence the SD must (i) determine a semantic interpretation and (ii) determine a phonetic representation. Let us define the 'deep structure of a sentence' as that aspect of the SD that determines its semantic interpretation, and the 'surface structure of a sentence' as that aspect of the SD that determines its phonetic form. A grammar, then must consist of three components: a *syntactic component*, which generates SD's each of which consists of a surface structure and a deep structure; a *semantic component*, which assigns a semantic interpretation to a deep structure; a *phonological component*, which assigns a phonetic interpretation to a surface structure. Thus the grammar as a whole will associate phonetic representations and semantic interpretations, as required, this association being mediated by the syntactic component that generates deep and surface structures as elements of SD's.

The notions 'deep structure' and 'surface structure' are intended as explications of the Humboldtian notions 'inner form of a sentence' and 'outer form of a sentence' (the general notion 'form' is probably more properly to be related to the notion 'generative grammar' itself — cf. Chomsky, *Current issues in linguistic theory*, for discussion). The terminology is suggested by the usage familiar in contemporary analytic philosophy [cf., for example, Wittgenstein, *Philosophical investigations* 168 (Oxford, 1953)]. C. F. Hockett has also used these terms [*A course in modern linguistics*, Ch. 29 (New York, 1958)] in roughly the same sense.

There is good reason (see below, section IV) to suppose that the surface structure of a sentence is a labeled bracketing that segments it into its continuous constituents, categorizes these, segments the constituents into further categorized constituents, etc. Thus underlying (6), for example, is a surface structure that analyzes it into its constituents (perhaps, 'what disturbed John', 'was', 'being regarded as incompetent by

everyone'), assigning each of these to a certain category indicated by the labeling, then further segmenting each of these into its constituents (e.g., perhaps, 'what disturbed John' into 'what' and 'disturbed John'), each of these being assigned to a category indicated by the labeling, etc., until ultimate constituents are reached. Information of this sort is, in fact, necessary to determine the phonetic representation of this sentence. The labeled bracketing can be presented in a tree-diagram, or in other familiar notations.

It is clear, however, that the deep structure must be quite different from this surface structure. For one thing, the surface representation in no way expresses the grammatical relations that are, as we have just observed, crucial for semantic interpretation. Secondly, in the case of an ambiguous sentence such as, for example, (5), only a single surface structure may be assigned, but the deep structures must obviously differ. Such examples as these are sufficient to indicate that the deep structure underlying a sentence cannot be simply a labeled bracketing of it. Since there is good evidence that the surface structure should, in fact, simply be a labeled bracketing, we conclude that deep structures cannot be identified with surface structures. The inability of surface structure to indicate semantically significant grammatical relations (i.e., to serve as deep structure) is one fundamental fact that motivated the development of transformational generative grammar, in both its classical and modern varieties.

In summary, a full generative grammar must consist of a syntactic, semantic, and phonological component. The syntactic component generates SD's each of which contains a deep structure and a surface structure. The semantic component assigns a semantic interpretation to the deep structure and the phonological component assigns a phonetic interpretation to the surface structure. An ambiguous sentence has several SD's, differing in the deep structures that they contain (though the converse need not be true).

So far I have said little that is in any way controversial. This discussion has so far simply delimited a certain domain of interest and a certain class of problems, and has suggested a natural framework for dealing with these problems. The only substantive comments (i.e. factual assertions) that I have so far made within this framework are that the surface structure is a labeled bracketing and that deep structures must be distinct from surface structures. The first of these assertions is well-supported (see below), and would probably be widely accepted. The second is surely much too obvious to require elaborate defense.

To go on from here to develop a substantive linguistic theory we must provide:

(9) (i) theories of phonetic and semantic representation
(ii) a general account of the notion 'syntactic description'
(iii) a specification of the class of potential generative grammars
(iv) a general account of how these grammars function, that is, how they generate SD's and assign to them phonetic and semantic interpretations, thus pairing phonetically represented signals with semantic interpretations.