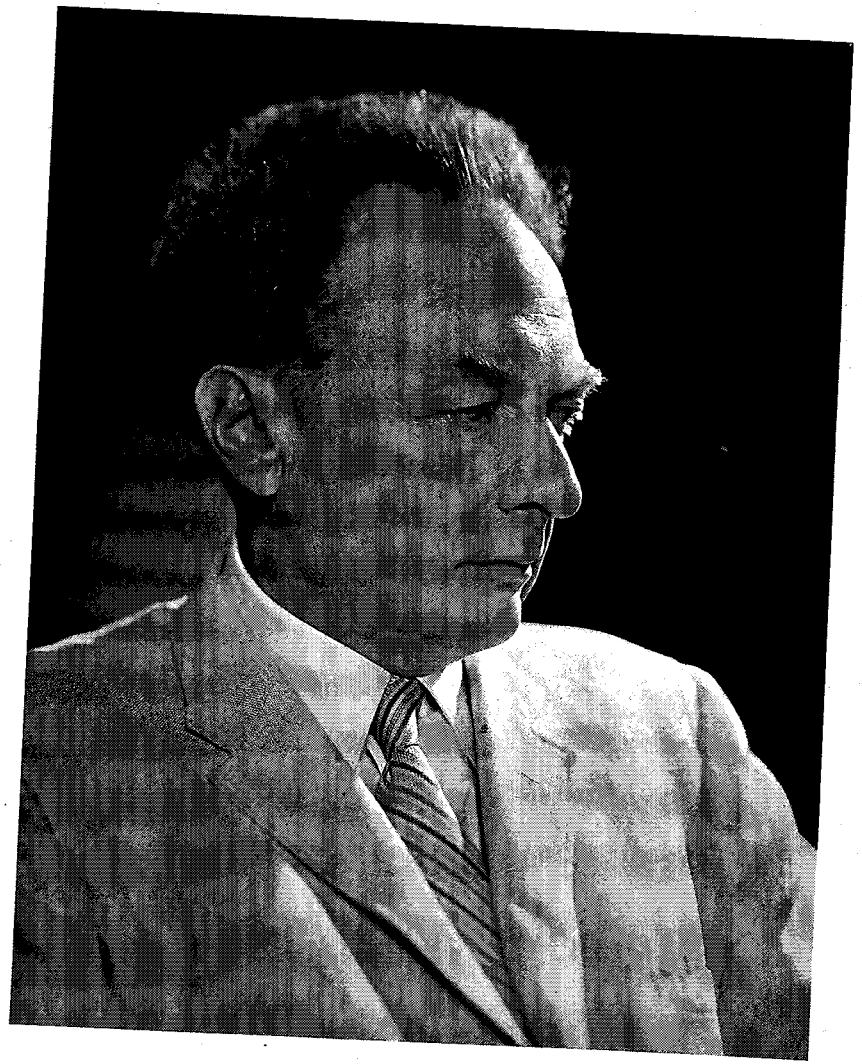

Roman Jakobson

FOR ROMAN JAKOBSON

ESSAYS ON THE OCCASION OF HIS SIXTIETH BIRTHDAY

11 OCTOBER 1956

Compiled by

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THE PUBLICATION OF THIS VOLUME

WAS ASSURED BY A MOST GENEROUS CONTRIBUTION

OF CURT H. REISINGER

WHICH IN TURN WAS MATCHED

BY GIFTS FROM A NUMBER OF OTHER FRIENDS

OF ROMAN JAKOBSON

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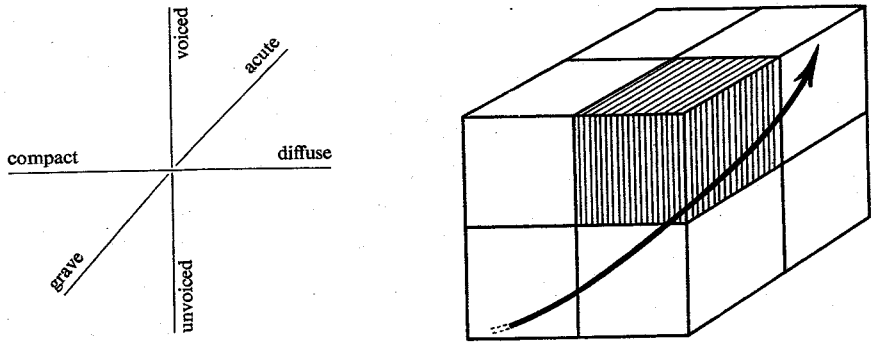
(at present, in imagination only; it would be difficult and maybe pointless to *measure* fine degrees on a speaker's vocal organs!). Then the utterances of one person would be represented by a continuous trajectory through this N-dimension space (Fig. 2 (b)) threading one phoneme–cube after another, being identified within each, by the Observer. But there is still one point of inaccuracy.

This point arises from the abstraction which has been performed by the philologist when reducing the list of N + m phonetic symbols to an irreducible set of N phonemes. Thus our space really requires some more axes, totalling N + m.



(a) 3 mutually orthogonal axes of "Distinctive Feature" (or "Language")-Space.

(b) The Space divided into cube-cells (8 shown here) representing phonemes, and the trajectory of an utterance.

Fig. 2

In summary, my view of these various linguistic concepts is as follows:

(1) "Distinctive Features" form the axes of an N-dimension language-space.
(2) These axes are binary-quantized, so that the language-space is divided up into cubic "cells". These cells represent phonemes.
(3) For any specific language (e.g. Southern English) certain of these cells are forbidden ("empty").
(4) Any number of extra dimensions (axes) may be added to this space, according to the precision with which the utterances of a specific person or group are desired to be described by a phoneticist. (N + m space). Then:
(5) The utterances of this person or group are to be imagined as continuous trajectories through this N + m space.
(6) Many speakers, saying "the same thing" in the same language, would be represented by a close 'beam' of trajectories.

What I am suggesting is, of course, nothing more than the fact that some of the concepts of Statistical Mechanics are relevant to *analysis* of the phenomenon we call speech. But I am far from being the first to suggest this!

UNIVERSITY OF LONDON

ON ACCENT AND JUNCTURE IN ENGLISH*

BY NOAM CHOMSKY, MORRIS HALLE, FRED LUKOFF

IN RECENT YEARS, A CONSIDERable amount of study has been devoted to the 'suprasegmental' features of pitch, juncture, and stress. In particular, English stress has been investigated in great detail, and a variety of interesting phenomena have been noted. These investigations have led to the widespread adoption of a phonemic notation in which four degrees of stress are marked.[1]

In this paper we explore the adequacy of a more economical phonemic transcription in which only the opposition *accented-unaccented* is marked. We find that for a well-defined and independently significant class of utterances such a transcription suffices to determine the full range of variation in stress which has been brought to light and clarified by recent investigations, provided that we take into consideration the hierarchical organization of the utterance.

1. By a 'transcription' we mean a system of symbols and an associated system of rules which assign a value to each sequence of these symbols. We call each sequence of these symbols a 'representation' of the utterances having the assigned value. Here we are interested in a phonemic transcription whose rules assign a phonetic value to every sequence of its symbols. The phonemic transcription that we construct below will meet a number of requirements that we shall discuss in detail. Conditions different from ours have been proposed for phonemic transcriptions. In the course of our discussion we advance reasons for preferring this set of conditions.

* This work was supported in part by the Army (Signal Corps); the Air Force (Office of Scientific Research, Air Research and Development Command); and the Navy (Office of Naval Research); and the National Science Foundation.

[1] Cf. G. L. Trager & H. L. Smith, *Outline of English Structure* (Norman, Oklahoma, 1951). Most of our data is taken from Trager & Smith, and from S. S. Newman, "On the stress system of English," *Word*, 2. 171–187 (1946). We have, on the whole, not attempted to discover new facts or to challenge the accuracy of available data, even though we were in some cases not entirely convinced of their validity. Instead we have designed our rules to fit the stress patterns described in the literature. The present paper offers a different phonemic analysis based on published data. Studies of stress, in general, are somewhat unconvincing because the data are impressionistic. Since the task of finding physical, objective (acoustic and/or articulatory) correlates of stress will require very extensive and time-consuming investigation, the best that can be done at present is to accept the available information on stress, subject to revision in the light of later discoveries.

We wish to construct a transcription – call it the transcription T – which meets the three requirements discussed below.

I. If two utterance-tokens (actual physical instances of utterances) are phonemically distinct,[2] then their representations differ.

For example, the word sequence "light house keeper" can be spoken, by some speakers, in three phonemically distinct ways, with the meanings, roughly, of

(1) (a) housekeeper who is light in weight
(b) person who keeps a lighthouse
(c) person who does light housekeeping

Given two juncture elements - (internal juncture) and = (external juncture), and a single accent element ´, we can present three (in fact, many more than three) distinct representations, e.g.,

(2) (a) light = hóuse - kéeper
(b) light-hóuse-kéeper
(c) lighthóusekeeper

However, we have not yet completed the development of a transcription in the sense defined above merely by providing the means for representing differently every two phonemically distinct utterances; it is necessary further to present rules which give the correct phonetic value to each representation. For instance, if we assign increasing numerical values to decreasing degrees of stress, so that primary (heaviest) stress is represented by 1, secondary stress, by 2; tertiary, by 3, etc.,[3] then we find in the case of (1), that the four syllables of "light house keeper" have associated with them the sequences of numerals (a) 2134, (b) 1324, (c) 3134, respectively, and our rules must be formulated in such a way that these values are determined by the representations (2a), (2b), and (2c). Our goal, then, is to design T in such a way that the representations of phonemically distinct utterances are distinct, and that the phonetic value of these utterances is determined by their representations, given a set of simple rules.

II. The elements of the transcription T are segmental phonemes, junctures and a single accent element.

The segmental phonemes represent physical entities and, therefore, each manifestation of a phoneme must have certain stateable physical properties. We express this by the formula that a phoneme is a bundle of distinctive features. This requirement is the equivalent of what is commonly referred to as the requirement of phonetic similarity of allophones.

The junctures, on the other hand, do not represent physical entities, but are introduced for the purpose of reducing the number of physical features that must be considered phonemic.[4] It is obvious that unless some more or less severe limitation is imposed on the use of junctures, there are many trivial ways of meeting conditions I and II. For example, suppose, that T contains a

[2] Two utterance-tokens are considered phonemically distinct if an informant distinguishes between them consistently. An experimental procedure can be devised to determine this. Cf. Z. S. Harris, *Methods in Structural Linguistics* (Chicago, 1951), 32 ff. Phonemic distinctness is the fundamental notion of phonemic theory, and I is often given as the fundamental condition any phonemic analysis must meet. We return below to the question of whether this condition can apply without qualification. Examples in this section are from H. L. Smith, *Linguistic Science and the Teaching of English* (Cambridge, Mass., 1956), 37ff.

[3] We will also use the customary symbols for representing four stresses, in cases where a four-way distinction suffices to represent the phonetic facts. Thus ´ stands for primary, ˆ for secondary, ` for tertiary, and ˘ for quaternary (weak) stress. We will later speak of "weakening" and "strengthening" stress (instead of "raising" and "lowering") to minimize confusion due to the fact that stress increases as representing numerals decrease. Thus to weaken stress means to increase the associated numerical value.

[4] Cf. C. F. Hockett, *A Manual of Phonology* (Bloomington, Ind., 1955), 158 and 168.

single juncture -; and suppose that it suffices to mark four stresses. Then we can arbitrarily decide to mark primary stress on a vowel V by "V", secondary stress by "V-", tertiary by "-V", and quaternary by "-V-", thus satisfying an even stronger condition than that posed for T, since no accent element need be contained in T at all.

Similarly, the number of segmental phonemes could be reduced. For example, one might say that English possesses only a single nasal consonant /N/ since the phonetic facts can be represented

[n] as /N/; [m] as /-N/; [ŋ] as /N-/

Simplifications of this sort can be pushed even farther, to the extreme of a transcription with a single phoneme symbol preceded and/or followed by one, two, three, etc. junctures. Needless to say, such solutions are entirely unacceptable and must be ruled out a priori. We propose to eliminate them by adding condition III:

III. Junctures should be distributed in a manner that is significant on higher levels. Specifically, junctures should appear only at morpheme boundaries, and different junctures should correspond, by and large, to different morphological and syntactical processes.

It is not obvious that conditions I and II can still be met if we insist on condition III. Hence if we can show that these three conditions can indeed be met simultaneously, then we have a significant result. If a less stringent condition of significance is imposed, the task we face becomes correspondingly easier.

The status of condition III should be kept clearly in mind in view of the many recent discussions on the interdependence of levels. There are two fundamental problems which are discussed in this connection. One is the question whether in arriving at a phonemic analysis of a language it is improper to bring to bear morphological and syntactic considerations. The other is the question whether given a phonemic system we can find a unique way of representing every utterance heard. In our terms the first is the question of whether we can arrive at a phonemic *transcription* without recourse to morphology and syntax, and the second is the question whether given the transcription we can arrive at a unique *representation* for every utterance.

Since these questions are independent of each other there are four positions that can be taken with regard to them. We take the negative position on both questions; i.e. we believe that morphological and syntactic considerations may be relevant to the preparation and evaluation of a phonemic transcription, and we do not require that the phonemic transcription provide a unique representation for each utterance. (See condition I.) This is the weakest of the four possible positions that can be taken on the above questions. We believe, however, that this is the strongest position that can realistically be maintained.

In our opinion there can be no question of circularity in our statement of condition III as a requirement of significance for the transcription T. It is to be noted that this requirement, which introduces higher levels of description into phonemics, must be met by the linguist who prepares a phonemic transcription and not by the user of this transcription. To read a phonemic representation properly one need know nothing of the morphological and syntactic structure of the language; one must only know the values of the symbols in the phonemic transcription (including the junctures) and the rules governing their combinations. On the other hand, to evaluate a phonemic transcription, or to prepare one, the linguist must know the morphology and syntax, as well as the phonemics of the language. As long as we regard a phonemic transcription as a method for representing utterances such that there be a unique reading for every representation and not as a method for arriving at representations of utterances (note that condition I says

nothing more or less than this), we can assert that the limitation on the occurrence of junctures stated above does not affect the purely phonemic status of our transcription T.

It is further to be noted that since junctures are introduced for the purpose of reducing the number of physical features that must be recognized as phonemic, we do not require that every morpheme boundary be marked by a juncture or that syntactic structure be determined by distribution of junctures. Only those morpheme boundaries are marked by a juncture where actual simplifications in the transcription are achieved. In other words, junctures are postulated only where phonetic effects can be correlated with a morpheme boundary.

2. We have stated a condition for the placement of junctures in terms of morphological and syntactic considerations. We have also pointed out that there is no circularity inherent in this statement of compatibility between levels. Though it is not crucial to avoid such a formulation, it is nevertheless natural to inquire into the possibility of stating a condition for the placement of junctures which does not go beyond purely phonemic considerations.

If we were able to specify certain phonetic features of transition, etc., as the general defining property of juncture, we could require that junctures be placed at all and only the points in a representation corresponding to such physical features. It is, however, evident that no such physical common denominator exists for all junctures.[4]

In determining the placement of junctures, it is usual to consider the special features that mark the beginning and end of isolated utterances as being of special importance. Customarily one proceeds as follows:

Suppose that we find phones *X* and *Y* which contrast in utterance-medial position, whereas only phone *Y* occurs in utterance-final position. (E.g., the slightly affricated [T] of "nitrate" and the [t] of "night rate" both occur in the context /nay—ret/, but only the latter occurs in the context — #.) Then we can set up a single phoneme *Z* with the allophone *Y* in the context — #, and the allophone *X* everywhere else, and medial *Y* can be represented *Z*#. (E. g., /t/ has the allophone [t] finally, and the allophone [T] before /r/, and "night rate" with [tr] is transcribed /nayt#ret/.) We might propose this as a necessary and sufficient condition for the establishment of junctures.

Condition (1): If phones *X* and *Y* occur medially in contrast, then *X* is represented as the phoneme *Z*, and *Y* is represented as the sequence *Z*# if and only if it is the case that *X* does not occur finally and *Y* does occur finally.

There is an analogous condition dealing with utterance-initial position.

But closer investigation shows that this is not acceptable either as a necessary or a sufficient condition; this can easily be shown from some simple and familiar examples. In German, for example, we have pairs of voiced and voiceless phones [d] [t], [b] [p], etc., such that the members of each pair contrast medially, while only the voiceless member of each pair occurs finally. These pairs thus meet the sufficient condition for establishment of a juncture proposed in Condition (1). If we accept this condition, then, we are required to set up for German the phonemes /D/, /B/, . . . and a juncture # such that /D/ has the allophone [t] in the context —# and the allophone [d] elsewhere (similarly with /B/, etc.). And medial [t], [p], . . . will be transcribed /D#/, /B#/ . . . , giving us such phonemic representations as /B#a:rə/ ("Paare"), /Ba:rə/ ("Bahre"), etc. But this is clearly an unacceptable result, so we cannot accept condition (1) as a sufficient condition for the establishment of junctures.[5]

Can we however accept Condition (1) as a necessary condition for the establishment of a juncture? Investigating the case of German somewhat further, we see that even this proposal cannot be accepted. We consider now the condition analogous to (1) in utterance-initial position. Obviously if one of these analogous conditions fails, the other cannot be accepted.

Consider a German dialect that does not have initial [ç], i.e. "Chemie" is [kemi], not [çemi], etc. But [ç] and [x] contrast medially, e.g., [ku:çen] ("Kuh-chen"), [anaçen] ("Anna-chen"), vs. [ku:xen] ("Kuchen"), [laxen] ("lachen"), etc. Clearly the only acceptable solution in this case is to place a juncture before medial [ç], giving /ku:#xen/, /ana#xen/, etc., and allowing us to consider [ç] and [x] as allophones of a single phoneme. But neither [ç] nor [x] occur initially. Hence condition (1) cannot be accepted as a necessary condition for the establishment of juncture, either. It is therefore inadequate in the strongest possible sense.

[5] Cf. Z. S. Harris, *Methods in Structural Linguistics*, 87.

One might seek to save condition (1) by limiting its application to cases where it does not contradict such purely phonemic conditions as the following:

Condition 2a: Two junctures cannot occur next to each other.

Condition 2b: No single consonant can be set off by junctures.

This would make it impossible to represent German /p/ as /B#/. However, it would not prevent the representation of German /s/ as /Z#/, since /s/ never occurs initially. Furthermore the condition is much too strong since there might well be cases where a mono-phonemic consonantal affix might be preceded and followed by juncture.

It seems to us, therefore, that the search for a purely phonological condition for the placement of junctures is not likely to be successful. We do not find this disturbing, for as we have stated above, we find no circularity in the statement of morphological conditions as criteria of significance for a phonemic analysis.

3. To characterize T, we must first present an analysis of the segmental phonemes which it contains. The analysis of consonants is of no relevance to our problem, but the analysis of vowels is of considerable importance. We will work with the following vowel phonemes:

(3)

Reduced	*Lax*		*Tense*	
ɨ	U	I	u	i
	ɔ	ɛ	o	e
	ʌ	æ	a	æ

This is the system of vowel phonemes of two of the authors. For these speakers, the lax vowels are, left to right in (3), the vowels of *pull, pall, but, pal, bell, pill,* and the tense vowels are those of *pool, pole, pot, pan, pain, peal.* The reduced vowel is that of *bird* and the final vowel of *butter, soda.* Each vowel occurs also without accent, e.g., as the vowel before the major stress in "an*i*mation," "f*u*lfillment", "imp*o*rtation", "inc*u*lcation", "rel*a*xation", "ost*e*ntation", infil-tration", "rh*eu*matic", "l*o*cation", "ret*a*rdation", "adv*a*ntageous", "gr*a*dation", "legality."[6] It is possible to revise this sytem, reducing the number of elements, but increasing the number and complexity of the rules of combination, by writing /i/ as /iy/, etc. This alteration would not affect any of our statements.

4. Besides segmental phonemes, the transcription T contains an accent element ′. Each vowel occurs with or without accent. (Alternatively and equivalently, we might consider T to consist of segmental phonemes and junctures, with two series of vowel phonemes, accented and unaccented, i.e., with accent as one of the distinctive phonemic features applying to vowels.)

For clarity of exposition, we will maintain a sharp distinction of usage between *accent* and *stress*. By 'accent' we refer to the element /′/ of the transcription T (alternatively, to the distinctive feature accented-unaccented). By the 'stress' on a vowel we refer to the particular degree of loudness with which the vowel is pronounced. A vowel may have any one of several degrees of stress, but it must be either accented or unaccented. The purpose of this paper, as stated in § 1, is to establish the predictability of stress from accent.

The transcription T also contains several junctures. We set up the two junctural elements (internal juncture) and = (external juncture). By and large, internal juncture corresponds to the process of word formation, and external juncture to the process of phrase formation. Thus we have "bláck - bìrd", "élĕvàtŏr-ôpĕràtŏr", as opposed to "blâck = bírd", "ôld = mán." We place the junctures in these positions in order to be able to describe the distribution of stress in a simple way, not because of the type of syntactic and morphological processes involved. The resulting

[6] All but one example from Newman's article in *Word*, 2 (cf. fn. 1, above).

correspondence to higher levels serves as an indication of significance in the sense discussed in connection with Condition III, above.

We consider that the junctures in a sentence occur in a hierarchic arrangement, and we write each juncture with a subscript to indicate its place in this hierarchy, lower numbers corresponding to more major breaks. We can thus rewrite (2a-b) as

(4) (a) líght $=_1$ hóuse $-_2$ kéeper
(b) líght $-_2$ hóuse $-_1$ kéeper

If a juncture has the subscript n, we say that it is of *order n*. The ordering of junctures, too, is introduced for the purpose of determining the distribution and value of stress. But we find, by and large, that it correlates with the results of constituent analysis on higher levels. This correlation is still another indication of significance, in the sense of the discussion of Condition III, above.

The presentation of a complete description of English stress would go far beyond the scope of this paper, and would probably require a parallel study of pitch and other junctural features that we have not considered. We will limit our analysis to a domain which we will call the 'phonemic clause,' following the terminology of Trager and Smith though our usage of the term may turn out not to be co-extensive with theirs. The phonemic clause will be bounded, in representations in T, by zero-order junctures. Within this domain, the two junctures discussed above suffice to determine stress in a simple and significant manner. When the transcription T is extended to cover complete utterances, and to include pitch as well as stress, further elaboration may be required. The significance of this domain cannot really be clarified until the transcription T is further developed in this way. We believe that it will be the case that utterances can most simply be described as consisting of such phonemic clauses as their fundamental phonological elements.

5. The first problem that confronts us is to determine how many distinct stresses must be recognized as data to be accounted for by the rules of the transcription T. Consideration of single words reveals at least five phonetically distinct levels of stress. E.g., the relative stresses in "emendation" must be marked "$\overset{3}{\text{e}}\overset{4}{\text{m}}\overset{1}{\text{e}}\text{n}\overset{5}{\text{d}}\text{ation}$." We arrive at this conclusion by noting that the heaviest stress is on the third syllable, and the first syllable is clearly louder than the second, which in turn is clearly louder than the fourth. Furthermore, we note that the stress on the first syllable is less than that on the first syllable of "either nation," the stressed syllables of which must be marked 21; so that the first syllable of "emendation" must have stress 3.

An even larger number of stress distinctions can be discovered when we proceed to longer phrases.

It is customary to regard the clear difference in stress between the second and fourth syllables of "emendation" as an allophonic variation, due to the difference of vowel. We will suggest that all distinctions, other than accented-unaccented, can also be regarded as allophonic.

6. Let us consider briefly the character of the sequences with which we will have to deal in constructing rules. Each phonemic clause is a linear sequence containing segmental phonemes, including accented and unaccented vowels, and containing junctures with subscripts which delimit constituents of different hierarchical status. But not every sequence of elements of T is admissible as a phonemic clause. E.g., a sequence containing only junctures is ruled out.

The placement of junctures in a phonemic clause can be thought of as imposing a constituent analysis on the sequence. The outstanding formal characteristic of constituent analysis is that two constituents cannot overlap unless one is included in the other. It follows that we can represent the constituent analysis of a sequence by the use of parentheses, with paired parentheses marking the boundaries of a constituent. For greater clarity, we can use several styles of parentheses, e.g., brackets, angles, etc. Suppose that A, B, C, D, E, F, G, are sequences of segmental phonemes containing no junctures. Then the constituent analysis of a typical clause might be given in such a manner as:

(5) $\{([\langle A\rangle\ \langle B\rangle]\ [\langle C\rangle\ \langle D\rangle])\ ([E]\ [F]\ [G])\}$

In such a case we will call the sequence A B C D E F G (set off by $\{\}$) a constituent of order 0, the sequences A B C D and E F G (set off by ( )) constituents of order 1, the sequences A B, C D, E, F, G (set off by [ ]) constituents of order 2, and the sequences A, B, C, D (set off by $\langle\ \rangle$) constituents of order 3.

We have not included various styles of parentheses as elements of the transcription T, but we do have available junctures with numerical indices, and we can achieve the same effect by using these symbols instead of parentheses. Suppose that "$\#_n$" stands for any juncture of order n. We can now rewrite (5) using junctures to indicate constituent structure in the following way:

(6) $\#_0$ A $\#_3$ B $\#_2$ C $\#_3$ D $\#_1$ E $\#_2$ F $\#_2$ G $\#_0$

A sequence of symbols is now defined as a *constituent of order n* if it is flanked by a juncture of order n on one side and a juncture of order $\leqq n$ on the other, and if it contains no junctures of order $\leqq n$ (i.e., if a constituent is bounded by junctures of unequal orders, then the order of the constituent is that of the higher juncture). Thus the sequence A $\#_3$ B . . . F $\#_2$ G is a constituent of order 0, the sequences A $\#_3$ . . . $\#_3$ D and E $\#_2$ F $\#_2$ G are constituents of order 1, the sequences A $\#_3$ B, C $\#_3$ D, E, F, G are constituents of order 2, and the sequences A, B, C, D are constituents of order 3. We see that (6) imposes the same constituent analysis as (5), when n-order constituents are defined in this way, except that now intermediate junctures are included as part of the constituent within which they appear.

We can now state the formal conditions that characterize the sequences with which we have to deal in stating the rules of stress. We require that every such sequence (every phonemic clause) begin and end with a juncture of order 0. Between every two junctures there must be at least one segmental phoneme. Except for the phonemic clause itself (i.e., except for $n = 0$), every constituent of order n must be contained within a constituent of order n-1; i.e., it must be an immediate constituent of a constituent of next lowest order. It follows from the foregoing that all constituents (and all junctures) of a phonemic clause are of non-negative order, that every phonemic clause is uniquely decomposable into constituents which overlap only if one is included in the other, and that the junctures immediately before and immediately after a given juncture of order n cannot both be of order smaller than n-1.

A given juncture may be directly followed simultaneously by several constituents. E.g., $\#_1$ in (6) is followed by the constituent E of order 2 and the constituent E $\#_2$ F $\#_2$ G of order 1. We define the *right domain* (*left domain*) of a juncture as the longest constituent – hence the constituent of lowest order – that follows (precedes) this juncture. E.g., the right domain of $\#_1$ in (6) is the constituent E $\#_2$ F $\#_2$ G.

7. We now proceed to develop a set of rules which will enable us to reach the goals cited in § 1 with the aid of the devices made available in §§ 3-4. That is, in terms of the elements of T, we state rules that will determine the stress value of each vowel. We can regard this as the problem of assigning integers to the vowels to indicate the degree of stress. We find that there are two kinds of rules:[7]

1. Basic structural rules which are stated in terms of accent and juncture.
2. Subsidiary phonetic rules which are stated in terms of particular vowel qualities.

We consider first the structural rules.

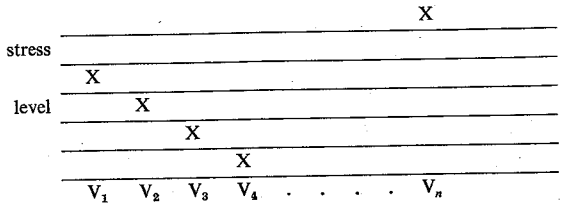
Rule 1: Suppose that a sequence . . V_1 . . V_2 . . . V_n . . . is a phonemic clause with V_1, . . ,V_n as its only accented vowels, where $n \geqq 2$ (i.e., the sequence contains at least two accented vowels.) Then the stress of V_1 is weakened by two, and the stress of V_i, for $i > n$, is weaker by one than the stress on V_{i-1}.

That is, in a sequence of accented vowels not containing junctures, the final one has the heaviest stress, and stress increases as a vowel is further removed from the final vowel, but never increases beyond two lower than the stress of the final accented vowel.

[7] Naturally, the rules given here will not apply without modification to all English dialects. Just as in segmental phonemics, the description of stress must vary somewhat from dialect to dialect, and actually, a distinct system must be presented for each dialect. It is to be expected, however, that the basic notions will carry over.

We thus have a contour of the shape

(7)



Where $n = 2$, we have such examples as "animation," represented /ænɪméšɪn/ and read [ǽnɪ́méšɪn]. Where $n = 3$, we have, e.g., "counter-revolutionary," which we represent /kæwntɪrrɛ́vɪlúšɪnɛri/ and read [kǽwntɪrrɛ̀vɪlúšɪnɛri],[8] since rule 1 requires that V_1 (in this case, /æ/) be weaker by 2 than V_3 (in this case /u/), and that V_2 (/ɛ/) be weaker by one than V_1. This is the correct reading for "counterrevolutionary," where there is less stress on "counter" than on "real" of "real revolutionary." It is questionable whether the process can be continued beyond $n = 3$; i.e., instances beyond $n = 3$ may require an intervening external juncture.

Rule 2a: The effect of an internal juncture is to weaken the heaviest (main) stress in its right domain by one.[9]

For example, "blackboard" is transcribed /blǽk -$_1$ bórd/ and read [blǽk-bȍrd]. Note that as Rule 2a has been stated, it applies only to the main stress and can thus alter the stress relationships in the right domain. Thus "operation" has the stress pattern 3414 in isolation, with the third vowel bearing the main stress. But in "elevator-operation," the stress pattern of "operation" is changed, in accordance with rule 2a, to 3424. This is the way the facts are recorded, e.g., by Trager and Smith, who give the representation "élĕvàtŏr òpĕrâtiŏn." However, although the stress relationships may be altered in the right domain, the *order* of stresses must be maintained. That is, the main stress must remain heavier than the other stresses. Thus rule 2a must be amended in consideration of the case where the right domain has, e.g., the stress pattern 12, as "blackboard." If "blackboard" constitutes the right domain of an internal juncture, then the effect of this juncture must be to weaken all stresses in the right domain. Thus "wall blackboard," represented /wól-$_1$ blǽk-$_2$ bórd/, is read "wáll blâckboàrd," with the stress pattern 123. We thus add to rule 2a the condition:

Rule 2a (cont'd): But if in the right domain this weakens the main stress to the level of the other stresses, then the latter are reduced by one.

In other words, rule 2a requires that the order of stresses in the right domain of an internal juncture remain the same, and that the main stress be reduced by one.

Rule 2b: The effect of an external juncture is to weaken the main stress in its left domain by one.

For example, "old man" is represented /óld = mǽn/ and read [ôld = mǽn]; "tired old man" is represented /táyɪrd =$_1$ óld =$_1$ mǽn/, and is read [tâyɪrd = ôld = mǽn]. Since this rule again

[8] An alternative pronunciation, [kǽwntɪrrɛ̀vɪlúšɪnɛri] we will represent as /kǽwntɪr = révɪlúšɪnɛri/ – cf. rule 2, below. Note that in the alternative pronunciation discussed in the text at least five degrees of stress are required, since /ɪ/ has less stress than the /ɛ/ of /rɛv/. There may be still other representations for other pronunciations.

[9] For some speakers, stress in a monosyllabic right domain is lowered even further.

operates only on the main stress, stress relationships within the left domain may be altered. Thus "elevated" has the stress pattern 1434 in isolation, but in "elevated highway" (which is represented /élɪvetɪd = háywe/) rule 2b will alter this stress pattern to 2434, thus changing the internal stress relationships. But here too, we find that although stress relationships may be altered in the left domain, stress order must be retained. If "blackboard" constitutes the left domain of an external juncture, as in "blackboard jungle," then the effect of this juncture is to weaken both stresses. We thus add to rule 2b a condition analogous to that added to rule 2a.

Rule 2b (cont'd): But if in the left domain this weakens the main stress to the level of the other stresses, then the latter are reduced by one.

In other words, rule 2b requires that the order of stresses in the left domain of an external juncture remain the same, and that the main stress be reduced by one.

We have considered the case where "blackboard" constitutes the left domain of an external juncture and the right domain of an internal juncture. The case where it constitutes the left domain of an internal juncture leads us to add an additional proviso to our set of rules. Consider the expression "blackboard eraser." The hierarchic construction of this expression is clearly

(8) blǎck -$_2$ bóard -$_1$ eráser.

Applying rules 1 and 2 to (8) we derive

(9) blǎck -$_2$ boârd -$_1$ eráser

But clearly the main stress of "eraser," while lighter than that of "black," is heavier than that of "board." This observation leads us to add to our rules the additional condition:

Rule 2a (cont'd): But the main stress in the right domain must be heavier than any non-main stress in the left domain.

This leaves only the case where "blackboard" constitutes the right domain of an external juncture. Symmetry would suggest that the additional proviso just given should be added to rule 2b as well, i.e., that the main stress in the left domain of an external juncture should be heavier than non-main stresses in the right domain. This is in fact the case. Though "blackboard" has the stress pattern 12 in isolation, the phrase "John's blackboard," which is represented

(10) Jóhn's =$_1$ blǎck —$_2$ bóard,

has the stress pattern 213.

Summing up these remarks, we can replace rules 2a and 2b, together with their amendments, by

Rule 2: The effect of internal (external) juncture is to:

(i) weaken the main stress in its right (left) domain by one

(ii) weaken the other stresses of the right (left) domain by one if main stress has been reduced by (i) to the level of other stresses

(iii) weaken the non-main stresses of the left (right) domain by one if these are equal to the main stress of the right (left) domain.

There are several reservations that should be made in connection with this formulation of rule 2, (ii) and (iii). It might be argued that in the expression "blackboard eraser," the stress relation between "black" and "board" is the same as in "blackboard" in isolation, namely 12, and that "eraser" has an intermediate stress 1+. Similarly in other cases. It is difficult to arrive at any clear judgment as to the facts in such cases. We have chosen the simpler solution, with only

integral values for stress, but the rule could easily be adjusted to accord with certain other interpretations of the facts.

We also face the problem of determining the limits of the constructions under consideration. In such constructions as "John's blackboard eraser," represented

(11) Jóhn's $=_1$ blǽck $-_3$ bóard $-_2$ eráser,

rule 2 gives us the sequence 2143 for the accented syllables. This appears to be correct, but it is not clear to what extent the possibilities of further stress differentiation can be realized. We have noted the same difficulty in connection with rule 1. We will return briefly to both of these problems below.

Rules 1 and 2 constitute the basic structural rules for the determination of stress. They apply solely to accented vowels. We turn our attention to the second set of rules mentioned at the outset of § 7, namely, those having to do with the particular vowel quality. A great many statements could be given here, depending on the extent to which one wishes to enter into details of allophonic variation. The basic rule is this:

Rule 3: Stress on the reduced vowel /ɪ/ is weakened to one below all other stresses. This applies to unaccented /ɪ/ and to /ɪ/ in the monosyllabic right domain of internal juncture.

Thus "butter," "magnate," "someone" are represented /bʌ́tɪr/, /mǽgnet/, /sʌ́mwʌn/, respectively, and read with the stress patterns 14, 13, 13, respectively. And "blackboard," "blackbird," represented /blǽk-bɔ́rd/, /blǽk-bɪrd/, are read, respectively, with the stress patterns 12, 13.

It may also be the case that the tense vowels of (3) are given a slightly heavier stress than the lax vowels, but this is difficult to determine. In general, it is difficult to determine degrees of stress in any greater detail.

There are certain special features of stress variation that can be described adequately in terms of rule 3, when we make full use of the possibilities of combination of the segmental element /ɪ/. Thus the vowel [i] often has stress 4 instead of stress 3; e.g., the last vowel of "effigy" (as opposed to "refugee"). We can mark this distinction by representing the weakly stressed [i] as /ɪy/ (which does not otherwise occur) instead of /i/. The statement that /ɪy/ and /i/ have the same vowel quality (though different stress) will then belong to segmental allophonics. Similarly, in the case of zero-stressed [u] (as in "value"), we can make use of the fact that /ɪ/ does not otherwise occur, and represent [u] as /ɪw/.

This discussion leaves unsolved the problem of explaining weak-stressed final [o] as in "motto" (opposed to "veto," in some dialects, with the aspirated allophone of /t/ which occurs in the [V̀—V] position). The most obvious alternative representation for [o] is /ʌw/, also unused elsewhere. If it turns out to be correct, as suggested above, that lax vowels are slightly weaker in stress than tense, then the "veto"-"motto" distinction would be given by the representations /víto/, /mátʌw/, just as in the case of [i], [u], above. If not, then we will have to add a special rule stating that final /ʌw/ is weakened in stress. In fact, it should be remarked that there is a general tendency for word final tense vowels to be weakened in stress. The number of exceptions to this, such as "refugee," "veto," "Plato," is very small, and even these are missing in many styles of speech and are often in free variation with the normal, weakened forms when they do occur. On the basis of this one might propose that the alternative representations be dispensed with in these cases, and that a rule be given stating that tense vowels are weakened in stress in pre-juncture position, with the few exceptions listed.

It remains only to give a general rule stating how the rules given above must be applied to the determination of stress value.

Rule 4: Given a phonemic clause,

(i) assign the value 1 to all accented vowels;

(ii) then apply each rule pertaining to accented vowels no more than once to each constituent, applying a rule to a constituent of order n only after having applied it to all constituents of order $n + 1$; i.e. beginning with the smallest constituents and proceeding to larger and larger constituents;

(iii) next assign to each unaccented vowel the weakest stress which is

a) at least 3

b) at least 4 if the given vowel is /ɪ/ or if it occurs before main stress with no intervening juncture

c) greater then the value of any accented vowel;[10]

(iv) finally apply all rules which pertain to unaccented vowels.

We therefore require that unaccented vowels be more weakly stressed than accented vowels; that within a word a given unaccented vowel be less heavily stressed in position before the accent than after it. This distinction in stress between vowels in pre- and post-accent positions is introduced to account for Trager and Smith's representation of "obey", abstract" etc. (p. 39f.) as /ǒbéy/ /ăbstrǽkt/; i.e. with stress patterns 41; as opposed to "cáthòde", "cóntràct", i.e. with stress patterns 13. In our transcription T these would be represented /obé/, /æbstrǽkt/, /kǽθod/, /kántrækt/ and rule 4iii accounts for the difference in stress. Newman distinguishes the stress pattern of "misplace" 31 from that of "disperse" 41 – we can account for this distinction by representing "misplace" as /mísplés/ (cf. rule 1) and "disperse" as /dispírs/.

We have noted several times that there is some question as to how far each construction can be extended. If they are extended indefinitely, the number of stress differentiations increases without limit. But there is clearly some upper limit to stress differentiation. We therefore add one more rule which qualifies all other rules.

Rule 5: There is an upper limit to the number of stress levels which are distinguished. This limit apparently varies for different styles of speech, as well as for different speakers.

To give this rule properly, we should have to indicate precisely which distinctions are not made in a case where operation of the other rules would lead to stress differentiations beyond the upper limit. However, it is very difficult to determine what the facts are in more complex constructions. For this reason, no precise statement which we might suggest would be of much value, and we will therefore leave this rule unspecified, pending some decision as to the facts in these constructions. Cf. example IV, § 8.

8. The following examples (cf. fns. 1 and 7) illustrate how the above rules work. Each example is given in conventional orthography and in its representation in T. The numbers on each line in the derivation refer to the stress values of the vowels at the top of the columns in which the numbers appear. Each line results from the preceding line by application of the rules (cf. § 7) which are identified at the right of the line (it is because of this formal analogy to a proof that we call this series of steps a "derivation"). When we go from one line to the next, we replace certain of the phonemic notations by phonetic ones, according to the rules; thus, accent marks (ˊ) are replaced by numbers, and a juncture marked in one line will not appear in the next line if it has already been used in the first line.

We eliminate the junctures in this way in the examples for the sake of clarity, disregarding their

[10] This condition may be disregarded in a style of speech that makes use of fewer distinctions. Cf. *Rule 5*.

effects on segmental phonemes. One can therefore determine by inspection which juncture has figured in the derivation of a certain step of an example by noting which juncture is not carried over from the preceding line.

EXAMPLE I. *elevator-operator*

	é l ɪ v e t ɪ r – á p ɪ r e t ɪ r	RULE APPLIED
1.	1 – 1	4i
2.	1 2	4ii, 2i
3.	1 4 3 4 2 4 3 3	4iii

EXAMPLE II. *excess-profits tax*

	é k s ɛ s $=_2$ p r á f ɪ t s $-_1$ t æ k s	RULE APPLIED
1.	1 $=_2$ 1 $-_1$ 1	4i
2.	2 1 $-_1$ 1	4ii, 2i
3.	2 1 2	4ii, 2i
4.	3 1 2	4ii, 2iii
5.	3 4 1 4 2	4iii
6.	3 4 1 5 2	4iv, 3
7.	(3 4 1 5 3)	fn. 9

Step 7 appears only if this is a dialect to which fn. 9 applies. Note that application of rule 5 might reduce the number of stress distinctions in this and the following examples.

EXAMPLE III. *excessive profits-tax*

	ɛ k s é s ɪ v $=_1$ p r á f ɪ t s $-_2$ t æ k s	RULE APPLIED
1.	1 $=_1$ 1 $-_2$ 1	4i
2.	1 $=_1$ 1 2	4ii, 2i
3.	2 1 2	4ii, 2i
4.	2 1 3	4ii, 2iii
5.	4 2 4 1 4 3	4iii
6.	4 2 5 1 5 3	4iv, 3

Note that the difference in stress between examples II and III (which occurs in the speech of at least one of the authors) is a result of a difference in constituent structure.

EXAMPLE IV. *the Pennsylvania Railroad is the main Pennsylvania railroad*

	ðɪpénsɪlvényɪrélrod $=_0$	ɪzðɪmén $=_1$	pénsɪlvényɪ $=_1$	rélrod	RULE APPLIED
1.	1 1 1 $=_0$	1 $=_1$	1 1 $=_1$	1	4i
2.	1 1 1 $=_0$	1 $=_1$	3 1 $=_1$	1	4ii, 1
3.	3 4 1 $=_0$	1 $=_1$	3 1 $=_1$	1	4ii, 1
4.	3 4 1 $=_0$	2	3 1 $=_1$	1	4ii, 2i
5.	3 4 1 $=_0$	2	3 2	1	4ii, 2i
6.	5 3 5 4 5 1 5 $=_0$	4 4 2	3 4 2 4	1 4	4iii
7.	6 3 6 4 6 1 5 $=_0$	4 5 2	3 5 2 5	1 4	4iv, 3

This is the result if all rules are applied freely. Suppose now that we apply the restriction of fn. 10; i.e., 4iiic is inoperative. Then the derivation will proceed as follows after step 5.

	ðɪpénsɪlvényɪrélrod $=_0$	ɪzðɪmén $=_1$	pénsɪlvényɪ $=_1$	rélrod	
6a.	4 3 4 4 4 1 3 $=_0$	4 4 2	3 4 2 4	1 3	4iiia, b
7a.	5 3 5 4 5 1 3 $=_0$	4 5 2	3 5 2 5	1 3	4iv, 3

This seems to be an accurate rendition of the pronunciation of this expression by one of the authors.

Suppose now that we apply the restriction of fn. 10, as well as Rule 5, interpreted specifically as follows: accented vowels are never weakened below 3. Then we can complete the derivation given by steps 1, . . , 5, 6a, 7a as follows.

	ðɪpénsɪlvényɪrélrod $=_0$	ɪzðɪmén $=_1$	pénsɪlvényɪ $=_1$	rélrod	
8a.	5 3 5 3 5 1 3 $=_0$	4 5 2	3 5 2 5	1 3	5

This agrees with the representation given by Trager and Smith, (*Outline*, p. 74), except that unaccented /ɪ/ is given the weaker stress 5 in this representation. For a style of speech which never goes beyond four degrees of stress (hence in which this distinction is not made) we would simply add to Rule 5 the stipulation that no vowel receives a stress weaker than 4. With this formulation, the 5's in step 8a would be replaced (in step 9a) by 4. In general the rules can be altered in various minor ways to accommodate certain variations in style of speech.

Notice that the constituent structure to which we are led on phonological grounds is identical with that given by Trager and Smith on morphological and syntactic grounds. That is, they consider the first phonemic clause "The Pennsylvania Railroad" to be a single constituent, an unbroken 'rank I nominal', and the second phonemic clause "the main Pennsylvania railroad" to be a 'complex nominal' with the constituents "main", "Pensylvania", "railroad". This is another indication of significance for the transcription T, in the sense of condition III, § 1.

9. We have outlined the construction of a transcription T which meets the requirements laid down in section 1 for a large class of utterances; i.e., every two phonemically distinct utterances of this class are differently represented in T, and phonetic differences in stress are predictable in terms of the representation. Furthermore, the junctures appear only at morpheme boundaries, and their distribution and hierarchical arrangement are reasonably in accord with independently known syntactic and morphological properties. This fact serves as an indication, as we have stated above, that the transcription T as formulated is not merely an *ad hoc* and arbitrary construction which meets fortuitously the conditions laid down, but that it is a significant transcription qualifying as a level of analysis for English.

It must be noted, however, that condition I has not been met in complete generality. It is not the case that every two utterances that can be consistently distinguished by native speakers are differently represented in T; for example, pairs of utterances that are different in such a feature as rate of speed, loudness, contrastive intonational features, or pauses, etc. are not distinguished. There is some variation among phonemic systems as to the distinctions marked. There are evidently good reasons why condition I should not cover all utterances, but the extent to which condition I should be applied has never, so far as we know, been clearly defined. This is a serious

gap in linguistic theory which gives an air of arbitrariness to any phonemic analysis, for while some contrasting features are distinguished, others are not. It is impossible to state what sort of transcription qualifies as phonemic until the limits of applicability of condition I are clarified.

We have specifically excluded from consideration all forms of expressive stress, including contrastive stress. In language, expressive elements are deviations from the normal pattern. The possibility for such deviation is, of course, enormous, and almost any stress arrangement can occur under special circumstances. Therefore, if this distinction between normal and expressive stress is not made at the very outset, the number of significantly different stress levels is only limited by the capacity of the vocal apparatus, and any hope for a systematic account has to be abandoned.

It should be noted that as a consequence of our decision to exclude contrastive stress from consideration we do not provide for the normal stress patterns of such utterances as "This is the brown house, not the white one," where there is extra heavy stress and extra high pitch on "brown" and "white." The description of such utterances poses many problems which have never been adequately handled. We feel that these utterances are best regarded as being in a special sense deviations from the normal pattern, and that a satisfactory description of them will require the development of methods not currently in use in phonemics.[11]

The transcription T has many interesting properties: it describes the distribution of stresses in terms of a hierarchic organization which has morphological and syntactic significance, thus indicating a systematic relation between the phonological and higher levels of linguistic analysis. It seems, therefore, reasonable that T should appear as one of the set of transcriptions that constitute a linguistic grammar.

Moreover, we feel that when the gap in linguistic theory cited above is filled in a satisfactory manner it will be the case that the set of utterances which are to be represented directly by a phonemic transcription will be the set that is, in fact, adequately represented by T. If this supposition is correct and T can be regarded as phonemic, then it will follow that only the opposition *accented/unaccented* need be regarded as phonemic in English (or to put it in an alternative convention, that only a single stress phoneme exists), all other variations in stress being allophonic; i.e., contextually determined. Essentially, in constructing T we have traded a transcription in which various levels of stress are marked, for one in which the constituent organization of the utterance on the phonological level is marked. It appears to us that this reinterpretation has a number of advantages, and that there are strong reasons for choosing T as phonemic if the supposition mentioned above is true.

Foremost among these advantages is the fact already mentioned that the constituent organization imposed from purely phonological considerations (i.e., from considering the simplest way to state stress) correlates quite closely with the constituent organization that is required for the description of English on other levels. This correspondence leads to an overall simplification of the grammar of the language, since the constituent structure once stated can be made to serve a variety of functions. The introduction of constituent structure into phonology leads to a different and more unified conception of linguistic levels. A constituent hierarchy has always been considered a characteristic feature of the higher levels of morphology and syntax. We are suggesting here that it exists on the phonological level as well.[12] Every linguistic level, then, has the basic form

[11] We have in mind methods analogous to the "transformational analysis" proposed for syntax in N. Chomsky, *Transformational Analysis* (University of Pennsylvania, PhD. thesis, 1955).

[12] Cf. Hockett, *Manual of Phonology*, 43: "Ultimate phonologic constituents do not occur in an utterance as the individual bricks occur in a row of bricks. Rather, they occur in clusterings, these occur in still larger clusterings, and so on, up to the level of the whole utterance. That is, the phonologic structure of an utterance shows a *hierarchic* organization. . . . " While the constituent organization under discussion here is not of quite the same kind as that considered by Hockett, the fundamental conception that constituent structure appears on the phonological level is the same.

of a linear system of symbols, organized into a hierarchical arrangement.[13]

Secondly, the fact that a single binary phonemic feature suffices to determine the various gradations of stress makes it unnecessary to postulate the existence of a special type of phoneme, the so-called suprasegmental phonemes.[14] The postulation of suprasegmentals as a separate system can be justified if indeed a parallelism to segmentals can be shown; that is, if there are several suprasegmental 'phonemes' whose distribution is most effectively described by considering them to be arranged into suprasegmental 'morphemes'. In the transcription T, however, only a single 'suprasegmental' element (the accent element) remains in the case of stress; and the distribution of stresses is accounted for automatically in terms of the hierarchy of junctures, with no intervening 'morphological' level. In such a case, it seems pointless to regard suprasegmentals as separate elements at all. We can consider accent to be a distinctive feature similar to such distinctive features as voicing, nasality, etc. Just as we have voiced and unvoiced consonants, so also we have accented and unaccented vowels. All suprasegmentals would then appear as features of phonemes, or as utterance-long or phrase-long components (i.e., contours). If similar treatment is possible in the case of other languages, one can considerably simplify linguistic theory by restricting it to the consideration of linear systems.

Thirdly, the simplicity and the symmetry of the rules is further support for the essential correctness of the proposed treatment.[15]

Finally, when we interpret the phonological data in this way we are able to suggest a natural and simple explanation for the fact that native speakers can assign stress patterns to new utterances

[13] According to a widely accepted view a phonemic system is characterized by the property that there is a one-one relation between the set of phonemically distinct utterances and the set of distinct representations. Given an utterance, it should be possible to determine uniquely its phonemic representation; given a phonemic representation, it should be possible to determine a set of non-contrasting utterances of which it is a representation. The transcription T evidently has the latter property – given a representation in T, a set of utterances is uniquely determined in the proper way. However, as T has been constructed, it is possible in certain cases that several representations, differing in the arrangement of junctures and accents, may determine (by the rules) the same set of utterances; i.e., a given utterance may have more than one representation. But this failure of T to meet such a strict criterion for phonemic analysis is not crucial. It is evident that very simple general rules can be given to eliminate the ambiguity in each particular case. E.g., we can alphabetize (order) the elements of T and, in case of ambiguity, choose the alphabetically earliest representation. We know, therefore, that given a transcription T as above, that fails to meet the biuniqueness condition in only one direction, there is a transcription T′ included in T (i.e., containing no more elements) which is phonemic in the strongest sense. Hence the occasional ambiguity in T does not affect our conclusion that the only phonemic opposition that must be marked in the case of stress is *accented/unaccented*. In this connection, note that the familiar phenomenon of 'neutralization' often necessitates the same type of arbitrary choice of representation in ordinary segmental phonemics. It is, therefore, questionable whether the biuniqueness condition should be taken as a requirement for phonemic transcription at all.

It should also be noted that if one of the trivial ways to achieve biuniqueness is chosen; e.g., by alphabetization as above, it will no longer be possible to meet condition III – i.e., that junctures be placed only at morpheme boundaries. Thus we cannot maintain both significance in the sense of condition III and biuniqueness. In the face of this we have given up biuniqueness while maintaining condition III, since we see no particular reason for the former and many reasons for maintaining condition III. If one were to choose to maintain biuniqueness (as many linguists have done) one would have to supply a weakened substitute for condition III in order to avoid trivial or incorrect solutions of the kind discussed in section 1. This, however, seems no easy task. These considerations appear to us a strong argument in favor of our procedure.

[14] At least in the case of stress. We feel (and hope to show at some later time) that a similar treatment of pitch is possible and advantageous.

[15] An incomplete investigation of stress in German and Yiddish (using Curme's material for the former and U. Weinreich's for the latter) seems to show that very similar rules describe the data in these languages.

in a fairly consistent and uniform manner. A linguistic grammar must provide an explanation for this fact, just as it must provide an explanation for the fact that speakers form new sequences of words in an orderly and relatively consistent manner. From the point of view from which we have been operating above, we can consider that in the process of forming utterances, the choice of words and the placing of the phonological, hierarchically ordered junctures is determined by higher level grammatical considerations, in which the phrase structure of the language plays an important role. This provides a small number of basic patterns with fixed stress relations. Each word is represented as a sequence of phonemes containing accented and unaccented vowels. Filling in one of the patterns with properly chosen words, we can read off the actual stresses by applying the rules that determine stresses in terms of accent, juncture and vowel quality.

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REMARKS ON THE DERIVATIONAL SUFFIXES OF THE RUSSIAN SUBSTANTIVE

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THE DERIVATIONAL SUFFIXES PLAY a great role in substantive formation in the Russian language. By the term 'derivational suffix' we mean the bound morpheme which occurs at the end of the root or stem and precedes the declensional desinence (including zero) and serves the purpose of forming new, non-affective substantives.[1] The derivational suffixes differ from the affective suffixes in that (1) the former provide words with new meanings rather than just a modification of the original meaning, and (2) the new substantives formed by means of derivational suffixes are not limited in gender to that of the underlying substantive as is the case with the diminutive-affective formations.

Derivational suffixes are productive in conjunction with both verbal and nominal stems. By the term 'nominal' we include both adjective and substantive. In nominal derivation the suffix is always added to a form of the stem or root ending in a consonant. Derivation from verbs differs in that the suffix may be preceded by a form of the stem or root ending in either a vowel or a consonant. Thus the formula for the underlying stems can be set up as follows, with C taken to mean consonant (or consonant cluster) and V to mean vowel (or vowel alternating with zero):

Nominal stems: —C- Verbal stems: —C- or —V-

Examples:

Nominal stems: *vesëlost'* (*vesël-ost'*) from *vesëlyj*
borodáč (*borod-áč*) from *borodá*

Verbal stems: *pisátel'* (*pisá-tel'*) from *pisát'*
kupéc (*kup-éc*) from *kupít'*

[1] This paper is concerned with simple suffixes only and does not discuss compound suffixes, such as -ovn'ik (-ov + -n'ik), -'oniš (-'on + -iš). A simple suffix contains no more than one vowel.

Transliterated items are italicized; forms between slant bars are in phonemic transcription; otherwise morphophonemic transcription is used (primarily for the suffixes and the verb stems). In the suffixal formulations zero is indicated by #; the alternation of # and vowel is indicated by a slant bar between the two; an apostrophe before the suffix indicates softening of the preceding consonant of the stem if possible. The nominative singular desinence following the suffix is indicated parenthetically, for ex. suffix -#/a k (a) as in *sámka, nakídka*, and suffix -'ic(a) as in *volčica, ráznica*.