Morris Halle

Stress Rules in English: A New Version*

In *The Sound Pattern of English* (hereinafter *SPE*) the stress contours of words were derived in the main with the help of the six rules listed in (1) below. All but the last of the rules listed (i.e. all but the Auxiliary Reduction Rule II) assign primary stress to some vowel in the word and, by a convention the validity of which has been questioned by Schane (1972), simultaneously lower the stress level of all vowels within the domain of the rule that had some degree of stress prior to the application of the rule in question. The Auxiliary Reduction Rule II (1f) assigns secondary stress and does not cause stress subordination.

In the listing (1) I have supplied for each rule a mnemonic tag to facilitate reference to it in the subsequent discussion, as well as a number of examples illustrating the operation of the rule. The capital letters utilized stand for the following phonetic entities: C_0: a sequence of zero or more nonsyllabic segments; Q: a sequence of zero or more unstressed segments; V: a syllabic segment (vowel); P: a sequence of zero or more segments of any sort; W: "weak cluster", i.e. a sequence consisting of a short vowel followed by a single nonsyllabic. In the examples below, the vowel that receives stress by the rule in question is given in italics.

(1) a. *"Tense" Suffix Rule*

$$+ \left[\overline{}_{+\text{long}} \right] C_0]_{\text{N,A,V}}$$

homin*o*id   mollusc*o*id

b. *Prefinal Stress Rule*

$$- C_0(W) \begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_0]_{\text{N,A,V}}$$

Am*e*rica   Ari*zo*na   Wisc*o*nsin   or*i*ginal   doctr*i*nal   mat*e*rnal

c. *Stressed Syllable Rule*

$$- C_0(W)(VC_0) \begin{bmatrix} \text{I stress} \\ +\text{syl} \end{bmatrix} C_0(+y)]_{\text{N,A,V}}$$

ass*i*milatory   comp*e*nsatory   inh*i*bitory   comp*u*lsory   heterodyne
kal*ei*doscope   h*o*minoid   moll*u*scoid

d. *"Verb" and Final Stress Rule*

$- C_0(W)]_{N,A,V}$

develop edit abolish cancel cajole attend usurp decide
assimilate demonstrate anecdote canoe engineer macaroon

e. *Alternating Stress Rule*

$- C_0VC_0\begin{bmatrix} \text{I stress} \\ + \text{syl} \end{bmatrix}C_0]_{N,A,V}$

assimilate demonstrate anecdote

f. *Auxiliary Reduction Rule II*

(i) $- C_0(W)VC_0[\text{I stress}]Q]_{N,A,V}$

Winnepassaukee Monongahela Conestoga Kalamazoo canoe
engineer macaroon

(ii) $\left.\begin{matrix} [C_0 - C_2 \\ [C_0\begin{bmatrix} \overline{} \\ + \text{long} \end{bmatrix}] \end{matrix}\right\}P]_{N,A,V}$

Montana bandana anticipate typhoon Ticonderoga

In what follows I shall try to motivate a number of modifications in the above rules
and in the stress subordinating convention. I shall attempt to show that these modifi-
cations not only result in a formally simpler system of rules than those listed above, but
also provide a more adequate coverage of the data.

1. In *SPE* the stress contour of adjectives formed with the suffix *-ory* was derived with
the help of two rules. The Prefinal Stress Rule (1b) assigned stress to the suffix;
subsequently the Stressed Syllable Rule (1c) applied and placed primary stress on an
earlier vowel in the word, simultaneously lowering the stress on the suffix. As shown
in (2) and as implied by the formula given in (1c) there are four mutually exclusive
environments in which the Stressed Syllable Rule operates:

(2) a. $\underline{}C_0WVC_0\begin{bmatrix} \text{I stress} \\ + \text{syl} \end{bmatrix}C_0 + y$ assimilatory (assimilatory by later rule)

b. $\underline{}C_0VC_0\begin{bmatrix} \text{I stress} \\ + \text{syl} \end{bmatrix}C_0 + y$ compensatory (compensatory by later rule)

c. $\underline{}C_0W\begin{bmatrix} \text{I stress} \\ + \text{syl} \end{bmatrix}C_0 + y$ inhibitory (inhibitory by later rule)

d. $\underline{}C_0\begin{bmatrix} \text{I stress} \\ + \text{syl} \end{bmatrix}C_0 + y$ compulsory (compulsory by later rule)

As noted in *SPE* the four cases cited in (2) consist of two pairs of parallel examples:
(2a) and (2b) vs. (2c) and (2d). In the former pair, stress is retracted over the imme-
diately pretonic (pre *-ory*) syllable without regard to its quantity. If the next syllable
ends with a weak cluster and if it is preceded by yet another syllable, primary stress

comes to rest on the latter (preantepenult) syllable; if the conditions just enumerated are not met, primary stress ends up on the second syllable before *-ory*. We observe a parallel situation in (2c) and (2d), except that here the immediately pretonic syllable is not automatically skipped over. The conditions on which the skipping of the pretonic syllable depend are discussed in *SPE*, and, as I have nothing to add to this topic, I shall limit myself here to observing that the possibility of skipping the pretonic syllable in stress retraction by the Stressed Syllable Rule is reasonably regular in many cases, but purely idiosyncratic in a small, yet not negligible, number of instances. The latter class of cases must be lexically marked.

In *SPE* verbs in *-ate* and other words whose last vowel is long are treated rather differently from the adjectives in *-ory*. Unlike the latter, the former receive stress on their last vowel by the "Verb" and Final Stress Rule (1d). Since the Stressed Syllable Rule is ordered before (1d), it is impossible for these words to be subject to the Stressed Syllable Rule. Instead, they are subject to the Alternating Stress Rule (1e) which retracts the primary stress from the final syllable to the antepenult. It is observed in *SPE* that there is a fair number of words with a long vowel in their last syllable which are exceptions to this. The exceptions are of two kinds. On the one hand, there are words such as those cited in (3a) which retract stress to the preantepenult, instead of the antepenult; while, on the other hand, words like those cited in (3b) retract stress to the penult instead of the antepenult.

(3) a. oxygenate   peregrinate   ameliorate   alienate   deteriorate
    b. adumbrate   remonstrate   vacate   locate   inculcate

It is not difficult to see that both types of exceptions can readily be handled by the Stressed Syllable Rule. The examples in (3a) are parallel to the examples in (2a), those in (3b) to those in (2d). Moreover, the examples that are handled in the *SPE* system by the Alternating Stress Rule (1e) can readily be accommodated by cases (2b) and (2c) of the Stressed Syllable Rule. I am proposing, then, that words such as *peregrinate* be treated exactly like words such as *assimilatory*, *devastate* like *compensatory*, *facilitate* like *inhibitory*, and *adumbrate* like *compulsory*. An immediate consequence of this proposal is that the Alternating Stress Rule can be eliminated from the grammar altogether. Instead, a redundancy rule must be added stating that verbs in *-ate* with a strong prefinal cluster are normally instances of (2b) while verbs in *-ate* with a weak prefinal cluster are commonly to be treated like instances of (2c). The extra cost of this redundancy rule is not exorbitant, especially in view of the fact that in *SPE* at least a partially equivalent redundancy rule is required to handle words such as those in (3). Moreover, the proposed modification leads to further changes which provide additional support for it.

In order for the Stressed Syllable Rule to take over the function of the Alternating Stress Rule in the words with a long vowel in their last syllable, it is necessary that

these words receive stress by a rule that applies before the Stressed Syllable Rule. The obvious candidate for this function is the "Tense" Suffix Rule (1a), which can readily be made to serve this purpose provided that we drop the requirement that a morpheme boundary precede the [+long] vowel. While in the process of modifying this rule, we must take note of the fact pointed out by Ross (1972) that the language has numerous words of the type illustrated in (4), which have a short vowel in their last syllable yet retract stress in the same way as words with "tense" suffixes.

(4) íc̀on eléctr̀on Àdiróndàcks phárỳnx Àháb pósìtron párallàx
    Bèelzébùb

There is thus good reason to replace the "Tense" Suffix Rule (1a) by a more general and technically simpler rule which stresses the last vowel in the word; i.e. by a rule of the form ——C_0].

It has been observed by Oehrle (1972) that there is no special reason for ordering the "Tense" Suffix Rule (1a) before, rather than after, (1b). This observation is of some importance, because if the modified "Tense" Suffix rule can be ordered after rule (1b), then the proposed modification amounts to no more than the addition of appropriate parentheses to (1b), resulting in the rule (5) (cf. (1b)), which will be referred to hereinafter as the Primary Stress Rule:

(5) *Primary Stress Rule*

$$——C_0(W)\left(\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix}C_0\right)]_{N,A,V}$$

Rule (5), which can be ordered before the Stressed Syllable Rule (2) = (1c) and is conjunctive with the latter, then applies in the four environments listed in (6).

(6) a. ——$C_0W\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix}C_0$]

   América Cánada cápital élephant fábulous Connécticut

   b. ——$C_0\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix}C_0$]

   Wiscónsin Nantásket Charýbdis Arizóna Massachúsetts Bermúda
   Jácob Golíath

   c. ——C_0W]

   édit elícit cáncel detérmine intérpret imágine (all verbs)

   d. ——C_0]

   Vermónt Saigón Berlín achíeve cajóle machíne caréen usúrp
   eléct tormént collápse lamént (see also (4))

Verbs predominantly follow patterns (6c) and (6d), whereas nouns tend to follow patterns (6a), (6b), (6d); adjectives appear to vacillate between the two types. There is, however, a large number of nouns that have to be marked lexically as undergoing

(6d) rather than (6a) or (6b). The need for lexical marking is not solely a consequence of the modifications in the rules proposed here but is also required by the *SPE* system. To capture such contrasts as that between *Ahab* and *Jacob* it is necessary, given the *SPE* scheme, to supply *Ahab* with stress in its lexical representation whereas *Jacob* can remain unmarked. The precise equivalent of these markings is required in the system proposed here.

In sum, I am proposing that rules (1a)–(1e) be replaced by the two conjunctively ordered rules given in (7):

(7)   a. *Primary Stress Rule (PSR)*

$$\underline{\quad\quad} \; C_0(W)(\begin{bmatrix} -\text{long} \\ +\text{syl} \end{bmatrix} C_0)]_{N,A,V}$$

b. *Stressed Syllable Rule (SSR)*

$$\underline{\quad\quad} \; C_0(W)(VC_0)\begin{bmatrix} 1 \text{ stress} \\ +\text{syl} \end{bmatrix} C_0(+y)]_{N,A,V}$$

The Primary Stress Rule (7a) is responsible for the assignment of stress to one of the three last vowels of the word. In addition, words are subject to the Stressed Syllable Rule (7b), which applies after (7a) and is conjunctive with the latter; i.e. words may but need not necessarily undergo both (7a) and (7b).

2. The modifications just discussed naturally suggest that an attempt should be made to eliminate also the Auxiliary Reduction Rule II of *SPE*, which, as already noted there, is of a rather suspicious character since it repeats much of the material contained in the Main Stress Rule but for various reasons cannot be coalesced with the latter. It can readily be seen that if the Stressed Syllable Rule (7b) is generalized as shown in (8) so that it will apply not only to words with stress on the last vowel but to all words that contain at least one stressed vowel, then this rule and the Primary Stress Rule (7a) together will assign stress to the correct syllables in words such as those in (9) below which served as primary justification in *SPE* for the establishment of the Auxiliary Reduction Rule II.

(8) *Stressed Syllable Rule (SSR)* (final version)

$$V \rightarrow 1 \text{ stress} / \underline{\quad\quad} C_0(W)(VC_0)\begin{bmatrix} 1 \text{ stress} \\ +\text{syl} \end{bmatrix} Q]_{N,A,V}$$

The proposed rules assign stress on the correct syllables, but they fail to provide for the proper stress subordination in the examples in (9).

(9)   Winnepassáukee   Monóngahela   Cónestoga   Passamaquóddy

(with stress marks: Winne[3]passáu[1]kee   Monón[3]gahe[1]la   Cóne[3]sto[1]ga   Passa[3]maquód[1]dy)

Given the *SPE* conventions the main stress would always appear on the earlier vowel, because since the Stressed Syllable Rule follows the Primary Stress Rule, the stress due to the latter will always be subordinated to that due to the former.

In a recent paper, Schane (1972) has questioned the stress subordination conventions of *SPE*. Instead, he has suggested that stress lowering be limited to rules that actually subordinate stress. Formally this means that the Stress Lowering Convention will apply only in the case of rules that assign [1 stress] to a vowel with [1 stress]; i.e. rules of the form

[1 stress] → [1 stress] / . . .

such as the Compound Stress Rule or the Nuclear Stress Rule. Rules of this kind are being viewed, therefore, as having cumulative effects, for each subsequent assignment of primary stress to a given vowel causes this vowel to have more stress than all other vowels in the domain of the rule. Thus, the Stress Lowering Convention obtains a more natural, intuitive status than it had in *SPE*.

In addition, the proposal allows us to solve the problem posed by the examples in (9) in a quite natural fashion. Since the Primary Stress Rule and the Stressed Syllable Rule (7) do not assign stress to vowels that have already received stress by a prior rule, they do not cause stress subordination, given Schane's convention. Since stress subordination commonly occurs not only in words such as those given in (9) but also in all words that are subject to more than one stress assignment rule, it is now necessary to add a special stress subordinating rule to the grammar. Schane was clearly aware of this need and proposed that a grammar of English include the "Detail" rule (10). (I assume that stress rules always assign [1 stress] rather than [+stress]. This is a purely terminological convention on which nothing of substance depends, but it simplifies the exposition.)

(10) *The "Detail" Rule*

$$\begin{bmatrix} 1\ \text{stress} \\ +\text{syl} \end{bmatrix} \rightarrow [1\ \text{stress}] / \underline{\quad\quad} QVC_0(+y)]_{N,A,V}$$

Condition: Q contains no [1 stress]

Since the last V in the rule stands for either a stressed or an unstressed vowel, rule (10) will place main stress on the last stressed vowel in the word that precedes the final syllable; it will, thus, handle correctly the examples in (9), as well as the examples in (2), (3), and (4); i.e. it will effect the following stress adjustments:

$$\overset{1}{\text{Wi}}\text{nne}\overset{1}{\text{p}}\text{assaukee} > \overset{2}{\text{Wi}}\text{nne}\overset{1}{\text{p}}\text{assaukee}$$

$$\overset{1}{\text{as}}\text{s}\overset{1}{\text{i}}\text{milatory} > \overset{1}{\text{as}}\text{s}\text{imil}\overset{2}{\text{a}}\text{tory}$$

$$\overset{1}{\text{d}}\text{et}\overset{1}{\text{e}}\text{riorate} > \overset{1}{\text{d}}\text{eteri}\overset{2}{\text{o}}\text{rate}$$

$$\overset{1}{\text{A}}\text{d}\overset{1}{\text{i}}\text{ro}\overset{1}{\text{n}}\text{dacks} > \overset{2}{\text{A}}\text{di}\overset{1}{\text{ro}}\text{nd}\overset{2}{\text{a}}\text{cks}$$

The rule as given, however, is not completely adequate. Words such as $\overset{3}{\text{Te}}\text{nn}\overset{1}{\text{e}}\text{ssee}$, $\overset{3}{\text{engi}}\text{n}\overset{1}{\text{e}}\text{er}$, and $\overset{3}{\text{bri}}\text{g}\overset{1}{\text{a}}\text{doon}$ present problems. In the *SPE* analysis these words were excep-

tions to the Alternating Stress Rule and received their tertiary stress by the Auxiliary Reduction Rule II. Under the revision being proposed here, we must extend the "Detail" rule so that in these lexically marked cases it will subordinate stress to the last stressed vowel even when the latter is in the final syllable of the word. This can readily be achieved by modifying the "Detail" rule as shown in (11).

(11) $\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] / \underline{\hspace{1cm}} Q\,(VC_0(+y))]_{N,A,V}$
Condition: Q contains no [1 stress]

A further modification of the "Detail" rule is required by adjectives such as *classificatory*. Brame (1972) has shown that adjectives of this type must have nested constituent structure, i.e. $[[classific]_V atory]_A$. Given this constituent structure the word will emerge after the first pass through the stress rules with stresses on the first and third vowels. On the second pass, it will receive stress on the suffix -*ory* and then vacuously on the third and first vowel by the Stressed Syllable Rule and the Initial Stress Rule (see (19) below). It will, therefore, reach the "Detail" rule with the stress assignment *clássifícatóry*. Given the formulation (11) of the "Detail" rule, this would result in main stress being placed on the third syllable, rather than on the first. In order to get the correct stress assignment, the "Detail" rule must be further modified as shown in (12).

(12) $\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] / \underline{\hspace{1cm}} Q((ic + at)VC_0(+y))]_{N,A,V}$
Condition: Q contains no [1 stress]

Thus, the "Detail" rule is a rule of fair complexity whose addition to the grammar must evidently be justified. We note in this connection that the rule does not have to be added to the grammar in toto; rather, it can be incorporated into the Compound Stress Rule which reads:

(13) $\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] / \underline{\hspace{1cm}} Q(\#\#P)]_{N,A,V}$
Condition: Q contains no [1 stress]
        P contains no ##

Rules (12) and (13) can readily be coalesced into the single rule (14) by means of the standard abbreviatory conventions of phonology:

(14) *Compound Stress Rule (CSR)*
$\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] / [\underline{\hspace{1cm}} Q((\#\#P)(ic + at)VC_0(+y))]_{N,A,V}$
Condition: Q contains no [1 stress]
        P contains no ##

Thus, Schane's "Detail" rule can be incorporated into existing rules at the very minimal cost of adding the optional sequence (ic + at)VC_0(+y) to the Compound Stress Rule. The added complexity is thus quite modest and is more than made up for by the important generalizations that it allows us to capture in another part of the grammar.

It is necessary to recall at this point that in *SPE* the Compound Stress Rule also has the second function of accounting for the stress adjustment in simple words; e.g. it is by virtue of the Compound Stress Rule that the secondary stress on the last syllable of *assimilate* resulting from the Alternating Stress Rule is lowered to tertiary. This is clearly impossible in the system under discussion, since the two rules of interest here—(7a) and (8)—being stress assignment rules rather than stress lowering rules, do not cause stress subordination. Stress lowering from primary to secondary in words such as *assimilate* is produced here by the Compound Stress (= "Detail") Rule (14). To get the stress on the last vowel of *assimilate* down to tertiary, another rule is therefore needed. Though no such rule appears in the grammar, a minor modification of the Nuclear Stress Rule will readily yield the rule required. As pointed out most recently by Bresnan (1971), the Nuclear Stress Rule normally applies only if there are at least two words in its domain with primary stress. It must, therefore, be of the form (15).

(15) $\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] \, / \, [\text{1 stress}]R\#\#P - Q]$

   Condition: Q contains no [1 stress]

It is immediately obvious that the stress adjustment effects in simple words (that is, the lowering of stress from secondary to tertiary) can be obtained if the Nuclear Stress Rule is allowed also to apply in the environment ____ Q]. This can readily be achieved by parenthesizing in (15) the string [1 stress]$R\#\#P$. As modified, the Nuclear Stress Rule will, however, also apply to compound words and lower all nonprimary stresses. This yields the correct stress in all relevant cases except compound words of the type $\overset{1}{elevator}\ \overset{2}{operator}$, where the second element is polysyllabic. This can be achieved by modifying the rule further, as shown in (16).

(16) *Nuclear Stress Rule (NSR)*

   $\begin{bmatrix} \text{1 stress} \\ +\text{syl} \end{bmatrix} \rightarrow [\text{1 stress}] \, / \, \langle[\text{1 stress}]R\#\#P\rangle_a - \langle Q\rangle_b M(\#\#C_0 V C_0)]$

   Conditions: Q contains no [1 stress]
                   M contains neither $\#\#$ nor [1 stress]
                   b only if a

3. We can now return to stress subordination in noncompound words (cf. (2), (3), (4), and (9)). The stress in all the words cited will be properly assigned by the two

rules in (7) (with the modification indicated in (8)). The Compound Stress Rule (14) will then subordinate the stress on the last syllable to that on an earlier syllable in (2), (3), and (4), whereas in (9) it will subordinate the earlier stress to the stress on a later syllable. Subsequently the Nuclear Stress Rule (16) will lower every [2 stress] to [3 stress].

The stress rules of *SPE* (cf. (1)) were predicated on the assumption that it was largely predictable whether a given word would undergo stress retraction by the Stressed Syllable Rule (1c), the Alternating Stress Rule (1e), or by neither of these. Words that received final stress by rule (158) = (1a) underwent stress retraction by the Stressed Syllable Rule (1c) regardless of length. Words that received stress on their last syllable by (1d) retracted stress to the antepenult syllable by the Alternating Stress Rule (1e) if they were trisyllabic or longer and did not retract stress at all if they were bisyllabic. However, in many cases bisyllabic words that did not undergo stress retraction showed an unreduced vowel with tertiary stress in their first syllable (cf. (17a)).

$$
\text{(17) a.}\quad
\overset{3\ \ 1}{\text{tycoon}}\quad
\overset{3\ \ 1}{\text{canteen}}\quad
\overset{3\ \ 1}{\text{benzine}}\quad
\overset{3\ \ 1}{\text{Eileen}}\quad
\overset{3\ \ 1}{\text{pontoon}}
$$

To assign supplementary stress to these words the special subbranch of the Auxiliary Reduction Rule II (cf. (1fii)) was invoked. The other part of the Auxiliary Reduction Rule (cf. (1fi)) had to be utilized to account for the tertiary stress and unreduced vowel in the words in (17b), which were marked as exceptions to the Alternating Stress Rule.

$$
\text{(17) b.}\quad
\overset{3\ \ \ \ \ 1}{\text{Tennessee}}\quad
\overset{3\ \ \ \ 1}{\text{extrapose}}\quad
\overset{3\ \ \ \ \ 1}{\text{comprehend}}\quad
\overset{3\ \ \ 1}{\text{attache}}\quad
\overset{3\ \ \ \ 1}{\text{contradict}}
$$

We have noted in the discussion of the stress contour of such words as $\overset{3}{Winnepas}$-$\overset{1}{saukee}$ (cf. (9) above) that the Stressed Syllable Rule in conjunction with the Compound and Nuclear Stress Rules can be used to assign the correct stress contour to those words. It can readily be seen that these rules can do the same with regard to the words in (17a) and (17b):

	tycoon		Tennessee	
PSR (7a) (case 6d)	1		1	
SSR (8)	1	1		1
CSR (14) (second option)	2	1	2	1
NSR (15)	3	1	3	1

At first sight this might appear to be sufficient evidence to eliminate both the parts of the Auxiliary Reduction Rule II from the grammar. However, this is not the

case, as shown by the stress contours of words such as those in (18) which have three
stressed vowels:

(18) Tïcóndëróga Hälicärnássus antïcipäte anthröpómorphïze
     ëlephäntíne phäntasmagória

The rules in (7) will account for the two stresses on the noninitial vowels; to obtain
stress on the initial vowel we clearly need a third stress rule, i.e. (19), a counterpart in
the present description of case (1fii) of the Auxiliary Reduction Rule II:

(19) *Initial Stress Rule (ISR)*
     $V \rightarrow [1 \text{ stress}] \, / \, \#C_0 \underline{\qquad}$

The Initial Stress Rule will follow the Primary Stress Rule and the Stressed Syllable
Rule, but precede the two stress subordination rules, (14) and (16). Sample deriva-
tions are given in (20).

(20)	Halicarnassus			anthropomorphize		
PSR (7a)		1				1
SSR (8)	1			1		
ISR (19)	1		1			
CSR (14)	2	2	1	2	1	2
NSR (16)	3	3	1	3	1	3

Concerning the derivations (20) two comments are in order. The rules as stated
here do not produce the proper stress contour in *Halicarnassus*; instead of 3 3 1 the actual
stress contour is 3 4 1. A special stress subordinating rule is required which will turn
the stress contour 3 3 1 into 3 4 1, or, if this rule is to apply after the Compound Stress
Rule (14) but before the Nuclear Stress Rule (16), 2 2 1 → 2 3 1. The need for such a
rule was noted in *SPE* (see pages 115 ff.), and the rule suggested there can readily be
incorporated into the present proposal. Second, I want to draw attention to the
manner in which the Stressed Syllable Rule (8) applies to the two words in (20). In
both it retracts stress to the pretonic syllable which happens to be strong. Thus, the
Stressed Syllable Rule applies here in the same manner as in words such as *com-
pulsory* (cf. (2d)) without the optional VC_0 sequence provided in the rule. In this
respect the words in (20) differ from those in (21).

(21) a. Wïnnepassaúkee Pëloponnésus Pëmigewásset Pässamaquóddy
     b. legitimätíze phenómenalïze

The difference in stress contour between the words in (20) and those in (21) thus
parallels that of *compulsory* vs. *sedentary* or *adumbrate* vs. *compensate* and should naturally

be handled by the same mechanism, the optional VC_0 sequence in the Stressed Syllable Rule (8).

Finally, it must be observed that in *SPE* verb/noun pairs such as *torment/torment* (with stress marks 3 1 / 1 3) were said to have different constituent structure, which allowed only the noun but not the verb to undergo the Stressed Syllable Rule. (The verb got initial stress by the *SPE* version of the Initial Stress Rule.) Given the modifications of the stress rules that have been proposed here, this is no longer possible. Each verb and each noun will be subject to the Stressed Syllable Rule and thus have stress on both syllables. To obtain the correct stress contour we must let the verb undergo the "Detail" rule (12) in the same (exceptional) way as *Tippecanoe* or *engineer*, (cf. (11)) (with stress marks 3 1 / 3 1), whereas the noun behaves like the majority of words with final stress, i.e. like *assimilate*, *cognize* (with stress marks 1 3 / 1 3), etc. (We return directly to the interesting fact that words such as *lament* and *reward* do not exhibit the type of stress differentiation found in *torment/torment*.) (with stress marks 3 1 / 1 3)

In *SPE* stress alternations in trisyllabic and longer words such as $[document]_V$ (with stress marks 1 3) vs. $[document]_N$ (with stress marks 1 on first, and 3 1 / 1 3 over *torment/torment*) were treated in the same way as the alternations in *torment/torment*. This is not possible given the rules proposed above. We recall that in general underived verbs are not found among the examples in (6a) and (6b); verbs commonly are subject to (6c) and (6d) instead, which assign stress to the penult if the last syllable ends with a weak cluster, otherwise stress goes on the last syllable, e.g. *cancel/determine* vs. *carouse/usurp*. In view of this, the verb *document* will receive final stress by case (6d) of the Primary Stress Rule. The stress will then be retracted to the initial syllable by the Stressed Syllable Rule (7b) = (8). The noun *document* will instead be treated like nouns such as *elephant*: the Primary Stress Rule will place stress on the first syllable by case (6a) and as a result none of the retraction rules will have any further effects.

4. The absence of stress on the initial syllable of the words in (21b) raises questions with regard to the validity of the Initial Stress Rule as formulated in (19). It will be recalled that in *SPE* the Initial Stress Rule (cf. (1fii)) applied only to syllables ending with a strong cluster. In order for the formulation (19) to be maintained, we should need a rule which would destress initial syllables ending with a weak cluster. A rule that has this effect is given in (22).

$$(22) \quad V \rightarrow [-\text{stress}] \ / \ \#C_0 \begin{bmatrix} \overline{} \\ -\text{long} \end{bmatrix} C[\text{1 stress}]$$

The vowel to be destressed must be followed by a stressed vowel, for otherwise rule (22) would incorrectly affect the examples in (20) and (21a). Rule (22) recalls at once a very similar rule which was independently justified in *SPE* (cf. pp. 119 ff., rule (111b)). The *SPE* rule was needed to account for the reduction of the italicized vowels in (23).

(23) expl*a*nation   div*i*nation   def*a*mation   prov*o*cation

I should now formulate the rule that brings about destressing in the words in (23) in a form somewhat different from that in *SPE*:

$$(24) \quad V \rightarrow \begin{bmatrix} -\text{stress} \\ -\text{long} \end{bmatrix} / \#XVC_0 \underline{\quad} C[\text{1 stress}]$$

A comparison of (22) and (24) shows at once that the two rules can be coalesced by the normal abbreviatory devices of phonology as shown in (25).

(25) *Destressing Rule*
$$V \rightarrow \begin{bmatrix} -\text{stress} \\ -\text{long} \end{bmatrix} / \#\langle XV\rangle_a C_0 \begin{bmatrix} \overline{\quad\quad} \\ \langle\text{long}\rangle_b \end{bmatrix} C[\text{1 stress}]$$
Condition: if not a, then b

It has been observed by Oehrle (1972) that bisyllabic nouns in English commonly have the stress contour 1 3 when their first syllable ends with a strong cluster (cf. (26a)), but these nouns have the stress contour ˇ1, when their first syllable ends with a weak cluster (cf. (26b)).

(26) a. argyle   microbe   mohair   alcove   Osage   permit   combat   protest
         import   replay   torment
     b. parole   adieu   police   chemise   manure   attack   debate   appeal
         report   lament

Observe now that the machinery needed to handle these facts is already at hand. All that is required is to order the Destressing Rule (25) so that it applies before the Compound Stress Rule (14). We then get derivations such as those in (27).

(27)   [lament]$_N$ [torment]$_N$
     PSR (7a)   1   1
     SSR (8)   1   1   1   1
     DESTRESS (25)   ˇ   1   ————
     CSR (14)   1 (vacuous)   1   2
     NSR (16)   1 (vacuous)   1   3   q.e.d.

To conclude the discussion I give examples in (28) where the Destressing Rules apply in fairly varied context. As argued in Brame (1972) and elsewhere, words such as *atomicity, salivatory, compensatory* must have the internal constituent structure shown in (28). Moreover, in view of the related noun *saliva*, the second vowel in the adjective *salivatory* must be regarded as being long in the underlying representation, and the PSR (7a) must be constrained so as to operate properly in placing the stress on adjectives that end with *-ic.*

(28)

	[[atom+ic]$_A$+i+ty]$_N$			[[salīv+āt]$_V$+ōr+y]$_A$				[[com=pens+āt]+ōr+y]$_A$			
PSR (7a)		1			1					1	
SSR (8)	1	1		1	1			1		1	
PSR (7a)	1	1	1	1	1		1	1		1	1
SSR (8)	1 (vacuous)			1	1	1	1	1	1	1	1
DESTRESS (22)	1	˘	1	1 ˘	˘		1	1	˘	˘	1
(24)	cannot apply			cannot apply				cannot apply			
CSR (14)	2	1		1			2	1			2
NSR (16)	3	1		1			3	1			3 q.e.d.

5. In the preceding pages I have attempted to show that the core of the English stress system is constituted by the following rules:

(29) Primary Stress Rule (7a)
      Stressed Syllable Rule (8)
      Initial Stress Rule (19)
      Destressing Rule (25)
      Compound Stress Rule (14)
      Nuclear Stress Rule (16)

This represents a significant simplification over the rules given in *SPE*. The most important savings result from the elimination of the "Tense" Suffix rule, the Alternating Stress Rule, and the first part of the Auxiliary Reduction Rule II. Since the latter rule is largely identical with the Stressed Syllable Rule but could not be combined with it, the elimination of this rule from the grammar is particularly desirable. Both the present system and the system of stress assignment in *SPE* make use of redundancy rules to deal with exceptions of particular words to particular subrules. The cost of the simplification in (29), therefore, is quite minor; mainly, the addition of the environment (ic + at)VC_0(+y) to the Compound Stress Rule.

   These improvements in the grammar of English are of considerable interest in and of themselves. In the case under discussion, however, we have been able to achieve somewhat more, for in order to obtain the empirical results we were forced to adopt a change in the theory of phonology. Specifically, we learned that the *SPE* convention on stress subordination has to be replaced by Schane's proposal which restricts automatic stress subordination to rules of a special form such as the Compound Stress Rule and the Nuclear Stress Rule. Whereas in *SPE* it was implied that stress subordination is generally an automatic side effect of stress assignment, the present study provides support for the idea that stress subordination is a process distinct and separate from stress assignment. This is, of course, an insight into the nature of language rather than a fact about English. We thus have before us yet another instance where a better understanding of the working of a particular language has allowed us to gain a better understanding of the working of language in general.

Addendum

It has been pointed out to me by Mary-Louise Kean that given the formulation of the Compound Stress and Nuclear Stress Rules that appear in Halle and Keyser (1971), the stress contours of compound nouns such as kitchen towel rack or community center finance committee can be obtained only by allowing a violation of the principle of strict cyclicity (see Kean 1971), for on the second pass through the cyclical rules the Compound Stress Rule must apply to the string kitchen towel rack which is only irrelevantly different from the string to which this rule applied on the first pass through the cyclical rules. It is, therefore, of some interest that the formulation of the Compound Stress and the Nuclear Stress Rules given above as (14) and (16) respectively allow for the derivation of these words without violation of the principle of strict cyclicity.

	[[kitchen]	[[towel]	[rack]]]	[[[community]	[center]]	[[finance]	[committee]]]
	1	1	1	1	1	1	1
CSR (14)		1	2	1	2	1	2
NSR (16)		1	3		not applicable		
CSR (14)		not applicable because of strict cyclicity principle					
NSR (16)	2	1	4	2	3	1	3

References

Brame, M. K. (1972) "The Segmental Cycle," in M. K. Brame, ed., *Contributions to Generative Phonology*, University of Texas Press, Austin and London.

Bresnan, J. (1971) "Sentence Stress and Syntactic Transformation," *Language* 47, 257–287.

Chomsky, N. and M. Halle (1968) *The Sound Pattern of English*, Harper and Row, New York.

Halle, M. and S. J. Keyser (1971) *English Stress: Its Form, Its Growth, and Its Role in Verse*, Harper and Row, New York.

Kean, M.-L. (1971) "Strict Cyclicity," unpublished paper, MIT, Cambridge, Massachusetts.

Oehrle, R. (1972) "The Stress Pattern of Bisyllabic Words in English," paper presented at the Third New England Linguistics Society Meeting, Amherst, Massachusetts.

Ross, J. R. (1972) "A Reanalysis of English Word Stress," in M. K. Brame, ed., *Contributions to Generative Phonology*, University of Texas Press, Austin and London.

Schane, S. (1972) "Noncyclic English Word Stress," mimeographed paper, UCSD, La Jolla, California.

Department of Linguistics
Room 20C-132
MIT
Cambridge, Massachusetts 02139