A SUGGESTION FOR A PRACTICAL DEFINITION OF LINGUISTIC STRESS

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Stress, as used in language, has been said to be a matter of

- loudness;
- physical force, energy or effort;
- breath force;
- mental effort;
- complex factors, among which loudness is entirely dispensable;
- pitch prominence, with possible accompaniments of length,
  loudness and quality;
- length;
- emphasis;
- whatever produces prominence;
- factors which may produce prominence but remain quite
  distinct from it;
- something basically subjective;
- something clearly objective;

or some modification or selection of these.

It has been thought of as being the same as accent, a type of accent,
part of accent, or distinct from accent. Its domain has generally been
said to be the syllable, considered of course in relation to other
syllables, though some writers prefer to treat it as specifically a
property of the vowel or syllabic peak. However, particularly in
phonetic studies, the term is sometimes applied to consonants or to parts
of segments, such as the prominent parts of diphthongs. There are also,
of course, references in general use to the stressing of units longer than
the syllable, and it is possible to find references in a single specialist
work to the stressing of units both shorter and longer than the syllable.
Potter et al. (1966), for example, present data on "stressed" and
"unstressed" segments as well as "the stressed sentence" and "the un-
stressed sentence".

When the expression "stressed syllable" is used it is not as a rule
made clear whether or not the stress necessarily begins on the syllable
onset, if present, whether or not any coda can be said to be stressed, or
whether or not these are things which vary from language to language.
Admittedly, Jones (1967: 149ff.) discusses what he terms level,
crescendo, diminuendo and crescendo-diminuendo stress with particular
reference to Serbo-Croat, a topic which had already been touched on by
Fry and Kostić (1939) and Trager (1940). But the question of stress on
onsets and codas is still not clearly resolved. This, I believe, is not
a trivial matter, as "stress" is frequently used as a criterion for deciding
where syllable division may be said to occur, and thus has a bearing on
any notions we may have about the nature of the syllable itself.
Some of the disagreements as to the nature of stress seem, at any rate at first sight, to be quite irreconcilable. In Bloomfield (1935) for example we have "stress - that is intensity or loudness - consists in greater amplitude of sound waves, and is produced by more energetic movement". Møl and Uhlenbeck (1956) declare that "in so-called dynamic stress intensity cannot be considered as a factor, regardless whether this term is taken in an acoustic or in a articulatory sense". Jassem (1952a) and Bolinger (1958) both avoid coupling English stress with intensity or loudness, Bolinger calling it "potential for pitch accent", Jassem what "marks off the beginning of a narrow rhythmical unit". Jassem adds: "rhythm, as the term is used in the present article, involves purely specific arrangements of the duration of syllables. If it were to involve, in any sense, gradations of force, our theory would only be a roundabout way of stating exactly that which we are attempting to refute." He further states: "In matters of stress great attention should be paid to (a) vowel quality (Modern Russian), (b) quantity (Modern English, Classical Latin) and (c) intonation (Modern French, Classical Greek, Sanscrit)." Jones (1964: 245), while describing stress in terms of "energetic action of all the articulating organs", "a strong 'push' from the chest wall" and (generally) "the objective impression of loudness", nevertheless points to a supposedly stressed syllabic /k/ with no sound whatsoever (in an English form /'ækju/ for Thank you). He also refers to voiceless final low-tone syllables in Tswana (like frequent pronunciations of thata 'strong') which "owing to lack of sonority of unvoiced vowels... have very little loudness." Covering an exceptionally wide range of possibilities, he characterises stress as "essentially a subjective action" and "usually accompanied by a gesture" and elsewhere (1967: 135) claims that the "application of strong stress involves... a special effort of the whole body". Many other examples of the great variety of approaches to this problem can easily be found in the literature and some of them have been described in Lieberman (1967: Ch.9), Crystal (1969: esp. 113-120) and Lehiste (1970: Ch.4). The fact remains that of Lehiste's three main suprasegmental features, quantity, tonal features and stress, stress is still "the most elusive".

A possible way out of the difficulty is to follow Crystal (1969: 120), who concludes that much of the controversy about the nature of stress has really been about the nature of "accent", and distinguishes between "accent" and "stress" thus:

"The accentual prominence of a syllable (be it primary or secondary) is reducible to a 'bundle' of phonetic features, the primary feature being a linguistically 'marked' movement of pitch.... Stress is also reducible to a 'bundle' of phonetic features... and these are the same as those which underlie accent. The difference between stress and accent, then, is based on which of the attributes of sound is the perceptually most dominant feature of utterance: in the case of stress, the dominant perceptual component is loudness; in the case of accent the dominant perceptual component is pitch." This is a reasonable distinction to make and it certainly accounts for many of the facts, including the existence of what Crystal calls "accent" in languages traditionally said to be characterised by "stress accent" or "dynamic accent", as well as in those said to be characterised by "pitch accent" or "melodic accent". After all, no one denies that the "stress accents" of "stress languages" often have clearly melodic features, and
most people would agree that these features may, at least in certain circumstances, be described as "dominant". It seems clear, however, from the detailed account of "accent" and "stress" in English in Crystal (op. cit.: 144-148, 158-159), that, at any rate in English, "accent", except in the case of what Crystal calls "tertiary accent" is always supposed to involve "an increase in loudness equivalent to stress". Crystal's concept can therefore, I believe, only account for all the facts if it is taken as applying to what Chomsky and Halle (1968: 26) refer to as "ideal", in which case what we call stress may frequently NOT be signalled by relative loudness. This again is quite acceptable in principle, especially if we assume that whenever we hear a strongly stressed syllable that is no louder, and possibly even softer, than a neighbouring more weakly stressed syllable, as in the English examples quoted by Bolinger (1958), Jones's Tswana forms and (if we accept it) /'kkju/, and many pronunciations which I have heard in English, Modern Greek and other languages, we interpret it as stressed because we tend to associate it, at some level, with alternative pronunciations that have relatively loud stress. If this in fact turns out to be the most satisfactory explanation, all well and good. There can be little doubt that a great deal of the actual interpretation of the speech signal is carried out in some such way, and the same must of course apply to stress. Nevertheless, if a theory of stress can be formulated which will enable us to refer to stress with relatively little ambiguity and at the same time point to a closer correspondence between "ideal" stress and its realisations (in sound as perceived) than present theories do, the task of linguistic descriptions will be made that much easier.

Needless to say, a one-to-one correspondence between the "ideal" and the "real" - in this case the phonological and the phonetic, or, with reference to a rather different distinction, competence and performance - is not to be expected. (Cf. Chomsky and Halle, op. cit.: 24-25; and many others). But presumably we will eventually find the sort of association between the abstract entity and actual phenomena of stress that will ultimately be capable of explication in terms of linguistic, psychological and physiological "rules". Indeed if we have no such hope, we would probably do better to stop using the term 'stress' for most of our purposes and to abandon investigation into its nature.

There is of course a theory, convincingly outlined by Lieberman (1967), which promises well for the future when, hopefully, we come to work out the details of these supposed "rules". This is the so-called "motor theory of speech perception" (see Liberman et al., 1963 and 1966) which involves "analysis by synthesis" and even some filling in of gaps. According to this theory we perceive speech partly by referring to the articulations we ourselves might perform in similar circumstances. Lieberman (op. cit.: 162 ff.) proposes its application to stress and intonation.

It will easily be seen that this theory can be used to explain many (though by no means all) of the problems surrounding the perception of stress, if stress is considered to be some kind of effort or articulatory force, along the following lines: we make perceptual judgements with regard to stress on the basis of our implicit knowledge, as speakers, of the effort or force which might have gone into the production of a sound as "heard", whether or not there are physical signs of this in the sound itself. In
practice, this means that we can, and do, make certain judgements about stress, and actually perceive it on the basis of evidence which is simply not available to acoustic apparatus. Lieberman seems to have been suggesting something like this. However, it will, I think, be equally obvious that the same theory can be applied to other concepts of stress. It could, for example, be applied mutatis mutandis to a concept of stress the description of which made no mention of effort or of force. It could, also, be applied to a case in which stress is thought of as being the absence rather than the presence, of certain essential characteristics in the stressed element compared with the unstressed ones. We could go even further; we could say that it could be applied where it is the unstressed elements that are thought of as having certain essential characteristics and the stressed ones as having, within the limits of the language, anything BUT those characteristics. In all cases, the perception of stress as opposed to lack of stress, or a certain degree of stress as compared with another, can, in principle be explained in terms of a motor theory.

A motor theory or any other theory of speech perception as applied to stress is not, then, quite the same as a theory of stress.

There are a few simplistic "theories" which for various reasons cannot be true.

First, stress cannot be equated with loudness in any absolute sense. In addition to the evidence presented elsewhere in this paper, the following (rather obvious) fact must be taken into account: an utterance with a general overall loudness may contain "weakly stressed" elements that are louder than "strongly stressed" elements in corresponding utterances with less overall loudness. For extreme instances of this, we have merely to compare shouting with normal speech and the latter with soft whisper, or speech very near to the hearer with the same speech very far away. But even within the limits of normal conversation variations of general loudness can produce such an effect - and it may be that variations in the range of loudness contrast can too. The situation is similar to the one already familiar from treatments of pitch levels in intonation (cf. Pike, 1945; Hadding-Koch, 1961; and many others), though one must expect a hearer's judgements of loudness to operate with a much smaller set of difference limens for loudness than for pitch (cf. Stevens and Davis, 1938: 152). Moreover, it is clear that the loudness of a speech signal may vary for all sorts of reasons, in a real linguistic situation, during the course of utterance. The distance between the speaker and the hearer may change, for instance. A speaker may raise or lower his head, or turn away from the hearer - or from a microphone. Sudden gusts of wind may make dramatic changes in loudness, as may various factors affecting telephone lines or radio transmissions. Even in cases where some sort of objective criteria for loudness can be established or assumed, physical and psychological factors internal to the hearer, not least the factor of attention, must surely alter any impression of loudness he may have. In most of these cases we would not wish to say that the stress patterns were varied as a result.

Secondly, loudness bears no simple relation to amplitude, or intensity. This is not to deny of course that, other things being equal, loudness increases with intensity within the threshold of hearing (though not
entirely proportionally). But it also depends on frequency and composition and, in the case of a short stimulus, duration (cf. Lehiste, op. cit.: 115). It is perhaps worth pointing out that since loudness tends to increase with frequency, there may be at least this one justification for the apparent ambiguity of such expressions as raise your voice à haute voix, as well as the erroneous claim that all stressed syllables are higher-pitched than neighbouring unstressed ones.  

Thirdly, the estimated loudness of different speech sounds does not even seem to bear the sort of relation to their intensity that one might expect on the basis of knowledge gained from psychoacoustic experiments. Much of the experimental work has been done with mechanically produced sounds of various kinds, including pure tones, which do not occur in speech. Extrapolating from subjects' responses to the complex sounds, however, one might reasonably expect a closer relation between the integral intensity of different speech sounds and the sort of judgements of loudness encountered, for example, by Lehiste and Peterson (1959). They found that /l/ and /u/, which as is well known, have a relatively low inherent sonority (or, in physical terms, intrinsic amplitude) were judged with remarkable consistency to be louder than /a/, when they had been produced with greater effort, though their intensities were less. Almost certainly, then, the subjects were judging "loudness" in speech sounds with the aid of what Lehiste (1970) calls "correction factors".  

Fourthly, although our judgement of loudness in speech may well be closely linked to subconscious judgements of effort - and so for that matter may some of our judgements of stress - it is not necessarily relatively strong effort that produces either. Boys sometimes alter the loudness of their yells and whoops by alternately covering and uncovering their mouths with their hands, making a particularly noticeable fluctuation in the loudness-softness pattern; in this case, there would not seem to be much change of effort involved either in the expiration or in the movement of the hand - certainly not one that could be correlated with loudness. From one point of view, the tongue and lips and the other movable speech organs can be said to be doing something rather similar in speech. In these movements it is often what corresponds to covering the mouth - building up pressure behind a complete closure during the articulation of a stop, for example - that presumably involve the greatest effort; and some of these 'covered' stages - such as the hold stage of a voiceless stop - are completely silent. Compared with articulations like these, the articulation of some quite strongly stressed vowels may involve rather little effort. As for psychological effort, we all know that there are certain occasions when we have to try much harder to say what is normally thought of as an unstressed part of an expression than we do to say a stressed part. I, for instance, have special difficulty with the last, unstressed, part of 'dismisses' in that grammatically peculiar tongue-twister about the Leith police; and, as a Northerner who in late adolescence modified my English accent towards Southern Standard British, I sometimes have to devote what seems to me like extra mental effort to the unstressed endings of 'chattered' and 'chatted', 'pacers' and 'paces'. These of course are largely performance matters (though 1
no doubt have rival competence models as well, in the case of /əd/~/ɪd/ and /æz/~/ɪz/. I mention them merely to show that stress cannot be equated with psychological effort.

One of the most interesting correlations that has been found in experimental work in phonetics is that between "stress" and sub-glottal pressure at or near the syllabic peak. Cf. Ladefoged (1967: 44-46). (Note that examples like that of thata mentioned earlier might be expected to show a "normal" correlation). Here of course we are back with the concept that stress is added breath force - one of oldest and most convincing of the relatively simple descriptions of stress - which, if it is true, must, however, have several additions and modifications made to it, on the lines of those I am about to suggest - that is, if it is to prove an adequate and complete description (e.g. for my example (1) below).

Moreover, one might presume that if, one day, the total energy expended in the neuromuscular systems in the production of sounds could be reliably measured it might be possible to state the neurological and physiological conditions of stress with considerable accuracy and completeness. A motor theory of perception, or some similar theory relying on a hearer's estimate, in terms of his own experience (and perhaps also innate knowledge), of the total expenditure of energy that could be involved in the production of the sound, might then be further refined to take account of the new data. Other questions such as phonological grading of stress could then (as is often done now) be left to the application of abstract linguistic rules, which can be explained in the light of theories that are frequently said to be "mentalistic", though they are not necessarily anti-materialist. Such an approach could even incorporate gestures. There is, perhaps, a danger that when reliable measurements become available, no very consistent correlations will be found, but that is no reason to discard, at this stage, a theory worked out along these lines. The fact that conclusions are sometimes drawn from inevitably incomplete energy measurements, like the measurements made by Stetson (1951), is again no reason to abandon such a theory.

If, however, characteristics of stress other than the incidence of increased sub-glottal pressure or of total energy in sound production can be shown to be present in the various types of stress, can be used in a workable definition, and can be investigated with the resources already at our disposal, it is reasonable to use them. I believe that there are such characteristics and that they have not up to now been fully exploited.

A satisfactory theory of stress ought to be able to explain why many linguists and phoneticians have disagreed about the nature of stress in general or about stress in individual languages. It ought to be able to explain, in particular, why some of them have excluded characteristics which others have thought essential; and it should be able to account for Jones's observations concerning Tswana thata etc., Bolinger's examples in Bolinger (1958), and some observations I have made, which I will now describe.
I have a recording of a Greek father addressing his child and saying Θέλεις μπίστα; 'Do you want a little (drink of) beer?' pronounced  

(1) 'Θελεις βι^τίστα

When an audience of British linguists heard this, several of them were sure that the strongest stress, in this case particularly loud, was on the final /a/. Every Greek to whom I have played it has insisted that the main stress is on the preceding /i/ or the syllable /ri/ of the word /bi^ritsa/. Moreover, I have often imitated the expression, using a similar ratio of loudness between the final /a/ and the preceding /i/. When I have used the same intonation as indicated here, Greeks have judged my performance, including my placement of stress, to be good.

The phrase την ὀικονομική κατάσταση της 'Αγγλίας 'the state of the British economy' (more literally 'the economic state of England') occurs as part of a tone group in another conversation I recorded. It is pronounced

(2) την οικονομι'κη κατάστασι της αγγλιας

It was not until I had listened to it perhaps a dozen times and transcribed it with intonation marked phonetically and phonologically that I noticed that the /i/ of the syllable /ki/, which I had heard each time as quite clearly stressed, and moreover as having the "highest pitch" of the phrase, was in fact completely voiceless. Moreover, every Greek I have asked up to now to say which of the syllables /ki/ or /ta/ is "more strongly stressed" has chosen /ki/ rather than /ta/ though the latter has a sonorous /a/.

The question Πώς μπορείς να είσαι με τη μαμά; 'Are you going alone or with your fiancée?' pronounced

(3) πως μ'μονος σου με τι μνιστι

occurs in a recorded conversation between two Greeks with /stι/ having what, from a phonological point of view, must be regarded as a low falling (or low level) tone. The immediately preceding syllable /mni/, however, is noticeably louder, and even its vowel is louder than the /i/ of /stι/. Yet no Greek I have asked tells me he finds that the stress pattern of this word (oxytone) has been in any way distorted.
There is the English expression *Do you now?* pronounced

\[\text{\textipa{\du: ju \textit{nau}}}\]

(4) \textipa{\du: ju \textit{nau}}

I have heard this expression when the /nau/ was very much more prominent, in terms of "loudness", than the /du:/. Yet I would have no hesitation in describing /du:/ as being more strongly stressed than /nau/.

One may also cite *The idiot!* pronounced

\[\text{\textipa{\textit{\d{	extipa{i}}\textit{dj{	extipa{e}}t}}}\}

(5) \textipa{\textit{\d{	extipa{i}}\textit{dj{	extipa{e}}t}}}

I have heard this as shown above but with the /i/ of /\d{	extipa{i}}/ both longer and louder than the first vowel of /\textit{idj{	extipa{e}}t}/ in a way that did not at all suggest emphatic or contrastive stress on 'the' (such as one might observe in expressions of the 'the Mr. So-and-so' type).

In addition I can think of many occasions when listening to Spanish and German as well as Greek and English when I have heard a final "nuclear" syllable very low in pitch and much less loud than any preceding stressed syllables — though the "nuclear" syllable would, presumably, be assigned the greatest degree of stress.

What is interesting about all these cases is that it is possible to point to features of the sounds as heard which could justify the interpretations made. In other words, it may not be only an application of the phonological rules, or a process of analogy — or even pedantry! — which caused me and others to make the interpretations we did. It is also interesting that people who do not understand the languages concerned may make other judgements, as indeed many able linguists did in the case of (1).\footnote{8}

The sort of features I have in mind are the detailed contours of sounds, in terms of pitch, length and loudness, as illustrated graphically in Delattre (1965: 23,25) — though Delattre is indicating physical characteristics based on objective measurements and assuming, at any rate for pitch, a near correlation between these and subjective impressions. I would add "quality" to these features in cases where this appears to be relevant. I am not suggesting that such contours as Delattre's "pitch shapes" are consciously perceived as this or that sort of pitch movement, a movement about which most competent speakers of a language could say "the pitch goes up so much, gets this much louder and continues in that general direction for so long", but rather that different "shapes" do in fact sound different to native speakers and that the differences can to some extent be described by a phonetician with a trained ear.
In the examples given, some of the sound features could be instanced thus:

A rising-falling tone begins on the syllable of /bi'ritsa/ described by the Greeks as stressed in (1) and on the first syllable of (4) and—perhaps equally important—the phonetic forms of the subsequent unstressed and less stressed syllables in these examples are different from the forms that would be used with main stress. For example, the fall on /a/ in /bi'ritsa/ does not reach a low pitch. If it were a final "stressed" fall as in /ku'litsa/ /ka'la/ or /'ka'la/ (etc.) 'Good!' a relatively low pitch would have been reached. That is no doubt one reason why Greeks refused to consider the /a/ on /bi'ritsa/ as in any sense stressed. Another example of /bi'ritsa/ occurs in the Greek father's recorded speech used as a one-word question. It is pronounced almost precisely as in (1). The father also asks the child, referring to himself: Θα πάνε η δουλήτσα; /Θε 'pai sti doul'itsa/ 'Is he going to go to work?' The pronunciation of /doul'itsa/ here has the same general "shape" as the /bi'ritsa/ examples. In both these cases my Greek informants insist that the stresses are normally placed, despite the loudness of the final vowels. As for (4) one can point to the contour of /nau/, which was phonetically, with thickness marking loudness, something like:

If it had borne the main stress the fall would have had a different shape—perhaps more like:

It would almost certainly have been even louder and longer and it would have been most unlikely to occur after a /du: ju/ with the phonetic intonation pattern that in fact occurred.

In (2) the /i/ of the syllable /ki/ had a duration appropriate to a stressed syllable consisting of voiceless stop + /i/, coupled with a phonetic intonation shape for succeeding syllables which is more or less normal for patterns consisting of a series of steps-down followed by a low falling tone (Cf. mutatis mutandis Kingdom's, 1958, "Tone II" with "High Level Head" and "Body", or O'Connor and Arnold's, 1961, "Stepping Head + Low Fall" in English).

In (3) there is a slight fall of pitch detectable during the pronunciation of the final /i/, and the preceding relatively level syllable is (at any rate in terms of the larger context of total expression in which it occurs) not sufficiently differentiated from the following one in either pitch or loudness to justify our interpreting it as stressed in defiance, as it were, of the normal stress rules.
In (5) it is almost exclusively a matter of a pitch treatment, this
time of the unstressed word, which shows that it is unstressed. The
high-pitched /ɔi/ was perceptually level throughout. A level pitch
at such a height would not be used if we wished to stress 'the'. In-
stead, whatever pitch level we began with, we would tend to use the
virtual diphthong often represented by /iː/: - thus pronouncing /ɔiː/: -
and moreover start to fall in pitch (or otherwise change the pitch)
before finishing the word.

Similar sound features can often be found, I think, in the other
instances I have mentioned. It will be noticed that the sort of cues
to stress I have in mind include phonetic features of the unstressed,
or less strongly stressed, parts of an utterance, taken in a linguistic
context. Analogy and linguistic knowledge are used, but, in the instances
I have given, not without a definite basis in sound features.

There are ways of explaining away such phenomena while clinging to
a more simplistic theory of stress than the one I am going to propose.
It could be objected that (1) involves an /i/, /a/ contrast of the type
that Lehiste and Peterson (op. cit.), Lehiste (op. cit.: 117-118) and
Wodarz (1961), among others, have indicated may be capable of the inter-
pretations "this /i/ is loud, since it has a lot of physical energy for
an /i/, and this /a/ less loud, since for an /a/ it has relatively little
physical energy." This explanation might be all very well were it not
for the fact that an /i/, /a/ contrast can have much less loudness constrast
in Greek when the /a/ is interpreted as stressed, and the /i/ as unstressed,
than it has in (1). Such an explanation is unlikely to be accepted for
(2) but here reference might be made to whisper surrogates or, at any
rate, "other factors" associated with prosodic features in whispered
speech (see Meyer-Eppler, 1957; Kloster-Jensen, 1958; Denes, 1959; and
Denes and Milton-Williams, 1962). Presumably breath force would be among
the factors considered: but my impression is that /ki/ in (2) does not
have relatively strong breath force. If, then, it is a combination of
factors that is considered, and if, moreover, these are compared with the
combinations of factors used in the voiced syllables of the utterance, we
must, in effect, use something like the theory proposed in this paper.
(3) could be explained away as deviant in performance but interpretable as
normal on the basis of probability, since the divergences from "normal"
are not great enough to upset native speakers' judgements. (4) can perhaps
be dealt with by calling /dː/: "accented" and /nau/: "stressed", but
if this is done in accordance with the notion of Crystal's "dominant
perceptual components" it is necessary to explain why /dː/, though
it involves less pitch movement than /nau/, is nevertheless the
element we should wish to call "accented".

I can see no way of explaining away (5) except by insisting that
high "static" stresses, or perhaps, all level stresses are ipso facto
less stressed than "kinetic" ones in English (but that is almost tant-
amount to accepting the theory I am about to propose), or by falling
back on analogy, explicit linguistic knowledge and the pedantry that
probably none of us is entirely immune from, and so saying that 'the'
does not carry stress in English except in very special circumstances.
Needless to say, the same sort of objection could be made to the other examples. In the case of the Greek ones, all educated Greeks know where the stress (\(\text{\textdlig}\)) falls in the Greek words; and indeed it is marked in the writing system. Moreover, in the words cited it is not subject to any frequent acknowledged non-realisation in speech, like the written 'or ' of prepositions like \(\text{\text{\textalpha{}}}\) ('from, of' etc.) or the written accents of the oblique forms of the articles. I should point out, however, that if a Greek wanted to pronounce */biri\'tsa/ or */mnistil/, thus deliberately shifting the stress of the key words in (1) and (3), he could easily do so and in such a case he could make it obvious that he was using a mispronunciation — as a joke perhaps, a mocking imitation of a foreigner, or an example quoted in a classroom, etc. 10

In some cases, I have found it useful to refer to loudness (though not as a sine qua non of stress). I believe it would be a great mistake to underestimate the importance of loudness. It may well be that, above some level that is NOT judged loud, only two degrees of loudness as such can be consistently identified by hearers in real continuous speech, but identification may be a very different thing from our response to modulations that we cannot identify. Suppose, for example, non-specialists were asked to identify "acute" or "grave" speech sounds, or even "front" or "back" vowels, they might get very bad scores, yet still be able to distinguish /t/ from /k/ or /i/ from /u/. Similarly, the sort of loudness-softness patterns described by Fry and Kostić (op. cit.), Trager (op. cit.) and Jones (1967) for Serbo-Croat stress might well be discernible by people who could not say which part was loud and which soft. I suspect that response to such subtle differences is part of our equipment for recognising foreign accent — and that probably even subtler, and at present totally unidentifiable, differences must be used, at least on occasion, in the recognition of individual voices. Loudness-softness patterns typical of a language, including loudness-softness patterns realised on a single speech sound, may form part of the total patterns whose comparatively full realisations are probably what lies behind stress. Thus part of the total pattern of a high level tone may consist of sustained relative loudness. This may or may not constitute stress in a given language. It does not, for example, in most varieties of English (mid level pitch, coupled with length and open juncture, is quite another matter); but it does, when final, in French:

\begin{verbatim}
Ca va? 'How are you?' or 'Are you well?'
\end{verbatim}

\begin{verbatim}
(6) sa 'va
\end{verbatim}

If a high level tone with these loudness characteristics is used with English words, the result sounds either un-English or, if used in a suitable context, as in (5), unstressed. In cases where the result is untypical of the language, one can hardly talk of linguistic stress.
Lehiste and Peterson (op. cit.) found that even vocal qualities seemed to have a bearing on judgements of loudness, and it is well known that breathy or creaky voice at certain stages of the production of a tone may have importance in some tone languages. There is presumably no reason why they should not also be part of a pattern that we could call stress. The importance of vowel quality in these matters — in Russian and English, for example — is also well known.

Length, too is important, but again there is no one-to-one correspondence. For example, it is all but impossible for a Greek to say θα παύω έχετ... 'I'll go there...' with the pronunciation

\[ \underline{\text{θα παύω}} \]

though he could say

\[ \underline{\text{θα πάω}} \]

or

\[ \underline{\text{θα πάω κέ}} \]

One explanation of this is that in Greek there is apparently nothing to stop an unstressed vowel before a pause being made very long and gently falling, but that such a treatment of a final stressed vowel, involving both length and this peculiar kind of falling pitch, is very rare. In fact the phonetic "shapes" associated with /ke/ in (8) and (9) are, in the case of such hesitations or deliberative pauses, characteristic of lack of stress. If there is no unstressed syllable to carry the characteristic pattern, it seems that either the pattern is not used or an unstressed carrier is supplied as in the above example. Such a rule can co-exist with a tendency to lengthen stressed sounds in Greek, a language in which stress, as I have tried to show, need not be relatively loud. We are faced with a situation in which an over-simplistic account would have to say that in the same language the presence of one suprasegmental feature (length) is sometimes a sign of the absence of another suprasegmental feature (stress) and sometimes a sign of its presence. But with stress, it is, I believe, never merely a question of the presence or absence, in an all-or-nothing manner, of one simple feature. It is, rather, total patterns that count, and then only in relation to linguistic context and the rules of the language.

Despite the impression one gets from considering only the disagreements about the nature of stress, there is a great deal of common ground among linguists and phoneticians. Most agree that tone languages can differentiate words, formatives or grammatical categories by means of
processes that are different from certain processes with parallel functions in other languages - and that these processes, in the other languages, can often be described as the application of stress (or at any rate accent). Most agree that there may be at least an element of stress in emphasis, and that emphasis occurs in all languages. Most would say that stress can make parts of the speech signal more prominent than others. Most say that stress can be loud, and that from an articular point of view it can often be thought of as in some sense energetic. Most agree that it may sometimes be at least "associated" with certain pitch features.

Moreover, there is little disagreement that stress functions linguistically in languages like English and the other Germanic languages, Russian and the other Slav languages, most (if not all) the Romance languages, Modern Greek, and a great many other languages in a great many parts of the world. It is also usually agreed that languages like Polish, Czech, Macedonian, Hungarian and Finnish may be said to have "fixed stress", while English, Russian and Modern Greek have relatively "free stress" (however minutely forcastable it may be from rules). Furthermore, in word-based accounts we find little essential argument about where stresses, whether "free" or "fixed", may be said to fall. Nevertheless, most would probably agree that a sound comprehensive definition is long overdue.

There is of course something to be said for adopting a narrow definition. In that case, however, much of what has been called stress in the past could no longer be described as such, and I think it would be difficult to persuade linguists throughout the English-speaking world not only to change their concepts of stress but to begin to apply the term in a very different way. It seems to be more practical to attempt to define what the term must mean when used for more or less the same purposes as it is now: hence the need for a comprehensive definition.

Such a definition should, I think, be primarily linguistic. One good reason for thinking this is that it is the linguistic concepts of stress for which the experimental phoneticians and psychologists attempt to find physical, physiological and psychological correlates. It should also, I think, be expressed as far as possible in terms of perception, since in linguistics we are centrally concerned with communication via perception. Moreover, if it proves possible to define stress largely in terms of perceived sound, the definition will be in line with both older and newer traditions in linguistics.

Considered as a linguistic entity, stress has usually been placed alongside tone and length (or quantity) as a prosodic, or suprasegmental, feature - that is to say, essentially a feature involving a relationship between segments or longer units made up of segment. Now, few people would wish to argue that stress is not prosodic or suprasegmental; and I am certainly not one of them. But I do question whether stress should be bracketed with features like tone and length. It seems to me that we should go further and treat stress as a higher-order abstraction (or at any rate a much more complex one) than these. In stating this, I do not wish to imply that stress is made up of tone
and length features as, in effect, Jassem (1952a, 1952b and 1959) does for Polish and English. On the contrary, I believe it incorporates only certain tonal features and certain length features, that these vary from language to language and from context to context within the same language, and that it draws, in addition, on features such as loudness and vowel quality. If it is indeed a higher-order or much more complex abstraction than tone and quality, one would expect it to be somewhat "elusive".

There is also a large measure of agreement concerning stress and rhythm. Stress is often said to contribute to the rhythmic system of certain languages. One could equally well put it the other way round.

Rhythm in sound may be realised by any basic, repeated, more or less regular, perceptual difference - including silence - in an otherwise uniform sound signal; and, as is well known, if it is not realised at all in the sound signal, it is frequently imposed on a series of sounds by the hearer. It is hard, then, to imagine any sequence of sound changes like those involved in speech which will not display rhythm to the hearer from one cause or another. It is also hard to imagine the production of such a signal without rhythmical impulses of one sort or another; and these are particularly likely to translate themselves into some sort of physical reality in the sound signal. Moreover, rhythm is by definition patterned, that is, in one sense of the word, systematic. We must therefore expect all languages to have rhythm systems, whether or not they can be said to have stress systems.

In fact the rhythm systems, even of unknown languages, seem fairly clear, and in analysis can usually be closely related to pause, pause-substitutes, open juncture contrasting with close juncture, explosion alternating with implosion in the Saussurean sense (see Saussure, 1969: 79ff.) or at least, potential for such comparatively easily definable categories as these. To use rhythmic groups, defined in such terms, in a definition of stress, seems, then, to be a practical proposition, providing factors of distinctive length (as, for example, they occur in Czech) and inherent length (as are to be found, presumably, in all languages) are allowed for.

It appears also to be generally agreed today that all languages have intonation systems, and that these are based largely on pitch treatment but involve divisions which may be marked by at least some of the pause and juncture features that divide rhythmic groups. In the case of tone languages like Mandarin Chinese and Ibo, and languages using tone like Swedish and some forms of Serbo-Croat, the intonation, applying to potentially longer units, can be treated as superimposed on the tonal systems that apply to short units.

Rhythm and intonation systems may also be to some extent interconnected. At least one unit of intonation, the "tone group" or "phonemic clause", is often thought of as at the same time a rhythm group (cf. Pike, op. cit.: 150).

It seems not unreasonable, then, to treat stress as a "function" of both rhythm and intonation. It will usually be associated, therefore, with variations in the patterns of length and pitch. In this case,
stress can be seen as a modification to utterances after allowance has been made for factors of pitch or length which are either inherent or distinctive in themselves.

Finally, it seems best to look on stress as a characteristic of the syllable (see Lehiste, op. cit.: 147) - or of the syllabic peak (though preferably not qua segmental sound) with a tendency to "spread" some of its features to the "right" and/or "left" of the peak.\(^{14}\) This is in line with general traditions in linguistics and phonetics and allows us to refer, properly, to "stressed syllables" or "stressed vowels" as we choose.

Accordingly, the following definition of actual linguistic stress is tentatively offered:

STRESS is any perceived or perceivable combination of factors of the sound of speech, changing or leading to change through time in a way which, for a competent speaker of a language, can initiate, or when final, constitute, on a syllable or syllabic peak, a pattern with recognisable prominence in the rhythm system (after allowances have been made for distinctive and inherent length), or more than minor distinctive function in the intonation system of that language.

A "perceived or perceivable combination of factors" comprises at least pitch, length, loudness, and quality (in the widest sense); and, if complex factors such as tenseness\(^{15}\) are found to contribute to the pattern in any language, clearly they must be included. "Leading to change through time" is intended to cover the possibility that what is interpreted as stress may sometimes be marked more positively by features of relatively unstressed sounds following stresses, rather than in the stressed sounds themselves. The change, for example, could be from (a) the virtual absence of one or more features in the stressed syllable, to (b) a complex involving their presence, perhaps in degrees that vary through time, providing that that complex can constitute the unstressed part of a prominent or distinctive pattern.\(^{16}\) "More than minor distinctive function" should normally be taken to imply a greater distinction than the difference in function between /\dai/ in (5) and /\dai/ without high pitch as in /\dai/ vidj debería, which is minuscule compared with the difference between either of these and the function of /\dai:/ in, for example, /\dai:/ misto smiða, /\dai:/ misto smiða or /\dai:/ misto smiða.\(^{17}\)

Tone is excluded as such from the definition, since, especially when it functions in the intonation system (as distinct from a system of lexical tones) of a language, it may often be spread over more than one syllable, and in this case only the first will be defined as stressed. However, stress and tone may of course coincide. Pause is excluded as being non-syllabic. Distinctive length and inherent length as such are expressly excluded, but additions to such factors would obviously qualify.

It is possible to object that the definition given here is a definition of accent rather than stress. In this connection, Crystal's remarks (op. cit.) have already been partially dealt with. The present theory, however,
still allows the possibility of describing /'əi/ in (5) and elsewhere as 'accented but not stressed' - it may, in addition, be said to be 'emphasised' - and it also overcomes the sort of objections that Martinet might make.18

One could also object that a definition of stress is unnecessary and that its function is the only thing that has importance (cf. mutatis mutandis Mulder, 1968: 210).19 It is worth pointing out that Saumjan (1968), when proposing a "two-level theory of phonology" whose levels involve different worlds - those which can be investigated in terms of (a) physics and (b) semiotics (op. cit. 218-222), the results of which investigations are "mutually exclusive and, at the same time, mutually complementary" - still (naturally) concerns himself with the problem of "the nature of the objective criteria to be considered in the definition of basic and mapping dominant parameters of this or that phonemic class", and finds (cf. the importance of the distinctive function of intonation in the present theory) that these criteria "are to be found in the concept of quantity of information".

It could also be objected that the definition given here is extremely involved. It is; but so, after all, is the problem of stress.

However, the following simplifications might perhaps be used instead:

STRESS is the detailed complex of factors of perceived sound changing through time in a way that is recognised by native speakers as consistent with an intitial focus of attention in a more general sound pattern.

(I am almost sure this is true, but I am not very happy with it as a definition, because it relies on the at present unanswerable question: What is a "focus of attention"?)

STRESS, in voiced speech, is the beginning phase of an intuitively known intonation figure in any given language or dialect. In psychological terms, it is the onset, or renewal of onset, of relatively strict control of an intonation figure.

This last definition has the disadvantages of referring only to voiced speech and introducing a new term. The term intonation figure must then be defined - as a "one"functioning in an intonation system (and/or a rhythm unit) with a recognisable "shape" in terms of pitch, loudness and quality in relation to time. Cf. the "pitch shapes" mentioned by Delattre (op. cit.) and the "detailed contours" referred to earlier in this paper - but in this case it is whole units such as tones that we are concerned with. It is probably true to say that reduced versions of these (cf. Pike, op. cit.: 73) are always present - and more or less perceivable - even in what we might be tempted to describe as purely rhythmic stress, so that the term intonation figure is not perhaps out of place.

Finally, for pedagogical purposes one might say:

The STRESSED parts of an utterance are those where you begin whatever pitch patterns you're going to use and where you devote special attention to matters such as relative loudness, relative length, vowel quality and so on.
Stress, as here defined, should be distinguished from both potential stress on the one hand, and emphasis on the other, as well as from features such as loudness (on the plane of perception), force, in particular breath force (on the plane of production), and tenseness.20

There is an obvious purpose in practical linguistics for the maintenance of a distinction between stress and potential stress - or, as I would prefer to call it, stress potential. For example, many prepositions and other form words in English and a whole host of other languages are rarely stressed in practice but may be stressed - usually for contrast or emphasis, or when they are cited, or when they are used in certain special positions. It is useful then to be able to ascribe to them a potential stress or stress potential - either of which terms can conveniently be abbreviated to "stress" when there is no danger of ambiguity, as when we ask "Where is the stress in the word because?" using the citation form /bi'keɪz/, though the pronunciation of this word in Britain nowadays is often the stressless /bi'kæz/ even before a pause. When used as a term in the literature on distinctive feature analysis, "stress" must, I think, refer to stress potential; and this latter expression is at least in this case, marginally preferable to potential stress, since it seems to make slightly more sense to say that something has both "stress potential" and, on a given occasion, "stress", than to say that it has both "potential stress" and "stress".21

Emphasis will, I think, always involve loudness, or force - that is, some kind of added force - or both. It may involve stress in the sense used here, but need not. There are many instances in various languages where a consonant, for example, is made to stand out by one means or another - as in a precise pronunciation of an English final consonant used for clarity on the telephone - and most of these cannot be said to play any part in the intonation or rhythm systems of the languages concerned. It is useful in the description of French to distinguish between emphasis and stress in such expressions as Parfaitement! 'Perfectly!' or sometimes 'Exactly!' when, for example, pronounced

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(10) "parfet'mä

if we refer to the phrase-final accent of French as "stressed" (as would be done in the terms of the definition given here). In (10) the emphasised syllable /par/ may be much louder than the stressed syllable /mä/.22

There is of course no reason why stress as defined above should not occur in tone languages, bearing in mind, however, that in these languages lexical tone pre-empts, so to speak, many potential functions of stress. In this case, stress can only make use of tone by modifying the tones already used lexically. This is essentially Kratochvíl's position regarding intonation (and hence in my sense stress) in what he calls Modern Standard Chinese (1968); and his attempt to give stress a separate "phonemic" status - citing examples like dōng-xī [tʊŋ'ɕǐ] 'east and west'
~ dōngxi [tʊŋxi] 'thing' - is, I think, successfully challenged by Cheng (1970) on the ground that expressions like the first should be regarded as two phrases (consisting in this case of dōng 'east' and xī 'west'). If Cheng is right, stress is, then, operating, as might be expected, as an intonation factor.

The question of the change from 'pitch accent' to 'stress accent' in Greek - with all its implications for the study of the general evolution of the Indo-European languages - becomes less of a problem in the light of the present theory. Ancient Greek use of lexical tone was apparently restricted to very few contrasts (cf. Sturtevant, 1940; and Allen, 1968). 'Acute' could contrast with 'circumflex' and 'zero accent', certainly, but 'grave' seems to have been an instance of intonation affecting the tonal system by at least reducing this contrast. It would be surprising, then, if in such a limited system, stress did not also function extensively, perhaps even lexically. The change to 'stress accent' would then be almost inevitable as the distinctively long vowels and the contrast between 'acute' and 'circumflex' disappeared. Normally the Modern Greek accent, like that of English and many - perhaps most, or even all - other languages, is largely realised in its treatment of pitch, but this treatment is not bound by the condition that 'acute' must be kept distinct from 'circumflex' any more than vowel length is bound by the condition that long vowels must be kept distinct from short.

In so far as stress is frequently dependent on pitch treatment a 'stress accent' need not involve different pitch patterns from those employed by 'pitch accent'. But in the case of 'pitch accent', as the term has traditionally been used, the range of variation in pitch treatment is limited, while with 'stress accent' it is as free as the rules of intonation will allow. For example, in Ancient Greek, before the /ɔ/, a contrast had been lost, e.g. /ego/ 'I', if used finally in an intonation phrase, would presumably have to have a feature of marked high pitch (as well as length) on the /ɔ/. Modern Greek, on the other hand, can run through the whole gamut of possible tones for the intonation of a phrase-final element - including a low falling (or low level) tone - on the /o/ of its corresponding form /'xɔ/.

If, then, the term 'pitch accent' is applied to languages like Modern Greek, or to English (as in Bolinger, op. cit.), it would probably be better to identify it by calling it a 'wide-choice pitch accent' as opposed to the relatively 'narrow-choice pitch accent' of languages like Ancient Greek. The use of the term 'stress' in the way suggested here, however, in no way obscures this important difference of accentual types.

I conclude that stress has no main single correlate in the primary perceptual features of the sound signal (pitch, duration, loudness and quality). Linguistic tone results from an interpretation - with respect to lexical and grammatical facts - of combinations of the primary features, with pitch as its main correlate; while linguistic length or quantity are derived from interpretations of perceived duration with respect to similar facts. Stress, in turn, appears to be the result of an interpretation of tone and length, in conjunction with any relevant features of loudness or quality, also with respect to lexical and grammatical facts. In other words, it is something added or extra to features of tone and length - but it is by no means only one isolable 'thing' that is added. Emphasis
may, in turn, be added to stress - or added to an element that is NOT linguistically stressed.

Such a concept of stress will, I believe, often make Bolinger's "contextual redundancy" (op. cit.) itself redundant as a cue for stress; and, if we are considering the application of cyclical phonological rules to stress placement and gradation, or the interpretation of stress where there is no phonetic cue, it is probably stress as defined here that we are, consciously or unconsciously, using as our basis, and not simply loudness or breath force.

SUMMARY

"Stress", as used in the English-speaking world to refer to (a) various kinds of ACCENT, and (b) a feature with linguistic function which may be used in addition to TONE, has been described and defined in a bewildering variety of ways, each of which concentrates on some aspect or aspects of stress which undoubtedly exist. Linguistic descriptions would be made easier if either a narrow definition of stress were adopted - in which case we could no longer refer to all instances of (a) and (b) above as "stress" - or stress is redefined more comprehensively. Since the latter appears to be the more practical proposition, a definition has been sought which would be broad enough to fit instances of "stress" which cannot be explained by any of the definitions proposed up to now. While admitting that the "real" may, in some instances have little or no correspondence with the "ideal" and that the functions of elements in language may belong to a different world from the world of phonetic reality, it was thought reasonable to try to isolate a functional concept of stress which would fit phonetic reality as closely as possible. Such a description appears to be implicit in a possible description of perceived stress - perhaps to a far greater extent than has been supposed up to now. The perceived - that is to say perceivable or subconsciously perceived - phonetic "shapes" of the prosodic features of a language - are taken as basic. Stress is then seen as an array of these features both in the stressed sound itself and as part of an array of features in any larger prosodic unit, with a function in the language concerned, which contains the stressed element. Items which do not fit into a scheme appropriate to a given language cannot, therefore, be viewed as, linguistically, stressed. A definition of STRESS as the incidence of any complex of sound features; changing through time, which native speakers could recognise as the beginning point of a prominent rhythm unit or a significant intonation pattern is accordingly proposed. Stress, as thus defined, should be distinguished from breath force, tenseness, loudness, emphasis, and, in certain contexts, potential stress (or stress potential). "Stress accent" turns out to be basically a wide-range pitch accent - as distinct from "pitch accent", which is a narrow-range pitch accent. It is proposed that it is stress as tentatively defined above, rather than a phenomenon describable in "simpler" terms, that underlies the various interpretations and phonological rules that are concerned with it.

NOTES

*An earlier version of the theory put forward here was outlined in a
paper presented at the Spring Meeting of the Linguistics Association of Great Britain in 1970. Without implying that they necessarily share my views, I wish to thank M.A.K. Halliday, J.W.F. Mulder, J. Carnochan, J.T. Pring, P.P. Newmark of the Polytechnic of Central London, and others who have commented on the arguments. Much of the research was supported by the Central Research Fund of the University of London.

1 There is considerable evidence that in Modern Greek a syllable-final /s/ is often tenser than an initial one. If this difference is treated as a matter of stress, it is difficult, without standing on one's head, to refer to the onset of stress as marking the onset of a stressed syllable, such as /sos/ in /mi' sos/ (μισος 'half') for example.

2 The expressions 'unstressed' and 'lack of stress' are used throughout this paper where many writers might often prefer 'weakly stressed' and 'weak stress'. This usage is in conformity with the view of stress taken here as a feature which may be said to apply only to certain syllables (or their peaks) in an utterance - unlike loudness which can, in principle, be assigned a value for every part of an utterance.

3 Lieberman (1967) is inclined to believe that only two degrees of "stress", primary stress as opposed to "everything else", are perceived as such in continuous discourse at normal rates of utterance. Halliday (1967: 14) and Chomsky and Halle (1968: 24-26) explain, each in their own way, what may lie behind many judgements involving more than two degrees. But this is not at issue in the present paper.

4 The claim might not be erroneous if those who made it were prepared to treat the first syllable (or vowel) in an utterance like /Insect/ or the last in an utterance like "The fool" as unstressed. According to most theories of stress, including my own, however, these would certainly be described as stressed. Moreover, if for any reason one wished to apply a term like "accented but not stressed" to a stress language, it would be a little eccentric, I think, to apply it to examples like these (though it could be applied to "The), especially when said with any of the most usual loudness-softness patterns.

5 Types is used here in contradistinction to tokens. Presumably there will always be some tokens that do not in fact share the basic characteristics of the types, and use surrogates instead, or are treated as tokens of a type for situational and contextual reasons arising from rules, or probability, or both. But an adequate theory should, if possible, ensure that there are rather few of them.

6 A simplified transcription system has been used for the segmental sounds of Greek, ignoring a number of details with regard to the voicing and fusion of consonants, since these are not an issue in the present argument. In the graphic representation of the intonation used here and in the numbered examples that follow, no attempt has been made to represent length (except for the final syllables of (7), (8), and (9)) or loudness, but this is not, of course, meant to
imply that there are no significant differences in these factors.

Voiceless vowels in such positions are common in Greek. (Cf. Householder et al., 1964: 14).

This, incidentally, is almost to be expected. One of the best-known phoneticians in Britain has said - to me, privately - "Whenever I'm listening to a language I don't know, I'm always hearing stresses in the wrong places." See also Jones (1967: 144-145, etc.)

But see the remarks by Jones (1967: 138) on the 'experiment' devised by A. Lloyd James in which the word 'mechanically' is whispered thus ['mika'nikoli'].

Some of my Greek informants were given the examples /bi'ritsa/ and /mni'stî/ from (1) and (3) out of context in the first instance, and subsequently asked if they thought the expressions could have been being used in some such way - that is, deliberately mispronounced. They denied it.

Mirambel (1959), whose description of Greek is generally very soundly based, does not seem to see Greek treatments of length and loudness in quite this way, but his remarks (op. cit.: 28-29) are nonetheless apposite - e.g. "Il n'est pas rare... que le grec présente, hors de l'accent, des voyelles allongées et des voyelles hautes, mais sans aucune phonologisation" and "en fin de mot, la différence de quantité vocalique se perçoit mal entre la tonique et l'atone; ceci explique que l'accent de la syllabe initiale ou d'une syllabe intérieure soit normalement entendu comme plus long que l'accent final; mais l'absence ou la présence de l'accent en finale est toujours perçue."

The obvious exception is French, which, however, in the terms of the present theory - as also in many other accounts - can unambiguously be said to use phrase-final (or group-final) linguistic stress.

Fry (1955 and 1958) and others have found that duration and frequency appear to provide somewhat more important acoustic cues to stress than intensity. Morton and Jassem (1965) show that particularly striking stress effects are produced by variations in fundamental frequency. It would have been surprising had it been otherwise.

English and German, for example, appear to have a considerable "leftward spread" of loudness and tenseness from the peak, while Modern Greek (cf. note 1 above) appears to have relatively little, at least with certain types of syllable. Another way of viewing these phenomena is of course in terms of the rates of build-up and fall-off of factors like loudness and tenseness in so far as such factors can be said to be features of syllables.

As described, for example, by Jakobson, Fant and Halle (1963: 36-39, 57-61) but not conceived of merely as a distinctive feature of segmental sounds.

Accordingly, even silence may be interpreted as stress, if it can be shown to be in some way syllabic. Jones's /'kkju/, for instance,
could perhaps be said to involve a type of silent stress based on
the intonation system of English, if "more than minor distinctive
function" is taken to include the very slight audible difference
between the fully stressed abbreviation /'kjæ/ , which I often hear
on London buses, the (in my terms) unstressed /kju/, which is probably
equally common, and the apparently very rare /'kjυ/ . The so-called
"silent stresses" of English verse are excluded by the definition since
they cannot properly be said to fall "on a syllable or syllabic peak".
There is, however, the term "silent icus", which will cover them.

Note that /'di  idjæt/ and /di  idjæt/ can both be said as relatively
emphatic phrases or as relatively unemphatic ones. One way of making
them emphatic is to emphasise the whole phrase. Another is to
emphasise only the word idiot - pronouncing it /'idjæt/ (since
/'idjæt/, though it may be the most common, is by no means the only
way of pronouncing the word emphatically). In either of these cases
the distinction, such as it is, between /'di/ and /di/ can, in itself,
contribute rather little to the total effect. The particular form
of /'di/ used in (5) may itself be looked on as emphatic, in which
case it may be compared with an emphatic low-pitched /di/ , and again
the distinction in function will be found to be very small.

See Martinet (1962: 35). He writes: "The use of 'stress', which
refers to a physical reality, instead of 'accent' is apt to confuse
even competent scholars", and proceeds to describe the distinctions
between in'crease and 'increase and a moving 'van and a 'moving van
as "accentual and nothing else", thus pitting himself against scholars
who say that in the first case it is a matter of stress placement and
in the second of intonation contour. It stress is taken to be a
special case of accent, as is suggested in this paper, each case can
be treated as an example of a significant incidence of stress.

Mulder agrees with me in all essentials: "It is sometimes said that
the substance of tone is 'pitch', i.e. sound frequency, whilst that
of accent is loudness, i.e. amplitude or 'volume'. This point of
view is not tenable." He goes on to say: "The actual nature of the
substance is irrelevant, as long as the functional similarities and
differences remain clear." I would add, however, that "the function-
al similarities and differences" often "remain clear" not only in
context but in the sound as perceived (or perceivable) - and that
when this occurs, it is reasonable to make use of the fact in
linguistic description and analysis.

These features may be among its components. So may the general
feature prominence; but since a stressed sound may, as I have tried
to show, be less loud and shorter than an unstressed one in the same
utterance, it seems best not to insist that stressed sounds must
always be prominent".

Moreover, stress potential, as applied for example to English or
Russian, could more reasonably be said to include factors such as
relatively full vowel quality which may be preserved in a sound that
is "stressable" though not in fact stressed.
Cf. Armstrong (1932: 140ff.), who appears to look on emphasis as basically the same sort of thing as stress. Of course, when emphasis modifies the initial stages of patterns with "more than minor distinctive function in the intonation system", it may properly be said to include stress as defined above.

REFERENCES


