LINGUISTICS

ENGLISH VOWELS AND SYLLABLE PEAKS

Jan Cygan

Wrocław University

The wide-spread practice of representing the syllable structure by means of formulae using C and V symbols shows one striking inconsistency: while the number of C's usually corresponds to the number of consonants in the margins, there is always only one V per syllable. This is odd, if only for a theoretical reason, since one would expect, at a certain level of analysis, both parts, C and V, to be analysed in a similar way, and both are capable of containing more than one phoneme (cf. Jakobson and Halle 1956:3.1).

The singleness of V confronted with the multiplicity of C's would imply an automatic equivalence of syllable peak with vowel. As will be seen presently, this is not so simple; besides, from the point of view of English syllable structure, all peaks cannot be treated uniformly, since (apart from the differences between stressed and unstressed syllables which will not be taken up here) in certain syllable types (the stressed open syllables) some peaks do not occur. It is this particular structural restriction that is to be kept in mind while analysing the syllable peaks of English.

English syllable peaks exhibit a great variety, including as they do, both 'pure' vowels (short or long) and diphthongal glides ('closing' or 'centring'). But even the division between the diphthongs and some long vowels is not fixed: the peaks of *day* and *no* for example are sometimes analysed as monophthongal, sometimes as diphthongal (the 'half diphthongs' of Sweet 1891: 233).

Current analyses of English syllable peaks are of four kinds.

1. The first solution regards the diphthongs (and possibly triphthongs) as unit phonemes, as also the long vowels, and puts them all on the same footing with the short vowels. Diphthongs are normally transcribed as two vowels, e.g. /ei/, long vowels with a chroneme mark, e.g. /i:/ (D. Jones), though

a more rational transcription uses geminate vowel symbols in the latter case, i.e. /ii/ (MacCarthy). Other transcriptions mark the timbre, not the length, no doubt due to the relative nature of the latter, thus e.g. /i/ distinguished from the dotless /ɪ/ (Abercrombie).

2. The second solution divides the peaks into simple and complex. Simple peaks include vowels, short and long, the latter being transcribed monophthongally as /i, e, o, u/; complex peaks include diphthongs /ai, au, oi/, sometimes transcribed (/aⁱ, aᵘ, oⁱ/) (Pike). Of that kind is also the system of K. Malone whose simple peaks include also the "glides" /y, w/ (= ai, au), while his complex peaks comprise the centring diphthongs. (N. B. /oj/ is vowel+consonant in his analysis).

3. The third solution is like the second in that there are also two kinds of peaks: simple and complex. Here, however, simple peaks comprise only the short vowels, while the class of complex peaks is enlarged by the long 'pure' vowels. The complex peaks are phonemicized as vowel plus some sort of glide (front, back or central). Of this sort is also essentially the analysis distinguishing simple and complex "vowels", where the latter are composed of vowel+transition (Catford).

4. Finally, there is a fourth treatment which consistently regards only simple vowels as syllable peaks, while all the semivowels are relegated to the margins (L. G. Jones).

The above four solutions represent essentially two types: one with all peaks equivalent (solutions 1 and 4), and one distinguishing between simple and complex peaks (solutions 2 and 3). Out of the four only treatments 3 and 4, however, are consistent and consequently acceptable.

The first treatment is probably the oldest one, but can no longer be vindicated in our days, since it neglects the fundamental requirement of completed segmentation (cf. Adamus 1967). The fact that a diphthong has the same function as a simple vowel, with which it may alternate within a morpheme (e.g. /teik/ ~ /tuk/) does not mean that the diphthong is an indivisible segment (cf. /teik/ ~ /laik/). In the same way both consonant clusters and single consonants fulfil the same functions in syllable structure (as onsets or codas) but no one maintains that consonant clusters are indivisible. The approach under discussion would permit a representation of all syllable peaks by V, but the representation fails to distinguish the vowels appearing in closed syllables only. The differences will come to sight only at the phoneme level.

The second treatment seems even less suitable than the first from the structural point of view. Its advantage is that it makes it clear that syllable peaks are not identical with vowel phonemes, but its division of peaks into monophthongs and diphthongs makes things even more complicated for a statement of syllable structure. The monophthongs include both checked and free vow-

els. Consequently, even transcription does not provide an adequate means of separating the peaks capable of occurring only in closed syllables. Vowels have simply to be listed according to their timbre and assigned to the checked or to the free vowels class. Moreover, the treatment does not pay due regard to the fact that the free (long) vowels share certain distributional features with the diphthongs.

The third type of analysis seems structurally correct. The division between simple and complex peaks falls in with their distribution in the syllable types (simple peaks do not occur in open syllables). The interpretation is also correct phonemically since the segmentation is completed. It also permits a considerable reduction of the phoneme inventory. The problem is one of the identification of the second element of the complex peaks. This will be dealt with later on. Meanwhile it may be remarked that the treatment permits the use at supra-phonemic level of generalized formulae of the type VV (or Vᵛ or VS) vs. V, representing classes of syllable peaks.

A two-way classification as in solutions 2 and especially 3 is also more in accordance with phonetic facts than a three-way classification of solution 1: there is no neat distinction between short vowels, long vowels, and diphthongs, since the so-called pure vowels may be diphthongized, the diphthongs may be monophthongal, and the short vowels are not always short (e.g. /bɛ/).

Finally, the fourth treatment is also quite consistent. Syllable peaks are here all of one kind only: short vowels. The semivowels /w, r, j/ are regarded as belonging to the margin. The structural conclusion from such an analysis would be that there are no stressed open syllables in English, and that all stressed syllables are closed since a vowel +semivowel is structurally equivalent to a vowel+consonant. As a consequence, the number of final consonant clusters is markedly increased (by those beginning with a semivowel) while not every semivowel follows each vowel. There is a problem with the r-less dialects where /ə/ replacing /r/ can hardly be regarded as part of the coda.

In view of the above considerations we choose solution 3 as the basis of our study and consider complex syllable peaks as polyphonematic, consisting of a vowel+something. The first thing now is to establish the inventory of the vowels. In establishing this inventory we shall again have in mind the structural peculiarities which are all-English, not those of any particular dialect. That is, we shall be concerned with the relationships within the vowel system rather than with the concrete phonetic values of the phonemes, which may be different from dialect to dialect.

An overall system for various dialects of English has been proposed by Trager and Smith (1951). It comprised nine vowels which are best tabulated in a symmetrical 3×3 pattern:

	Front	Central	Back
High	i	ɨ	u
Mid	e	ə	o
Low	æ	a	ɔ

The system was conceived as a maximum system, and was meant to cover most of the dialects of English, but not any particular dialect. Any single dialect makes a selection from among the above inventory, e.g. the Pennsylvania English uses only 8 of the above vowels (see Francis 1963 : 181), Mid-western American English (also called General American) — only 7 (see e.g. Hockett, and others).

There are also analyses which are contented with only 6 phonemes representative of the short vowels occurring in the stressed syllables of English. Such analyses are found both for British and American English, and they deserve special consideration since only six vowels do not occur stressed before pause. Some recent examples of such inventories are:

Kurath (1964 : 18)				Trnka (1966 : 14)		Pilch (1966 : 243)	
British		American		(British)		(American)	
ɪ	ʊ	ɪ	ʊ	i	u	i	u
ɛ	ɒ	ɛ	ʌ	e	ɔ	e	ə
æ	ʌ	æ	a	æ	ʌ	æ	a

As can be seen, the symbols used by Kurath are rather narrow; those used by Trnka and Pilch are broader. The most elegant representation of a six vowel system, however, with typographically simplest possible shapes, was proposed for central Atlantic American by Bloch and Trager (1942) and for the British RP by Jakobson, Fant and Halle (1952), and recently by Catford (1965, 1966). The inventory is /i, e, a, o, u, ə/ with shwa as the only exotic symbol.

Compared with the overall system of Trager and Smith, this system represents a substantial reduction, resulting again in quite a symmetrical arrangement:

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    i    —    u
    o    ə    o
    —    a    —
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Missing are here three exotic symbols: the 'barred eye' /ɨ/, the 'digraph' /æ/ (we would rather call it a ligature, since it is a unit symbol), and the 'open' /ɔ/.

The lack of /ɨ/ is most easily accounted for. Gleason (1961 : 323) admits that "though /ɨ/ is exceedingly common, the distinctions /i : ə/ and /i : ɨ/ carry a very low functional load". E. Sivertsen (1960 : 195) is of the opinion that "most occurrences of /ɨ/ seem to be phonologically conditioned" and

"even for American [ɨ] the data presented as evidence for setting up an /ɨ/ phoneme do not appear wholly convincing". The 8-vowel Pennsylvania English does just without it; nor is it used in Kenyon and Knott's *Pronouncing Dictionary of American English*, let alone British English. One might be inclined to think that Trager and Smith included it to fill a gap in their very neat pattern.

The problem of /ɔ/ vs. /o/, where both of them appear in a vowel inventory, is that they contrast rather by length than by timbre; /o/ rather than /ɔ/ is chosen as the more appropriate symbol in a transcription which uses the simplest shapes.

The lack of /æ/ invokes most controversies. But though typical of both RP and American English, it does not occur in the North of England or in Scots (D. Jones 1956 : 36), and as Abercrombie (1964 : 37) maintains, "in any case this vowel in RP seems to be becoming both less front and also more open (a tendency which may also be observed in some types of Cockney accent) — in other words the vowel is losing the characteristics which originally singled it out for special attention". (Cf. also Jakobson, Fant and Halle, 1952 : 35.) Besides, as observed by Abercrombie (1964 : 20) "a is a more romanic letter than æ; it is also more general, since by tradition it may cover an 'area' of vowel sounds which is larger than, and includes, the area covered by æ".

The main criticism is that [æ] and [a] cannot be allophones of one phoneme because of the existence in English of [ʌ] to which [a] is closest (Adamus 1967 : 114). This is not at all convincing. Apart from the above mentioned fact that there are English dialects (e.g. Northumbrian, Scots) with [æ] instead of [æ], [ʌ] and [a] are no closer to each other than [æ] and [a] are. In terms of the characteristic features

/a/ is low central unrounded,
/ʌ/ is mid central unrounded,
/æ/ is low front unrounded;

thus there is only a single feature difference (low ~ mid) between [a] and [ʌ], exactly as there is only one difference (front ~ central) between [æ] and [a]. On the contrary, æ seems to be closer to a than ʌ is on diagrams (see e.g. D. Jones's Pronouncing Dictionary), while Hockett (1958 : 79) puts in the same pigeon holes æ and a, a and ɑ, ʌ and ə, but not a and ʌ!

But, as already mentioned, it is the relationships between the elements rather than phonetic identity that are of importance. Thus if /æ/ is accepted as a seventh vowel (as in L. G. Jones, 1956) it remains unique in that it does not combine with any semivowel; moreover, the number of contrasting vowels non-occurring in open syllables continues to be six, compare

	pit	*pet*	*pat*	*pot*	*put*	*putt*	
British	[ɪ]	[e]	[ɔe]	[ɔ]	[ʊ]	[ʌ]	(no [a])
English	/i/	/e/	/a/	/o/	/u/	/ə/	(no /ɔe/)
American	[ɪ]	[e]	[əe]	[a]	[ʊ]	[ə]	(no [ɔ])
English	/i/	/o/	/ɔe/	/a/	/u/	/ə/	(no /o/)

If there is a contrast /a/ ~ /o/ (as in British and central Atlantic American) /ɔe/ is unnecessary; if there is /ɔe/ and /a/ (as in the majority of American dialects), there is no /o/ in the system. Thus we hold it true with Bloch and Trager (1942 : 50) that "English syllabics can be completely and accurately described in terms of six vowel phonemes (which occur as peaks of syllables either alone or in combination with a following semivowel)".

The six vowel phonemes have been assigned the following distinctive features by Jakobson, Fant and Halle (1952):

/o/ compact grave flat
/a/ compact grave plain
/e/ compact acute
/u/ diffuse grave flat
/ə/ diffuse grave plain
/i/ diffuse acute

Transposed into "God's truth" features, these would be:

compact=low, diffuse=high;
grave=back, acute=front;
flat=rounded, plain=unrounded.

This binary classification permits to level out the system obtained from Trager and Smith's square, by compressing it vertically as it were, and removing the empty slots, as follows:

		grave		
	acute	plain	flat	
diffuse	i	o	u	high
compact	e	a	o	low
	front	unrounded	rounded	
		back		

The ranging of /o/ with /i/ and /u/ as a high vowel, as well as that of /e/ and /o/ with /a/ as low, are justified by structural facts which will be seen below. It may only be pointed out that in a binary classification the meaning of 'high' is 'non-low', and that of 'low', conversely, 'non-high'. As for the vertical columns, 'back' means just 'non-front'. It will be convenient, however, to retain the term 'back' for the last column (rounded), while the back unrounded column can continue to be referred to as 'central'. The main dif-

ference between this last arrangement and those of Kurath, Trnka and Pilch quoted above is that it is horizontal rather than vertical as theirs were (i.e. 3×2 rather than 2×3 in Hockett's convention). Our arrangement is not without advantages. There is no problem with the mutual position of the non-high back vowels: /o/ higher than /ʌ/ (Br. E.), but /ʌ/ higher than /a/ (Am. E.) while it is actually central. Other advantages for an explication of the structure of complex peaks will be seen presently.

With the complex peaks there are two problems. One is that of identifying the first element, the other that of identifying the last element. The former is generally supposed to be more difficult (cf. Haugen and Twaddell, 1942); however, it is not important for our purposes. Whatever the timbre of the first element, it functions as the nucleus of the peak, and therefore syllabic. More important for us is the problem of identification of the last element (the peak satellite). Peak satellites, phonetically expounded by what Ladefoged most aptly called 'approximants', have been variously phonemicized as

(a) the diffuse (high) vowels of our diagram /i, u, ə/ (e.g. Trnka 1966 : 20);
(b) the semivowels (i.e. consonants) /y, w, h/ in some analyses (e.g. Trager and Smith), /j, w, r/ in others (e.g. L. G. Jones);
(c) the glides or transitions /ⁱ ᵘ ᵊ/, of a separate phonemic status distinguished from both vowels and consonants (e.g. Catford).

The 'vocalic' interpretation (a) has its advantages. As pointed out by Sivertsen (1960 : 184) "it gives a basis for a simple distinction between the distributional classes of vowels and consonants: the syllable peaks consist of vowels only, the syllable margins of consonants only". But there are disadvantages too. With peak nuclei /i, u, ə/ tautosyllabic vowel geminates obtain, and it may not be clear which of the elements is syllabic, the first or the last. The ambiguity can be removed by marking the nonsyllabic vowels as į, ų : /ių, uų/ (Trnka) or by distinguishing between stressed and unstressed vowels /'ii, 'uu/ (Jakobson, Fant and Halle). In the former case there is some inconsistency of transcription (/ių/ vs. /ei/ or /ai/, etc.), in the latter, stress becomes a distinctive feature of vowels, the number of which is automatically doubled. What concerns us most, however (even if the practical problems of transcription could be solved satisfactorily), is the problem of showing the contrast between monosyllabic VV sequences (complex peaks) and disyllabic VV sequences (e.g. *carrying*).

The 'consonantal' interpretation (b) assumes an identification of the last element of the complex peaks with the onset consonants /j/, /w/ and /h/ or /r/. The usual objection against this treatment is that the second part of such peaks as /aj, aw/ is dissimilar to prevocalic /j, w/ (Swadesh, 1935). However, as Gleason (1961 : 38) points out, "the differences between initial and final /y/, or initial and final /w/, must be taken as the consequences of their position rather than as any significant differences in their function in the

language". And Sivertsen (1960 : 188) maintains that "on phonetic and distributional grounds ... it is possible to give /h j w/ a phonetic definition which covers both their pre-peak and post-nuclear variants, and the peak satellites are clearly in complementary distribution with [h j w]".

Most objections concern /h/. Gleason does not identify the peak satellite as /h/ but sets up an extra phoneme /H/. Kurath classifies pre-peak /h/ as fricative, a label which obviously does not fit the peak satellite. There may be doubts about the phonetic justification for calling pre-peak [h] a fricative (Pike calls it a voiceless vocoid), and as pointed out by Sivertsen (1960 : 189) "its distribution parallels that of sonorants rather than that of fricatives: like all the other sonorants it occurs only immediately before the syllable peak, and like /j w/ it never occurs as a coda consonant".

The 'transition' approach (c) distinguishes between the pre-peak consonantal /j w r/ and the peak satellite glides /ⁱ ᵘ ᵊ/, and on the other hand, between the glides and the vowels. The disadvantages are: first, an increase in the classes of phonemes: instead of the generally accepted two classes of vowels and consonants, we get three classes: vowels, consonants, and glides (transitions). Second, and more important, is the fact that, if vowels are syllabic, and consonants — non-syllabic, transitions may be either non-syllabic or syllabic. There is consequently also no means of distinguishing between monosyllables and disyllables here.

Before we decide on which interpretation is best for our purposes, it may be remarked that the choice of a consonantal interpretation phonemically does not mean that the sound has to be consonantal: /h/ may mean [ə]. In the same way the Jakobsonian choice of vocalic interpretation is compatible with the consonantal values of unstressed high vowels, i.e. unstressed /i/=[j], etc. (Jakobson, Fant and Halle 1952 : 20).

Whatever the phonemicization of the last elements of the complex peaks, i.e. whether they are held to be vowels /i, u, ə/ glides /ⁱ ᵘ ᵊ/, or consonants /y w r/, the distinctive features of these elements are independent of their function, and thus can serve as a basis for further generalizations.

The distinctive features of the peak elements are:

	/o/	/a/	/e/	/u/	/ɔ/	/i/
compact/diffuse	+	+	+	-	-	-
grave/acute	+	+	-	+	+	-
flat/plain	+	-	-	+	-	-

A peak may begin with any one of the above six vowels, but no peak may end in a compact (low, open) vowel. That means that any sequence of two open vowels would be disyllabic. It is convenient to classify the peaks according to their last element, since there are fewer of them.

Peaks ending in /i/ are:

	/ii/	/ei/	/ai/	/oi/
compact	--	+-	+-	+-
grave	--	--	+-	+-
flat	--	--	--	+-

They are all non-flat, except /oi/. The exceptional nature of /oi/ is also seen from the fact that it is a peak whose elements are diametrically opposed (all pluses with /o/ and all minuses with /i/). Trnka regarded /oi/ as the only 'foreign' diphthong in English. Malone did not even regard it as a diphthong ('glide' in his terminology), but the vowel /o/ + consonant /j/. Phonetically it has the largest span among English diphthongs, joining the two extremes: low back and high front.

The /i/-peaks form a neat scale. In /ii/ there is no feature difference. The identity of elements in terms of distinctive features accounts for the fact that the peak has been regarded as monophthongal. In /ei/ there is only a minimum difference of one feature. This has also very often, especially in American analyses, been regarded as monophthongal (cf. also Abercrombie 1967 : 60). Sweet called both /ii/ and /ei/ 'half diphthongs'. Finally in /ai/ there are two feature differences: this is a regular full diphthong ('glide' in Malone's interpretation). The maximum difference of all three features found in /oi/ is non-occurrent in any other peak.

The above scale is fairly neatly paralleled by that of peaks ending in /u/:

	/uu/	/ou/	/au/	/iu/
compact	--	+-	+-	--
grave	++	++	++	-+
flat	++	++	-+	-+

/uu/ parallels /ii/ as a near-monophthong, /ou/ parallels /ei/ as a half diphthong. /au/ parallels /ai/ as a full diphthong. The parallelism forces us to choose /ou/ rather than /əu/ for [əu]; the more so that some American analyses represent it as 'long' /o/ (parallel to a 'long' /e/).

The /u/-peaks are all grave (non-front). There is no peak corresponding to /oi/ (which would be */eu/), but there is an analogous long-range front to back movement, represented phonemically either as the triphthong /juw/ (Bloomfield, 1933; O'Connor and Trim, 1953), or as the diphthong /iw/ (e.g. Francis, 1963). Reasons of symmetry and facts of initial consonant clustering habits which cannot be discussed here make us rather choose the latter alternative, which Trager and Smith (1952:27) also admitted as "old-fashioned, instead of /yuw/". The fact that the elements here are diffuse (high) is responsible for the unstable, shaking nature of the peak, where either the first or the last element can be syllabic.

Parallels to the /i/ and /u/ peaks can also be found among the /o/ peaks.

/ɔə/ and /aə/ are near monophthongs or half diphthongs, cf. no feature difference in the former and a minimum difference in the latter:

	/ɔə/	/aə/
compact	— —	+ —
grave	+ +	+ +
flat	— —	— —

The other /ə/ peaks (the 'murmur diphthongs' of Sweet) can be viewed as parallel to the corresponding /i/ and /u/ peaks /ii, ei, uu, ou/ with the last element replaced by /ə/:

	/iə/	/uə/	/eə/	/oə/
compact	— —	— —	+ —	+ —
grave	— +	+ +	— +	+ +
flat	— —	+ —	— —	+ —

/uə/ and /iə/, similarly as /iu/, are shaking diphthongs ,where either the first or the last element, or both, can be syllabic (falling diphthong, rising diphthong, or two syllables respectively). On the other hand, /eə/ and /oə/ also tend to be monophthongal; in British English e.g. [oə] is nowadays pronounced [o:], and at any rate no contrast is made between the diphthong and the monophthong. In some American dialects /eə/ is levelled to /ee/, so that there is no difference between e.g. *Mary* and *marry*.

The replacement of non-syllabic /i/ and /u/ by /ə/ is caused by the following /r/ and consists in a complete assimilation of features. That it is the complex peaks that are so assimilated follows from the fact that simple peaks are all (except perhaps /u/) possible before intervocalic /r/: *squirrel, cherry, carry, sorry, hurry.* (Note also the spelling facts.)

The assimilation of features is best seen in the triphthongs /aiə/ and /auə/:

	/aiə/	/auə/
compact	+ — —	+ — —
grave	+ — +	+ — +
flat	— — —	— + —

/aiə/ parallels the /i/ peaks in that it is all non-flat; /auə/ parallels the /u/ peaks in that it is all grave. /ə/, which is both non-flat and grave, steers the middle course, in terms of the distinctive features, between /i/ and /u/: it has one plus only, while /u/ has two and /i/ has none. It differs from both /i/ and /u/ by one feature, graveness or non-flatness respectively. The position of the medial /i/ and /u/ in the triphthongs is known to be the weakest and they tend to be lost.

The element /ə/ is less closely connected with peak nucleus than either /i/ or /u/: /ə/ can follow any peak nucleus, and it can follow both /i/ and /u/ in their satellite functions in the same syllable.

So far — thanks to the distinctive feature approach — we have been able to postpone the decision as to the vocalic, consonantal, or 'transitional' nature of the peak satellites. Before we decide on one or another of the possible phonemicizations, however, there is still one point to settle. This is the use of /h/ in some, /r/ in other interpretations, which makes it necessary to consider the mutual relationships of /h/ and /r/. The problem is of course closely connected with the well-known cleavage of English into the "r-less" and the "r-ish" dialects. ("British" and "American" may be conveniently used to refer to the former and the latter respectively, though the correspondence is by no means exact: r-less is Southern British, but also Eastern American; r-ish are not only most American dialects, but also e.g. Scots.) In the r-less dialects, as is known, [r] does not appear before a consonant or before pause; it occurs only prevocalically. In the r-ish dialects some sort of [r] appears in all these positions.

However, compared with the r-ish dialect forms, the r-less forms do not exhibit zero sound in the place of [r]; corresponding to an [r] of the former there is a non-syllabic [ə] in the latter, thus e.g. Am. [fir]=Br. [fiə]. *fear.*

If this were always so, the problem of phonemicization would be quite simple. One would posit a phoneme /r/, actualized respectively as some kind of [r] in r-ish, and as [ə] in r-less dialects, thus e.g. /fir/ (=Am. [fir], Br. [fiə]).

Things, however, are not so simple. There are cases where non-syllabic [ə] appears in all dialects, e.g. *real.* This is especially common with [a:] and [o:]. We can use /h/ to represent the non-syllabic [ə] here. This symbolization helps to keep apart such items as *law* and *lore*, phonemicized as /loh/ [loə] and /lor/ Am. [lor], Br. [loə] respectively. Similarly with *pa* and *par*, etc.

An objection to this kind of treatment is expressed by Sivertsen (1960:185) when she says that "it hardly seems satisfactory to analyse identical segments in similar phonological environments in different ways". However, we do not think it right. The fact that two different phonemic combinations such as /oh/ and /or/, /ah/ and /ar/, /ih/ and /ir/ have (in the r-less dialects) identical realizations should not at all be surprising. The actual phonemic manifestation may be regarded as the surface structure, the phonemic representation — as an underlying deeper structure. The principle of isomorphism (cf. Kuryłowicz, 1949) makes us see a parallelism here with the level of grammar. As is well-known, surface structure in syntax may be ambiguous, since they may go back to different deep structures e. g. *time flies.* The ambiguity is resolved by grammatical means which make the implicit structure explicit, e.g. *the time flies* vs. *time the flies.* Similarly, the phonetic ambiguity is resolved in the case of a vowel following, e.g. *the law of the land* vs. *the lore of the land.*

The phonemicization of the last part of the peak in *law* as /h/ rather than /ə/ is purposeful: it permits to distinguish monosyllabic peaks from disyllabic

vowel sequences, e.g. *real* /rihl/ vs. *idea* /aidiə/. The symbol /h/ is not without a phonetic motivation; aspiration does occur after vowels as shown by the fact that *law* played back from the tape sounds as *hall* (cf. Biedrzycki 1963:31).

To be consistent, we should carry out the distinction between the non-syllabic /j w/ and the syllabic /i u/. Since peak satellites are non-syllabic, they should be symbolized by /j, w/. This 'consonantal' interpretation is well in keeping with the general theory of sonorants whose primary function is maintained to be consonantal (cf. Kuryłowicz, 1948, n. 22); they function as syllabics only if there is no vowel adjoining.

The problem of /r/ is more difficult because of the linking phenomena. This, however, involves a discussion of disyllables (including both unstressed peaks and intervocalic consonant interludes), which goes beyond the scope of this article. Here we shall only note that /r/ in *bearing* is not intrusive, and consequently it has to be taken account of in *bear* in phonemicizing English. As a result we have to posit four rather than three peak satellites to cover both the r-less and the r-ish dialects. Apart from the non-syllabic nature of peak satellites this is another reason for choosing consonantal rather than vocalic symbols for them, i.e. /j w h r/.

The complex peaks of English would then be phonemicized as follows

Vj	Vw	Vh	Vhr	Vjhr	Vwhr
/ij/	/iw/	/ih/	/ihr/		
/ej/			/ehr/		
/aj/	/aw/	/ah/	/ahr/	/ajhr/	/awhr/
/oj/	/ow/	/oh/	/ohr/		
	/uw/		/uhr/		
			/əhr/		

The phonemicization of the complex peaks with /r/ as /Vhr/ (cf. Bloch and Trager) rather than just /Vr/ (without /h/) results from the fact that they parallel the closing diphthongs, as shown above. In the sequence /hr/ following the vowel nucleus or /j/ or /w/, either /h/ or /r/ or both are realized; /r/ is not realized preconsonantally or before pause in r-less English, /h/ is not realized in some r-ish dialects, in which case /Vhr/ sequences are indistinguishable from /Vr/ sequences, also symbolized as retroflex vowels /Vʳ/ (see e.g. Pilch 1966: 244). /h/ and /r/ are both realized side by side (as [ə] and [r] respectively) in the r-less dialects prevocalically and in some r-ish dialects.

In view of this the /Vhr/ peaks might be more accurately symbolized /V(h)(r/ with the understanding that the bracketed symbol (h) may be wholly, and the half-bracketed (r, conditionally missing, but not both at the same time. In other words, /h/ may be regarded as 'silent' in some American dialects; in other dialects it may be regarded either as prolongation [·] or non-syllabic [ə]; the final /r/ in British English may be regarded as silent potential linking [r].

To sum up, English syllable peaks (stressed) may be simple or complex. Simple peaks display six vowel contrasts, and occur in closed syllables only. Complex peaks may be analysed as simple peak plus something, since no type of complex peak has more than six possibilities. In complex peaks a simple peak forms the syllabic nucleus, the rest being non-syllabic satellites. The order of peak elements is fixed: the syllabic comes first, the non-syllabics (one, two, or even three) following in the sequence: (1) /j/ or /w/, (2) /h/, (3) /r/. /j/ and /w/ are mutually exclusive, /h/ can follow upon either of them (cf. the reverse onset combinations [hj] and [hw]), /r/ can follow upon any peak element, its connection with the preceding peak element(s) being the loosest. According to Gleason (1961:39), in most instances /r/ is not part of the syllable peak, though the relationship between /r/ and a preceding vowel is often closer than is the case with other consonants.

The mutual relationships of vowels and syllable peaks, however, are not simply those of a part and the whole. The vowels constitute a formal (phonological) class, the peaks — functional (phonotactic) structures. The former may be compared to formal morphological classes ('parts of speech') in grammar, the latter to functional syntactic structures. To use Firthian terminology, any syllable peak may be regarded as a (horizontal) structure with definite places in it occupied by (vertical) systems of vocoids. In particular instances a syllable peak may contain nothing but a vowel and thus be identical (co-extensive) with it, but it must be remembered that the two notions belong to different levels of analysis. To adduce a parallel from grammar, a finite verb belongs to the class of verbs in morphology, but functions as a predicator in syntax.

The use of the term 'vowel' to mean 'syllable peak' is a result of a confusion of levels, just as is the wide-spread use of the term 'verb' in connection with syntactic sentence patterns, such as e.g. SV (subject — verb). The confusion is no doubt due to the well-known fact that predicator in English main clauses is always expounded by a finite verb; hence a finite verb is taken as a signal of a main clause. Similarly in phonotactics, any occurrence of a vowel is a signal of a syllable. However, a predicator may consist of a finite verb form plus non-finite form(s); likewise a syllable peak may consist of a syllabic vocoid plus non-syllabic vocoid(s). The mutual relation is then only accidentally one of coincidence (P=V); rather it is, more generally, one of inclusion or one-way implication: V implies P, but not vice versa. Any occurrence of a vowel in English marks a syllable, but syllable peaks are not as a rule equivalent to vowels.

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