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THE EVAPORATION OF LIQUIDS IN COCKNEY

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Part of the periodic cycle of change which the English language undergoes every 300 years or so involves the vocalisation of the liquids /r,l/ to vowels. In the late Middle English, /l/ was vocalised after surface au and ou when followed by a non-coronal consonant, e.g. talk [tɔ:k] but malt [mɔ:t] and in the eighteenth-century all post-vocalic /r/'s were vocalised in the standard dialects. Evidence from the study of the contemporary accent of the London region, known popularly as Cockney, shows that the process has virtually reached completion, and that Cockney now has no post-vocalic liquids (except in certain special 'linking' environments). Due to the intimate relationship that Cockney has always had with the standard British accent RP, the consequences that this has for the development of English as a whole are enormous, particularly with regard to its vowel system. In this paper I want to argue for two points concerning /l/ vocalisation in particular:

- (a) that the process is not adequately described in terms of SPE (Chomsky & Halle, 1968) speaker-based (articulatory) distinctive features, but that its motivation is rather hearer-based (acoustic);
- (b) that the process is a syllable-based one, and that the syllable is therefore a fundamental phonological unit for describing sound-change.

Southern varieties of British English commonly have two variants of the alveolar lateral approximant /l/: a 'clear' (or 'light') [l] and a 'dark' [ɫ]. The first is found syllable-initially and the second syllable-finally; we shall return to the consideration of environments and the justification for a syllable analysis presently. Both variants of /l/ are formed by placing the point and rim of the tongue on the roof of the mouth just behind the upper teeth, forming an apico-alveolar articulation. The sides of the tongue are laterally contracted, and air is able to pass between the tongue and the molars on one or both sides without producing a turbulent airstream (except, predictably, when voiceless after voiceless initial segments, cf. Bladon & Al-Bamerni, 1976). Meanwhile, the dorsum of the tongue may assume any one of an infinity of postures, each giving a vowel-like timbre or 'colour' to the lateral. In Cockney, we may distinguish four main areas of vowel quality, or

secondary articulation, here: palatalised [l<sup>j</sup>] occurs before high front approximants; pharyngealised [l<sup>ɸ</sup>] occurs before low back vowels; 'clear' [l] with the timbre approximately of Cardinal 3 [ɛ] occurs before all other segments syllable-initially; and 'dark' [ɫ] with the timbre approximately of Cardinal 7 [o] occurs syllable-finally.

The first two variants of /l/, are governed by a low-level (phonetic detail) rule in Cockney which, to paraphrase Bailey (1978), automatically and universally converts any alveolar consonant into a very narrow [y<sup>x</sup>], where x indicates the colour of the adjacent tautosyllabic nuclear segment. We may consider these intrinsic allophones of /l/ (Ladefoged, 1965) as opposed to clear and dark /l/ which are extrinsic allophones. Thus there are no accents of English which have [l<sup>j</sup>] in a word like lark, or [l<sup>ɸ</sup>] in a word like leaf, but many which have only clear /l/, e.g. Irish English, or only dark /ɫ/, e.g. North Lancashire.

This analysis shows the distribution of the variants of /l/ in Cockney in an accurate and principled way; it is easy to confuse the conditioning factors, as this statement by Crystal (1980:373) shows:

'In English, velarisation is dependent on context, as when the l in cool is given a velar resonance because of the influence of the preceding BACK vowel, this can be compared with the l of leap, which is articulated much further forward in the mouth (towards the palate) because of the influence of the following FRONT vowel [i:] '.

Clearly, if Crystal's analysis were correct, peel would be pronounced \* [pi:l] and loop \* [ɫu:p]. What Crystal seems to have assumed is that the assignment of the phonetic quality of both extrinsic and intrinsic allophones of /l/ is such that 'clarity' is determined by the frontness (and so palatality/velarity) of any adjacent vowel. The domain of the process is limited to syllable-initial position, as the facts show. Bladon & Al-Bamerni (1976) have attributed the exceptionally large degree of R-L (anticipatory) coarticulation in syllable-initial /l/ to its low level of 'coarticulation resistance'; conversely, syllable-final and syllabic variants of /l/ have a much higher level of coarticulation resistance, and so are less free to adopt secondary articulation from surrounding vowels. One reason for this, and for the fact that in general English may be said to be an anticipatory language (Ladefoged, 1975), may be to assume its unit of speech encoding to be the CV syllable, within which coarticulation may freely occur. (Cf. Kozhevnikov & Chistovich, 1965). Indeed, one study of English coarticulation comes to the conclusion that 'it might be posited...that for consonants such as /l/... movement to the following vowel is an inherent part of the consonant itself' (Kuehn & Moll, 1976:316).

Dark [ɫ], on the other hand, shows a marked degree of coarticulation resistance, particularly when syllabic, according to Bladon & Al-Bamerni (1976). It is also usually labio-velarised to some extent, with the result that vowel peaks preceding it become more open and backed, e.g. fit [fit], fill [fiɫ]; in addition, it has been shown that 'movement toward final /l/ is substantially slower than movement toward or away from initial /l/' (Keuhn & Moll, 1976:312), and consequently there is a tendency for a brief glide to appear between the vowel peak and the /l/, e.g. fill [fi<sup>u</sup>l].

As Leidner (1976) has pointed out, muscle activity which is normally associated with velarisation is considerably lessened after back vowels, and there is an inverse relationship of 'gestural antagonism' in this position: the greater the gesture backing and humping the tongue, the less likely the tongue tip is to make contact with the alveolar ridge. Examples of this phenomenon are widespread throughout the languages of the world (see Leidner, 1976, and von Essen, 1964, for examples); restricting ourselves to English, the process can be observed in Middle English, where /l/ was dropped after [ɔ:] and [ɑ:], e.g. talk, palm; and in Modern English, where 'ɫ' is apt to be lost when preceded by /ɔ:/, which has a resonance similar to that of [ɫ] (Gimson, 1970:238), e.g. always [ɔ:wɪz]. Cockney has completed this historical process and now has no /ɔ:l/ in closed syllables; consequently, pairs of words such as bald/board, false/force, Paul's/pause are potential homophones in Cockney. Not that the process has stopped there: all dark [ɫ]'s in the accent are potentially, if not actually, lost, creating an entirely new set of diphthongs ending in [ʊ]. Of course, when syllabic /l/ is vocalised, the result is a full vowel like [ʊ] or [ɤ].

This may be a convenient point at which to examine the labial component of the vocalised /l/. In citation forms containing a fully vocalic /l/ there is a noticeable on-glide after the vowel, e.g. bottle [bɒtɹ<sup>w</sup>], [bɒtɹ<sup>u</sup>]. This marked degree of labialisation is either rounded, i.e. has an endo-endolabial approximation with rounding, or is unrounded, i.e. has an exo-exolabial approximation with weakly spread lips (Catford, 1977). It seems to make little sense to think of these labial-velar glides in terms of primary and secondary articulations, at least in the way they are usually defined: 'a secondary articulation is defined as having a lesser degree of stricture than the primary articulation, and is made with articulators left free by the primary articulation' (Ladefoged, 1971:59). This poses an interesting problem for the phonology of Cockney: how do we characterise the place of articulation here? Also, what do /l/ and [ʊ] have in common for a classical phonemic analysis? Sivertsen, (1960:131) writing on Cockney within this framework, was forced to admit that 'this is a case where the distinctive features postulated for a phoneme do not apply to all its allophones', and we shall consider the problem in more detail below.

Women

For all /l/	Vocalic	80%	
	Consonantal	20%	
		<hr/>	
		100%	N = 399

Men

For all /l/	Vocalic	84%	
	Consonantal	16%	
		<hr/>	
		100%	N = 257

Percentage by environment

	V		v			
<u>Women</u>	/- rnd/	_____	/+ rnd/	_____	/+ syll/	_____
Vocalic: - round	33	18%	1	1%	8	12%
+ round	120	64%	114	80%	45	64%
Consonantal	33	18%	28	19%	17	24%
	<hr/>		<hr/>		<hr/>	
N =	186		143		70	

Men

Vocalic: - round	4	5%	0	0%	3	5%
+ round	58	77%	99	82%	53	85%
Consonantal	13	17%	21	17%	6	10%
	<hr/>		<hr/>		<hr/>	
N =	75		120		62	

Men/Women

Vocalic: - round	37	17%	1	1%	11	10%
+ round	178	83%	213	99%	98	90%
	<hr/>		<hr/>		<hr/>	
N =	215		214		109	

For the moment, let me just state confidently that the motivation for some degree of close labial approximation when the alveolar contact is lost is acoustic: proprioceptively at least, it seems that rounding compensates acoustically, possibly via lowered  $F_2$ , for the lost apical closure and approximant lateral airflow (cf. Ohala, 1974). Kahn (1976:104-5) writing on American English, notes that 'it is possible to attain "/l/ quality" (even as judged by speakers who tend towards consonantal /l/) with no contact between tongue and roof of mouth'. Syllable-final /l/ in English is not inherently rounded, yet it appears from the following figures (compiled from data in Leith, 1973) that the rounded variant of the vocalic /l/ is the overwhelming favourite for Cockney speakers: see Table.

Rounding is thus not a 'carry-over' feature from the preceding segment, which is usually a vowel, although in the case of syllabic /l/ the preceding segment is usually a consonant. This is not to deny that there are no L-R coarticulations associated with /l/, since it seems for at least some speakers that L-Vocalisation is blocked after apico-alveolars, merely that there is no assimilation of rounding **here**. I can find no evidence for the neat picture of assimilation of tongue-height and lip-rounding presented by Sivertsen (1960:132): full [fʊ], fill [fi], solve [sɒv], bulb [bʌ], although I have a strong (though unconfirmed) suspicion that this symmetry may be a product of the descriptivist Smith-Gleason-Hockett framework utilised by the author, rather than of the data.

Why [ʊ] rather than [ɯ] should happen to be the favoured variant is a matter of conjecture. Explanations for this fact might be either articulatory (back rounded vowels are more 'natural' than back unrounded ones); or phonological (something like Foley's, 1977, closure principle i.e. the requirement that operations on elements in a set produce an element in that set). When Cockneys vocalise /l/, according to this theory, they produce [w] because they already have /w/. Neither of these approaches is satisfactory, Foley's closure principle seeming especially devoid of predictive (and so explanatory) power (Katamba, 1979). Wells (1982) analyses this problem in terms of 'naturalness', while noting at the same time that 'naturalness is not quite the same thing as articulatory simplicity' (1.4.1.); we quote his remarks in full:

'although this roundedness (of the /l/ glide) necessitates an additional articulatory movement, namely lip rounding, it does result in a segment type which is more natural than it would have been otherwise' (ibid)

As examples of criteria which may distinguish natural from unnatural segment types, Wells cites earlier acquisition by children, greater frequency in the world's languages, and the fact that sound change tends towards natural rather than

unnatural segments. But this surely rephrases the question without attempting to propose a principled explanation for the problem. The real reason for the vocalisation of [ɹ] → [w] (not [ʍ]), and conversely of [ɹ] → [j] (not [ɥ]) is surely acoustic and explicable in terms of these segments' chromaticity, i.e. labial and palatal respectively (Miller, 1973). The size of the resonating cavity where there is close velar approximation is increased by protrusion and rounding of the lips, and is conversely reduced by lip retraction and spreading where there is close palatal approximation. Any admixture of chromatic quality leads, therefore, to a reduction in acoustic perceptibility (cf. the analysis of [i] and [u] as 'quantal' vowel types on acoustic grounds in Stevens, 1972. The addition of rounding to the /ɹ/ glide, which is less simple sc. natural articulatorily, leads to a more perceptually prominent labial-velar segment: one which is more natural acoustically.

The analysis of the rounding of the /ɹ/ glide in terms of the preceding vowel also makes incorrect predictions about what results from the vocalisation of syllabic /ɹ/.

Sivertsen, (1960:132), having phonemicised syllabic /ɹ/ as /əɹ/, shows all the resulting vowels as [ʌ]; the problem here is that the data just examined (Leith, 1973) reveal unequivocally that syllabic /ɹ/ is vocalised most often as [ʊ], by speakers who in terms of birth-date, social class and so on are all but identical to Sivertsen's informants. According to the 'rounding carryover' analysis therefore, syllabic /ɹ/ would have to be represented underlyingly as something like /Uɹ/.

Ward, (1948:142), makes a number of interesting observations, among them noting that 'in London dialect, the dark l, instead of having an [ʊ] resonance, has that of [o] or [ɔ] i.e. the vowel quality is that of a lower and more retracted vowel than [ʊ]'. This point is also essentially made by Wise (1957), and both scholars consider that this 'over-dark' [ɹ] has one rather unfortunate consequence, orthopoeically, Ward writing for elocution teachers and Wise for stage actors. This is that this type of /ɹ/, which appears from the drawing supplied in Ward (1948) to be a uvularised lateral, shows a tendency for the tongue tip to make no contact with the alveolar ridge, and replace the /ɹ/ with a vowel. Ward notes additionally that 'over-dark' [ɹ] also causes the vowels preceding it to change markedly, although she admits that some change in vowel quality is inevitable before dark /ɹ/, even in RP. To return to the first point here, there does seem to be a slight problem in determining what kind of velar glide results from the vocalisation of dark /ɹ/, and how it comes about. The fact that retraction of the tongue dorsum (and probably concomitant advancement of the tongue root) is the major contributory factor in the tongue tip failing to make contact with the alveolum seems to be basically correct, but it does not seem to be the case



that what is left is simply the vowel colouring minus apical contact. Ward gives as possible Cockney pronunciations for milk [mɪlɔk] or [mɪɔk] which shows that she is thinking along these lines, but it is hard to see phonetically how the second part of the diphthong here can be considered the non-syllabic, let alone take on the characteristics of a glide. It also seems to be the case from the data that the usual quality of the /l/ glide is much higher and laxer, approaching [ʊ], which is the timbre of RP [ɫ] according to Ward (1948) and Wise (1957).

The clue, I think, resides in the early rule cited above, which has persisted to the present day even in RP, according to which /l/ is deleted after back vowels, especially after /ɔ:/. This seems the most likely place for it to have first disappeared in Cockney: /o:/ is diphthongised in closed syllables there, course [kɔʊs], and the transition from the last part of the diphthong to the [ɫ] in words like fall [fɔʊl] is minor and liable to be omitted altogether, leaving [fɔʊ]. Similarly, [ɫ] may have then been deleted after the other systemic /U/ diphthongs, the only difference then remaining between /VU + l/ and /VU/ consisting in the quality of the vowel, e.g. how [hæʊ] v. howl [haʊ]; bow (n.) [bəʊ] v. bowl [bəʊl]. The process is then completely generalised so that /l/ occurring after any phonetic [ʊ] is deleted, with the glide remaining.

The loss of /l/ in syllable final position and the creation of a set of /U/ diphthongs has meant not only the neutralisation of the distinction between phonetic [Vʊ + ɫ] and [Vʊ], but also the creation of something like a 40-member vowel system. Such an unwieldy system is potentially quite unstable and already, although the whole process is reportedly less than a century old, vowel neutralisations have reduced the system to possibly 24 members. This is an idealised, predictive statement, as a count of the actual phonetic realisation of /Vl/ combinations contained in Leith (1973) demonstrates; only by a process of ignoring all but the crudest phonetic detail, and abstracting to a large extent, is it possible to arrive at such a confident conclusion. Having said that, the trend seems clear even from the 24 informants examined, all of whom were born in the last century (average birthdate 1894) and who must have been amongst the first speakers to systematically vocalise /l/, and consequently to have to adjust to such a large vowel system.

Of the underlying vowel segments without /l/, most remain unaffected; the existing /U/ diphthongs neutralise as follows:

æ	U			<u>how</u>	
	AI	+	1	<u>hale</u>	
æ	U	+	1	<u>howl</u>	[hæʊ]
	æ	+	1	<u>Hal</u>	

Although /AU/ and /A + l/ are distinct at present, dull [dɔ̃ʊ] ≠ dough [daʊ] the possibility of them merging at a later date would give:

AU	<u>dough</u>	[dɔ̃ʊ]
A + l	<u>dull</u>	

They could equally as well diverge: dough [daʊ], dull [dɔ̃ʊ] > ? [daʊ]. Conversely, the back variant /ɒU/ has already merged with /ɒ + l/:

ɒ U	<u>dole</u>	[dɒʊ]
ɒ + l	<u>doll</u>	

Quite a number of common words which have /əU/ in RP, like dole, have both /AU/ and /ɒU/ in Cockney; consequently, dole may be homophonous with either doll or dull. Wells (1982) claims that the split of RP /əU/ into Cockney /ɒU/ before dark /l/ and /AU/ elsewhere has been complicated by morphological regularisation, thus roll [rɒʊl], rolling [rɔ̃ʊlɪŋ] > [rɒʊlɪŋ], by analogy (but compare Roland where no morphological pressure is felt). My own feelings, as a native speaker, confirmed by the data contained in Leith (1973), is that many common words which have /əU + l/ in RP e.g. roll, told, old, sold, hold, etc. have both variants /AU/ and /ɒU/ in Cockney, and in general the distribution in the data is about even (37:40). It seems, therefore, that we must consider /AU/ as a candidate for reduction with the other /U/.

The new set of U-diphthongs has already reduced as follows:

I + l	<u>rill</u>	[rɪʊ]
i: + l	<u>reel</u>	
?iə + l	<u>real</u>	
e + l	<u>weld</u>	[wɛʊd]
ɜ: + l	<u>world</u>	

The /e/ vowel in common words like girl and world, and possibly pearl, seems to be lexically conditioned; another possibility is that it was introduced into Cockney as a pronunciation for girl, cf. RP gel, and spread to other words by analogy.

aɪ + l	<u>smile</u>	[smɔ̃ʊ]
a: + l	<u>snarl</u>	[snɔ̃ʊ]
o: + l	<u>Paul</u>	[pɔ̃ʊ]
u: + l	<u>pool</u>	} [pɔ̃ʊ ~ pʊʊ]
U + l	<u>pull</u>	

Wells (1982.2:314-16) suggests the following as a possibility for the last set:

ɔ: + 1	<u>fall</u>	[fɔɔ]
u: + 1	<u>fool</u>	} [fɔʊ ~ fʊʊ]
ʊ + 1	<u>full</u>	
?ʊə + 1	<u>cruel</u>	[krʊʊ]

How should we represent cruel underlyingly, given that for Londoners like myself, cruel and crawl are potential homophones i.e. [krɔʊ]? In general, words which in RP contain the centring diphthongs /iə, Uə/ have the disyllabic /i:ə, u:ə/ in Cockney, e.g. pier rhymes with pee-er [pi:ə ~ pi:jə] and tour rhymes with two-er [tu:ə ~ tu:wə]. Where [iə] does seem to occur in Cockney is as a variant of /i:/ before [ʔ] e.g. real [ri:l ~ ri:ə1 ~ riəl], (cf Wells, 1982.1:216) and we can account for the range of possible pronunciations of cruel [kru:l ~ kru:ə1 ~ krʊəl] in the same way by positing underlying /kru:l/ here. The pronunciation given by Wells above, [krʊʊ], we can then treat simply as the normal phonetic realisation of /u:/ (via breaking) in Cockney, cf. moon /mu:n/[mʊʊn]. Interestingly, Jones (1977) gives [kru:ə1 ~ kru:l] as variants of RP cruel /kruəl/; what is an important difference between the two accents is that while RP has another variant [krɔ:l] from /kruəl/ via lowering, cf. RP poor [pʊə ~ pɔ:] this pronunciation is not a possibility in Cockney.

Lastly, Sivertsen (1960) observes that the two sets howl, Hal, hale [æʊ] and smile, snarl [aʊ] may be further reduced to [æʊ] the possible reduction here seems not to have been taken up in the 22 years since the publication of Sivertsen's monograph, and in fact if anything the latter two words have C5 [ɑ], sometimes with slight rounding.

Given below are the main realisations of /V + 1/ sequences in the phonetic transcriptions given in Leith (1973) and Sivertsen (1960):

I	Iʊ	AU	əʊ
e	ɛʊ	æʊ	æʊ ~ əʊ
æ	əʊ ~ æʊ	ɒʊ	ɔʊ
ɒ	ɔɔ	o:	_____
A	ʌʊ	iə	_____
U	oʊ	eə	_____
i:	Iʊ	ɜ:	ɛʊ
AI	æʊ	a:	ɑʊ ~ æʊ
aI	ɑʊ	ɔə	_____
oI	ɔIʊ ~ ɔIjʊ ~ ɔʊ	ʊə	_____
u:	oʊ	ə	ʊ

This is reducible to the following set of U-diphthongs:

IU		oU
eU		ɒU
æU	AU	ɑU
<u>rill</u> , <u>real</u>		<u>pull</u> , <u>pall</u>
		<u>pool</u> , <u>port</u>
<u>weld</u> , <u>world</u>		<u>dole</u> , <u>doll</u>
<u>how</u> , <u>howl</u>	<u>dole</u> , <u>dough</u> ,	<u>smile</u> , <u>snarl</u>
<u>hale</u> , <u>Hal</u>	<u>dull</u>	

Wells (1982.1:174) gives the following, very similar, grouping:

IU		Uu
ɛU	^U	ɔU
æU	ɑU	ɒU
<u>field</u> , <u>build</u>		<u>tool</u>
<u>shelf</u>	<u>toe</u>	<u>fall</u> , <u>sort</u>
<u>fail</u> , <u>foul</u>	<u>snarl</u> , <u>smile</u>	<u>doll</u> , <u>dole</u>

Apart from minor differences in symbols used, this system is essentially the same as my own, although less complete; however, as we have seen above, words like tool and tall are potential homophones [tɒu] and consequently I see no need for a /Uu/ diphthong, except as a stage in the development of the vowel in words like too, i.e. /u:/ > [ʊu] > [əʊ ~ t:]. This also disposes of the need to consider /^U/ and /ɑU/ together as central or back unrounded diphthongs, since their respective starting points are so widely different: that of toe is front, nearly C4, while that of snarl is back, C5.

As promised above, we may now turn to the problem of justifying a syllabic analysis of the /l/ vocalisation rule in Cockney. Since the appearance of Chomsky and Halle (1968), where the concept of the syllable is given no theoretical status (since it would have involved introducing another initial symbol § in derivations), various scholars have argued for the necessity of considering the syllable as a fundamental unit of phonology. (Anderson & Jones, 1974; Bailey, 1978; Hooper, 1972; Kahn, 1976; Rudes, 1977; Vennemann, 1972). In general, we may say that for a given set of interesting phonological data P, either

- (a) syllabic phonology cannot describe P;
- or (b) it describes P as well as any other theory;
- or (c) it describes P more simply than any other theory;
- or (d) it alone can describe P.

(a), it would seem, is unarguable, and (b) would likewise be the minimum prerequisite for advancing a syllabic analysis at all; (c) is what Hooper (1972) and Vennemann (1972:2) have argued:

'All phonological processes which can be stated in a general way with the use of syllable boundaries can also be stated without them, simply by including the environments of the syllabification rules in the formula. My contention is rather than in numerous cases such a formulation would miss the point, would obscure the motivation of the process rather than reveal it'

This, as we shall see, is precisely the case with the non-syllabic formulation of the process we are considering. Of course, Vennemann's remarks also mean that (d) can never obtain as the ultimate decision procedure between syllabic phonology and any other descriptively adequate phonological theory, and we are left with the notion of 'simplicity' alone with which to choose between competing theories. Not that this is a trivial point: simplicity, in conjunction with consistency, completeness and possibly symmetry, is a crucial quality for any purportedly explanatory theory (Sampson, 1976).

Most formulations of the relevant environment(s) in which /l/ is darkened and vocalised thus refer to the level of the segment (before consonants), the word (word-finally) and the rhythm group (before pause), as Wells does (1982.1: 259):

$$(1) \quad l \rightarrow o / \text{---} \left\{ \begin{array}{l} // \\ \#_o C \end{array} \right\}$$

Other attempts to account for the correct distribution of clear and dark /l/ in British English are even more tortuous, as for example Gimson (1970:201):

$$(2) \quad l \rightarrow \text{ɫ} / \left\{ \begin{array}{l} V \text{---} \\ \text{---} \\ C \text{---} \\ [+ \text{syll}] \end{array} \right\} C$$

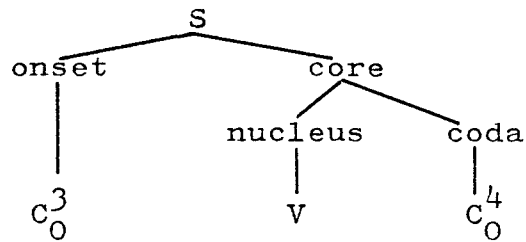
and the slightly simpler reverse formulation, stating the rule in 'elsewhere' terms:

$$(3) \quad 1 \longrightarrow \left\{ \begin{array}{l} 1 / \text{---} \left\{ \begin{array}{l} V \\ j \end{array} \right\} \\ \ddagger \text{ elsewhere} \end{array} \right\}$$

Consider first the 'clear' rule (3): word-final /l/ is clear when the next word begins with a V, or /ju:, jə/, e.g. failure [fəɪljə], full use [fʊl ju:s] and dark when the following word begins with a C or /j/ followed by any other vowel, e.g. full bottle [fʊɫ bɒtɫ], full yard [fʊɫ j :d]. Simplifying, we may say that if we consider /ju:, jə/ to be vowels, and /j/ + any other vowel to be a CV sequence, then we can state the distribution of /l/ as: clear [l] before V, dark [ɫ] before C, regardless of word boundary. There remains one problem with this analysis, namely that this does not explain why /l/ is also dark before pause: consonants and pause boundaries share no plausible intrinsic content which should cause them to function together as a natural class in rules. In fact, this particular disjunction (or one like it, mentioning consonants and word boundaries) is notorious in the writings of those phonologists who do not accept the reality of the syllable, as a notational variant of the environment 'syllable final'. Recall, too, that the analysis of /ju:, jə/ as vowels, made in order to simplify the statement of the distribution of clear /l/, is also crypto-syllabic, since it is dependent on considering sequences of segments (or bundles of features), rather than the segments (or features) alone. For those unprepared to treat /ju:, jə/ as vowels, a problem remains, stated here by Wells (1982.1:258): 'of the semivowels, /j/ is treated like a vowel (clear l in million), but /w/ as a consonant (dark [ɫ] in always)'. However, /j/ is treated as a consonant by speakers of English according to at least two productive processes, viz. the yard = [ðə ja:d] not \*[ðɪ ja:d], and it is a yard not \*an yard.

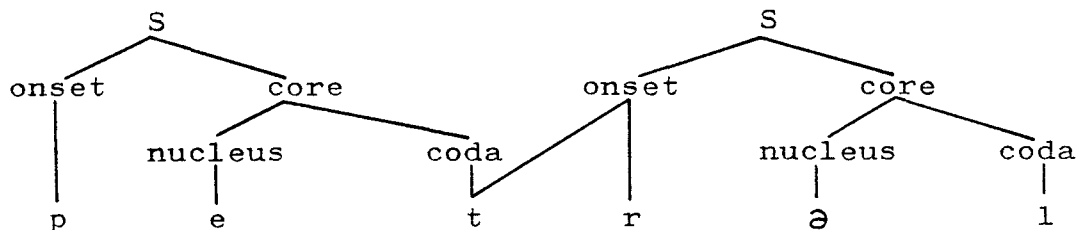
Although it could be said that the peculiarity of distribution here is merely phonetic, simply that /l/ is clear (palatal) before palatals, and dark (velar) before velars, it does not explain why some accents of the South of England with both clear and dark /l/ have the dark variety before the palatal /j/ in million [mɪɫjən]. A syllabic approach captures all the facts in a neat and principled fashion; Cockney allows syllable initial /lj/ sequences, whereas the accents just described prefer to treat the /l/ in million as syllable final and the /j/ as syllable initial. No accent of English, on the other hand, has a tautosyllabic /lw/ sequence, and consequently /l/ here will always be syllable final.

We define the general shape of the English syllable as follows:

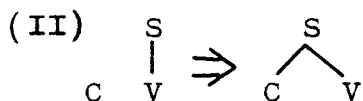
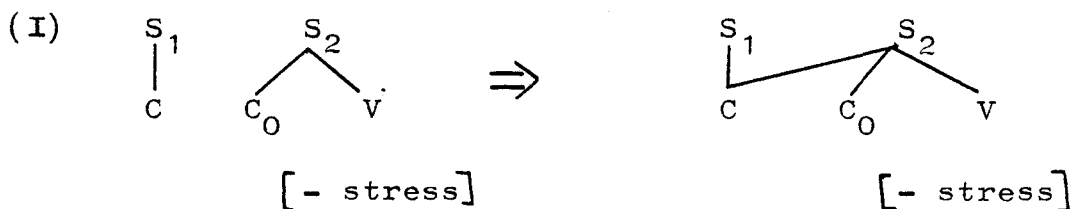


The nucleus is obligatory in all syllables and is usually filled by a V, although a sonorant C (liquid, nasal) may move from the coda into the nucleus, thereby becoming syllabic; both the onset and the coda contain only C. The term 'syllable initial' refers to all elements of the onset, and the first C in it may be referred to as absolute syllable initial (ASI) where it needs to be distinguished from the rest of the onset; conversely, the term 'syllable final' refers to all elements of the coda, and the last C in it may be referred to as absolute syllable final (ASF), where it needs to be distinguished from the rest of the coda. Accordingly, in monosyllables, /l/ is clear in syllable initial position, leaf, plead, and dark in syllable final position, feel, field. /l/ is dark when syllabic, bottle, since it is derived from an underlying / l/ sequence; note too that the possible final clusters with syllabic /l/ are identical to the possible final clusters with syllable final /l/, indicating the basic correctness of this analysis.

Between syllables, lines of association may connect the coda of one syllable with the onset of the following syllable, so that the ASF consonant of the first is also the ASI consonant of the second. The relevant C is consequently a member of both syllables, and is usually referred to as ambisyllabic, as for example /t/ in:

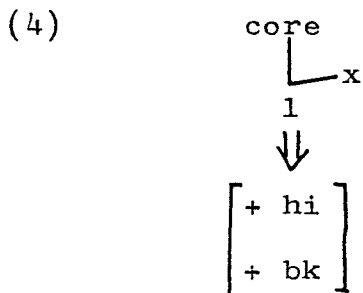


Phonetically, petrol is [pɛʔt̚ə l] in Cockney, which indicates that /t/ is both syllable final, since it is glottalised, and syllable initial, since it devoices /r/. Ambisyllabic /l/ has often been said to have both clear and dark properties, corresponding to its membership of two syllables (Bladon & Al-Bamerni, 1976; Fallowes, 1981; Vennemann, 1972). Lines of ambisyllabic association may be drawn by the following rules (adapted from Kahn, 1976):



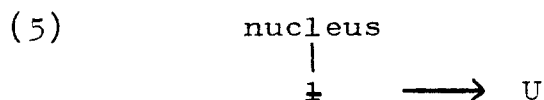
Rule I applies within the word, Rule II disregards word boundaries. Rule I seems to apply variably in some cases, thus in the pronunciation of million with dark /l/ above, it does not apply and the /l/ remains syllable final only. Rule II captures the generalisation that CV seems to be the optimal syllable structure; it too seems to apply variably, in that it is inhibited by the phrase boundary in feel ill (commonly pronounced with dark /l/), cf. feel it, with clitic it, where /l/ is usually clear.

We are now in a position to state the distribution of clear and dark /l/ in Cockney accurately:



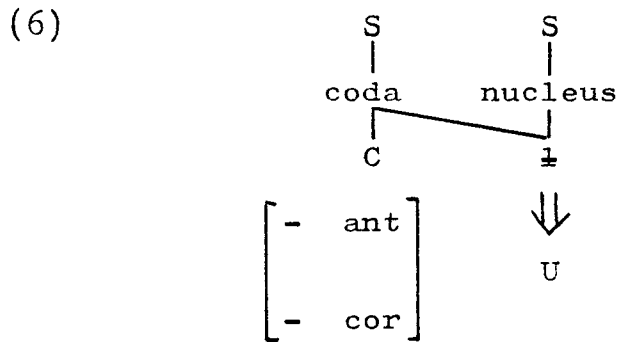
The cross indicates that a line of association must not be present; thus the rule states that /l/ is dark when it is, or has been, syllable final as long as it is not also ambisyllabic, i.e. part of the onset of the following syllable.

The rule which vocalises syllabic /l/ may be stated informally as:

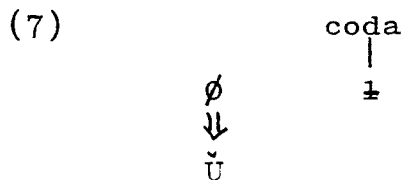


L-vocalisation is inhibited for some speakers, and possibly for all speakers in careful speech, for syllabic /l/ which is preceded within the same syllable by an alveolar C (by the application of Rule I): 'the syllabic lateral...may possibly be more frequent after another alveolar contoid than in other positions' (Sivertsen, 1960:132). The rule which governs this is:

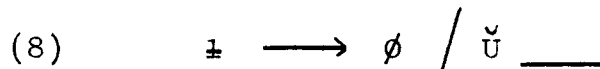




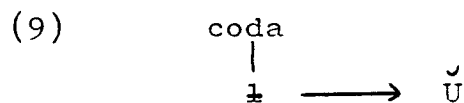
Next, a glide insertion rule epenthesises a high, back, usually rounded vowel before non-syllabic dark /l/:



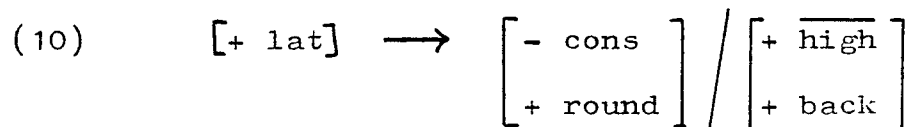
and an L-less rule subsequently takes out the lateral:



A rule like (8) allows us to capture the generalisation that dark /l/ is most easily, and from all the evidence probably initially, deleted after U-diphthongs, and rule (7) encapsulates the natural tendency for a U-glide to appear before velarised /l/. Since no dark /l/'s actually surface in unguarded, andante Cockney speech, we could theoretically collapse rules (7) and (8) into:



and collapse this rule (since syllabicity is predictable from position within the syllable) with (5) to form a simple L-vocalisation rule:



Although this rule simplification seems to be the general historical trend, we must keep the sub-parts of the rule separate in order to account for the alternations in lento Cockney speech: 'sometimes this vocoid (i.e.  $\check{\text{U}}$ ) is apparently in free variation with the lateral...or the vocoid may be followed by the lateral' (Wells, 1970:239).

It would appear here that variation due to rate of speech closely models the historical rule development, where the andante rules represent surface generalisation i.e. [ɫ] → ∅ firstly after /ɔ:/ = [oʊ], then /aU, AU/, then any [Vʊ], and rule simplifications, i.e. (6) > (5); (7) + (8) > (9); (9) + (5) > (10).

Let us now examine the putative development of L-vocalisation in Cockney. As we saw above, there is an older rule in English, persisting to the present day even in RP, according to which /l/ is lost after back vowels, especially and we have suggested that the motivation for this may be articulatory, due to the phenomenon of gestural antagonism. Similarly, since the movement of the tongue towards final is slower than movement towards or away from initial [l], there is a tendency for a velar glide to be epenthed before the [ɫ] as described by rule (7). Again, the motivation for this is seen to be articulatory. This velar glide is usually rounded [ʊ] rather than unrounded [ɤ] and we have suggested above that this is acoustically motivated. The last stage in the process that we are considering, rule (10), is again acoustically motivated due to what Jonasson (1971) calls 'articulatory reinterpretation', which may occur when different articulatory gestures have similar perceptual effects. Rule (10) is, in fact, more revealing if formalised using acoustic features:

$$(10) \quad [+ \text{lateral}] \quad \longrightarrow \quad [- \text{cons}] \quad \left[ \begin{array}{c} \text{---} \\ + \text{ flat} \\ + \text{ grave} \end{array} \right]$$

In rule (10), it is arbitrary from the use of articulatory distinctive features that /l/ should become round when it is also high and back; acoustic features are translatable into articulatory correlates, however (Jakobson & Halle, 1956), and so [+ flat, + grave] corresponds to both velarised for consonants, and to high, back and round for vowels.

We are now in a position to examine the phonological consequences of L-vocalisation, both for Cockney and for English in general since, as Gimson remarks in his introduction to Collins English Dictionary (Hanks, ed., 1979:xix), 'of all the various accents of British English, that of the London region has developed most rapidly, the speech of the other regions remaining closer to the historical origins of the language'. The loss of syllable final /l/, and the consequent phonologisation of the U-diphthongs, is comparable in its effects on the vowel system of the language to the loss of syllable final /r/ in the south-east of England in the 18th century. The similarity has not gone unnoticed by other scholars; Wells (1982.1) formalises the two processes as:

$$(11) \quad r \longrightarrow \emptyset / \text{---} \left\{ \begin{array}{c} \parallel \\ \#_o C \end{array} \right\} \quad (= 146')$$

$$(12) \quad l \longrightarrow o / \text{---} \left\{ \begin{array}{c} \parallel \\ \#_o C \end{array} \right\} \quad (= 171)$$

The implications of L-vocalisation have been conveniently summarised by the same author (1982.1:80), and we shall consider the possibilities in turn:

'is this essentially a difference just in the realization of /l/ in non-prevocalic position (so that [mɪʊk] is still phonemicized as /milk/, etc.? Or are we to say that Cockney has a special restriction on the phonotactic distribution of /l/ (excluding it from non-prevocalic position), together with a wider phonotactic distribution of /w/ (if we take Cockney milk as /miwk/)? Or does Cockney vowel system contain a whole set of additional diphthongs not included in the RP system - /iU, eU/ etc.?'

Let us consider the second possibility first, that syllable final /l/ is becoming, or has become, /w/. There are, it seems to me, sound reasons why this is not likely. Phonetically, [w] is not identical to [ʊ]; in my speech, to eat [tʊi:t] is not the same as tweet [twi:t] (cf. also Jones, 1972 §466r). As matrices of SPE distinctive features, they are indistinguishable, and perhaps Ladefoged's (1971) feature [rate] may make the difference explicit, since distinctive features must surely be able to mark surface phonetic differences as well as systemic ones. Phonologically, the reintroduction of /w/ in syllable final position would represent a completely unmotivated regressive constraint on the distribution of semivowels in Cockney, whereby /j, w, l, r/ would be permitted syllable initially and /w/ syllable finally.

Of the remaining possibilities, both are true at present due to the phenomenon of linking /l/. A consideration of linking in Cockney shows that /l/ must be present underlyingly in certain positions, since it is present (and clear) when a vowel follows, e.g. call a cab /kɔ:l ə kæb/ [kɔvləkæb]. The general principle of linking is that a glide homorganic with the preceding vowel is inserted; this principle obviously does not apply to linking /l/ at the moment, although /l/ could possibly become levelled with linking /w/ in the right places, e.g. call a cab [kɔwəkæb]. There is some evidence (Beaken, 1971) that vocalisation is extended in the speech of London children to include word-internal /l/, where it is ambisyllabic. If this were to happen, the restriction on /o:/ only occurring in closed syllables in Cockney would be lifted, helping to phonologise the new diphthong. (Note that, unlike /r/, there is no record of 'intrusive' /l/ in Cockney, although it is a feature of Bristol speech: the name of the town originally had no /l/). Where Cockney does seem

to have an additional set of U-diphthongs is in just those environments where /l/ is never subject to linking, i.e. where a consonant always follows, for example in a word like milk /mIUK/, cf. mill /mIl/. As has already been noted, the complete phonologisation of the U-diphthongs is contingent on the vocalisation of the linking /l/.

In this paper, I have tried to show that the process of L-vocalisation, whereby syllable final liquids in Cockney have (virtually) become vowels, is of the greatest potential importance for the development of the English vowel system. Central to the description of the process is the fact that, on the one hand, it is acoustic in its motivation and so not expressible accurately in terms of articulatory distinctive features; and that on the other, the process is syllable-based, and that the syllable is therefore a fundamental phonological unit for describing sound-change.

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## ASPECTS OF THE INTONATION OF SPANISH

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This investigation seeks to isolate the pitch contours that are available in the intonation of Spanish. The methods of analysis used in the past are discussed and compared. A set of rules governing the use of intonation patterns is proposed.

### 1. Previous work in Spanish intonation

Quite a lot of work has been published in the field of Spanish intonation, beginning at the turn of the century. Most of this work was on Latin-American Spanish. Since the intonation of American Spanish is quite different from standard Castillian intonation, I do not feel that such work is relevant to this discussion. Kvavik and Olsen (1974) have made a full survey of published work in this field.

Among the work on peninsular Spanish, that of Tomás Navarro stands out. Most later writers up to the present day acknowledge their debt to him. In 1918 he wrote Manual de Pronunciación Española, a general phonetic analysis of standard Castillian pronunciation. There is a section on intonation with hints for foreign learners. However, Navarro covers intonation, as he sees it, much more fully in his Manual de Entonación Española (1944).

Navarro's data are collected partly by direct observation, but mostly from recorded speech, particularly that held by the Archivo de la Palabra de Madrid. This consists of monologues delivered by writers, teachers and academics from various regions of Spain. Navarro claims that they use ordinary intonation patterns, although the style is elevated.

Navarro deals in what he calls 'melodic units', although he often refers to grammatical sentences. The melodic unit is defined as 'the smallest part of an utterance which has a definite musical form, at the same time being meaningful in itself within the whole sense of the utterance'. It seems possible that in many cases this melodic unit would coincide with my 'phrases' (see 3), since presumably speakers would tend to pause at the end of meaningful sections of the discourse (see 4 on hierarchies). Navarro talks about pauses as being closely related to punctuation. He states that colons and semicolons always coincide with the end of a melodic unit, even if no pause is heard. He claims that the comma has no relationship with any phonetic division. In 4 I found that my informants regularly paused at commas. It is likely that some important differences exist between

Navarro's melodic units and my phrases, which are bounded by pauses. Navarro claims that by his method, a text should be divided into melodic units which are different for each speaker. I found very little variation in the position of pauses for my two informants when they were reading the same text.

Navarro divides his melodic units into three parts: 'the initial inflection', 'the body of the unit', and 'the end of the unit'. He claims that the unstressed syllables at the beginning of the unit are usually lower in pitch than the stressed syllable they precede. I too found that this is often the case, but other regular forms were also found in my analysis (see 4). Navarro defines the body of the unit as that part which begins with the first stressed syllable and ends with the unstressed syllable immediately before the final stressed syllable of the unit. He says that the note of the first stressed syllable is more or less that on which the rest of the body of the unit is pronounced, the only variations being caused by unstressed syllables which may be pronounced lower than stressed ones, and words with special emphasis being above the normal line, as well as sonorous consonants causing falls. He claims that the central part of the melodic unit follows on in a regular and predictable way, once the positions of the initial and final stresses have been established. This is not in keeping with my findings. Particularly, I found the contour of the stress-group before the final one to be relevant in my functional approach.

For Navarro the end of the unit is the most significant part. He calls this section the tonema. He identifies five kinds: "cadencia, which is a fall of some eight semitones below the line of the central part of the melodic unit, and signifies the end of a sentence; anticadencia, a rise of about four or five semitones above the line of the body of the unit; semicadencia, as cadencia, but only falling three or four semitones; semianticadencia, as anticadencia, but only rising two or three semitones; and suspension, which is a level tone on the same note as the body of the unit.

Navarro then proceeds to discuss how these tonemas serve to identify functions in spoken Spanish. He claims that an 'ordinary statement' is expressed by a cadencia; a 'categorical statement' has the body of the unit 'noticeably higher than normal'. Confusingly, he calls this state an anticadencia, which he previously suggested occurred only in the final section of the unit. He claims that a 'doubtful statement' is expressed by a reduction in the depth of the final cadencia. An 'insinuating statement' has a brief rise instead of the normal cadencia, which Navarro describes as analogous to the semianticadencia tonema. It is not clear exactly why this is not in fact a semianticadencia. This kind of description goes on for some eighty functions. It is sometimes rather difficult to see exactly what Navarro means by particular



terms he uses; he speaks, for instance, about pitch patterns with 'distensive branches', 'semantic nuclei', 'semigrave', 'grave' and 'circumflex' tones, but none of these are ever defined clearly. In any case in my analysis, the final stress-group (my term) was found to be falling in all but a few cases.

Many writers have taken Navarro's model and either modified it slightly or simply repeated sections of it in their own work. Among them are Gili y Gaya (1950) who acknowledges that his section on intonation is largely to Navarro's credit, and Quilis and Fernández (1964), another pedagogical book with a chapter on intonation which quotes Navarro extensively.

Stockwell and Bowen (1965) has a chapter on 'Stress, Rhythm and Intonation Patterns'. They isolate stress (relative prominence of syllables), pitch (highness or lowness of tone) and terminal junctures (certain features which signal the phrasing in speech) as being the components of intonation.

These terminal junctures occur where, as before pauses, 'there are special features of pronunciation such as slight drawling of the vowel or a certain kind of change in pitch which themselves signal the presence of the boundary just as much as the pause does'. Since they later state that this 'vowel-drawling' only occurs in English and not in Spanish, I do not see any justification for placing terminal junctures at places other than pauses in Spanish, especially since Stockwell and Bowen do not specify the 'certain kind of change in pitch' that is necessary. They call the stretch of speech between the beginning of an utterance and the first terminal juncture a 'phrase'. This phrase is the unit on which their analysis is based, and in most cases would approximate to my phrase (cf. 3).

Stockwell and Bowen claim that Spanish has two degrees of stress, strong and weak (which correspond to my +sentence stress, -sentence stress distinction (cf. 3). However, they point out that stress is independent of pitch by citing pairs of words distinguished only by the position of the lexical stress. It is not clear whether they are making a distinction between word stress and sentence stress or not. They seem to refer only to word stress, therefore not admitting (or not considering significant) the possibility of a syllable bearing sentence stress but not word stress, or no sentence stress, although having word stress. (cf. 3 for further discussion of stress in Spanish).

For pitch contours, Stockwell and Bowen take the position that 'it is sufficient to know the pitch at only certain points in the phrase'. They claim that once the pitch at these points is chosen by the speaker, the variations at other points are either conditioned or make no difference. These points coincide with: (1) each strong stress in the phrase, (2) the end of the phrase and (3) the beginning of the phrase (if there are any weak-stressed syllables before

the first strong stress). In my analysis this is not sufficient, since the distinction between syllables jumped up to or fallen down to was found to be significant (cf. 6). Also Stockwell and Bowen claim that there never seem to be more than three strong stresses in a phrase. At this point the difference between their phrases and mine become clearer: I have many phrases with four or five sentence stresses.

Stockwell and Bowen's second claim about pitch contours is that only a few pitch levels are significant. They state that while English has four such levels, Spanish has only three. In my analysis, the significant factor in discussing pitch is its movement from lower to higher and vice-versa, with each syllable compared for pitch with those surrounding it. Here, there is a change in emphasis: for Stockwell and Bowen pitch movement is seen only as a way to set from one pitch level to another, whereas in my analysis it is the directions of pitch movement themselves that are important. This means that Stockwell and Bowen cannot distinguish between occurrences such as stressed syllables jumped up to or down to. Also, since they do not mark pitch direction except for terminal junctures, they cannot distinguish between contours such as:

```

      "
    "  *                *
  "    "                "  "
*      "    and    *    "    "
                        "  "
                          "

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which I found to be significantly different.

When they discuss terminal junctures Stockwell and Bowen claim that there are three kinds in Spanish: level, which frequently occurs in Spanish; rising, which rarely occurs except before a pause; and falling. This analysis is not comparable to mine, since my pause-defined phrase boundaries are only a subset of Stockwell and Bowen's terminal junctures. Therefore, although I found that phrase final stress-groups were nearly always falling, sometimes rising and hardly ever level, this is no actual counter-evidence to their claim.

Stockwell and Bowen state that the last, strong stress of the phrase in Spanish is usually the most prominent. I found no justification for considering any stress in the phrases to be especially prominent or 'nuclear' (cf. 3). Even if, as Stockwell and Bowen claim, the final stress is more prominent, this has no bearing on the analysis, since this supposed prominence is not used by the language to lay emphasis on a particular word of the phrase, nor is the tone it bears used to determine the pitch contour of the remainder of the phrase. When Stockwell and Bowen examine emphasis, they find as I did that Spanish cannot use pitch prominence to give emphasis.

Nine years before The Sounds of English and Spanish (1965), Stockwell, Bowen and Silva-Fuenzalida (1956) published a paper: Spanish Juncture and Intonation. The ideas in this earlier paper are not substantially different from those expressed in 1965, in that Stockwell et al posit three terminal junctures and three pitch phonemes; however, they have three stress phonemes (in 1965 they have only two).

Also in this paper Stockwell et al discuss internal open juncture and vocalisations (mostly vocal qualifiers) which have no direct relevance to their discussion of intonation. Their sections on stress, pitch and terminal juncture are more or less unchanged in the later work. The change from three to two stress phonemes is reasonable. Originally, they had a strong stress phoneme, a mid stress phoneme and a weak stress phoneme. It seems that the mid phoneme was established by analogy with English with only very weak evidence to support its existence.

Wallis (1957) is a very short article comparing English and Spanish. It is intended for teachers of Spanish. Wallis claims that 'Spanish intonation is oriented stress-wise'. She gives the example of contrast in emphasis being achieved very often by stresses upon potentially stressable syllables (which she contrasts with lexically stressed syllables). This is an interesting point which I take up later (3). However, I disagree with her explanation of the phenomenon of lexically unstressed syllables bearing sentence stress. It seems more probable that this shift in stress is due to the rhythm of the phrase: it looks as though Spanish tries to avoid a long sequence of unstressed syllables. This could be the reason for the shift that Wallis found as well as for the extra sentence stresses that I found on long words (cf. 3).

Wallis states that pitch is quite predictable on the whole in Spanish. She defines four pitch levels (1 being the highest). Normally 2 and 3 are used, stressed syllables on 2 and unstressed on 3, with 1 and 4 used for extra contrast. This kind of direct relationship between sentence stress and pitch seems to give wrong results: I have many examples in my text where a stressed syllable has lower pitch than surrounding unstressed syllables.

## 2. The Material

My two informants, Ana and Marián are students in Oviedo. Both were born and educated in Asturias, but they speak fairly standard Castillian, with a few dialect words mixed in, although their syntax is mostly standard. For example, they would never say the Asturian óyes-me? instead of the standard me oyes?. On the other hand, like most Asturians, they rarely use the perfect tenses, relying on the preterite and imperfect to express pasts. When they came across an example of the perfect tense in my text, they found it unnatural to read, and later commented on its 'Madridness'. On the whole, however, their intonation does not seem substantially different from Castillian intonation.

Although both Ana and Marián participate in the reading of the dialogues, Marián is only directly compared with Ana, the principal informant, in material collected from passages 3 and 7. This provides a useful check on the normality of Ana's intonation patterns. The intonation differed only in a few places.

For reasons of practicality, all my material was gathered from prepared texts including a series of dialogues which were written to elicit particular forms which might prove to be interesting. The informants read each passage through carefully before the recordings were made, in an attempt to eliminate hesitations in the reading. Then, after several dry runs to allow the informants to become used to the tape-recorder, the passages were recorded with a break after each passage. It would perhaps have been better to use recordings of real and spontaneous speech, but the difficulties in analysing such data would outweigh the advantages. It should be noted that the results of this investigation are only expected to hold for formal, reading Spanish.

The first passage is a three minute formal monologue. This has long complicated sentences, and is written in elevated literary style. It is taken from Pabellón de reposo by Camilo José Cela. Passages 2-7 are from another novel by the same author, La Familia de Pascual Duarte. These passages are dialogues, mostly questions and answers, interspersed with narration. The final dialogues, passages 8-14, are constructed to elicit forms such as examples of exact and partial repetition, and also to investigate the various intonations that no can have as its meaning and implication changes, and to compare this with other negative words, such as nunca, ninguna, nadie and nada.

### 3. About the transcription

Before starting I shall define my terminology. For the purpose of the following analysis, a 'phrase' is the phonetic material between two pauses; a 'stress-group' a stressed syllable and any unstressed syllables which follow it. Any unstressed syllables before the first stressed syllable of a phrase shall be called the a group.

In the transcription of the recorded material I have tried to display what I consider to be the most relevant aspects of Spanish intonation. Pauses of three lengths are marked: short '.', long '..', and some pauses which are longer '...'. I am not convinced that the difference between the two pauses is significant; this is discussed in 4.

Syllables which have sentence stress are shown by large dots '•', and syllables which do not by small dots '•'. Lexical stress is not marked unless this is accompanied by sentence stress (cf. 3) for full discussion of this point. No attempt has been made to distinguish degrees of stress. My first, working transcription differentiated between stressed and unstressed syllables and no subsequent grounds for making a finer distinction were found. Similarly,

there seems to be no good sound basis for assuming the existence of a 'nuclear' stress in Spanish, so naturally this is not marked in my transcription. The problem of degrees of stress and how Spanish gets by without a nuclear stress is discussed in 3.

Differences in pitch level are distinguished by marking the large and small dots on the horizontal lines on the grids beneath the text. If a dot is higher than the dot it follows, this means that it was perceived it to be on a higher pitch. However, these pitch heights are only relative to each other. In no sense are they intended to indicate absolute pitch levels, not is it implied that a dot, say on the middle line in one phrase, has the same pitch as one in the same position in another phrase. The levels of pitch may only be compared within a phrase in the following manner: unstressed syllables are compared with other unstressed syllables in the same stress-group, and with the stressed syllables which constitute the beginning and end of the stress-group. The pitch levels of stressed syllables are compared only with the one or two nearest stressed syllables within the phrase.

If the pitch of a syllable is perceived as changing between the beginning and end of the syllable, this is marked by a tail for stressed syllables:  $\wedge$  or  $\vee$  and by a line for unstressed syllables:  $\backslash$  or  $/$ . Sometimes a stressed syllable is heard to be risen onto or fallen down to. This is marked  $\wedge$  or  $\vee$ . This situation is discussed further in (3) where 'moving' syllables are compared with pitch movement over a number of syllables. However, the tail is not considered to be part of the stress-group of the stressed syllable if it precedes this, but rather as the end of the previous stress-group. If the syllable is the first syllable of a phrase, then this tail is deemed to constitute the a group (cf. 4).

I should like to make clear my views on just what kinds of stress are important in Spanish. By a stressed syllable I mean one which seems to stand out from the rest, due to its greater length, increased loudness, pitch obtrusion (cf Bolinger, 1958), or a combination of these. Pitch obtrusion occurs when a syllable is noticeably higher or lower in pitch than neighbouring syllables, or initiates a change in direction of pitch movement. However, I found sentence-stressed syllables which do not display pitch obtrusion, such as the stress on "so" in:

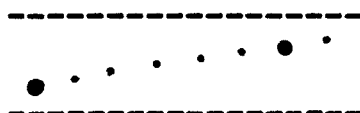
sabías que se casó mi hermano [11.5]  
-----  
• • • • • • • •  $\wedge$  •  
-----

Lexical or word stress is entirely predictable from the orthography in Spanish. It falls on the penultimate syllable in words ending in a vowel: [n] , or [s] , and on the final syllable in all other words unless the stress is marked in some other position by an acute accent. The possible combinations of stresses in continuous speech are as follows:

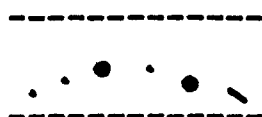
1. no lexical stress and no sentence stress
2. lexical stress but no sentence stress
3. sentence stress but no lexical stress
4. lexical stress and sentence stress

The third combination is rare in my text, since almost by definition, lexical stress marks potentially stressable syllables (cf. Weinreich, 1954 and Huss, 1978). However, I do have some instances of long words which have two sentence stresses in their length, e.g.:

desacompasadamente [1.10]



violentamente [1.61]



It could be that these words are lexically stressed in two places, but this is contrary to general opinion and needs to be examined further (cf. 1 and Wallis 1957).

Regardless of the presence or absence of lexical stress, syllables with sentence stress are transcribed as ● and those without as • . I did not find lexical stress to be relevant to my analysis of intonation. One might expect that if lexical stress was of relevance in the description of intonation then it would have played a role in the rules for stress-groups (listed in 4). This proved not to be the case. Even the few existing exceptions to my rules could not be explained by reference to lexical stress. Therefore, when stress or stressed syllables are discussed in my analysis, the reference is to sentence stress and the syllables which carry it.

I found no reason to assume the existence of a nuclear stress in Spanish analogous to that which is generally assumed for English. I could not distinguish any systematic differences in degree of stress in my text. Besides, the functions which are usually associated with a nuclear stress, such as contrastive or other emphasis are achieved in different ways in Spanish. It is not possible to make a word stand out by giving it extra strong stress. This is done by changing the rather flexible word order to put the word which is most important into a prominent position. For example, the English sentence John loves Mary could be translated in several different ways:

John loves Mary	Juan ama a María
JOHN loves Mary	Es Juan que ama a María
John LOVES Mary	Juan le ama de verdad a María
John loves MARY	Es a María que le ama Juan

As can be seen, Spanish also has to use paraphrases in order to express emphasis in some cases. If any word were to be pronounced so that it stood out intonationally, this would be quite meaningless to a Spaniard. In fact it would be a signal to him that he was listening to a foreign speaker.

Similarly, emphasis is expressed by additional explanatory words:

ni siquiera me miró [11.18]

The diagram shows a series of dots representing pitch levels. The first three dots are at a low level, followed by a sharp rise to a higher level for the fourth dot, which is marked with a checkmark. The fifth dot is slightly lower than the fourth, and the sixth dot is at the same low level as the first three. The entire diagram is enclosed between two horizontal dashed lines.

In English this would be He didn't even LOOK at me. The stress on miró is no greater than it would be if the word were less important.

In my transcription syllables which fall or rise are marked as  $\checkmark$ ,  $\checkmark$  if they are stressed and as  $\setminus$ ,  $/$  if they are not. I do not consider these pitch movements to be phonologically different from those which occur over a number of syllables:  $\bullet \cdot \cdot \cdot$ ,  $\bullet \cdot \cdot$ . I have taken both kinds of movement to be falls or rises respectively, with remarking on the number of syllables over which the movement is spread. This is the position taken in Crompton (1978). In my analysis the distinction did not seem to be significant.

#### 4. Formal Approach

In this section the problem is approached from the formal point of view. The object is to devise a set of rules which will define what form a pitch contour may or may not take, given its environment, position in the phrase, etc. Firstly, a hypothesis was made, with the intention of later modifying it to accommodate minor rules which hopefully would be found for the counterexamples which would inevitably refute the initial hypothesis, or alternatively abandoning this as fundamentally wrong.

My first hypothesis was that all stress-groups are either rising, falling or level, as follows:

rising: suben a los [1.5]

The diagram shows a series of dots representing pitch levels. The first dot is at a low level, followed by a steady rise to a higher level for the second dot, which is marked with a checkmark. The third dot is slightly lower than the second, and the fourth dot is at the same low level as the first. The entire diagram is enclosed between two horizontal dashed lines.

falling: sabe como [1.1-2]

The diagram shows a series of dots representing pitch levels. The first dot is at a high level, followed by a steady fall to a lower level for the second dot, which is marked with a checkmark. The third dot is slightly higher than the second, and the fourth dot is at the same low level as the first. The entire diagram is enclosed between two horizontal dashed lines.

level:            quellos besos        [1.30]  
 -----  
 ●   .   .   .  
 -----

It seemed that this should be sufficiently restrictive to be easily testable. However, among the hundreds of stress-groups in the data, quite a few exceptions to the hypothesis were found, of which some 32 were rise-falls, 12 were fall-rises, 2 were fall-levels, 1 appeared to be fall-rise-fall, 1 was rise-level and 1 was level-rise.

It is possible to account for many of these exceptions on phonetic grounds. It seems that some kind of raising assimilation is operating on many fall-rises. These would be simple falls, but are somehow 'pulled up' by the next stressed syllable if this is relatively high, and a straight fall would mean a large jump up. Examples of this are:

ves a diario        [1.7]  
 -----  
 ●   .   .   .   .  
 -----

hondo y verde mar [1.21] if two syllables  
 ----- can be so affected  
 ●   .   .   .   .   .  
 -----

cia un fantasma [6.7]  
 -----  
 ●   .   .   .   .  
 -----

Crompton (1978) observed a similar phenomenon in French. There are a few examples where falling assimilation seems to take place in the same way:

quiero hasta el fin [1.54]  
 -----  
 ●   .   .   .   .   .  
 -----

ia que le gustabas [11.19]  
 -----  
 ●   .   .   .   .   .  
 -----



Other counterexamples to my initial hypothesis arise where a rising diphthong disrupts a contour which would otherwise be a fall or a level. Most of these lead to rise-falls, while one appears as a rise level. All involve a jump up onto the stressed syllable:

sientan en las cervece	[1.6]
-----	
✓ . . . . .	
-----	

quiero	[1.65, 1.67, 1.67, 3.6]
-----	
✓ .	
-----	

quiera me mi	[11.18]
-----	
✓ . .	
-----	

It is not clear whether the perceived rise is due to a genuine change in fundamental frequency or is simply caused by the slides of the diphthongs. However, since not all such diphthongs were heard as rising, it seems that these anomalies might be similar to other rise-falls where no diphthong is present.

I found several cases where the rise at the beginning of the stress-group occurred on the initial syllable where this had a particular prominence (see however 3). Examples are:

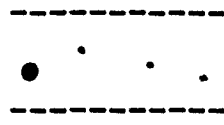
nada les ha	[1.39]
-----	
• . . .	
-----	

nada	[6.15] and [10.1]
-----	
✓ .	
-----	

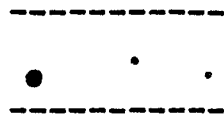
qué va	[11.20]
-----	
✓ \	
-----	

Also there were stress-groups where a stress seems to come too early in the pattern. These occurred very close together in the text:

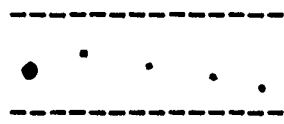
misma lenti [1.33]



nuestras ca [1.34]

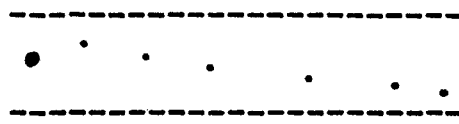


bezas se separ [1.34]



Three other stress-groups which show rise-falls do not fit into either of the above categories:

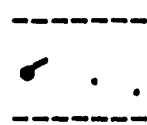
saben de lo que es amar [1.38]



pobre mucha [1.46]



sí seño [2.8]



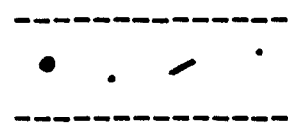
It could be that all these three groups of exceptions are displaying what Crompton (1978) called 'spreading'.

Even after all this explanation, there are still a few cases of fall-rise which do not seem to be caused by any special conditions:

ción de ninguna [1.13]



miento aún con [1.49]



madre	[3.9] and [7.9]
-----	
↘	
-----	
sabes	[5.7]
-----	
↘	
-----	
quiero	[7.6]
-----	
↘	
-----	

It is possible that [1.13] and [1.49] have slight stresses on gu and aún. This would create a new stress-group, so breaking the fall-rise. However, the other five examples seem to constitute evidence that genuine fall-rises can occur in Spanish.

My initial hypothesis can now be amended and made into a set of rules for stress-groups:

1. Any stress-group can be rising, falling or level. In a very few cases a fall-rise pattern may occur. The last stress-group in a phrase will normally be falling.
2. In some cases with a falling stress-group, a diphthong in the stressed syllable may cause an apparent rise, thus disturbing the fall. 'Spreading' may have a similar effect.
3. For falling stress-groups, if the initial (stressed) syllable of the next stress-group is high, then the last syllable or two of the first stress-group may rise to meet it. The reverse happens occasionally in rising stress-groups.

Clearly the above rules for stress-groups do not apply to a groups (that is those unstressed syllables before the first stressed syllable, and hence the first stress-group, of a phrase). Therefore, I started again with a new hypothesis:

If an a has only one syllable, this will be lower than the first stress of the phrase. If the a has more than one syllable it will be level and lower than the first stress.

I did not find so many counterexamples to this hypothesis. In fact it was remarkable how many a's did comply with this rather rigid set of conditions.

In eighteen phrases the a was found to be falling, usually below the pitch of the first stress. In all but two of these cases it seems likely that these are not true a's, but rather that the perceived pause preceding them either does not exist, that it is some kind of hesitation which does not affect the

curve, or that it is too short to affect the curve (which would imply that some pauses do not constitute phrase boundaries). This view is supported by the fact that in these sixteen cases, if the pause were not there, the fall would be a continuation of a fall in the previous phrase's final stress-group.

Examples of this are:

miento. como la po	[1.46]
-----	
• . . . .	
-----	

quiero. como te quie	[1.67]
-----	
↙ . . . ↘	
-----	

pájaro. de mal agüero	[6.10-11]
-----	
• . . . •	
-----	

An interesting example is:

quiero. arrebatadoramen	[1.64]
-----	
↙ . . . . •	
-----	

where, if there were no pause, the stress-group would be a rise-fall, with the rise apparently caused by the diphthong.

The remaining two falling a's cannot be accounted for by removing the pause:

diario. por las calles	[1.7-8]
-----	
• . . . •	
-----	

ya. pero lo llevas	[9.7]
-----	
↙ . . . •	
-----	

In [1.7-8] the fall is so slight that it might be considered a level, and so not a counterexample. The only possible explanation for [9.7] is that the pe is stressed.

Other counterexamples arise where the a is level, but not lower than the first stress, for example:

porque na [1.27-8]  
 -----  
 . . . ●  
 -----

casi indefinidamen [1.29]  
 -----  
 . . . . . ↗  
 -----

There are quite a few examples of this pattern, and I suggest that it is an acceptable alternative form of a.

Two phrases were found where the a is rising, but instead of going up to meet the first stress, it continues on to be higher than it:

de lo que es amar [1.8]  
 -----  
 . . . . . ↗  
 -----

no me di [11.6]  
 -----  
 . . ●  
 -----

In each of these a's, if the stress were moved back one syllable, the pattern would conform to my hypothesis.

To conclude this section, I can now give a set of rules for the a groups:

1. If a has only one syllable, this must be lower than the first (stressed) syllable of the first stress-group.
2. If a has more than one syllable, these must be either on a level tone (normally lower than the initial stress, but sometimes higher), or rising to a point not usually higher than the position of the initial stressed syllable of the phrase.

So far I have only looked at stress-groups and phrases. It seems worth examining the text further to see if larger intonational structures exist. Only the first passage of my text is considered here, because it is a long section of connected monologue, with grammatical hierarchies and dependencies which may or may not imply the existence of intonational ones. It is widely accepted in the field of English

language that 'comma intonation' exists. Is it meaningful to talk about 'comma intonation' in Spanish? Do 'full-stop' and 'paragraph intonation' also exist?

To examine this aspect of my text I looked at the original passage which the informants read, examining punctuation to see how far this affected the informants' performance. Since they were reading aloud in a rather formal situation, perhaps any school-taught reading patterns would come through. For the results of this examination see Appendix 2.

In this passage the sentences are long and complex. For the most part the informants marked full-stops with a long pause, accompanied by an extra long fall. Paragraphs show an even more exaggerated fall, often beginning several phrases before the end of the paragraph, as can be seen in the paragraph ending in vida [1.51] and ojos [1.66].

Mostly commas are paused at, and usually fallen at. However, in a few cases there is no pause at a comma, and the informants made many pauses where there was no comma or full-stop in the original text. Also, at some commas there were particularly long falls; it is worth looking more closely at these to see why. They occur in the phrases ending in:

corazón ----- · · ◡	[1.1]
ciudad ----- · · ◡	[1.4]
negocios ----- · ● · ◡	[1.4-5]
cervecerías ----- · · · ● ·	[1.6]
amar ----- ◡ ·	[1.8]
vedado ----- · · ·	[1.39]

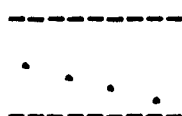
taras [1.43]



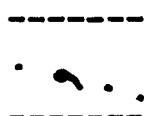
sé [1.45]



resucitar [1.54]



memoria [1.56]



acaba [1.57]



In [1.1] and [1.8] there are long pauses. This could be good enough reason for a long fall. All of the remaining words are the last word in an embedded sentence. This is a very interesting feature. It seems that embedded sentences are recognised as sentences by the informants and treated as such in their intonation. In fact, many embedded sentences in my text end in falls of varying depth.

From this evidence it is clear that a certain amount of intonational patterning exists for units larger than a phrase. It seems that the intonation recognises sentences and embedded sentences and can also build up over a number of phrases to produce a mark for the end of an even larger unit, such as a paragraph.

##### 5. Functional approach

Up to this point the form of the contours found in the data have been examined and rules which specify what contours may or may not occur in the intonation of Spanish have been devised. Hopefully these rules generate every permissible contour, while excluding all those which are inadmissible.

However, the purely formal analysis may not, on its own, be sufficient to uncover all significant aspects of Spanish intonation. As is clear from my first section, most writers seem to attribute a great deal of importance to the relationship between form and function in intonation. If specific pitch contours can be consistently and systematically related to the function of the phrase bearing them, then this

would provide the basis for a series of important generalizations, without which no description of Spanish could claim to be complete.

In order to test whether or not a consistent and systematic statement of the form-function relation is feasible in Spanish, four functional categories were selected for examination:

- Yes-no questions
- Information-seeking questions
- Negative words
- Negative structures

These are among those most commonly discussed by other writers. They have the advantage of being easily definable. In the sections which follow, these functions are examined in turn, in an attempt to find which pitch contours are available for their expression and whether there is any pattern to be found in the data.

Yes-no questions

It is convenient to subdivide the yes-no questions in the text according to their grammatical properties. There seem to be (1) an unmarked group which have the form of a full sentence, (2) a group of one or two word repetitions of a previous speaker's words, (3) a group with one or two word questions which are not repetitions, and (4) negative questions.

Examples of unmarked questions occur in:

Usted tiene marido	[2.1]
-----	
• • • • •	
-----	

Estás segura	[5.8]
-----	
• ✓ • • \	
-----	

Estás enfermo	[6.18]
-----	
• • • \	
-----	

Tienes miedo	[6.19]
-----	
• • • \	
-----	

Va a llover	[8.1]
-----	
• • • \	
-----	



There seems to be a fairly constant pattern here: a steady rise to the last stressed syllable, and then a fall on that syllable to the end. Only two exceptions to this generalization were found:

Van a cortar el agua hoy [9.1]



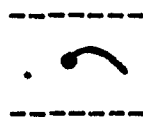
Has comido alguna vez pan frito [13.5]



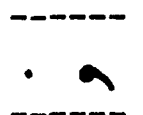
In [9.1], if hoy were not present, the contour would be as above. Perhaps some kind of boundary other than a pause exists here (like Stockwell and Bowen's 1965 terminal junctures cf. 1: for a discussion of this). In [13.5] pan frito is such a common expression in Asturias that its intonation may be set, as it is with other fixed expressions.

The second group occurs when one speaker has made a statement, and another wants to question a particular part of the statement, or if the first speaker answers an information-seeking question, and the second speaker finds the answer incredible, wants to check that he heard correctly, or perhaps is just thinking about the answer. Examples of this are:

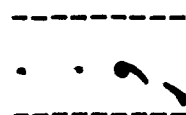
Pascual [3.3]



Se fue [4.1]

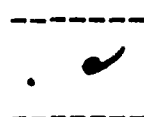


A Sevilla [10.3]



Here, instead of the rising curve of the first group, there is a level, or even a fall before the final stressed syllable. This then falls sharply, along with any unstressed syllables which follow it. However, this is not always the case. There are many exceptions, for example:

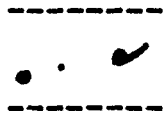
Pascual [7.3]



so that no very significant generalization seems possible here.

The third category of yes-no questions is like the second in that it has a one or two word structure, but is functionally closer to the first, in that it is a straightforward question. The difference between these and the first category is that these are referring back to previous questions and answers and cannot be made sense of out of context. Examples are:

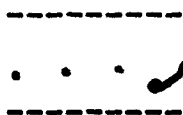
Otra vez [4.2]



Liada [4.3]



Y el café [13.3]



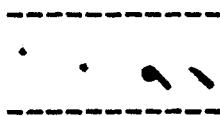
This kind of question only occurs in a certain type of dialogue with defined roles of questioner and answerer. However, there does not seem to be any uniformity in the contours found on these questions: rises, rise-falls and levels all occur. Again, no significant generalizations can be made.

This last group are those yes-no questions which contain a negative, such as:

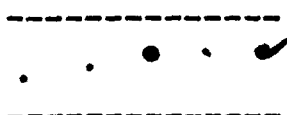
Y no tiene usted ninguna hermana casada [2.6]



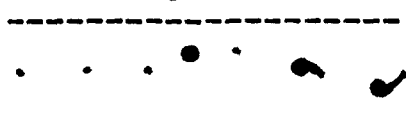
No lo sabes [5.7]



No lo sabes tú [9.4]



Me lo dijiste tú. no [11.7]



This group is slightly different from the others, because its questions expect a particular answer, yes or no. (The other three groups' questions could be answered equally well by either yes or no). The above questions all expect no, except [11.7] which has the negative element as a tag and thus expects yes. All the pitch contours are different. The only interesting point is that the no? tag of [11.7] is a rise.

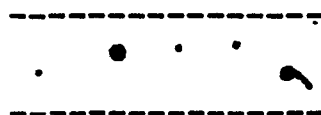
I conclude that the only generalization that can be made about yes-no questions is that many have the curve which is described above. The other functionally-defined groups have no consistent intonational manifestations.

### Information-seeking questions

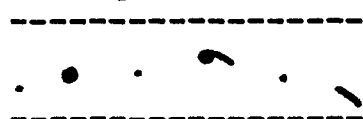
Questions which require an answer that supplies information can be categorized according to (1) whether or not the question itself is an answer to a question, (2) whether it is unmarked or (3) if it is marked for some emotional message.

I shall begin with those questions which are answers to other questions. For example:

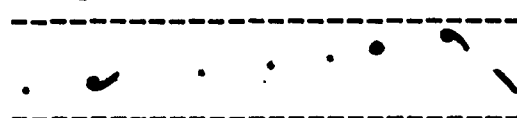
Qué voy a querer [3.7]



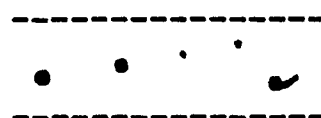
A tí qué mas te da [4.4]



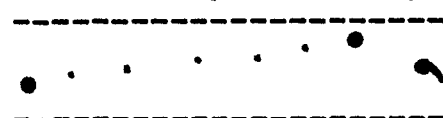
De quién he de tener miedo [6.19]



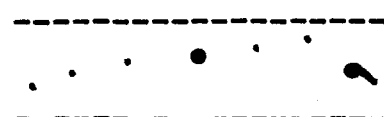
Qué voy a querer [7.7]



Cómo lo voy a saber yo [9.5]



Cómo no vas a saber [9.6]



[4.4], [6.19], [9.5] and [9.6] have very similar pitch contours: a steady rise to the last stressed syllable which is dropped down to and falling. This pattern is different from that of the most common yes-no questions in that the last (falling) accent is jumped down to here, while it was part of the rise in the yes-no questions.

However, the pitch contours of the remaining 'answer-questions' do not conform to this pattern.

Unmarked information-seeking questions can now be dealt with.

Examples of these are:

Cómo se llama [2.9]  
-----  
• • • •  
-----

Cómo se llama su marido [2.12]  
-----  
• • • • • • • •  
-----

Dónde esta mi abrigo [9.3]  
-----  
• • • • • •  
-----

Cuántas galletas comiste [11.15]  
-----  
• • • • • •  
-----

These are all straight requests for information. They all have a level or a rise at the beginning and they end in a fall. This is similar to the yes-no contour, except that here the fall need not begin on the final stressed syllable; usually it begins on the penultimate stress. This may be some kind of nuclear stress which determines the turning point of the contour, but since no evidence for a nuclear stress was found in my formal analysis, these isolated phrases do not prove its existence.

The data contains other examples of information seeking questions which do not have the pattern described above, for example:

Dónde está [5.5]  
-----  
• •  
-----

Qué ves [11.11]  
 -----  
 ~ ~  
 -----

Some of the information-seeking questions in my text appear to be spoken with a particular emotional message in addition to their function of requesting information. The following examples seem to carry the suggestion that the speaker is surprised by something that a previous speaker has said:

Quién [3.1]  
 -----  
 ✓  
 -----

Quién [7.1]  
 -----  
 ✓  
 -----

Desde hace cuánto tiempo [12.5]  
 -----  
 • • • • • ~ •  
 -----

[3.1] and [7.1] are first Ana's then Marián's versions of the same line. They both give the single syllable a sharp rise. /12.5/ also has a rise, but the curve ends in a fall, giving this question the same pattern as the unmarked information-seeking questions.

In the following examples, a challenge is offered along with the question:

Qué quieres [3.6]  
 -----  
 • ~ •  
 -----

Qué vienes a buscar [5.1]  
 -----  
 • ~ • • • ~ •  
 -----

Qué quieres [7.6]  
 -----  
 • ~ •  
 -----

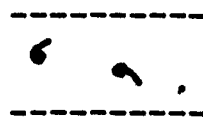
Once again [3.6] and [7.6] are the same question spoken by each of the two informants. Although the three examples seem to mean the same sort of thing, their pitch-contours have nothing in common: [5.1] has the pattern displayed by [12.5] and the unmarked questions.

The next questions seem to express irritation of one kind or another:

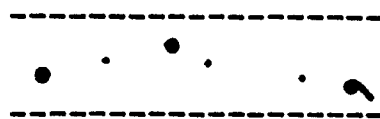
Qué le pasa a usted [3.8]



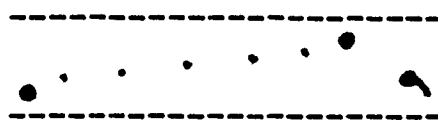
Qué tienes [6.15]



Qué le pasa a usted [7.9]



Cómo lo voy a saber yo [9.5]



All of these questions have either the answer-question form or the yes-no form. This kind of recurrence of pitch contours seems to invalidate the idea that there exists a consistent relation between form and function in Spanish intonation.

To conclude: there seem to be a great variety of pitch contours available for use by information-seeking questions. No generalizations can be made here. Sometimes it is possible to say that one particular contour occurs quite often with a given function, but no more than that. Even the pattern that was found to be most common for yes-no questions occurs with information-seeking questions. This would appear to render pointless any distinction between these two types of questions as far as their intonational properties are concerned.

#### Negative Words

Now, negative words such as no, nada, nunca, ninguna and nadie can be discussed. All instances of such words where they are isolated from other structures by pauses have been taken into consideration. Unmarked negatives, emphatic negatives, qualified negatives, questioning negatives, 'irritated' negatives and 'fed-up' negatives are examined (these begin the kind of functional category found most often in the literature).

Unmarked negatives, such as

no. señorita	[2.2]
-----	
● . ● .	
-----	

no	[6.18]
--	
●	
--	

emphatic negatives, such as

nada	[3.9]
-----	
● .	
-----	

no	[5.7]
--	
●	
--	

qualified negatives, such as

no. claro que no	[9.5]
-----	
● . ● . ●	
-----	

no. no me digas	[11.6]
-----	
● . ● .	
-----	

all had a fall on the negative word. Questioning negatives, such as

no	[3.10]
--	
●	
--	

no	[11.10]
--	
●	
--	

were either high statics or rises. The emotional negatives had unrelated pitch contours.

It seems therefore that negative words usually fall, unless they are questioning something, when they usually rise.

### Negative Structures

The negative structures all contain a negative word somewhere in them. Among the pitch contours of the negative structures in my text were found every possible kind of rise, fall or combination of the two, including the yes-no type and the information-seeking question types.

No generalization can be made about the intonation of negative structures. There is simply no pattern to be found in the data.

### Conclusion

I conclude that a functional approach to Spanish intonation cannot produce an adequate analysis. There is no consistent form-function relation of any generality. The formal regularities listed in 4 seem to be quite independent of the uses for which utterances are employed.

### 6. Methods of analysis: Form and Function

In this paper the analysis of Spanish intonation has been approached from two points of view: the functional and the formal. The formal analysis gave a set of explicit rules, describing the pitch contours that phrases may take. The functional analysis, on the other hand, which attempted to determine the relation between particular pitch patterns and their functional correlates (e.g., questions, statements etc.) gave no such neat results. It was possible to form some impressions about the relationship between form and function, but only in a very limited way. The reason for this apparent lack of success in the functional analysis is that in cases where it looked as though a particular pitch contour was the norm for some function, that contour was found to occur for another function that would not normally be connected with the first. Thus no concrete theory came out of my functional analysis. By comparison with the formal approach it stands as an example of how not to perform an intonational analysis!

In view of this it is very surprising to find that the greatest part of the work done on intonation, both Spanish and of other languages, has the functional approach as its basis. Many seem to come up with a more or less neat package of contours which are uniquely attached to specific functions and nuances of meaning (for example Navarro (1944) discussed in 1). If these packages were found to be accurately compiled, then this approach would be more valid than the formal approach. It seems a plausible theory: after all, the same words pronounced with two different intonations have often very different meanings.

However, I could find no consistent one to one tie-ups between pitch contours and the functions they express. Perhaps it is feasible to predict the contours that a given function may not take, but in no way was it possible to make accurate predictions as to which curves are available to it.



Maybe the most probable contours can be suggested, but no more than this. Certainly the link between form and function is not as straightforward as some writers would suggest.

In view of this practical finding, it is worth considering in more detail the theoretical bases of formal and functional approaches to the analysis of intonation. If a functional method of analysis could be developed, which was genuinely able to directly relate function to form in all cases, then this would certainly be a way of making valuable and important generalizations about intonation. On the other hand, it is possible that there are formal regularities within the intonational system of the language that are unrelated to the uses to which particular pitch patterns are put. An analysis performed on a functional basis would in this case miss important generalizations.

The main difference between the two parts of my analysis is, therefore, that in the formal approach the object is to arrive at an explicit formula for the generation of pitch contours, whereas in the functional approach, functions of phrases are the starting point, the aim being to discover what pitch contours are open to them, or if they are forced into a preformed intonational mould. The formal approach gave coherent results, while the functional approach largely did not. This may be taken to indicate that the intonation system of Spanish does display formal regularities that are independent of the uses to which pitch patterns are put.

#### Appendix 1. Texts

The line numbers here are those referred to throughout the paper where examples of intonation contours are given.

Informant 1. Ana

Passage 1.

amada mía de mi corazón. nadie sabe como yo. del armagor del cariño.. los hombres sanos. los hombres que andan por la ciudad. que van y vienen a sus neg- ocios. que se suben a los automóviles. y	1.5
se sientan en las cervecerías.. los hombres. a quienes ves a diario. por las calles.. nada saben de lo que es amar.. de lo que significa amar apasionada- mente. desacompasadamente. en una lucha	1.10
titánica. feroz y desigual. contra el reloj que marcha. sin piedad alguna. sin consideración de ninguna clase. a dejarnos abandonados en cualquiera de sus horas. como esos navegantes que se	1.15
caen al mar desde la borda de los trasatlánticos. en mitad del océano. sin que un solo hierro de la armazón del buque. sin que un solo músculo de la cara del capitán. sin que una sola	1.20
ola. del hondo y verde mar. se sientan	

estremecidos. por ese misterio que se resuelve. por esa lágrima que quizás alguien derrame. cuando la noticia llegue. llevada por el viento hasta la orilla... 1.25

nada saben. de lo que es amar. porque nada saben tampoco del silencioso tránsito que se alarga. casi indefinidamente. como aquellos besos. que tú y yo nos dabamos sentados al pie del árbol de tu jardín. para morir un día. poquito a poco. con la misma lentitud. con la que nuestras cabezas se separaban. cuando no sentíamos ni el mundo. que seguía su marcha. ni el frío. ni la noche. sino tan sólo nuestros dos corazones.. 1.30

nada saben de lo que es amar. porque nada les ha sido vedado. porque la vida siempre les ha dicho que sí. que se les entregaba. que la viviesen hermosa y libre. como se les presentaba. limpia y sin taras. como esa ideal mujer de los poetas. armoniosa y pura como quien yo sé.. como quien ocupa por entero mi ya débil pensamiento. como la pobre muchachita morena y cariñosa. cuyo recuerdo aún mantiene. esta misma tensión que me consume. cuyo pensamiento aún consigue que yo siga tomándome la molestia. de no quitarme la vida.. 1.35

te quiero amada mía. pequeña amada mía. te quiero hasta morir. hasta morir y resucitar. te quiero hasta el fin de los mundos. hasta donde se pierde la memoria. hasta donde dios empieza y acaba. hasta el límite mismo de lo que no tiene límite. te quiero. como nadie quiere a nadie. como jamás ninguna mujer. pudo decir que la quisieran. te quiero a toda prisa. violentamente. el fuego del cariño que te tengo. podría hacer secarse al mismo mar profundo. te quiero. arrebatadoramente. sin que un solo momento. todo lo que te quiero. deje de estar presente ante mis ojos.. 1.40

y te quiero como te quiero. porque todo el cariño que te tenía reservado. para una larga vida. he de dártelo entero en estos cortos meses que nos quedan. perdóname. 1.45

1.50

1.55

1.60

1.65

1.70

Passage 2:

usted tiene marido.  
no señorita. soy soltera.  
ah ya. soltera.  
el panorama de la alcoba cualquiera  
imaginación puede forjarlo. 2.5

y no tiene usted ninguna hermana casada  
si señorita. una.  
como se llama.  
hortensia.  
ah que pena. que pena de flor 2.10  
casada. como se llama su marido.  
pedro.  
que duro. que duro. que duro.  
la señorita del cuarenta se echo a  
llorar sin desconsuelo 2.15  
pobre flor. pobre flor. pobre flor.

Passage 3:

quién. soy yo. quién. era la voz de  
mi madre. sentí alegría al oírla.  
para que mentir. yo. pascual. pascual.  
sí madre. pascual. abrió la puerta. a  
la luz del candil parecía una bruja. 3.5  
qué quieres. que qué quiero. sí.  
entrar. qué voy a querer. estaba  
estraña. porqué me tratería así.  
qué le pasa a usted madre. nada. porqué.  
no. como la veía como parada. 3.10

Passage 4:

y la rosario. se fue. se fue.  
sí. a dónde. a almendralejo. otra  
vez. otra vez. liada. sí. con quién.  
a tí qué más te da.

Passage 5:

qué vienes a buscar. vengo a  
buscar un hombre. poco hombre es  
quien escapa del enemigo. poco. y  
poco hombre es quien no aguarda una  
visita que se espera. poco. dónde 5.5  
está. no sé. ayer salió. para dónde  
salió. no lo sé. no lo sabes. no.  
estas segura. tan segura. como que  
ahora es de día.

Passage 6:

hace frío. no sé. yo no tengo.  
será el cuerpo. puedo.. pasabamos por  
el cementerio.. qué mal se debe  
estar ahí dentro. hombre. por qué dices 6.5  
eso. qué pensamientos mas raros  
se te ocurren. ya ves. el ciprés  
paracía un fantasma. alto y seco. un  
centinela de los muertos. feo esta el  
ciprés. feo. en el ciprés  
una lechuza. un pájaro de 6.10  
mal agüero. dejaba oír su silbo  
misterioso. mal pájaro ese. malo. y  
que todas las noches está ahí. todas.  
parece como si sustase de acompañar a

los muertos. parece. que tienes. nada, 6.15  
no tengo nada. ya ves. manías.  
miré para domingo. estaba pálido como  
un agonizante. estás enfermo. no.  
tienes miedo. miedo yo. de quién he  
de tener miedo. de nadie hombre. 6.20  
era por decir algo.

Informant 2. Marian

Passage 7:

quién. soy yo. quién. era la voz de  
mi madre. sentí alegría al oírla.  
para qué mentir. yo. pascual. pascual.  
sí madre. pascual.. abrió la puerta. a  
la luz del candil parecía una bruja. 7.5  
qué quieres. que qué quiero. sí.  
entrar. qué voy a querer. estaba  
extraña. porqué me tratería así..  
qué le pasa a usted madre. nada. porque.  
no. como la veía como parada. 7.10

Passage 8:

va a llover.  
no. no creo que llueva.  
pues. vi en el periódico que si no  
llueve hoy. cortan.. el agua.  
ah. que van a cortar el agua. 8.5  
si. y a mi tampoco me parece que  
va a llover.

Passage 9:

van a cortar el agua hoy.  
no. me parece que va a llover.  
dónde esta mi abrigo.  
no lo sabes tú.  
no. claro que no. como lo voy a saber yo. 9.5  
como no vas a saber. es tu abrigo.  
ya. pero lo llevaste tú el otro día.  
que lo lleve yo. mentira.

Passage 10:

fuiste a granda.  
no. pero fui a sevilla.  
a sevilla.  
si. bueno. a un pueblo cerca de sevilla.

Passage 11:

quieres volver a casa.  
no. todavía no.  
tienes hambre.  
no. pero me apetece comer algo.  
sabías que se casó mi hermano. 11.5  
no. no me digas.  
me lo dijiste tu. no.  
yo no.  
no se cuándo vendra juan.  
no. yo creo que sí que sabes. 11.10

qué ves.  
nada.  
quién fue.  
nadie.  
cuántas galletas comiste 11.15  
ninguna.  
cuándo volverás a verlo.  
nunca. no me hablé. ni siquiera me miró.  
cómo. yo creía que le gustabas.  
qué va. 11.20

Passage 12:

dónde vives.  
en avilés.  
y jorge.  
en valladolid.  
sí. desde hace cuánto tiempo. 12.5  
pues un año ya. me parece.  
fíjate tanto.

Passage 13:

te gusta la leche.  
sí.  
y el café.  
también.  
has comido alguna vez pan frito. 13.5  
sí. no me gusta nada.  
cómo que no.

Passage 14:

vamos ahora.  
bueno. dentro de un rato.  
vamos ahora.  
bueno. si quieres.  
vamos ahora. 14.5  
bueno. vamos  
vamos ahora.  
bueno. pero primero quiero  
despedirme de juan

Appendix 2. Hierarchies

The following is a description of how the informants interpreted punctuation in the text. First is the line in the transcription where the punctuation occurs, then the punctuation mark with the word which precedes it, the contour of the tone-group which the word ends and the length of pause, if any, which comes after this word.

Lines across the text indicate the end of paragraphs. A low fall is one where the pitch drops from relatively high to relatively low.

1.1	corazón:	low fall . .
1.2	cariño.	fall ..
1.3	sanos,	fall .
1.4	ciudad,	low fall .

1.4-5	negocios,	low fall .
1.6	cervecerías;	low fall ..
1.8	calles,	fall ..
1.8	amar,	low fall ..
1.9-10	apasionadamente,	fall ..
1.10	desacompañadamente,	rise .
1.11	titánica,	fall .
1.12	marcha,	fall .
1.12	alguna,	fall .
1.13	clase,	slight fall .
1.15	horas,	rise .
1.17	trasatlánticos,	fall .
1.17	océano,	fall .
1.19	buque,	rise .
1.20	capitán,	low fall .
1.21	mar,	level .
1.23	resuelve,	fall .
1.24-5	llegue,	rise .
1.25	viento	no pause
1.26	orilla.	very low fall ...

---

1.27	amar,	level .
1.29	alarga,	fall .
1.29	indefinidamente,	slight fall .
1.32	jardín,	low fall .
1.32	día,	rise .
1.33	poco,	slight fall .
1.36	marcha,	fall .
1.36	frío,	slight fall .
1.36	noche,	rise .
1.37	corazones.	very low fall ..

---

1.39	vedado,	low fall .
1.40	sí,	fall .
1.41	entregaba,	low fall .
1.42	presentaba,	fall .

1.43	taras,	low fall .
1.44	poetas,	fall .
1.45	sé,	low fall ..
1.46	pensamiento	fall .
1.49	consume,	fall .
1.51	vida.	low fall ..

---

1.52	quiero,	no pause
1.52	mía,	fall .
1.52	mía,	fall .
1.53	morir,	fall .
1.54	resucitar,	low fall .
1.55	mundos,	fall .
1.56	memoria,	low fall .
1.57	acaba,	low fall .
1.58	límite.	low fall .
1.59	nadie,	fall .
1.60	quisieran.	very low fall .
1.61	prisa,	fall .
1.61	violentamente;	fall .
1.63	profundo.	fall .
1.64	arrebataadoramente,	rise .
1.66	ojos.	fall ..

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1.70	quedan.	fall .
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1.71	perdóname.	low fall ..
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## THE ROLE OF CONTEXT IN WRITTEN COMMUNICATION<sup>1</sup>

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### Introduction: The Doctrine of Autonomous Texts

A substantial body of thought about language supports the notion that written and spoken language differ most with respect to the contexts in which each is created and must function. Writers, unlike speakers, do not produce language in the company of a language receiver. And written texts, unlike spoken, must function apart from the context of their production. Unlike spoken discourse, which is said to be 'context bound', written texts must be 'autonomous' and 'explicit' in order to function 'acontextually'. Indeed, current research distinguishes composition from writing a priori in precisely these terms. Bereiter and Scardamalia's (1981:3-4) distinction is typical:

Writing is use of the written medium and entails such skills as handwriting, spelling, and punctuation. People who could converse by passing notes back and forth to one another would be said to know how to write. If that were all they could do, however, they could not be said to know how to compose. ... Composition involves producing... 'autonomous text'..., a coherent piece of language that can accomplish its rhetorical purpose without depending on context or on interaction between sender and receiver. One does not, in principle, need to know how to write in order to compose. Composing can be done by dictation.

This contrast between 'context-bound' utterance and 'autonomous' text is often defined in terms of exophoric and endophoric referencing. Exophoric references 'point away from' the text either to things in the speaking environment (e.g. Put it here); or to ideas which exist as presumed, shared knowledge and require no elaboration (e.g. I don't believe it). By contrast, endophoric references point to other parts of the text where they are elaborated, illustrated, or defined. Consider the following example:

1. What we really need in our field is articulation of a comprehensive theory. This effort is complicated by the fact that so many researchers operate out of different and frequently incompatible assumptions.

In these two sentences, This effort is an endophoric reference to something identified in the text itself, namely articulation of a comprehensive theory in the previous sentence. Endophoric

referencing is the chief way writers and speakers explain what they mean; and when editors and teachers ask a writer to be 'clear' and 'explicit', they are typically requesting a more endophoric and less exophoric text.

### Three Fallacies

It is true that written texts typically function in contexts other than those in which they were written. It does not follow from this premise, however, that in order to function, written texts must be 'autonomous', 'acontextual', and 'explicit'.<sup>2</sup> Nor does it follow that those which are abbreviated, e.g. notes, are uncomposed. There are three fallacies in such deductions. The first fallacy is confusing situation of expression with context of use. The fact that writers do not converse with readers face to face, or that their texts speak independently of them, does not mean that these texts are therefore 'acontextual' and 'autonomous'. Rather, it means that unlike speech, where situation of expression and context of use are concurrent, written texts are composed for a context of eventual use.

The second fallacy is confusing fullness of meaning with explicitness of text. Although it is true that difficult texts often benefit from revisions which clarify and elaborate key points, it does not follow that texts become categorically more meaningful as more of their references are elaborated. This is why legal documents do not necessarily mean the more for all their explicitness and why EXIT signs and grocery lists do not necessarily mean the less for all their crypticness. Moreover, the kind of effective elaboration which enhances, say, well-written technical manuals with ample explanations, illustrations, and definitions is neither random nor ubiquitous. Rather, it is planned and selective, dealing only with points requiring emphasis or clarification.

There is a subtle and important difference between an elaboration and complication of text. For example, a particular part in the tax code that might be ambiguous and consequently difficult for tax attorneys may well be abstruse and hard in a very different way for the general tax payer. That a given text can be ambiguous for some readers and abstruse for others can easily be demonstrated by showing that high- and low-knowledge readers require qualitatively different revisions (Nystrand, in prep.): tax attorneys require more details (elaborations of key points) whereas tax payers need the main idea to relate all the details. The same endophoric text which works to clarify things for the attorneys works just the opposite to complicate things for the general tax payer.

A well-written text communicates not because it says everything all by itself but rather because it strikes a careful balance between what needs to be said and what may be assumed. Clearly, what counts in effective composition is knowing how and when to be explicit, not simply being explicit.

The third fallacy is distinguishing written and spoken language in terms of autonomy of text. The doctrine of autonomous texts juxtaposes not spoken and written language but rather certain highly specialised uses of language, namely literary composition and idle chatter. It is a skewed comparison, overlooking such examples of spoken language as lectures, seminar discussions, and college rap sessions; and such examples of writing as kit instructions and notes.<sup>3</sup> Cohesion results not when language is written but rather when language, both written and spoken, is put to particular uses, especially those uses which bridge discrepancies in writer-reader knowledge, as in expert-layman communication (Nystrand, Doyle & Himley, in prep.). Language is not composed because it is internally cohesive; language takes particular form when it is put to particular uses. To characterise written composition in terms of text structure is to put the structural cart before the functional horse.

Not only is the doctrine of the autonomous text specious. By excluding a priori important examples of written communication, this doctrine has fostered a number of misconceptions about the composing process, especially among educators. First, it has perpetrated the idea that certain uses of written language (viz essays) not only can but ought to function rhetorically without any relationship to their context of use. As a corollary to this point, it has justified teaching writing as a matter of correct form rather than effective use. It has furthermore perpetrated the idea that there are some uses of written language (e.g. notes) that are acompositional. And it has promoted a categorical explicitness of text as an inappropriate instructional objective.<sup>4</sup>

In order to examine the many problems with these sundry contentions, let's first consider the composition of notes.

#### How Notes Are Composed

Notes and signs are typically informational (e.g. EXIT or Gone to store - be home for dinner); and their composition requires keeping in mind a number of critical informational variables having to do with who, what, when, where, and how: who the readers will be and what they will know at the time they discover the text; when the readers will read and, in the case of signs, how much time they will have to read; and where the readers are most likely to find the information (notes), or where the readers are most likely to be when they discover the information (signs). These situational variables are critical to text meaning, defining a window of semantic opportunity as it were: EXIT signs have no meaning except in relation to doors, and notes which are addressed to the person who delivers the milk must be placed next to empty bottles. Children's notes are often amusing and uncommunicative because of their failure to take these factors into account (e.g. Mom, I'll be home in a few minutes).<sup>5</sup>

If composition is a deliberate process of organizing language and thoughts in order to achieve a particular purpose or effect, then writing notes clearly qualifies. It certainly involves far more than 'the mere basic skills' of handwriting, spelling, and punctuation. Composing notes requires the writer to make a great number of correct assumptions about context. Notes are no less composed simply because they are abbreviated. As with all composition, the writer must carefully balance what is said, i.e. the text, against what need not be said. And what need not be said, of course, depends on the actual context of use, i.e. who's reading, what they know, when they read it, what they want to find out, and so on.

#### How Essays Communicate<sup>6</sup>

If notes are no less composed because they are cryptic and contextualised, essays are no more composed and 'autonomous' because they are elaborately explicit. The composition of an essay is as much constrained by its context of eventual use as is the briefest grocery note. A good example of this point is Canadian psychologist David Olson's 'From Utterance to Text: The Bias of Language in Speech and Writing', the seminal essay which argues the case for autonomous texts and is typically cited as the source of the doctrine. This essay was written for a very particular context of use, namely the forum of The Harvard Educational Review, a research journal for scholars with multidisciplinary interests in educational issues. So that the essay might function in this context of scholarly dialogue, argument, and references, it is paginated; it is prefaced by an abstract; it is replete with footnotes, reference notes, and references; and it is appropriately formatted in such a way that the author's name and the title of the journal, along with volume, number, and date, appear on the title page of the essay. The publisher has made sure that these essential contextual factors accompany all future photocopies of the text.<sup>7</sup>

The author himself, moreover, contextualises his argument by starting with an extensive literature review, reciting not only historical but also contemporary evidence from research in the structure of language, the nature of comprehension, the nature of logical reasoning, the acquisition of language, and the psychology of reading. The argumentative purpose of this review is obvious: the author hopes to show compelling reasons for his thesis. The communicative function is different, however: the review serves to establish footing<sup>8</sup> - shared knowledge or common ground with readers from which the author sallies forth with his main points. In this sense, the review functions like the question that begins a conversation, You know that box I'm always talking about? Well... or the Re: of business correspondence or, indeed, the effective introduction to any essay: it works thematically by establishing a communicative footing and so initiating the communication.

The Structure of Argument versus The Structure of Communication

It is generally true that essayists proceed, as Olson notes, by explicating the many implications entailed by their premises in the manner of Locke's An Essay Concerning Human Understanding, and that, for this reason, essays tend to be highly explicit. Yet if essays are more explicit than grocery lists, this explicitness is due to more than requirements of genre to state propositions. Reasoning by inference, deduction, demonstrations, and proof, particularly on topics new to readers, makes special demands on language, as well as on logical processes. These two kinds of demands require careful distinction if we are to understand what essayists do qua thinker compared to what essayists do qua writer.

It is the essayist qua thinker whom we 'charge with reasoning via unspecified inference and assumptions' 'if unconventionalised or nonlinguistic knowledge is permitted to intrude' into the argument (Olson, 1977:272). But it is the essayist qua writer whom we charge with incomprehensibility if complex new ideas and terms are inadequately contextualised in terms of shared, nonlinguistic knowledge. Indeed, any text which might succeed in eliminating all dependence on presupposed, world knowledge would be a very ambiguous and nonexplicit text: as unclear as any image which is all figure and no ground. The essayist qua thinker formulates 'a small set of connected statements of great generality that may occur as topic sentences or paragraphs or as premises of extended scientific or philosophical treatise' (Olson, 1977:269). By contrast, the essayist qua writer makes appropriate text segmentations, this 'indentation functioning, as does all punctuation, as a gloss upon the overall literary process underway at that point' (Rodgers, 1966:6). Endophoric referencing is important in terms of exposition because it is the way essayists spell out the implications entailed in their premises. Endophoric referencing is important in terms of communication because it is the major way writers contextualise new information and so maintain a balance of understanding between themselves and their readers.

In short, effective text analysis requires careful distinction between the structure of argument and the structure of communication. As argument, Olson's essay works by stating explicit points and propositions. As communication, however, it works by juxtaposing these propositions with knowledge readers bring to the text. This reader knowledge is unstated, shared, given, and not necessarily propositional. Hence, as important as the many explicit points that Olson makes are the many that are never stated. And this omission is surely no sin. To the contrary: Olson's thesis is clear because he strikes an effective balance between what needs to be said and what may remain unsaid. Were he elaborate in his treatment of the latter, his essay would be turgid, wordy, unclear; and we might rightly hold him in violation of the 'contract' that underlies all communication from the briefest note to the longest treatise.

The contract which writers have with their readers requires them to attend to three different kinds of compositional tasks. First, they must establish footing by identifying common ground, as noted above. In addition, they must contextualise new information: buttressing those points of text which, if not treated, would threaten the established balance of discourse and shared knowledge. And finally (though not necessarily last), they must carefully mark relevant text boundaries to indicate conceptual, narrative, and other shifts, and to break the text into manageable information units.

Olson's essay is clearly not just an autonomous text explicating all the implications entailed by his general premise. We understand Olson's thesis largely as we do (a) because it appears in the context of a research journal and (b) because the argument concerns an idea which has a history (dating back at least to Plato), and which has been researched by scholars in many diverse fields of inquiry. The text of Olson's essay, like all well written compositions, functions not because it is independent of its context of use but because it is so carefully attuned to this context.

#### The Role of Context in Written Communication

What, then, is the role of context in written communication? To begin, context of use in written communication is eventual, not concurrent with the production of discourse as is the case with spoken language. For the most part, the writer's situation is irrelevant to actual text functioning. Where the writer composes, what might be viewed from the writer's window during the composing process, what music might have provided inspiration, all these aspects of the composer's situation while writing are functionally unimportant. Pieces of writing do not function communicatively at the time of their creation; they only bear a potential for communication. It is precisely the purpose of the writing process to create such a potential. This potential is realised, moreover, only when writer and reader finally come together by way of the text. It is this situation of the reader reading which defines context of use in written communication, for it is this moment precisely when the writer finally speaks to the reader and the text must do its communicative thing.

As we have seen, this point has been a source of considerable confusion in many comparisons of spoken and written language. Olson and others, for example, define context narrowly in terms of immediate context of production: mainly such paralinguistic features as gestures and quizzical looks. The actual context of situation for any communication, however, is far more rich and complex than the physical gestures of the conversants. Relevant factors include the nature of the audience, the medium, and the purpose of the communication. This is no less true for writing than speech. Business executives, for example, know all too well that the complete meaning of an interoffice

memorandum frequently involves not just the typed text but myriad contextual details, including (a) why the communication is in writing; (b) who is copied (and has received carbon copies or cc:); (c) who is not copied; and especially (d) who, though not copied, is nonetheless a recipient (of the 'blind' carbon copy or bcc:) and perhaps even the main reason for the memo.

It is true, of course, that written texts must function without benefit of hand gesture or eye contact. But it is a serious mistake to view the paralinguistics of speech as a categorical prerequisite to all communications. If paralinguistics refers to those phenomena that 'occur alongside spoken language, interact with it, and produce together with it a total system of communication' (Abercrombie, 1968:55), then written language may be said to have its own special resources in this regard. These resources, moreover, serve the essential paralinguistic purposes of modulation (superimposing upon a text a particular attitudinal colouring) and punctuation (marking boundaries at the beginning and end of a text and at various points within to emphasise particular expressions, and to segment the utterance into manageable information units) (Lyons, 1977:65). Quotation marks, for example, commonly indicate irony, scepticism, or critical detachment; and exclamation marks and underlining typically show emphasis. A more complex type of modulation is achieved when writers exploit reader expectations for particular genres of written discourse. The classic example here is irony in Swift's 'Modest Proposal'. Because it is in essay form, readers often assume that the proposal is serious, and that the contents are meant to be taken literally.<sup>9</sup>

The increasing availability and sophistication of electronic wordprocessors substantially increases the range of such paralinguistic modulation available to professional, business, and academic writers. With capabilities previously available only in printers' shops, these machines are now on many individual writers' desks. Included among these capabilities are the usual marks of punctuation, plus boldface, italics, hanging indents, offsets, and fonts of all sorts. The total impact of these typographic capabilities in this new setting is not yet clear, especially on writing tasks not usually published. For example, what sorts of correspondence and typescripts should and should not be formatted with justified right margins? Nonetheless, the possibilities of these systems for subtle modulations of text have not been lost on the office systems people, who routinely promote their products not only in terms of increased efficiency but also, and especially, enhanced corporate image. With only a few formatting commands, businesses can present themselves as Baskerville, Palateno, Sanserif, or Bold Roman. No doubt the day of the designer letter is upon us.

In addition to such possibilities for modulation, writers have access to a wide range of punctuation for marking syntactic, prosodic, and semantic boundaries. The most significant mark of punctuation for use beyond the sentence

is indentation and paragraphing. The paragraph (from Gk. para, beside + graphos, mark) was originally a symbol placed in the margin to indicate conceptual, narrative, and other shifts in the flow of discourse. The original notion persists in our transitive verb to paragraph (Rodgers, 1966). This treatment of paragraphing has recently been elaborated by Halliday and Hasan (1976:296-7), who see the paragraph as a 'device introduced into the written language to suggest...periodicity':

In principle, we shall expect to find a greater degree of cohesion within a paragraph than between paragraphs; and in a great deal of written English this is exactly what we do find. In other writing, however, and perhaps as a characteristic of certain authors, the rhythm is contrapuntal: the writer extends a dense cluster of cohesive ties across the paragraph boundary and leaves a texture within the paragraph relatively loose. And this itself is an instance of a process that is very characteristic of language altogether, a process in which two associated variables come to be dissociated from each other with a very definite semantic and rhetorical effect. Here the two variables in question are the paragraph structure and the cohesive structure.

This approach to paragraphing has recently been operationalised by Bell Labs in its Writer's Workbench program, a collection of computer programs designed to aid writers in evaluating and modifying their texts (cf. Gingrich, 1980).

### Conclusion

It is clearly a mistake to associate the spontaneity of casual talk with fragmented expression, and equally wrong to confuse elaborateness of text with fullness of meaning. The attempt to view writers as somehow disadvantaged because they are bereft of the paralinguistic resources of speech, moreover, is a misconception of written communication, and is consistent with the traditional conception of writing as a defective representation of speech. What is missed by such confusions is how writing and speech work differently as language systems. If casual conversation with friends as well as notes to oneself are cryptic whereas formal inquiries to and from the Internal Revenue Service, either written or spoken, are comparably elaborate and explicit, this difference mainly means that the former can be more abbreviated while the latter must be more elaborated if coherence is to be maintained, messages are to be adequate, and communication assured. It does not mean that cryptic texts are necessarily 'semantically inadequate' or unclear to the reader/hearer. And above all, it most definitely does not mean that written texts are 'autonomous' whereas spoken utterances are 'context-bound'. What it mainly means is that speech and writing work differently to maintain reciprocity and the underlying pact of discourse between conversants.



FOOTNOTES

1. The author thanks Margaret Himley and Charles Scott for their comments and suggestions regarding this paper.
2. The impression that speech is 'fragmented' and writing is 'compact' and 'integrated' (e.g. Chafe, 1982) may be partly phenomenological. In speech, planning process and generated text are largely simultaneous and inseparable whereas in writing, they always separate as soon as the composing is complete. As public behaviour, speech presents itself not only as words spoken but also as a sequence of starts and restarts and pauses. By contrast, writing, which is private behaviour, conceals hesitations and restarts, and presents itself only as the tidied up result, altogether detached from the process. Until recently, pauses in the writing process have not even drawn research interest (cf. Matsuhashi, 1982).

Also, it is important to recognise the bias of written language in the analysis of language, both written and spoken. Because both analyses are conducted via the written medium (actual written texts in the case of writing and written transcripts in the case of speech), the analyst typically enters the analysis as a reader. It should surprise no one that written texts seem 'integrated' by comparison with written transcripts which seem 'fragmented': speech is indeed fragmented by the very process of transcription, a process which written texts never undergo.

3. Three important exceptions to this generalization are Stubbs (1982), Tannen (1982), and Wells (1981).
4. Two studies which show the extent to which the doctrine of autonomous texts is a pedagogical notion rather than a linguistic or rhetorical concept are Michaels (1981) and Williams (1980).
5. See Gundlach (1982).
6. For an extended discussion of this section, see Nystrand, Doyle & Himley (in preparation).
7. As more books are photocopied, alas, more publishers are printing the year of publication on the title page (rather than on the copyright page).
8. Communicative footing is not to be confused with Goffman's (1979) footing; the speaker's stance toward the audience in face-to-face interaction.
9. Steinmann (1981) has written extensively on poetic effect in these terms.

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SIMILARITIES AND DIFFERENCES BETWEEN  
MATHEMATICAL AND LINGUISTIC TRANSFORMATIONS

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1. Introduction

In this paper I wish to explore a particular component of the claim 'mathematics is a language' (construed as a metaphor), namely the syntax of mathematics. Throughout, the concern will be with a formal description of some transformations both in arithmetic and algebra itself (and algebra is identified as the meta-language in both cases), computer simulation of mathematical activity, and questions of algebra teaching in schools.

2. A general framework

The statement 'mathematics is a language' can often be found in writings on mathematics education, e.g. Schwarzenberger (1971:64); Griffiths (1975:3); Pimm (1982:139), but seldom has the claim itself been subjected to a detailed examination. One way to make sense of this sentence, and also to explore its potential, is to see it as a codified, structuring metaphor of the form X is Y, as discussed at length by Lakoff and Johnson (1980). Thus the ability of the metaphor to do systematically useful work is precisely dependent upon the insights provided by looking for linguistic phenomena in mathematics and applying linguistic knowledge to it. One instance of this approach can be seen in Klemme (1981) on speech acts in mathematics. Another, on metaphor itself, is Pimm (1981).

The reverse situation is far more commonplace in an increasing number of disciplines, namely where mathematics is used to provide knowledge about the area under study. For example, if you have a well-developed theory of groups, then to claim successfully that something has the structure of a group instantly makes codified knowledge about your system available, when suitably translated and specialised. Theories of transformational generative grammar provide a good instance of this latter process, where the phenomenon of grammatical structure has given rise to abstract mathematical systems (e.g. phrase-structure grammars), which are conceived of as deductive schemes in which proof of theorems is possible, and which thereby informs you about the structure of language. 'Language is mathematical' might be a description of this reverse metaphorical view.

However, although metaphors tend to be employed directionally, in that one context is presumed better known than the other, in certain situations two-way information can be exchanged. One recent example can be cryptically rendered brain = computer (the symmetric property of = capturing the proposed bidirectionality); and one interpretation of this has been the increasingly widespread attempts at computer modelling of human abilities. In this paper I wish to explore one aspect of the mathematics-is-a-language metaphor, namely what sense can be made of the expression 'the syntax of mathematics'.

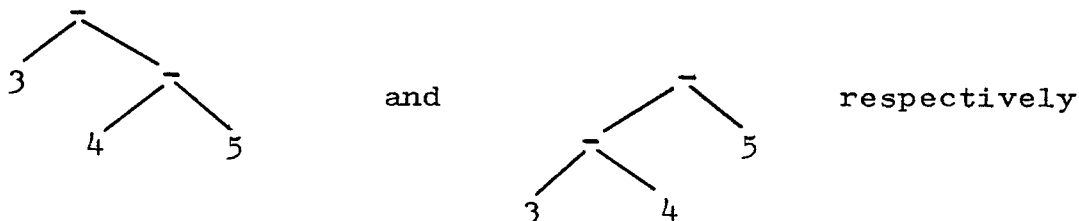
Transformational generative grammar develops a meta-language with which to describe formally some of the transformations which seem to be present in our language, as well as a generative scheme by which to assign constituent structures. I use the term 'seem' merely to suggest the question of whether or not the rules, of which some linguists are seeking a precise formulation, have psychological reality, even though many native speakers deny any (conscious) knowledge of, or access to, explicit rules governing the formation of sentences or judgement of their acceptability. (As a musical aside I must admit to difficulty in coming to terms with an analogous claim that because the music of Mozart aged five exhibits classical harmony, he therefore must have had knowledge of/understood/...the content of such a theory). In philosophical terms, the question is one of whether a theory of syntax should be a fitting theory (with a paradigm of, perhaps, gravitational theory - we make no claims that particles are aware of Newton's inverse square law, merely that their behaviour conforms to this description) or a guiding one (I do what I do because I am following these rules).

It is a commonplace that virtually every human learns to speak a language successfully and yet, when we look for native, or even fluent, speakers of mathematics, they seem rather thin on the ground (though for the case of arithmetic, see Sinclair, 1980). Papert (1980) in his recent book Mindstorms, describes his language Logo as an attempt to provide entry for children into environments (Mathland) where mathematics is the everyday language of discourse and communication with the machine (personified as a turtle), so that speaking mathematics becomes a natural activity. Gattegno (1971, 1982) too points in a veiled manner to the algebraic awareness of young children inherent in their mastery of natural language.

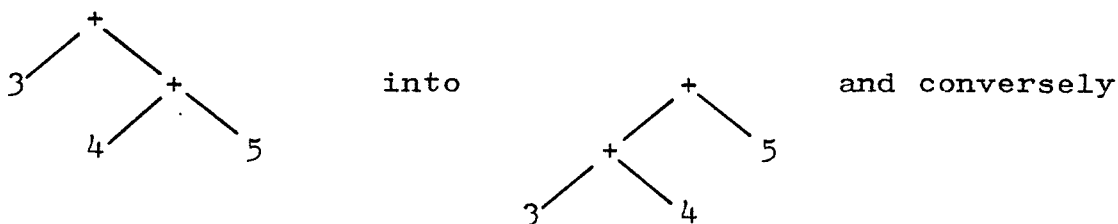
### 3. The Syntax of mathematics?

A working programme might therefore be to attempt to derive a phrase-structure grammar for parts of mathematics (two obvious contenders being arithmetic and algebra) and then to attempt a transformational account operating on the output. Let us look at some examples in arithmetic.

There is ambiguity in the mathematical phrase 3-4-5 in that, following a Bloomfeldian constituent analysis approach (cf. Lyons, 1968:210), it can be bracketed as 3-(4-5) or (3-4)-5 which have different meanings (and, for example, different calculators will evaluate the string 3-4-5 differently). A tree-diagram, using mathematical operations as nodes, produces two alternative structures.



3-4+5 has a similar ambiguity, whereas 3+4+5 does not, which suggests a transformation taking



(which is recognisable as the statement that + is associative).

What is the meta-language to be employed to express this transformation, presuming this to be a general instance? That of abstract algebra, and as an aside 'generalised arithmetic' is one of the common approaches to introducing algebra at school. Thus the (optional) T-rule

$$a * (b * c) \rightarrow (a * b) * c \quad (\text{and its converse})$$

together with a marker on + in the mathematical lexicon (+ associative) will account for the mathematical synonymy of 3+(4+5) and (3+4)+5 and hence the absence of ambiguity of the phrase 3+4+5. Repeated applications of this rule account for the lack of ambiguity of any finite string of additions and - being marked (- associative) will prevent the rule from operating for subtraction. Another example of a binary operation is hcf (highest common factor) and knowledge of the world leads to hcf being marked + associative.

There is a separate problem with 3-4+5 (where there are two different operations) in that we want to account for 3+4x5 and 3x4+5 as well.

A distributive transformation

$$a * (b \circ c) \rightarrow (a * b) \circ (a * c)$$

is fine for \* = x, o = +.

But the converse assignment gives rise to non-synonymous utterances in most instances, e.g.  $3+4x5$  is not synonymous (under either reading) with  $(3+4)x(3+5)$ . There seem to be two levels of generality at work, one on the possible numbers and the other on the possible binary operations.

In the above I have been implicitly using the definition that a mathematical phrase is a finite grammatical string of numerals and operation symbols, and phrase synonymy is numerical equality. I am aware the question-begging term 'grammatical' needs consideration (see the end of this section). Here are a couple of further examples at the phrase level.

Reducing Fractions

Reduce  $\frac{16}{24}$  to lowest terms.

Surface strings  $\frac{16}{24} \rightarrow \frac{8}{12} \rightarrow \frac{4}{6} \rightarrow \frac{2}{3}$

Transformation (in the language of Akmajian and Heny, 1975)

S.D.  $\frac{p}{q}$  p,q whole numbers

S.C.  $\frac{p}{q} \rightarrow \frac{r}{s}$  r,s whole numbers  
where  $pxs = rxq$   
 $0 < r < p$   
 $0 < q < s$

This T-rule is optional and non-predictive, but describes any correct fraction reduction.

Expanded Place Value Notation

Surface form  $23 = 2 \times 10 + 3$

S.D.  $x_n \dots x_1$   
with each  $x_i \in \{0, 1, \dots, 9\}$   
(e.g. 64321)

S.C.  $x_n \dots x_1 \rightarrow x_n \times 10^{n-1} + \dots + x_1$   
(e.g.  $64321 \rightarrow 6 \times 10^4 + 4 \times 10^3 + 3 \times 10^2 + 2 \times 10 + 1$ )

As with linguistic transformations, the descriptions are in terms of the surface strings, seen as linear collections of concatenated symbols. Some general points can be made about the examples.

1. The meta-language of arithmetic is algebra. Many (but not all) of the transformations, the laws of arithmetic, are taught explicitly to pupils in the meta-language.

2. Transformations are reversible but are often applied only in a left to right manner and are perceived and described as different things. For instance, if we extend the notion of phrase to include letters, thereby switching from the context of arithmetic to that of algebra itself (something I shall come back to later), we have

expanding brackets:  $(x+a)(x+b) \rightarrow x^2 + ax + xb + ab$

factorizing:  $x^2 + (a+b)x + ab \rightarrow (x+a)(x+b)$

3. The descriptive language of the teacher in describing such transformations is often purely in terms of the surface structure, thereby focussing attention on the form, rather than the meaning which gives rise to the transformation:

'take it over to the other side and change the sign'

'cross multiply'

'turn it upside down and multiply'

'collect all the x's on one side of the equation'

'always do to the top what you do to the bottom'

4. Mathematical syntactic rules are more prescriptive, are consciously taught, learned and applied at the surface level and therefore have a clearer claim to constituting a guiding theory. In an extreme form, they can be posited as axioms, determining the permissible transformations of the system. Algebraic activity, if seen as formulating expressions of generality, can be seen at all levels.

For example, Quentin, aged five, when asked what he had done in number work at school and asked for an example replied 'three things together with four things makes... some things with some things make some things (laughter)', but algebra as an overtly mathematical activity, is primarily written and is recognisably symbolic and succinct, though the power of the compactness of expression only becomes apparent when attempting to transform such expressions.

All the transformations I have been discussing have been phrase-to-phrase ones which I shall term structural. Every algorithm (e.g. to evaluate  $27 \times 36$  or  $349 \div 17$ ) can be seen as a finite, ordered sequence of structural transformations (see discussion of the Fraction Buggy program in section 4). More generally, there are partial orderings in the application of certain transformations, as evidenced by, for example, the acronym BODMAS (brackets off, division, multiplication, addition, subtraction). Two different algorithms for subtraction rest on quite intricate transformations



- (a) e.g. 52 you 'borrow' and change 2 to 12 and  
-37 'repay' it (note bourgeois morality at  
work) by changing the 3 to 4

In other words, you have to solve  $62 - 47$ .  
i.e.  $a - c = (a+k) - (c+k)$

- (b) using expanded notation as a way of rendering less opaque  
the compact place-value notation of our decimal  
numeration system

$$\begin{array}{r} 52 = 50 + 2 = 40 + 12 \\ -37 = 30 + 7 = 30 + 7 \\ \hline \phantom{52} \phantom{-37} = 10 + 5 \end{array}$$

i.e.  $(a+b) - (c+d) = (a-c) + (b-d)$

If we focus on algebraic phrases themselves, the meta-language itself becomes the object of study and algebraic transformations, the 'laws' of algebra, are themselves formulated algebraically - algebra is its own meta-language. Unfortunately, there are instances where certain algebraic transformations conflict with arithmetic ones. (Henceforth  $P_i$  denotes a mathematical phrase). For example:

x deletion

$$P_1 \times P_2 \rightarrow P_1 P_2$$

Simplest example:  $a \times b \rightarrow ab$

Care has to be taken if subsequent arithmetic specialisation (is this shift akin to assignment of lexical items?) occurs in that if  $a = 2$ ,  $b = 3$  then  $ab = 6$  and not 23 (a common error of pupils learning algebra). Concatenation of symbols has different meanings in arithmetic and algebra. There is clear justification for a rule of + deletion arising from, e.g.,  $2 + \frac{1}{2} \rightarrow 2\frac{1}{2}$ ,  $2 + 0.5 \rightarrow 2.5$  and also place value  $20 + 5 \rightarrow 25$ . The phenomenon of overgeneralisation of rules may account for many students applying + deletion at the level of algebraic transformations to render  $2a + 5b \rightarrow 7ab$ , see Hart (1981). In general, possibly as a result of prompts to algorithmic transformations (merely writing  $6 + 9$  is perceived as a powerful nudge to carry out the addition), there seems to be a pressure to continue to apply transformations until all of the operation symbols have been removed. This would also result in the observed unwillingness to accept  $2a + b$ , or even  $\sqrt{2}$ , as an acceptable surface string.

Another related difficulty in confusing level and formulation of transformation comes from multiplication being commutative ( $a \times b = b \times a$ ), which when combined with the arithmetic transformation expanded notation and x deletion gives:

$$a \times b = ab \rightarrow 10a + b$$

$$b \times a = ba \rightarrow 10b + a$$

Students often have internalised false, but plausible, transformations, e.g.  $(a + b)^2 = a^2 + b^2$  (an application of an interpretation of 'do the same thing to both sides') or  $\sqrt{a + b} = \sqrt{a} + \sqrt{b}$ . They are false, in the sense that they are not the unconditional transformations (identities) such as  $(a + b)^2 = a^2 + 2ab + b^2$ . One approach for coping with such 'mistakes' (which seem highly resistant to change, and certainly one counter-example is not sufficient to dissuade) is to focus explicit attention on the transformation and ask and explore questions about its scope and validity - in such a way attacking directly where the questions of transformations come from. Such questions include:

1. when are they valid within the existing system?
2. can we change our system, or relinquish other transformations so that this one will be valid?

The reader might care to explore the dual to the distributive transformation  $(a + b)c = ac + bc$  which, interchanging the roles of  $+$  and  $\times$ , claims

$$(a \times b) + c = (a + b)(a + c)$$

In this way the rules of algebra can be seen as expressions of high-level generality. A changed system will permit different transformations, and so more sense can be made of the switch from not being able to transform  $4-8$  or  $x^2+1 = 0$ , to being able to do so in an extended system. The carry-over of names and symbols to the extended context has a metaphoric content I have explored elsewhere (Pimm, 1981).

There is a separate class of mathematical transformations which operate on sentences as a whole. For the purposes of this article, a mathematical sentence is a pair of phrases linked either by  $=$  or one of  $\leq, <, >, \geq$  (and the sentence is called an equality or equation and an inequality respectively), e.g.:

$$217 + 203 = 420; \quad 2x + y \geq 16; \quad ax^2 + bx + c = 0$$

Transformational grammar applied to natural language attempts to account for some of the relations we perceive among sentences (e.g. Postal, 1964). You might care to decide in your own mind how and why you believe  $7-x = 4$  and  $4+x = 7$  are related mathematical sentences.

A first attempt at describing sentential transformations might be a sentence (or many sentence - e.g. adding two equations in solving simultaneous equations to give a

third) -to-sentence mapping where the relation of synonymy (implicit in the Katz-Postal hypothesis) becomes 'has the same solutions as', an interpretation which bears a very close relation to a truth-conditional semantics. Unfortunately, there are some transformations, such as 'squaring both sides', which can introduce spurious 'solutions', while retaining the original ones. Hence there is a need for a weaker formulation, namely 'the solutions to the output sentence contain those to the input sentence.'

An example of work exhibiting both phrase and sentential transformations is the following:

$$\begin{aligned}x^2 &= 1 \\x^2 - 1 &= 0 \\(x-1)(x+1) &= 0 \\x-1 &= 0 \text{ or } x+1 = 0 \\x &= 1 \text{ or } -1\end{aligned}$$

The question of the relation between the first and second lines for example is unclear to many students. A common<sub>2</sub> strategy is to link every phrase by =. Thus if  $f(x) = x^2$ , find  $f'(2)$ ? provoked:

$$f(x) = x^2 = f'(x) = 2x = 2x2 = 4$$

The following transformation, unless adequately formulated, can result in the loss of solutions.

<u>Cancellation</u>	S.D.	$P_1 \times P_2 = P_1 \times P_3$
	S.C.	$P_2 = P_3$
	Condition	$P_1 \neq 0$

e.g.  $x^2 + x = 0$   
 $x + 1 = 0$   
 $x = -1$

$x=0$  is 'lost' as a result of using cancellation as a universal transformation.

Another example comes from solving simultaneous, linear equations:

$$\begin{aligned}2x + 3y &= 14 \\x - y &= -3\end{aligned}$$

'Multiply the second equation by 2':

$$x - y = -3 \rightarrow 2x - 2y = -6$$

'Subtract the third from the first equation':

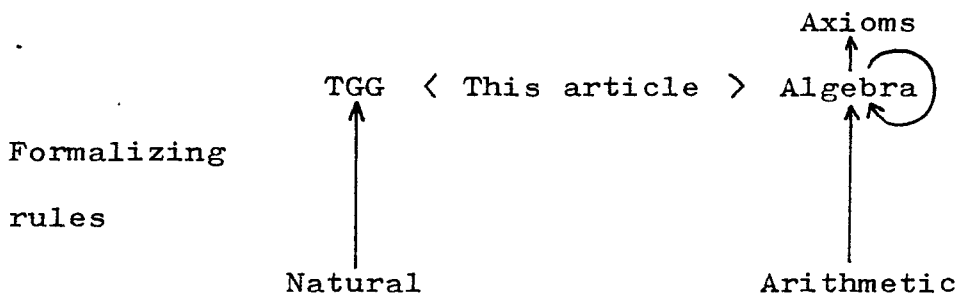
$$(2x + 3y = 14) \text{ and } (2x - 2y = 6) \rightarrow 5y = 20$$

'Cancellation':

$$5y = 20 \rightarrow y = 4 \text{ (after rewriting 20 as } 5 \times 4 \text{)}.$$

In this section, I have attempted to describe some of the transformations (both structural and sentential) which can be found in arithmetic and algebra. I have begged the question of what a grammatical phrase is (see Appendix), in the sense of not providing an explicit phrase-structure grammar to derive all such phrases and no others.

The mathematical equivalent of the NP VP meta-language (in which the transformations are formulated) is algebra and we expect students to be fluent users of this meta-language as well as to be able to distinguish whether a transformation is one applicable to the world of algebraic 'objects' or to that of arithmetic ones. The extreme is given by an axiomatic approach (e.g. abstract algebra) where the language is solely taught in terms of allowable transformations.



The parallels are by no means clear or self-evident but provide, for me, an interesting perspective both on mathematics and its teaching.

#### 4. Computational Approaches

Approaches to language using a computer have been extensively reviewed recently in this journal by Ritchie (1982). In mathematics, particularly given the string manipulation facility of the LISP family of languages, varied attempts have been made to get computers both to perform symbolic calculations and prove theorems. In the context of this paper, there are two approaches I wish to illustrate. The first is the program Subtraction Buggy (written in Smalltalk) developed by John Seely Brown at Xerox Corp., Palo Alto and Fraction Buggy (written by Pascal), designed by Tim O'Shea and Ben du Boulay and written by Malcolm Storey at the Open University.

They attempt to model faulty child procedures for performing the said mathematical operations and provide a useful context for the discussion of the notions of competence and performance. In the introduction to the fraction program, the authors claim that 'children often make mistakes when doing fraction sums and sometimes these mistakes are just slips. But very often mistakes are due to misunderstandings about fractions which cause the child to use the same procedure consistently...This program calls these incorrect, but consistently applied, procedures "bugs"'

This program is used as part of the OU course EM235, Developing Mathematical Thinking, to encourage teachers to notice and explore the more systematic aspects of children's errors. However, assuming no random component is programmed in, the rules are completely consistently applied which facilitates diagnosis in this simulated context. The program operates by responding to fraction questions (with complete choice of number and operation) posed by the user. If you believe you have diagnosed the bug(s), it then probes your conjectures by sample questions, asks for your proposed response, then responds with what would have been x's response (each algorithm is given a person's name). Thus an example of a generated dat set might be:

Zachary

$$1\frac{3}{4} - \frac{1}{2} = 2$$

$$\frac{2}{3} - \frac{1}{3} = 1$$

$$\frac{7}{8} - \frac{5}{8} = 2$$

$$\frac{1}{9} + \frac{1}{3} = \frac{1}{6}$$

$$\frac{3}{7} \times \frac{7}{8} = \frac{3}{8}$$

$$\frac{1}{8} \div \frac{1}{4} = \frac{1}{2}$$

It is an interesting question of how systematic and procedure-produced children's errors are and whether this approach will prove insightful for teachers. Although the opening discussion of the simulation indicated flawed understanding giving rise to bugged procedures, possible processes of debugging are not explored.

The second example I wish to discuss is an AI approach to solving equations which attempts to represent procedural knowledge about that activity in the program. PRESS (Prolong Equation Solving System) comprises a series of manipulative transformations, and, far more importantly, contextually-based guiding principles as to a good next move. The latter is essential in order to prevent a 'combinatorial explosion' arising from the exponential branching of possibilities, as many transformations have structural descriptions which are fulfilled by most every output. For example:  $u \times v \rightarrow v \times u$ ;  $u = v \rightarrow v = u$ ;  $(u+v)(u-v) \rightarrow u^2-v^2$  (and their converses). This program, developed and written by Alan Bundy and co-workers at the University of Edinburgh, is described by him as a state-of-

the-art program and is designed to emulate the written protocols of expert solvers. Bundy (1983) gives the A-level examination question: Solve  $\log_e(x+1) + \log_e(x-1) = 3$ , as an example.

$$\begin{aligned}\text{Solution: } \log_e(x+1) + \log_e(x-1) &= 3 \\ \log_e(x-1)(x+1) &= 3 \\ \log_e(x^2-1) &= 3 \\ x^2 - 1 &= e^3 \\ x^2 &= e^3 + 1 \\ x &= \pm \sqrt{1+e^3}\end{aligned}$$

In this solution there are a number of processes at work. By using tree diagrams, he is able to identify precisely where the occurrences of  $x$  are and some of the general aspects of the program are to ensure (a) the distance between the various occurrences of  $x$  is narrowed (attraction), (b) terms are combined so as to produce a single occurrence of the unknown (collection), and then (c) to strip away (via inverse functions) to obtain  $x$ , decreasing its depth of nesting (isolation).

5. The vexed questions of purpose and meaning

Madam, I'm Adam.

Able was I 'ere I saw Elba.

A man, a plan, a canal - Panama.

A fool, a tool, a pool - lootaloopaloofa

Algebra is high on structure and low on meaning.

PRESS is very successful at solving A-level equation tasks and it seems clear that within very few years there will be programmable calculators, with PRESS-tell chips, readily available in schools. Computers are very successful mimics, particularly where a clear decision algorithm is being employed. A measure of this program's achievement is that for equation solving, the situation is nowhere near that clear-cut. PRESS is more credible as a model of mathematical thinking, than natural language programs are for languages, in that it is implementing, in a guiding way, the consciously-formulated and articulated rules, procedures and principles of expert human solvers. However, I have noticed a tendency to presume that because there is a program which can mimic the surface features of some activity, there has therefore been provided (a) deep insight into what is required to do that activity, and (b) (even more tendentially) how humans do it.

However, let us look at the conception of algebra involved. Algebra is clearly nothing more than the application of rewrite rules to expressions. Within this framework, a successful mimicry of surface mathematical behaviour is entirely possible. Such a perspective is remarkably close to a Hilbertian, formalist view of mathematics as a whole, namely that mathematics is the rule-governed manipulation of marks on paper. To this extent, computer modelling can be seen as the latest refuge of the behaviourist.

But, sadly, I fear this description of algebra in particular, and mathematics in general, would find a strong resonance with the experience of many pupils in mathematics classes. For a clear instance of this see Erlwanger (1973). Unfortunately, perhaps, humans are in the main less adept than machines at rule learning and rule application in the absence of meaning. This may sound trite but I strongly believe, with apologies to Kant, that 'while semantics without syntax is blind, syntax without semantics is empty'.

Pupils who, in response to the injunction 'collect all the x's on one side of the equation', perform precisely that and transform  $x+3 = 2x$  into  $xx+ = 23$ , are acting in keeping with the computational tradition of employing the surface, symbolic features as the focus of awareness and basis for action. Too much algebra teaching is solely syntactic in that so much mathematical practice is coded into precepts which operate entirely on the symbols, rather than being combined with a meaning, an interpretation in which the requisite transformations make some sense.

- I agree wholeheartedly with Whitehead (1925:59) when he claims 'civilisation advances by extending the number of important operations which we can perform without thinking about them'. To this extent, calculators are liberating devices, freeing the mind of the technical intricacies of computational algorithms, and permitting the addressing of more serious strategic problems such as the choice of operation appropriate to a particular problem. An equation-solving chip could be equally as powerful and enabling, providing an entry to the utilisation of techniques which were formerly inaccessible.

However, we should not permit the efficacy of powerfully disassembling software to distort the purpose and reason which mathematicians see in their activities. The success of PRESS on a diet of A-level equation-solving problems shows up in part, the vapid nature of those tasks (just as giving a calculator to a CSE candidate will often render trivial a major proportion of the items), rather than the successful modelling of mathematical activity itself. 'Every mathematician endowed with any intellectual honesty will agree that in each of his proofs, he is capable of attaching a meaning to each of the symbols he manipulates' (Thom, 1971:696).

It is generally accepted among mathematicians that for complicated calculations it is often easier to 'disengage' the semantic component and operate formally, by rule, on the symbols alone. But school teaching seems to have accepted the goal of algorithmic fluency without concern for semantic re-integration. One way of expressing this moral is that it is easier to do A-level, than to understand it.

In the introduction to Evolution of Mathematical Concepts Wilder (1968:3) makes an enlightening distinction between two possible ways of reacting to and dealing with symbols. The first is (my emphasis):

'Man possesses what we might call symbolic initiative; that is, he can assign symbols to stand for objects or ideas, set up relationships between them and operate with them on a conceptual level'.

He goes on to discuss a contrasting (and regrettably more common - at least in mathematics) mode of operation:

'...what we might call symbolic reflex behaviour... does not create the symbols, but can react to them just as they react to other environmental stimulants ... However, much of our mathematical behaviour, which was originally of the symbolic initiative type, drops to the symbolic reflex level. We memorise multiplication tables and then learn special devices (called algorithms) for multiplying and dividing numbers. We memorise simple rules for operating with fractions and formulae for solving equations. These are justifiable labour-saving devices and the professional mathematician understands the purpose of what he is doing while the pupil who only learns the devices, usually does not even comprehend why they work'.

It is, therefore, personally advantageous to have as many mathematical operations as possible at the symbolic reflex level, to ease the cognitive load, but provided, and this is crucial, that you can, at will, reinstate such 'reflexes' to conscious thought and control. It is really a question of power and mastery in relation to the utilisation of symbols; whether you use them and can make them work for you or are used by them. Wilder concludes:

'...a considerable amount of what passes for "good" teaching in mathematics has become of the symbolic reflex type, involving no use of symbolic initiative ... What essential difference is there between teaching a human animal to use an algorithm to find the square root of a number and teaching a pigeon to punch certain combinations of coloured buttons that will produce food?'



## 6. Conclusion

My concern is primarily with the teaching of mathematics. The metaphor 'mathematics is a language' is one which I find increasingly useful in trying to come to grips with this thing, this activity, mathematics. It is selective in what it highlights, stresses and ignores as with all potentially illuminating insights. But, as all readers of detective fiction know, the torch-holder is also illuminated by the act of holding the torch.

I have tried to explore one interpretation of the notion of grammar in natural language in the context of arithmetic and algebra. The consequences of such an approach may be seen, in part, by these powerful programs I have discussed. However, although such an approach allows a succinct description of surface operations on symbols, and also allows computer programs to be written which mimic equation solving (for example), it affords the temptation to use this description as a vehicle for teaching. Bundy comments that if pupils understood the nested, embedded nature of variables, although the surface string is linear, certain errors would disappear. This is going from a knowledge of the program structure (the meta-concepts used to represent algebraic knowledge) to suggestions for remedial teaching. Just because the program needs to 'know' this does not, to my mind, imply that pupils will. It is not clear at all that structural knowledge is required, particularly of detailed technical matters.

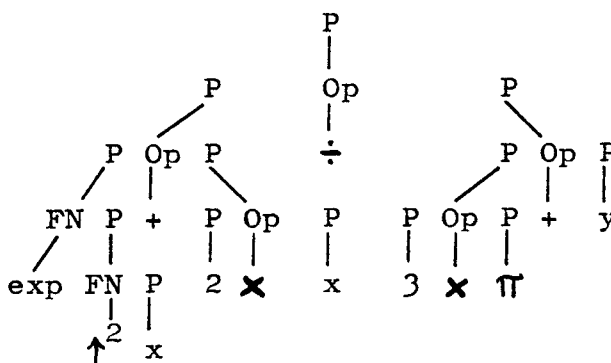
I would like to finish with an anecdote. I had trouble with chemistry at school because, among other things, I treated chemical equations as algebra because I saw them that way. I could do algebra. I learnt the rules about making equations 'balance', with no problem. But I couldn't understand why some of my equations were acceptable and others weren't. What was missing was the sense of these equations as describing some aspects of the world (some parts of which steadfastly refused to combine with others, despite my symbolic permission and approval), rather than merely being manipulations in a closed symbolic system according to specified rules. Structural analysis and powerful programs are very important and impressive, but it is essential to retain a sense of proportion and direction. Our society has seen as increasing incursion of machines from the automation of the physical to that of the mental. Machines can extend our reach and strength, but can also restrict and atrophy our current abilities, as well as distort our perceptions of what we ourselves do and why.

APPENDIX

A simple, initial PS grammar might be

- P → P Op P
- P → FN P
- P → {a,b,c, ... any real number}
- FN → { ∫ dx, ↑<sup>m</sup>, ↓<sup>n</sup>, log<sub>e</sub>, exp, sin, cos, ... }
- Op → { +, x, -, ÷, hcf, tcm, ... }

So  $\frac{e^{x^2} + 2x}{3 + y}$  has derivation



Combined with the transformation  $axb \rightarrow ab$  (note that, although  $\pi$  is a number,  $3\pi$  is acceptable, as  $\pi$  is not a digit, therefore not confusable with place value) and  $a \div b \rightarrow \frac{a}{b}$ .

Because meaning is largely absent for many people in mathematics, they are forced back onto attempting to learn the features for generating correct expressions directly, i.e. to learn an apparently arbitrary syntax for symbolic forms. Thus, \*8- and \*7++++4. The surface features in mathematics are more often consciously taught ('there will always be a dx at the end of an integral'), yet in the absence of understanding, little difference will be perceived between

$$\int_1^2 \frac{1}{x} dx \text{ and } \int_{-1}^1 \frac{1}{x}$$

as both have the correct 'feature' for a definite integral (cf. chemical equations).

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Newcastle upon Tyne: Grevatt & Grevatt. Pp.18 + vi

I suppose the real test of a work of this kind is whether its users find books and articles that they would not otherwise find. I have already found two extremely useful references that I did not know, so for me at least the work is useful.

It contains 135 references, 'intended for final-year undergraduates and postgraduates, beginning research into the mental processes of language, and needing controlled verbal materials with normative data...and also provides sources to aid in the analysis of spontaneous language' (p.vi).

Inevitably, there is very uneven coverage of different aspects of language. After a list of other catalogues of references (nos. 1 to 8), there is: word properties, including frequency data, word association data, synonym dictionaries, etc. (9 to 50); phonological and graphemic data (51 to 93); grammatical properties of words (94 to 107); syntax (108 to 120); text and discourse (121 to 130); and miscellaneous (131 to 135). Inevitably also, the material in the earlier sections is more straightforward controlled, normative data.

On the other hand the text and discourse list is a miscellaneous collection: not entirely the authors' fault, but not very helpful to student users. It contains: material on readability; Bartlett's classic 1932 study on remembering (here dated 1967); Coulthard and Montgomery, eds., Studies in Discourse Analysis, which is said to be useful for its bibliography, though its bibliography contains many inaccuracies; Leech and Svartvik's Communicative Grammar of English which doesn't obviously fit here at all. On the other hand it does not give work such as De Beaugrande's, Ochs' or Chafe's experimental studies of written and spoken versions of the same narrative.

Rather a mixed list, but serendipity does work and most users will find something they did not previously know.

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REVIEW of John Lyons (1981)  
Language, Meaning and Context  
London: Fontana. Pp.256

This is an up-to-date survey of linguistic semantics written with Lyons' characteristic care and precision. The book emphasizes what the subject owes to recent work in logic and the philosophy of language, and aims 'to throw a bridge between a restricted version of the meaning-as-use theory and the truth-conditional theory of meaning' (p.109).

A good introductory chapter establishes some elementary distinctions and introduces the principle of compositionality. The rest of the book is in three parts dealing with words and phrases (Chapters 2-4), sentences (Chapters 5-7), and utterances (Chapters 8-10).

Chapter 2 distinguishes types and tokens, and forms and expressions, and discusses some basic sense relations preparing the way for the distinction between denotation and sense in Chapter 3. Here Lyons talks about the fuzziness of the definitions of most lexical items, and introduces the novel notion of cultural kinds like 'dirt' and 'chair' alongside the traditional notion of natural kinds. Chapter 4 deals with lexical structure, favouring the use of meaning postulates over componential analysis, and introduces the notions of entailment and possible worlds.

Chapter 5 discusses the propositional content of sentences and truth-conditions, whilst the following chapter considers various aspects of sentence-meaning which cannot be captured by propositional logic. This chapter presupposes some knowledge of the propositional calculus; readers without this would find it rather difficult to follow. The predicate calculus is not mentioned. This part of the book concludes with a chapter on formal semantics in which Lyons discusses the Katz-Fodor theory and then gives a useful introduction to the model-theoretical approach derived from Montague grammar which has all but displaced it.

The final part of the book begins in Chapter 8 with a good introduction to Austin and an extremely helpful development of his notion of the locutionary act. This is where Lyons' relentless pursuit of exact distinctions really pays off. His distinction between sentences and utterance-inscriptions, for example, enables him to argue with satisfying force that tokens of an utterance-inscription like I have may result from the utterance of indefinitely many sentences, including 'I have done the washing up', 'I have got an electric typewriter' etc.,

and conversely, that a sentence like 'I have done the washing up' can be uttered not only as I have done the washing up but also as I have done it, I have, or Me (p.183). But although Lyons says here that what sentence (if any) has been uttered can only be determined in its context of utterance, and insists in several places that what proposition a sentence contains also depends on context, it is only in Chapter 9 that the process of interpretation and the notion of context are considered in any detail; Grice is introduced here. In the final chapter Lyons mentions presupposition, but against the current fashion devotes comparatively little space to it, though he does say that

anyone who deliberately violates an existential presupposition in using what purports to be a definite description fails to express any proposition at all. Looked at in this way, much of the recent discussion of presupposition ...seems little short of vacuous (p.225).

This is a very good point. Also in this chapter Lyons discusses indexicality, insisting on the context-dependence of most utterances, and emphasizes what he calls the subjectivity of utterance: the fact that speakers generally do not communicate merely propositions in their utterances, but also their attitudes to them; for example, their degree of certainty that they are true. This is one reason why a truth-conditional semantic theory can never be adequate on its own.

The question of what is and is not covered by the notion of propositional content - and thus, of what falls within the scope of truth-conditional semantics - is central to the book. On the one hand Lyons makes the point that metaphorical utterances are by no means excluded from its domain: the propositions they express (once it has been worked out what they are) need be no less truth-conditionally determinate than those expressed in literal utterances. But on the other hand he summarily excludes from the propositional content of sentences some things which perhaps should not be excluded. Firstly, he excludes verbs like assert and deny in utterances like I assert that it is raining on the grounds that assertion and denial are communicative acts and not parts of propositions (p.134). This is very controversial. Assertion and denial may be communicative acts, but assert and deny are nevertheless forms of lexical items having senses, and there is no reason to assume that the senses of performative verbs are not operative in performative utterances. The proposition that "It is raining" is indeed the object of the illocutionary act in this example, but the uttered sentence still contains the proposition that "The speaker asserts that it is raining". Instead of denying this it

would be preferable - and consistent with Lyons' analysis of the locutionary act - to argue that the latter proposition is the object of the speaker's locutionary, as distinct from his illocutionary, act. (Proposals along these lines have recently been made by Recanati, 1980, and Edmonson, 1981).

Lyons' parallel manner of argument when he contrasts objective with subjective modality (pp. 237-38) is a second example. He distinguishes two interpretations of epistemically (or deontically) modal utterances like He may not come: on the objective (epistemic) interpretation the speaker asserts categorically the modalized proposition "He may not come" and is fully committed to this as a fact; on the subjective interpretation he asserts the proposition "He will not come", but in a qualified way, indicating his subjective uncertainty by means of the modal may which then is not contained in the asserted proposition. But if the proposition which is understood to be conveyed by the illocutionary act is different in the two cases, this does not exclude the modal verb from the proposition expressed in the locutionary act; the sentence uttered arguably contains the modalized proposition "He may not come" in either case.

These points relate to the question of where - indeed, whether - to draw a line between semantic and pragmatics. For Lyons much of what is often called pragmatics is covered by an unusually broad conception of semantics (p.9). Consistent with this view, he implicitly favours the argument that the illocutionary acts of statement, question and command (corresponding respectively to declarative, interrogative and imperative sentence forms) are basic, with all other illocutionary acts being seen as belonging to sub-classes of these three (p.187). But this argument, to quote Lyons from another context, 'is hardly the approach that would be chosen by someone who was not determined, for metatheoretical reasons', to find a close correspondence between semantic (or grammatical) and pragmatic categories. Illocutionary acts like giving consent or thanks, making an objection or apology, and the whole class of conventional acts which Bach and Harnish (1979) call 'Effectives', like baptizing, appointing, resigning and so on, are not readily seen as varieties of any of the 'basic' acts. Moreover, some intuitively (and lexically) defined illocutionary acts may be natural members of more than one of the 'basic' classes. For example, some acts of warning or advising may be seen as kinds of directive, others as kinds of statement, and still others as both at once.

As for his general aim of bringing together formal and speech acts theories - which surely is the project which



holds most promise for a unified semantic (or semantic-pragmatic) theory - Lyons does make a good case for this in principle, but does not indicate how truth-conditional theories might in practice be extended to account for utterances of sentences which are not declarative in type and indicative in mood. This indeed is the biggest problem facing that project, though in fact it has been argued that there is no reason why the conditions specified in a Montague-type semantics must be truth conditions; Hausser (1980), for example, has suggested a development of Montague semantics which makes use of denotation-conditions in an analysis of imperatives and interrogatives.

The only point at which Lyons seriously lapses from clarity and consistency is in his discussion in Chapter 4 of necessary truth. He opens the topic by introducing the concepts of analytic truth and logical truth, and says 'it is important to draw the distinction clearly' between them (p.86). But he fails to do so: he says that logical form can be held to be part of the meaning of propositions so that 'logical truths are a sub-class of analytic truths' (p.88), and though he rejects the view that all analytic truths are also logical truths, his only example of an analytic truth ("All bachelors are unmarried") is called one on the grounds that it is 'equivalent' to the proposition which is then his example of a logical truth ("All unmarried men are unmarried"). The confusion increases when, having said twice that all necessary truths are either analytic or logical, Lyons immediately introduces and discusses 'different kinds, not only of non-logical necessity, but also of non-analytic necessity' (p.88). To make things worse, this discussion of synthetic propositions which according to Lyons are not contingent but necessary truths, follows the statement that he will not develop his point about not all synthetic propositions being contingent (p.87). He does develop it, though, by contrasting with analytic necessity 'natural' and 'cultural' necessity. Lyons purpose here is to warn against mistaking for analytic truths propositions which may be true in virtue of some other kind of necessity, for only analytic necessity is within the scope of semantic theory. But introducing these other kinds of necessity - which bring fresh problems on their own account that, on Lyons' argument, would not be linguistic problems in any case - does not result in much clarification of the concept of analyticity.

Two general criticisms might be made of the book. First, not enough examples are given to illustrate and bring to life the theoretical points that are made. Secondly, although Lyons insists that there is more to semantics than propositional meaning, he says very little about the significance of non-propositional aspects of meaning. For example, although he mentions that different expressions may be used to refer to the same entity, he implies (e.g. p.226) that the sole function of referring expressions is to enable the addressee to identify the referent, and he

says nothing about the contextual or ideological factors which may motivate the selection of one expression rather than another, or the significance of this selection for the expression and transmission of values. In short, the book contains nothing on what might be called 'the politics of meaning', and this would have been welcome in a book on semantics belonging to a series which 'aims to show how linguistics links up with other disciplines such as sociology ...' (p.5) - particularly since Lyons argues for the importation of the notion of subjectivity into the theoretical vocabulary of the discipline. There are now a number of works by linguists which discuss the relation between language and ideology. Fairclough, 1982, gives an extremely good outline of how this relationship might profitably be studied.

These points, together with the book's abstract treatment of its often complex subject matter, would not make it the most accessible introduction to semantics for students just beginning with the subject. But, for those with at least some knowledge of semantics this book will be a valuable resource.

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REVIEW of Peter Trudgill and Jean Hannah (1982)  
International English: A Guide to Varieties  
of Standard English  
London: Edward Arnold

This book gives useful information on the varieties of English used in England, Australia, New Zealand, South Africa, Wales, North America (the U.S.A. versus Canada), Scotland, Ireland, the Caribbean, West Africa and India. The varieties discussed are all standard dialects; or, as in the case of West Africa and India, varieties where a significant amount of standardization has occurred. There is a brief attempt to justify a basic division between 'American' types (American and Canadian) and 'English' types (the other varieties where English is a native language), with Irish somewhere in the middle, although this division is admitted (p.4) to be over-simplified.

The book will be extremely useful to teachers (native speakers or not) of EFL. For example, I have frequently corrected foreign speakers of English for saying on the weekend. This is clearly ill-formed for me, and a mistake for at the weekend. I discover, however, that on the weekend is normal U.S. English (p.66). The authors make just this point, using different examples (p.3). They point out in addition that European universities frequently now allow their students to choose between American and British English 'as long as they are consistent'. This is, the authors argue, quite unrealistic, since all native speakers will be 'inconsistent' in their own usage if they have lived in both countries. This is a very important point, and could have done with much more detailed discussion. They also only just raise (p.100), but hardly discuss at all, whether local varieties of English are more appropriate for pedagogical purposes in West Africa, India, Malaysia, and so on. They do not discuss at all the theoretical implications of such a notion of 'mixed' competence.

Given its length, the book is obviously not comprehensive on any of the varieties. Rather, it provides notes and copious examples, not previously available in one place, on superficially striking features of pronunciation, morphology, lexis, syntax and spelling, as appropriate.

I am not competent to comment on the descriptive details of most of the varieties. I have several quibbles, however, over the description of standard Scottish English, my native dialect. I have also checked this section with another native speaker, female, elderly, middle-class, who has lived her whole life in Glasgow. Conveniently, I read the book

under review and carried out my informal checks with my informant before I had access to the much more detailed discussion of Scottish English in Wells (1982). On all the following details, my intuitions agree with Wells (henceforth W) and disagree with Trudgill and Hannah (henceforth TH). I am not suggesting, of course, that W and TH are directly comparable books in either scope or audience: they clearly are not.

TH (p.83) give absence or presence of post-vocalic /r/ as the only difference between pot and port. For me, they have different vowel phonemes, as in long and load respectively. The phonemes /ɔ/ and /o/ contrast before /r/ as in horse and hoarse. Similarly, cork and pork, and short and sport do not rhyme. (Cf. W, p.408). For me, the pair shot and short differ only in the presence of /r/, and would work in place of the TH's example. Now, of course, Scottish accents vary a great deal; and, as Trudgill has argued elsewhere, there is no standard accent of English. However, this raises the problem of what 'standards' TH are then describing.

TH (p.83) give the fricative phoneme /x/ two allophones: velar [x] as in loch and palatal [ç] after a front vowel as in dreich ('dull') or nicht ('night'). I have no palatal allophones of the phoneme, even if my articulation is further forward after a front vowel. W (p.396) gives only the velar fricative in all such words. TH also give /x/ as occurring in a number of specifically Scottish English words, but could have pointed out that its occurrence is really very restricted indeed in the standard language. The only common word is loch. Otherwise, it is restricted to place names, and is optional in words such as epoch: /k/ or /x/. Words such as dreich or pech ('out of breath') are regional dialect words, not common core standard lexis.

More difficult to disentangle is TH's doubtful claim that there is a length distinction in the pair booze, boos (p.83), with the morphologically complex item, boo + PLUR, having a longer vowel. The pair are entirely homophonous for me. TH note, correctly, that there is a length distinction in greed, agreed, and in tide, tied. They fail to note that there is also a vowel quality distinction in tide, tied: approximately [ʌi, əe]. This is felt strongly by native speakers as a phonemic contrast. The problem with analysing it as such is that the two vowels are in complementary distribution, with [əe] before a morpheme boundary. (Cf. W, pp.405-6). Similar short-long pairs are: need, kneed; brood, brewed; could, cooed. But TH have neglected part of Aitken's Law (cf. W, p.400), that a vowel is phonetically short, unless it is followed by (a) a morpheme boundary, (b) a voiced fricative, or (c) an /r/, in which case it is long. The long vowel in booze is accounted for by (b).

There are other small slips in the book. For example, the Glossary defines mass noun as being unable to occur with an article. For article read indefinite article (the foliage, \*a foliage). Mass nouns are also said to have no plural form. But p.59 gives accommodation as an abstract mass noun which is invariably plural in U.S. English, as in Good accommodations are hard to find here.

There are occasional striking omissions. For example, p.21 lists twenty Australian lexical items, but not beaut! which can strike British people as the most frequent word in Australian English. Some rather obvious generalizations are not given. For example, pp.69-72 give a long list of spelling differences between British and American English, but there is no mention that the general trend is towards shorter spellings in American English, with all the implications which this has for economy in printing and storage of printed matter. In general, just a little commentary on many of the observations would have been welcome.

As another example, they note (p.73) the U.S. English punctuation convention of an upper case letter following a colon as in their example:

1. There is only one problem: The government does not spend enough money on education

But they make no comment on where this leaves the concept of a sentence in written English. This was always something one could count on! One knew where the sentence boundaries were in a written text, even if one did not know the principles for inserting them. But is (1) one sentence or two?

In summary, the book contains a wealth of information which is not otherwise easily obtainable in one place. However, in cases where I am competent to judge, the descriptive data are not entirely accurate in all details. There is no indication in the book of how the data were collected: the answer is from any available source, published descriptions, personal observations, and informants. Finally, the presentation is often rather in note form. It would have benefitted from at least a little more discussion of the practical uses of the material or its theoretical implications: there are many of both which readers will derive from the data presented.

#### Acknowledgements

I am very grateful to Peter Trudgill and Jean Hannah for their detailed comments on an earlier draft of this review. Their response led me to revise several points of detail, though our views still differ in some places.

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ANNOUNCEMENT

Materials for the Study of the  
Uncommonly Taught Languages

The Center for Applied Linguistics has developed and maintained a file of information on basic tools of access for the teaching and learning of the uncommonly taught languages. All modern languages except standard English, French, German, Italian, Russian and Spanish may be included. In 1976 we published this information as an annotated bibliography, divided into eight fascicles entitled A Survey of Materials for the Study of the Uncommonly Taught Languages. Since October 1978 we have been updating these files, as well as putting the old and new information onto word processor files. Having the information on word processor files enables us to add and update materials easily, as well as to quickly answer requests about the materials.

We currently have a grant from the Department of Education, Division of International Studies to continue the updating process and, in addition, to republish the revised Survey in late 1983 or early 1984. This will be the most comprehensive list available of materials for the uncommonly taught languages. We now have almost 7,000 entries covering 970 languages.

We are seeking information to add to the Survey to make it as completely up-to-date as possible. We would like to know about any teaching materials, readers, grammars or dictionaries for the uncommonly taught languages published since 1980 that are intended for adult learners. The file entries will need to include author(s), title, place and date of publication, publisher and number of pages. Any indication of availability would be helpful, e.g. through the publisher, out-of-print, etc. We are also including information on audio materials (tapes, cassettes or records; number of units; length; and speed).

If you know of any of the types of materials described above, please send the information to:

Deborah H. Hatfield or Dora E. Johnson,  
Center for Applied Linguistics,  
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Journal of Linguistics. 11, 2:249-60.

Trudgill, P., ed., (1978) Sociolinguistic Patterns in British English. London: Arnold.



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