

THE SEMIOTIC NATURE OF PHONETIC DATA

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I would like to address myself to the question 'What is the nature of phonetic quality, and what assumptions underlie our claim to be able to abstract it from the phonic totality of any given utterance?'

The nature of phonetic quality, which as a phonetician I regard as the prime datum for the study of language, has only rarely been called into question (Jones 1938; Ladefoged 1967). Examining the concept from a semiotic point of view may help to clarify its nature, particularly with regard to the complex, mutually-defining relation that phonetic quality, as the exponent of phonological and paraphonological elements, has with the extralinguistic concept of speaker-identifying voice quality, or personal timbre.

I shall take the view that the phonic medium (Abercrombie 1967) is used to signal three different sorts of information -- phonological, paraphonological and extralinguistic information; and that all three sorts of information can depend, in different languages (or, within one language, in different accents, in different styles and registers, and in different individuals), on the use of identical vocal features. It then follows that, if the distinction between phonetic quality and voice quality is not always able to be drawn *a priori* by appeal to differences of phenomena, the ability to distinguish the particular semiotic function of any vocal feature in any given case is crucial to practical work in linguistics.

Looking downwards from phonology to its phonetic exponents, from a glossematic point of view for a moment, all that is necessary for the cenematic elements of a language is that they should be able to be distinctively encoded by the speaker and distinctively identified by the listener. To achieve perceptual distinctiveness, cenemes, as abstract entities, have to be manifested by those aspects of the artefacts in a physical medium which can act as symbolic signals. This relationship between cenematic units and the physical medium is clearly vital for linguistic theory, because it is through the successful analysis of the relationship, and *only* through it, that we can get any observational access to the cenematic level and then to the referential, plerematic complex of language.

A pre-requisite in the linguistic phonetician's success in establishing the link between the relevant signal in the medium and the particular cenematic unit is his ability to perceive the signal in the first place. This sounds self-evident. But the signal is not a simple percept. It is an abstraction of a particular pattern of phonetic quality (leaving aside the parallel phonetic factors of pitch, loudness and duration).

Phonetic quality is often treated in writings on linguistics as if it were 'raw data', as part of the 'real', 'directly observable', 'concrete' world. I would like to assert the view that this is emphatically not so. The phonetic level of analysis is a level of considerable abstraction from

the phonic artefacts created by each act of speaking. The same is true of the abstract status of voice quality. Every analytic decision about phonetic quality entails a complementary decision about voice quality (and of course, vice versa); every decision about either is the product of a number of steps of analytic abstraction from the phonic artefacts of the medium.

It may be helpful here to trace, in Figure 1, the network of complementary typological distinctions that need to be drawn in an exhaustive analysis of the phonic medium. A basic premise is that the phonic totality of the vocal sound production of any speaker of any language during speech can be completely accounted for, with no uncategorized residue, by the typological distinctions put forward.

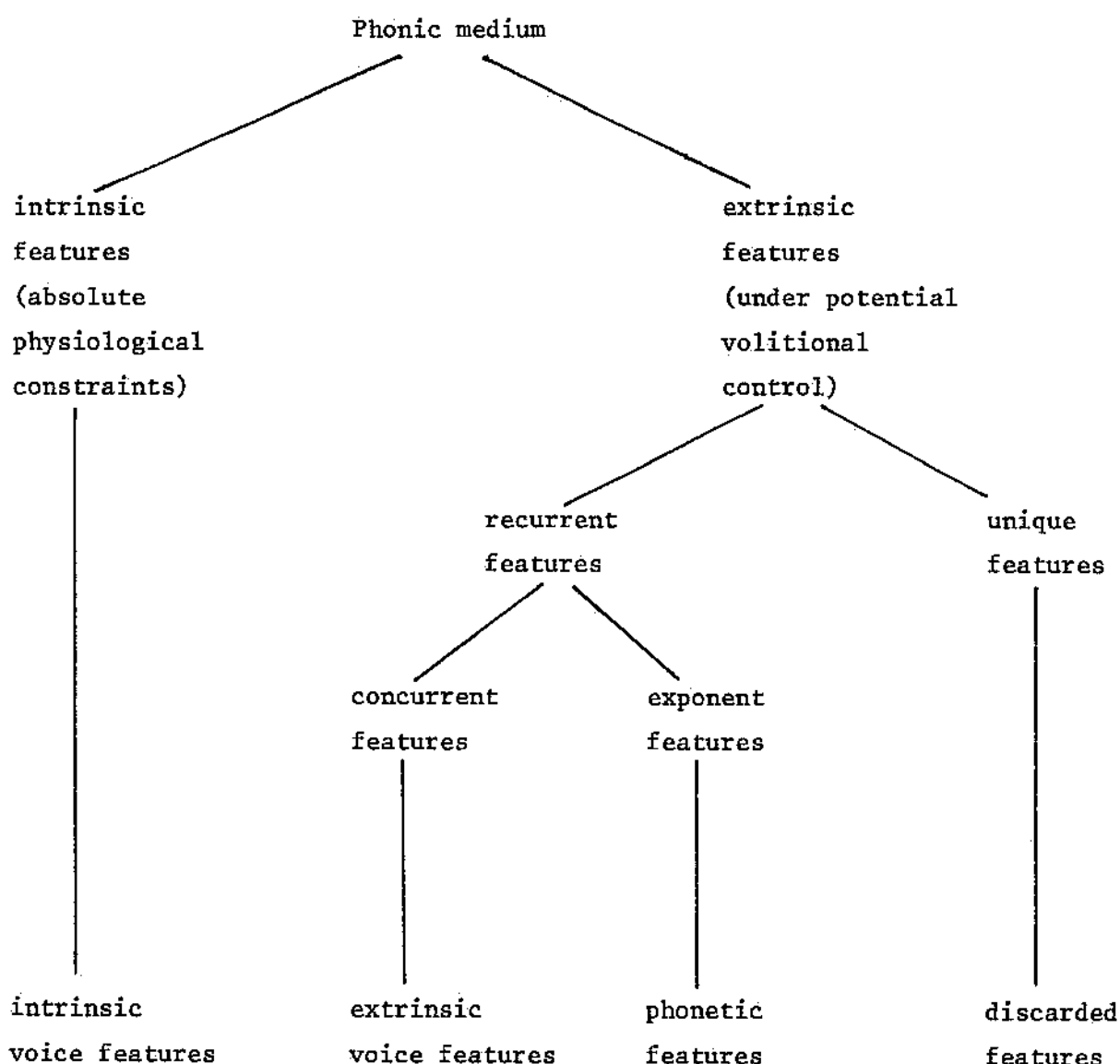


Figure 1. *Summary diagram of the typological distinctions between features making up the phonic medium.*

The first distinction is between the *intrinsic* vocal features and the *extrinsic* features. Intrinsic features are those which derive solely from the invariant, absolutely uncontrollable physical foundation of the speaker's vocal apparatus. They contribute only to voice quality, and are the source of a great deal of indexical information¹ about physical aspects of the speaker, -- sex, age, physique, health, fatigue, and so forth.

The extrinsic features are made up of all aspects of vocal activity which are under the volitional control of the speaker, whether 'consciously' or not.

These extrinsic features are made up of two initial categories: firstly, *unique* events such as a momentary clearing of the throat to remove a build-up of mucus on the vocal folds. Such unique events are of no further interest, and are discarded from further consideration. Secondly, the *recurrent* features are those typically recurring vocal features which are in some sense under the control of the speaker. Without this notion of typical recurrence, there could be no concept of 'phonetic sameness'.

The recurrent features are the central focus of the whole analytic machinery of articulatory phonetics: the division proposed here of the recurrent features into exponent and concurrent aspects is intended to show, however, that they include not only a phonetic component but also the learnable component of a speaker's voice quality.

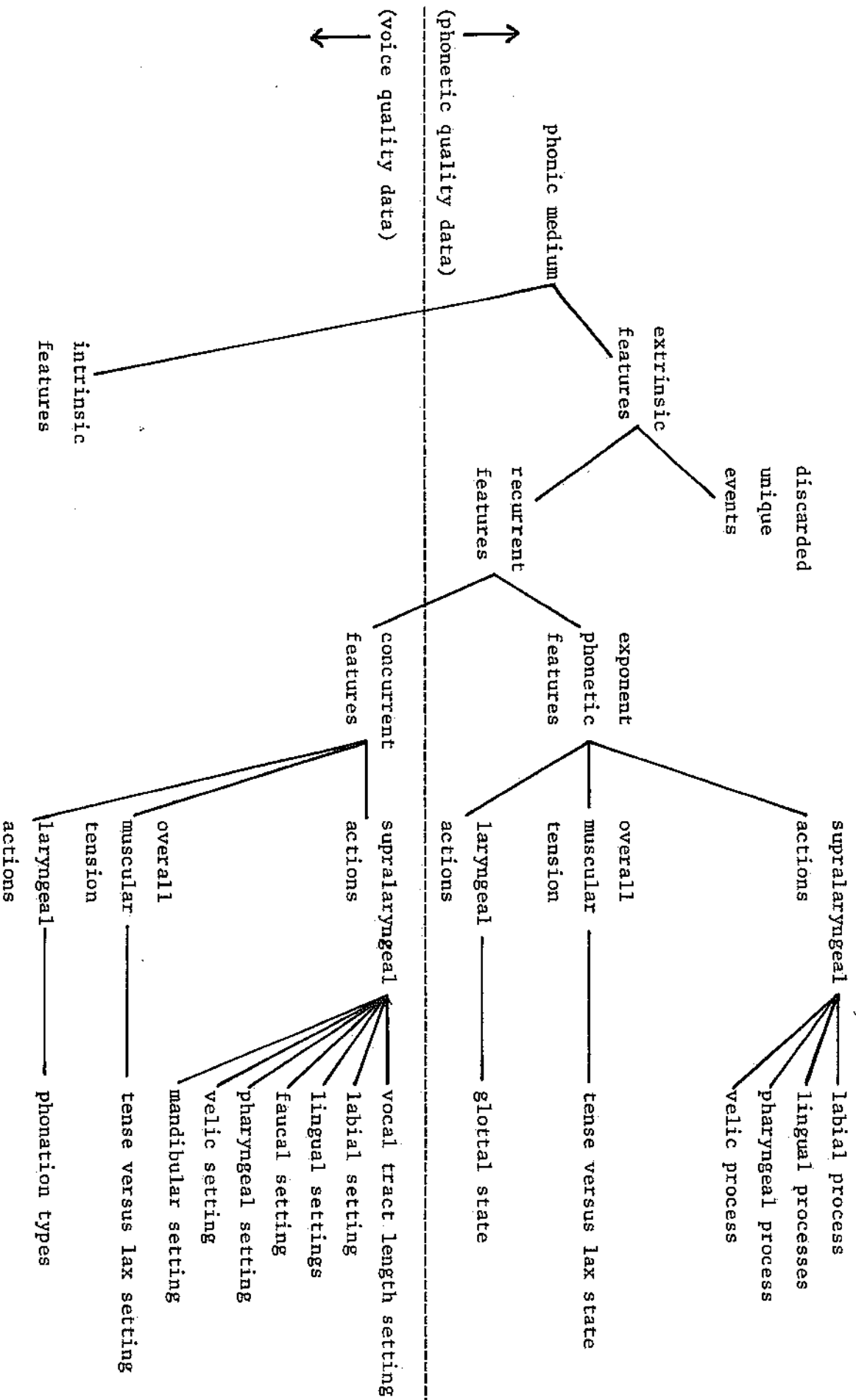
The *exponent* features are all and only those vocal features which serve as signals ('signs', 'manifestations', 'realizations') for phonological and paraphonological units. They are the familiar phonetic features.

It may be useful to emphasize at this point that no distinction between phonological and paraphonological features has been proposed in Figure 1 under any of the nodes in the diagram dominated by the node labelled 'extrinsic features'. There are two reasons for this: firstly, it would be a confusion of levels of analysis. The classification in Figure 1 is of aspects of substance, not of form. The second reason is that in a general theory wider than that demanded by the scope of a given language, the phonetic features available for symbolizing the units of phonology and paraphonology are very broadly one and the same set of features. There will perhaps be tendencies for paraphonology normally to exploit longer-term aspects of the phonetic features than the characteristically shorter-term aspects employed by phonology, but no necessary difference of principle exists between the phonetic parameters chosen. To take a very brief and obvious illustration from the use of labial activity in English, the paraphonological effect of lip-spreading in smiling is usually of longer duration than of lip-spreading for a particular vowel.

The *concurrent* features make up the extrinsic contribution to voice quality. They provide the background, quasi-permanent auditory colouring to a person's voice which together with the intrinsic features give a person his characteristic overall voice quality. They are by definition learnable and imitable. Honikman (1964) called them 'articulatory settings', and Bishop Wilkins (1668) described some of them over three hundred years ago, though without giving them that name.

In Figure 2, the concurrent component of voice quality is shown as

Figure 2. Vocal features exploited in the production of phonetic quality and voice quality



being divided into three major groupings of articulatory settings -- settings of supralaryngeal adjustment, of laryngeal phonation types, and of different degrees of overall muscular tension. Fuller accounts can be seen in Abercrombie (1967) and in Laver (1964, 1968, 1975). Briefly, typical supralaryngeal settings include quasi-permanent lip-protrusion, lip-rounding, velarization, pharyngeal constriction, nasality, an 'open' jaw position, and so forth. Laryngeal settings include phonation types such as breathy voice, whispery voice, harsh voice, creaky voice, falsetto, and combinations such as harsh whispery voice, as well as normal voice. Tension settings include, as well as neutral tension, tense voice and lax voice, often impressionistically labelled 'metallic voice' and 'muffled voice' respectively.

It is not accidental, in Figure 2, that the exponent phonetic features are shown, like the concurrent voice features, as being divided into supralaryngeal, laryngeal and tension aspects. All three are necessary to account for the phonetic manifestations of phonological and paraphonological units. Considering matters of quality alone, each of the three groups of exponent features has to be analytically sub-divided in much the same way as the corresponding group of concurrent features.

With rather few exceptions, any given vocal feature contributing to quality may be attributable in different circumstances to a different semiotic function. *A priori*, there is no way of telling (from quality alone) whether breathy voice, for example, is acting as a phonological signal (as in 'voiced aspiration' in Hindi and Gujarati), or as a paraphonological signal of confidential intimacy (as in English), or as a concurrent voice quality feature merely characterizing the speaker. It is true that duration will normally be a very helpful clue, provided one's sample is extensive enough, with voice quality features being longest-term, phonetic features expounding paraphonological elements medium-term and phonetic features expounding phonological elements shortest-term. In any single case, the analysis of quality will thus be a complex perceptual problem, with several layers of figure-ground relations to be resolved. Firstly, the extrinsic features have to be seen as a figure against the ground of the intrinsic features. Then the exponent phonetic features are a figure against the ground of the concurrent voice features. Finally, those phonetic features exploited by phonology constitute a figure against the ground of the phonetic features used by paraphonology. If the operational decision about which particular features constitute the figure and which the ground in any given case cannot be taken according to purely phenomenal criteria alone, then the decision is eventually necessarily a semiotic decision about function rather than a descriptive decision about substance.

The difficulty of making an accurate decision about the semiotic functions involved is reflected in the not infrequent misallocation in everyday life of voice quality features as features of phonetic quality. In the situation where a speaker has whispery voice, say because of temporary laryngitis, it is not uncommon for listeners ignorant of his medical condition to reply using whispery voice themselves, misanalysing his whispery voice as a paraphonological signal of conspiratorial secrecy instead of the intrinsic index it is in reality to his state of health.

In linguistic fieldwork, operational decisions about the allocation of features to voice quality versus phonetic quality can be just as difficult.

Key (1967:19), cited by Crystal (1971:191) reports that in Cayuvava, a language of Bolivia, nasalization has an honorific stylistic function, in that 'an individual of lower social or economic status addresses one of higher rank with a prominence of nasalization for all vowels of the utterance'. A linguist working on this language for the first time might well conclude if faced with ubiquitous vowel nasality, that it was a feature of voice quality, to be discarded from his phonetic attention. Such possibilities of misallocation arise partly from the fact that decisions about both voice quality features and paralinguistic phonetic features are often made tacitly, without explicit consideration. This situation is likely to persist as long as the linguist believes that his task is only to account for phonetic phenomena expounding phonological elements, and that the identification of those phonetic phenomena can be achieved without reference to the paralinguistic and voice quality features in which they are embedded. The profitability of the alternative view, where the linguist's task is seen rather as an attempt to account for all extrinsic signs used in spoken communication, is elegantly demonstrated by Trudgill (1973, 1974) in the field of sociological linguistics. In his study of the urban dialectology of social differentiation of Norwich English, he tries to develop a

diasystem the aim of which is to produce all forms of Norwich English from a common underlying base. The diasystem comprises a single underlying systematic phonemic system, and (a number of different types of rules). (Trudgill 1974:191)

One type of rule incorporated in his diasystem specifies particular articulatory settings of the sort mentioned above. They are regarded as 'ancillary to the phonetic realization rules' (*ibid.*), that is, to the rules for the realization of phonological elements. Trudgill characterizes the value of including concurrent extrinsic setting components of voice quality with the phonological specification of accents as follows:

If we incorporate (...) rules of this type into the Norwich diasystem, (...) the statement of both the phonetic realization and realization level mutation rules can be much simplified. (...) Another advantage of setting rules is that they relate different types of Norwich English to each other in the diasystem in a much more generalized and significant way than a series of individual rules. Different social types of Norwich English may be characterized by the presence or absence, of, say, (setting rule) 100, rather than by a whole series of rules. This is an important point, since it is clear that perhaps the single socially most significant feature of linguistic differentiation in Norwich is the type of voice quality produced by the particular type of setting employed by a speaker. It is in any case this feature which most clearly distinguishes (working class) from (middle class) speakers. This point, of course, did not emerge at all from our atomistic analysis of the co-variation of linguistic and sociological phenomena'. (Trudgill 1974:190-91)

A further justification for linguistic interest in the participation of voice quality settings in considerations of phonetic quality lies in language change and in sociolinguistic aspects of multilingual societies.

Perceptually, the effect of a given setting is seen in terms of the consequent adjustments of articulatory position of susceptible segments. A setting of quasi-permanent velarization, for example, will tend to affect

not only various consonant segments, but also to retract and in some cases also or alternatively to raise the vowel segments. It is not inconceivable that historical vowel shifts in a language could arise from the adoption of a different voice quality setting, which would have the effect of adjusting the articulatory positions of the vowels in ways which depended on the individual vowels concerned and their relation to the setting.

In the multi-lingual situation, where the language of a particularly prestigious section of the community may influence the linguistic behaviour of other sections, it doesn't seem beyond the bounds of possibility that the prestigious behaviour chosen for imitation might include setting components of voice quality, or perhaps partial segmental reflections of a given setting.² A more traditional analysis would see such influence as being exercised on individual segmental performance alone, but to ignore its possible interpretation as an imitation of an aspect of voice quality is to lose a possibly valuable generality.

In conclusion, the attraction of looking at the problem of phonetic quality in semiotic terms is that it sets the analysis of phonetic data in a very wide framework. It allows the communicative substance of language to be seen as part of a more comprehensive communicative system, including not only the paralinguistic communication of mood, but also the indexical communication of the whole physical, psychological and social profile of the speaker, as portrayed in his voice quality. It is interesting that, in questioning the assumptions underlying the concept of phonetic quality, one is necessarily led to an examination of the complementary extralinguistic concept of voice quality, and thus, seeing the two together, to this view of phonetics set in the broader frame of semiotics. From this perspective, it is re-assuring to be reminded again that the concerns of phonetics as a discipline are *not* the construction of some elaborate but merely peripheral game of taxonomy, but the apprehension of a fundamental, central aspect of human communication. At the very least, a semiotic approach to phonetic theory may provide a stronger base, because it is a more explicit base, to the foundation of the rest of linguistic theory: at best, in a semiotic view of phonetics, we learn more about how we construct and sustain our identity as social, communicative beings.

NOTES

1. The sense of C.S.Pierce's term 'index' adopted here is not the 'deictic' sense in current use by philosophers of language, but rather the 'evidential' sense, as used in Abercrombie (1967).
2. I am indebted to Professor R.B. Le Page for this observation.

REFERENCES

- Abercrombie, D. (1967) *Elements of General Phonetics*. Edinburgh U.P.
- Crystal, D. (1971) 'Prosodic and Paralinguistic Correlates of Social Categories', in E.Ardener (ed.), *Social Anthropology and Language*, pp.185-206. London, Tavistock.
- Honikman, B. (1964) 'Articulatory Settings', in D.Abercrombie, D.B. Fry, P.A.D.MacCarthy, N.C.Scott and J.L.M.Trim (eds), *In Honour of Daniel Jones*, pp.73-84. London, Longman.
- Jones, D. (1938) 'Concrete and Abstract Sounds', in *Proceedings of the Third International Congress of Phonetic Sciences*. Ghent.
- Key, H. (1967) *Morphology of Cayuvava*. The Hague, Mouton. (= Series Practica 53).
- Ladefoged, P. (1967) *Three Areas of Experimental Phonetics*. Oxford University Press.
- Laver, J. (1964) 'The Synthesis of Voice Quality', *PAT Report*, University of Edinburgh.
- (1968) 'Voice Quality and Indexical Information', *British Journal of Disorders of Communication*, 3:43-54.
- (1975) *Individual Features in Voice Quality*. University of Edinburgh, Ph.D. Thesis.
- Trudgill, P. (1973) 'Phonological Rules and Sociolinguistic Variation in Norwich English', in C.-J. Bailey and R.W. Shuy (eds), *New Ways of Analyzing Variation in English*, pp.149-63. Georgetown U.P.
- (1974) *The Social Differentiation of English in Norwich*. Cambridge U.P.
- Wilkins, J. (1668) *An Essay towards a Real Character and a Philosophical Language*. London, John Martyn.