The Basis of Articulation[*]

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0. Introduction.

Most of those who have written about the basis of articulation have done so with mixed feelings. Bloomfield considered the basis worth discussing but characterized observations regarding it as necessarily "vague...hazy and inaccurate" (1933:127-8). Sweet, though according the topic prominent mention (1906:74-5; 1911:4), cautioned that "no language carries out the tendencies of its basis with perfect consistency" (1906:75). Malmberg, likewise granting the existence of an "articulatory basis", refers to the term as "a convenient, but not strictly scientific label" (1963:71). The reaction of Vildomec appears to typify that of many writers: claiming not to know what the basis is exactly, he assures us that it is nonetheless "of primary importance" (1963:218). Definitions have been attempted, such as this disconcertingly vast one by Honikman[1]

> the gross oral posture and mechanics, both external and internal,
> requisite as a framework for the comfortable, economic, and
> fluent merging of and integrating of the isolated sounds into
> that harmonious, cognizable whole which constitutes the
> established pronunciation of a language (1964:73)

but despite her attempt to refine the notion and revive interest in it, and the more recent attempt to do so by Drachman (1970), present-day linguists have all but abandoned this traditional concept.

There are at least two reasons for the current neglect of the basis of articulation. The first is practical: as Table 1 indicates, almost every aspect of phonology has on occasion been consigned to the basis. Clearly, by swallowing up all these considerations the basis has made itself unapproachable. But there have also been theoretical reasons to ignore the basis: Chomsky and Halle specifically exclude it from consideration on grounds that its effects are "not locatable in particular segments but rather extend over entire utterances" (1968:295). As such, the basis, though acknowledged to exist, is seen as essentially irrelevant to both underlying and phonetic representation, hence to phonology.

Table I
Some Aspects of Phonology Included in the Basis of
Articulation According to Various Writers

1. Favored position of the tongue (DHfHMST)
2. Degree of lip activity (DHMS)
3. 'Gravitation' of all articulatory muscles toward a particular locus or axis (H)
4. Syllable division (BD)
5. Degree of tension of the articulators (HaHMV)
6. Shape of lips (H)

7. Characteristics of timing, stress, and pitch (TV)
8. Time consumed by articulatory gestures (HT)
9. Segment inventories (BDM)
10. Retraction of the jaw (B)
11. Voice onset time (D)
12. Features of the articulators determined by race (T)
13. Precision of articulation (BM)
14. Location of resonance centers (D)
15. Extent of articulatory gestures (B)
16. Spread of nasalization (D)
17. Degree of nasalization (M)
18. Psychological dominance of vowels over consonants (D)
19. Point of articulation (D)
20. Diphthongization (M)

B - Bloomfield 1933
D - Delattre 1966
H - Honikman 1964
Ha - Haden 1938
Hf - Heffner 1950
M - Malmberg 1963
S - Sweet 1906
T - Thalbitzer 1904
V - Vildomec 1963

1. The basis and Natural Phonology.

It is within the context of a natural theory of phonology that the
possible significance of global properties of utterances reemerges. While
at present the basis of articulation as such plays no important role in
any phonological theory, the theory of Natural Phonology (Stampe 1969,
1973; Donegan and Stampe 1979) invites reassessment of the basis in a
way that the standard generative model does not: in the generative frame-
work a theory is explanatory if it provides a description of the set of
possible grammars and a procedure for selecting the correct grammar for
given data (Chomsky 1965:34). Natural Phonology identifies explanation
instead with determining how phonology is "governed by forces implicit
in human vocalization and perception" (Donegan and Stampe 1979:126), thus
inviting the question of whether the way the tract is set up for speaking
affects the nature and interaction of these phonological forces ('processes').

A difficult hurdle stands before anyone who would resuscitate the
basis of articulation, however. Even if it can be shown that, say, the
French tongue 'prefers' a particular position, how can we know that this
position does not simply reflect the rule system of French; that is, how
do we know that the favored tongue position is not a secondary effect
deducible from the rule system of the language by somehow plotting what
would be the most convenient 'homing' position for the articulations of
French? If the basis of a language is of any great phonological importance,
it must to some extent play a determining role.

It is at first hard to see what kinds of evidence might be brought
to bear on the issue. If language L homes to tongue position T and employs
process P, application of which is facilitated by T, we certainly can't
claim that T is responsible for the existence of P in L; neither can we
indisputably claim the reverse--that T is determined by the processes

of L--since these two possibilities are superficially identical. A reasonable response to this difficulty is to ignore it and view the basis as a pleasant mystery. But if the basis of a language does in fact determine aspects of its phonological structure, continuing to ignore the basis would hobble our understanding of phonology. In the remainder of this paper I want to explore evidence for the existence of bases of articulation and for their role in determining phonological structure. To make the discussion manageable, I will restrict attention to positional settings of the tongue and lips. This is not to imply that the basis is less ornate than Table I would suggest; it seems necessary to start, though, with something observable and fairly simple.

If bases of articulation exist, their reason for doing so is surely to accommodate the articulations of particular languages. What does not seem to have been properly appreciated is that the influence will also pass in the opposite direction. The point here is that there is a direct relationship between phonetic difficulty and actual physical properties of the tract. Lenition processes respond to specific difficulties involved in achieving the successive articulatory positions required for speech, but different things will be difficult for a 'normal' speaker and one whose tongue, for example, has been partially excised for medical reasons, or whose tongue is very large, or who suffers from a severe overbite. If it makes sense to speak of naturalness at all, lenitions must respond to the actual tract. Strictly speaking, there is of course one genetic tract per person, but if the muscles can be set up differently, the physical reality upon which the articulations of a language are imposed will also differ. If such settings exist, the tract set up by a native speaker of English and the one set up by a native speaker of French are physically distinct, and what is easy for the one will to an extent differ from what is easy for the other in ways that cannot be understood by looking at a universal set of processes defined with respect to the genetic tract alone.

Drachman (1970) suggests that the basis "is required in order to trigger the presently (plausible and) productive rules of the language... Thus, [for English] Palatalization but not Spirantization, vowel nasalization and flapping of dentals but not the English Vowel Shift" (475). If this were the whole story, the basis could be viewed as determined by the rules. But Drachman adds that in acquisition the basis "may..., exceptionally, dominate the rule system, with the result that rules are...modified, reordered or even suppressed" (475). This bilateral influence on each other of the plausible, productive rules and the tract Drachman terms a "conspiracy". While he adduces no specific examples of children hitting on an incorrect basis, such effects probably do occur.[2] However, I would question the notion that tract dominance is a matter of modifying, limiting, or suppressing phonological processes, and I will argue in section 2.5 below that tract dominance needn't be exceptional.

To the extent that processes dominate the basis, it does make sense to say that the basis "triggers" them. This is simply a precise restatement of the traditional claim that the basis facilitates certain characteristic language-particular features of pronunciation. But it is peculiar to state that in the opposite case--when the basis dominates--the same processes are suppressed, modified, or limited by the basis, for this deprives the processes of their phonetic motivation. Suppose that a child mistakenly adopts a basis that fails to facilitate palatalization in a language in

which adults do palatalize. The child has not thereby suppressed palatalization, but has only adopted a tract configuration for which palatalization is irrelevant.[3] It is not that the process is muzzled, but that the dog-house is empty; for that child with that tract set as it is, palatalization is not a natural, phonetically motivated process. If we wish to think of natural processes as representing the system of implicit restrictions on the speech capacity, we cannot simultaneously hold that processes which do not apply in a language due to its basis are suppressed or limited, since this ascribes to them some metaphysical existence apart from the basis in phonetic reality which chiefly recommends them to us.

The point is that processes conspire with the basis more fundamentally than Drachman suggested: the processes of a language exist with respect to particular bases which provide their phonetic motivation. I expect that if this fact is taken properly into account, it will initially complicate the study of phonology, but will eventually lead to better understanding of the differences between languages.

2. Reality of the basis.

To this point in the discussion it is an open question whether the basis is a mythic beast or a psycho-physical fact. Indeed, most of the evidence in favor of bases of articulation is of a questionable sort, namely, impressions gained listening to speakers of a language or attempting to approximate their speech. Honikman's (1964) and Sweet's (1906) comparisons of French, German, and English, for example, are of this sort. The best evidence would be cineradiography or some less carcinogenic technique for observing the articulators during speech. There seem to be no published cineradiographic studies that specifically address this question, which is not surprising, since the task is formidable. It would require close comparisons of series of measurements from the running speech of numbers of informants using very high speed film. Such studies are definitely needed to validate claims about the basis and would, I feel sure, repay the effort.

2.1. Hesitation vowels.

Lass suggests that hesitation vowels "might...be a source of information about a truly linguistic 'neutral position'" (1976:44); a connection between hesitation vowels and the basis is also implied by Hinds (1973:259). The idea that the hesitation vowel of a language and its basis are related has great appeal.[4] The hesitation vowel in French is mid to low, somewhat front, and often somewhat rounded (discussion below). The articulatory position that would produce this vowel is precisely that which has been imputed repeatedly to the French basis (e.g. by Sweet, Delattre, Honikman, Bloomfield; a parallel claim can be made for German, where the basis is traditionally deemed similar to that of French, though not quite so front).

2.2. Incidence of English uh.

There appear to be no careful studies of hesitation vowels in particular languages. In an informal study of my own I found that there is not as much variation in these vowels in English as the literature suggests. Key (1977:94) mentions various hesitation 'noises' for English. Coupling her list and mine, a small set emerges:

$$[ə{:}] \quad [\tilde{ə}m] \quad [əb] \quad [ɚ{:}] \quad [æ{:}] \quad [ɛ{:}] \quad [a{:}].^{5}$$

What this list fails to express is the overwhelming predominance of
[ə:]. I recorded the incidence of hesitation vowels for 42 speakers while
listening to a radio call-in show. Of 42 callers, 41 used hesitation vowels.
Of these 41, used [ə:], three also used [ə̃m] and one used [əb]. Evidently,
[ə:] is the hesitation vowel _par excellence_ in English (cf. Maclay and
Osgood 1959:24). Although _er_ is a frequently cited possibility and occurs
in comics and transcriptions of conversations, I have heard it in speech
only a few times, and invariably it marked occurrence of a speech error,
as in "I know it from the show...er...the movie." [ɚ:] in this case may
be a reduced form of the word _or_. Note, though, that _er_ is the British
spelling of [ə:] or [ɜ:]; so some American English [ɚ:]'s might arise
as spelling pronunciations.

2.3. Function of uh.

There is evidence that _uh_ functions in discourse. It occurs more
in dialogues than monologues (see Rochester 1973), no doubt due in large
part to its use to hold the turn. Filled pauses occur less frequently
in stories to passive audiences (Levin and Silverman 1965), where the
turn-taking dynamics are relaxed. Consistent with this, Davy and Quirk
(1969:114) comment that 'voiced pause' is not used when speaking to oneself.
Studies of the placement of _uh_ and other hesitations (Boomer 1975; Goldman-
Eisler 1958) indicate that _uh_ appears primarily in three locations: (a)
at grammatical juncture, (b) at other constituent boundaries, and (c)
before the first content word within a constituent. Such studies have
not been sensitive to the discourse functions of _uh_. Without recourse
to discourse structure, placement of _uh_ before the first content word
of a constituent cannot be fully explained. It is clear that to hold
a turn, one could begin a constituent before completely planning it, since
beginning at all reserves the turn, while not doing so invites an interruption
(cf. Sacks, et al 1974:718-20). I have observed four distinct uses of
_uh_ in conversation: (a) to reserve the turn during, for example, word
search, (b) to indicate desire to take the turn, (c) to indicate disagree-
ment with what another has said without intention to take the turn, and
(d) to indicate presence in conversational settings where this might be
questioned, for example, on the telephone.

To say that _uh_ has complex functions in discourse is not, however,
to disqualify it as a neutral vowel with properties attributable to the
basis. Three considerations bear on this: (a) If _uh_ is learned as an
arbitrary word, there is no way to account for the identity of _uh_'s vowel
with that of the other two most common filled pause alternatives, [ə̃m]
and [əb]; (b) Filled pauses in various languages[6] are never fully high,
back, front, or rounded, though they can approximate these qualities
to a degree (see my comments on _l'e muet_ below). If filled pauses are
learned, we might expect to find [o], [u], [ʊ], [ü], or even a diphthong
turning up as the regular hesitation vowel in some languages, but we don't;
(c) One would expect the hesitation vowel of a language to involve the
minimal vocal gesture that will hold a place in speech. Simply initiating
voicing is the easiest way to accomplish this. The quality of the vowel
would then directly reflect the tongue position of the basis of articula-
tion.

It is almost certainly incorrect to regard uh as a speech error (e.g. Clark and Clark 1977:262), both because it is clearly functional, and because it appears to interact with a linguistic rule. Jefferson (1975:183-4) notes that the definite article in English regularly takes its prevocalic form [ði] before uh, rather than its preconsonantal form [ðə] (unless a speaker wishes to convey the impression of correcting an error, in which case the wrong variant may be chosen to display this intention). Jefferson concludes that uh is "at least a projectable syntactic unit, and is perhaps characterizable as having the status of a word in the English language." The point I wish to make is that while uh is certainly a linguistically functional unit, and may even have the status of a word, its phonetic quality is not arbitrary; in fact, one could argue that this vowel is non-phonemic.

2.4. French schwa.

As mentioned above, the hesitation vowel in French is somewhat front and often rounded. The same is true of l'e muet, the French schwa in le, je, que, etc. A parallel statement can be made regarding the English unstressed schwa in sofa, which seems indistinguishable from the English hesitation vowel. The quality of the French schwa has been hotly disputed among those who care. It is now fashionable to regard l'e muet as central, and in one way this seems correct. There is excellent evidence that l'e muet doesn't significantly overlap with the French front rounded vowels and belongs further back than them on an acoustic vowel diagram. Schane (1968:30) is correct to assign l'e muet the feature [-front] based on Pleasants' general conclusion that

> il a son point d'articulation en arrière de celui de eu fermé
> et même de eu ouvert...Les caractéristiques de l'articulation
> de [ə]...sembleraient indiquer que [ə] est une voyelle centrale.
> (1956:247)

However, the phonology and the phonetics of this vowel are distinct matters. It is clear from other remarks by Pleasants, including the following, that French schwas are in fact somewhat fronted:

> L'[ə] de nos expériences se place juste à la limite qui sépare
> les voyelles antérieures des voyelles centrales. (1956:58).

For further evidence that l'e muet is phonetically fronted, we may look to its stressed variant. It is often claimed that in imperatives like dites-le, where normally unstressed schwa received stress, /ə/ is replaced by /ø/. The rationale for this is that speakers recognize that /ə/ cannot bear stress and so substitute another vowel for it (see Price 1971:78). If this analysis is correct, the phonetic fronting of /ə/ would explain why /ø/ in particular is chosen as the substitute for /ə/. But a careful look at the phonetic quality of stressed schwa makes the substitution of /ø/ look implausible. Pleasants argues extensively (1956:38-43; 59; 72-3; 253-68) that stressed /ə/ is phonetically distinct from both stressed /ø/ and /œ/. It appears, therefore, that stress simply enhances the frontness of /ə/.

What I am suggesting is that if a language uses a neutral vowel in positions of reduction, the quality of the vowel will be identical to that of the hesitation vowel of the language, and both will reflect the basis. In some languages the neutral vowel will not be transparently equivalent to the hesitation vowel because of coarticulation with adjacent segments, but one might expect the basis coloring to come through, for example, in open syllables after [h]. These remarks are of course speculative, but the identity of the hesitation and schwa vowels in French (and, apparently, English) makes it at least plausible that schwas reflect the basis.[7]

2.5. Epenthesis.

Daly and Martin (1972) suggest a minor connection between the basis of articulation and the phonological rules. They claim that the phonetic properties of epenthetic vowels introduced for syllabification "are at least partially determined by the base of articulation of the particular language" (1972:608). They propose the following three restrictions (1972: 610):

1. A language may have an epenthetic /i/ if and only if that language has a palatal or a palatalized series of consonants;
2. A language may have an epenthetic /a/ if and only if it has a pharyngeal or pharyngealized (perhaps a glottal or glottalized) series of consonants;
3. A language may have an epenthetic /ɨ/ if and only if it has a labio-velar or (labio)velarized series of consonants.

Unfortunately, they cite no data in support of these restrictions,[8] nor of their general claim.

Responding to Daly and Martin, Hinds (1973) argues against these claims using examples of marked epenthetic vowels in languages which have no marked consonants. He argues exclusively from loan words in Japanese and Koran, citing as precedent Daly and Martin's use of Turkish loan words to illustrate a claim about harmony. The use of loan phonology invalidates Hind's objections, however, since vowel insertion in borrowing is fundamentally different from proper epenthesis. Hinds' evidence against two of Daly and Martin's claims is from Japanese, which 'epenthesizes' [i], [e], [a], [o], and [u] in loan words. Ohso (1973), however, makes it clear that the insertion of these vowels involves interpreting the foreign target with respect to the segment inventory and processes of Japanese. In fact, from the point of view of a speaker of Japanese, such vowels are not inserted at all--they are seen as vowels that were incorrectly deleted by the foreign speaker. They are insertions only from the point of view of the language borrowed _from_.

Daly and Martin are probably right to say that the basis has a hand in determining the quality of epenthetic vowels, but it will be difficult to sort out the basis-influenced vowels, because some languages epenthesize phonemes unrelated to their basis; Egyptian Arabic, for example, epenthesizes [i] in all epenthetic environments (Broselow 1976), though it shares with other forms of Arabic a rather pharyngeal, rather low, rather back hesitation vowel. That other languages do epenthesize basis-colored vowels is indicated by the epenthesis of l'e muet in French (Pleasants 1956:155-60; Schane 1968:31-2) or of schwa in English (as in athlete, [ǽθəlit]).

2.6. French [R].

Delattre (1966:10-11) discusses 'le Mode Antérieur' of French, a
collection of characteristics which together give French pronunciation
a fronted quality. In his words, "parler sur le Mode Antérieur veut dire
porter les lieux d'articulation, les centres des cavités de resonance,
le plus possible vers l'avant de la cavité orale" (10). He includes the
following as characteristic of this mode: (a) the convex and bulged-forward
shape of the tongue body; (b) by comparison with English, a further forward
point of articulation for [t], [d], [n], and [l]; (c) pronunciation of
[s], [z], [š], and [ž] with the apex of the tongue curved downward so
that the fricative aperture is strictly laminal; (d) preponderance of
front vowels over back ([ieEyøoe] vs. [uoɔ]); (e) preponderance of rounded
vowels over unrounded ([yøoeuoɔ] vs. [ieE]); (f) greater coarticulatory
rounding (especially of labial consonants: cf. Fr. pour and Eng. poor)
with following rounded vowels than in English.

Interestingly, Delattre includes French uvular [R] as a further symptom
of this anteriority. On the historical replacement of apical trilled
[r] by [R], Delattre says, "c'est grâce à cet r dorsal que la langage
peut conserver sans interruption la position bombée convexe qui favorise
la résonance antérieure générale" (1966:11). A Frenchman whose tongue
tip suddenly adhered to his lower teeth would be a gastronomical cripple,
but could enunciate his order perfectly.[9]

It would be wrong to say that the French basis of articulation deter-
mines that French /r/ should be uvular; this is simply not the case.
Some dialects of French preserve the apical trill, and there was a long
period in the history of French when the apical /r/ lingered despite the
presence of other aspects of anteriority.[10]

The issue that all of this raises is an historical one. There is
too much anteriority in French to be due to mere accident. The change
to uvular [R] in particular is striking. It appears that the basis of
articulation of French is holding sway in the court of phonological change.
The effect seems at odds with that of push and drag chains, which aim
at distinctiveness. The general tenor of developments in French has been,
as much as possible, to move the focus of articulation to the front part
of the mouth. There are limits on how far this kind of thing can go,
but French seems to be doing its best to reach them.

It is precisely in a case like this that the basis, nonexceptionally,
influences the processes of a language. The change from [r] to [R] accommo-
dates the basis, rather than the other way around. The picture that emerges
is this: the primary function of the basis is to accommodate the articulations,
but in so doing the basis becomes itself a thing, with its own habits
and sluggishness, and so influences the kinds of variation likely in the
language, and thus also its diachronic development. It seems very likely
that this state of affairs can explain why it is that some languages retain
quite marked series of consonants--say, pharyngeal ones--over long periods
of their development, without tending to give them up in favor of less
marked articulations. Just as processes must be defined with respect
to the basis, so must the markedness of segments. The claim that pharyngeals
are marked should come as a surprise to the speaker of Arabic, whose basis
is low and back.

3.   The basis and 'neutral position'.

Jakobson et al. (1951) proposed the existence of a 'neutral position'
of the tract, assumed to be universal and to approximate the position
for a very open [æ]. The neutral position is one taken during speech,
since it is claimed to be important "for predicting the effects on formant
positions of variations in the overall length of the vocal cavity of differ-
ent individuals," and "also serves as a reference point for the tenseness
feature" (18).

Chomsky and Halle (1968:300) adopted the notion of a speech neutral
position, though they specified the position of the tongue body as roughly
that for the vowel in English bed, but with the blade of the tongue at
rest (compare 1968:300 and 304). Lass makes a revealing comment in this
connection:

> It is interesting that the neutral position in SPE is much closer
> than that given by Jakobson et al...there is no discussion of why
> it has shifted so far up, which tends to make one suspicious that
> it is an analytical convenience rather than a fact about languages.
> Actually Chomsky and Halle need an essentially 'front' and 'mid'
> neutral position, because the features [high, low, back] are defined
> in terms of the deviation from just such a position. (1976:44).

Chomsky and Halle distinguish the neutral position from that associated
with the basis of articulation (1968: compare 295 with 300), which allows
them to claim that the neutral position is universal--and use it as a
reference point for the distinctive features--while claiming that the
basis is not. This gambit, however, leaves them in the awkward position
of claiming that the deviations from neutral involved in producing, for
example, a [+high] segment are deviations from the--at that point--abstract
speech neutral position, not the actual in-speech homing position deter-
mined by the language-specific basis.

I know of no evidence whatsoever for the separate existence of a
universal neutral or speech-ready position, nor for that matter, any evi-
dence that the positions for unfilled and filled pause are distinct, or
that any of the positions just mentioned are in fact distinct from that
for the basis of articulation.

4.   Secondary articulations.

Daly and Martin (1972:612) observe that while the presence of velar-
ization in a language tends to correlate with the quality of the basis
of articulation, the presence of a series of velars does not; in general
the basis of a language is more associated with its secondary than its
primary articulations. This can be explained by referring to Perkell's
observation that in cineradiographic studies there can be observed two
separate articulatory systems at work, a slow and gross vowel-producing
system ('extrinsic') and a quick, precise consonant-producing system
('intrinsic'):

> ...the production of a consonant can be thought of as being a
> gesture superimposed on the continuously varying vowel producing
> system...coarticulation effects of vowels are, for the most part,
> manifested by influencing the position of the consonant-articula-
> ting organs rather than by altering the manner of articulation...

the positioning element of consonant production is performed by the slow extrinsic system and it is strongly influenced by coarticulatory effects. This positioning aspect presumably also operates to produce secondary features of consonant articulation such as palatalization, labialization, and pharyngealization.

Deformation of the articulatory organs is superimposed on the positioning element, and the deformation is performed by the action of fast, precise intrinsic musculature. (1969:65-66)

If we consider the positioning elements of the basis to operate on the gross, extrinsic system, we can neatly account for its correlation with secondary rather than primary articulation.

5. Conclusion.

As I have been using the term 'basis of articulation', it designates the language specific homing positions of the articulators in running speech. Such positions appear to directly determine the quality of the predominant hesitation vowel of a language and may also influence the quality of vowels used in positions of reduction and epenthesis. In a larger discussion of the basis it would be necessary to include many of the other global phonological properties of utterances listed in Table I, and others.

In general it seems necessary to distinguish setting phenomena from 'local' ones, like processes, and to acknowledge the connection between the two. I have suggested that this connection is one of interdependence: the basis accommodates the articulations of a language, but the direction of influence may also be reversed so that the basis is itself accommodated. Finally, I have claimed that to characterize such notions as 'phonetic motivation' and 'markedness' without reference to bases of articulation is to buy universality of description at the expense of phonetic reality.

Research needed to clarify this area of phonology includes the following: (a) careful instrumental studies of the homing positions of the articulators in running speech for various languages; (b) close measurements of the phonetic properties of naturally occurring hesitation vowels for various languages; (c) comparison of the data from (a) and (b); (d) cross-language studies of the historical persistence of bases of articulation; (e) studies of the acquisition of bases of articulation and their influence on the sound substitutions children use.

Footnotes

[1]Not all of the writers I will mention use the term 'basis of articulation' but they all seem to be getting at the same thing, whether they use 'organic basis' (Sweet), 'tract setting' (Honikman), or one of a half dozen other terms.

[2]While I am aware of no published remarks to this effect, it is a commonplace among students of child language that some children begin with, for example, a very palatal(ized) inventory, or lots of rounding.

[3] I am not talking here about a child who is trying not to palatalize for some reason and uses the basis to accomplish this goal (if such a thing ever happens) but the simpler case of a child who just plain gets the basis wrong.

[4] It may not be that the hesitation vowel of a language is invariably determined by its basis of articulation. It is conceivable that in some languages this vowel would be learned independently, putting it on a par with 'hesitation words' like the English interjection well, but I know of no such languages.

[5] Except with [ə̃m] and [əb], some nasalization is optional, probably a result of not controlling the velum rather than intending to produce a nasalized vowel.

[6] I hesitate to cite the hesitation vowels for languages other than English, French, and German, because I have gotten conflicting opinions from native speakers of other languages. Often an approved literary hesitation vowel is offered, but it differs from what the speakers really do. I prefer to send this question to the phonetics lab--it is, after all, a simple enough matter to make spectrograms of hesitation vowels occurring in ordinary conversation.

[7] Once again, it is best left to the laboratory to determine if a language's schwa and its hesitation vowel are alike.

[8] I doubt that these restrictions are right in lumping together primary and secondary articulations. See my comments in 4.0.

[9] It is amusing and instructive to try to read a passage of French aloud with the tongue loosely held in the position just described, and then a passage of English. The English is quite distorted, while the French sounds only faintly, if at all, unnatural.

[10] The change to [R] cannot be dated precisely, but it is known to have occurred in the late seventeenth or early eighteenth century. A thorough discussion of this change is found in Nyrop (1914:42-8).

References

Bloomfield, Leonard. (1933). Language. New York: Holt, Rinehart and Winston.

Boomer, Donald S. (1965). Hesitation and grammatical encoding. Language and Speech 8.148-9.

Broselow, Ellen I. (1976). The Phonology of Egyptian Arabic. Ph.D. Dissertation, University of Massachusetts.

Chomsky, Noam. (1965). Aspects of the Theory of Syntax. Cambridge, MA: MIT Press.

Chomsky, Noam, and Morris Halle. (1968). The Sound Pattern of English. New York: Harper and Row.

Clark, Herbert H. and Eve V. Clark. (1977). Psychology and Language. New York: Harcourt Brace Jovanovich.

Daly, D. M. and L. W. Martin. (1972). Epenthetic processes. Papers in Linguistics 5.4.

Davy, D. and R. Quirk. (1969). An acceptability experiment with spoken output. Journal of Linguistics 5.109-20.

Delattre, Pierre. (1966). Studies in French and comparative phonetics. Janua Linguarum 18. The Hague: Mouton.

Donegan, Patricia J. and David Stampe. (1979). The study of natural phonology. in Current Approaches to Phonological Theory, ed. by Daniel A. Dinnsen. Bloomington, IN: Indiana University Press.

Drachman, Gaberell. (1970). Rules in the speech tract. in Proceedings of the Sixth Annual Meeting of the Chicago Linguistic Society.

Goldman-Eisler, Frieda. (1958). Speech production and the predictability of words in context. Quarterly Journal of Experimental Psychology 9-10: 96.

Haden, Ernest F. (1938). The physiology of French consonant changes. Language dissertation No. 26. Supplement to Language 14.4.

Heffner, R-M. S. (1950). General Phonetics. Madison: University of Wisconsin Press.

Hinds, John. (1973). On 'epenthetic vowels'. Papers in Linguistics 6.2.

Honikman, Beatrice. (1964). Articulatory settings. in In Honor of Daniel Jones, ed. by D. Abercrombie, et al. London: Longmans.

Jakobson, Roman, C. Gunnar M. Fant, and Morris Halle. (1952). Preliminaries to Speech Analysis. Cambridge, MA: MIT Press.

Jefferson, Gail. (1975). Error correction as an interactional resource. Language in Society 3.181-199.

Jespersen, Otto. (1904). How to Teach a Foreign Language. (trans. by Bertelsen). London: George Allen and Co. Ltd.

Key, Mary Ritchie. (1977). Nonverbal Communication: a Research Guide and Bibliography. Metuchen, NJ: Scarecrow Press.

Lass, Roger. (1976). English Phonology and Phonological Theory: Synchronic and Diachronic Studies. Cambridge: Cambridge Univ. Press.

Levin, H. and I. Silverman. (1965). Hesitation phenomena in children's speech. Language and Speech 8.67-85.

Maclay, Howard, and Charles E. Osgood. (1959). Hesitation phenomena in spontaneous English speech. Word 15.19-44.

Malmberg, Bertil. (1963). Phonetics. New York: Dover.

Nyrop, Kr. (1914). Manuel phonétique du francais parlé. 3rd edition. Copenhagen: Copenhague et Kristiania.

Ohso, Mieko. (1973). A phonological study of some English loan words in Japanese. OSU WPL 15:1-26.

Perkell, Joseph. (1969). The Physiology of Speech Production. Cambridge, MA: MIT Press.

Pleasants, Jeanne Varney. (1956). Études sur l'e muet. Paris: Librairie C. Klincksieck.

Pope, M. K. (1934). From Latin to Modern French with Especial Consideration of Anglo-Norman. Manchester, England: Manchester University Press.

Price, Glanville. (1971). The French language present and past. London: Edward Arnold.

Rochester, S. R. (1973). The significance of pauses in spontaneous speech. Journal of Psycholinguistic Research 2.51-81.

Sacks, Harvey, Emanuel Schegloff, and Gail Jefferson. (1974). A simplest systematics for the organization of turn taking for conversation. Language 50.696-735.

Schane, Sanford. (1968). French phonology and morphology. Cambridge, MA: MIT Press.

Stampe, David. (1969). The acquisition of phonetic representation. in Proceedings of the Fifth Annual Meeting of the Chicago Linguistics Society.

Stampe, David. (1973). A Dissertation on Natural Phonology. Ph.D. Dissertation, University of Chicago.

Sweet, Henry. (1906). A Primer of Phonetics. 3rd ed. Oxford: Clarendon Press.

Sweet, Henry. (1911). A Primer of Spoken English. Oxford: Clarendon Press.

Thalbitzer, William. (1904). A Phonetical Study of the Eskimo Language. Copenhagen: B. Luno.

Vildomec, Věroboj. (1963). Miltilingualism. The Netherlands: A. W. Sythoff-Leyden.