THE RELEVANCE OF THE NOTION "BASIS OF ARTICULATION"
TO CONTRASTIVE PHONETICS

JANISIA ORGA

The University of Groningen

For the purposes of this paper the following definition of the "basis of articulation" (called also "articulation basis" or "base") will be adopted:
the system of characteristic articulatory movements of a given language that confer upon it its general phonetic aspect (Chomsky and Halle 1968:206, after Marouzou 1943:38).

To justify the incorporation of the notion into contrastive analysis on
the phonological plane I shall attempt to demonstrate that:

1. contrastive (pedagogical) analyses which do not account for differences between the articulation bases of the languages compared, i.e. do not include descriptions and comparisons of those composite articulatory actions in their totality, do not capture an important aspect of the differences in the phonetic nature of the languages and are, therefore, incomplete;

2. teaching programmes based on such incomplete contrastive analyses cannot assure a fully satisfactory mastery of the target language pronunciation (Honikman 1984:74) says in this context: "... where two languages are disparate in articulatory setting, it is not possible completely to master the pronunciation of one whilst maintaining the articulatory setting of the other";

3. the acquisition of the articulation basis of the target language constitutes an important step towards eliminating "foreign accent". (Indeed, it can be learnt by an average learner in a very short time, which, in view of the general emphasis on cost effectiveness, cannot be disregarded).

None of the above claims can be proved unless a definition is given of
the set of parameters from which descriptions of articulation bases are
generalized. In order to abstract, as it were, those parameters from the
phonetic substance of languages let us start by examining the pedagogical situa-
tion, the argument for such procedure being that, through the elimination of factors that are included in any standard contrastive treatment of the pronunciation of a foreign language, it is possible to arrive at that residue which had best be discussed under the general heading of the basis of articulation. The “standard” approach appears to be based on phonemic analysis and the ensuing discussion will refer mostly to that framework. It may be that generative phonology will either supplement it or supplant it (and the basis of articulation will be described in a “metascalar” of the type suggested by Kim 1972); I believe, however, that the practical descriptions of the articulation basis will be formulated in much the same way, whatever their underlying theoretical framework.

The aspect of pronunciation which is given priority in all foreign language courses is the acquisition of the phonological distinctions of the target language, i.e., the suppression of phonological interference. That involves, in terms of articulation, the mastery of the principal variants of particular foreign phonemes and of those prosodic features that are functional (i.e., distinctive) in the communicative sense. In the “minimum” programmes which aim primarily at achieving the ability to communicate in the foreign language, the phonetic means used to maintain the phonological distinctions of the target language are not particularly important. As Abercrombie (1967:5) puts it,

“... a medium is far from completely absorbed by being a vehicle for a specific language. There is always a certain amount of play, as it were, within the limits of the patterns; all that is necessary for linguistic communication is that the contrasts on which the patterns are based should not be obscured.”

Thus, as long as e.g. the four German phonemes [ɛ], [ɛ], [ʊ], [ɔ] are not all realized by the Polish learners as [ɛ], or English [θ] is not realized as [θ] or [t] (cf. them, sit, sit, bit) or send is not confused with sent, there is quite a wide margin of acceptable realizations. These are usually the native “equivalents”, e.g. the Polish rolled [r] used for the English continuant [r], or in the case of “unfamiliar” sounds — approximations, e.g. [s] used for the English [s] and interdental instead of dental [θ]. Such realizations might be called compensatory, as the mechanism of their formation resembles that of compensation in pathological speech of native speakers (see Drachman 1969).

The learner who by some means, such as above, has mastered the phonological distinctions of the foreign language during a “minimum” programme, will be able to communicate with the native speakers (i.e., will be understood — his own comprehension is not really ensured), but will have a more or less pronounced “foreign accent”. Most language courses, however, aim at a degree of phonetic accuracy and contrastive analysis is concerned with that aspect of pronunciation, to optimize communicativeness and add naturalness to the learner’s utterances in the foreign language, in other words, to reduce the heaviness of the foreign accent.

The question of what constitutes the “accentless”, natural speech (i.e., “consonant with the character of the language; instinctively felt and recognized by the native to be right; unexaggerated” (Honkula 1964: 83)) is best answered by reference to phonetic norms of a language or language variety. The word “norm” in this sense has been well described by Duska with reference to a certain prosodic feature of Polish, which is non-distinctive but

“... normalny w sensie stałego występowania... Ta norma umożliwia przestrzeganie jej tego co nią nie jest, umożliwia zaistnienie deformatii, a dalej ocenę ich jako ekspresyjnych lub jako obcojęzycznych względnie w ogólne pozajęzykowe...” (1957: 113, 115).

Phonetic norms are then abstractions from the utterances of particular speakers of a given language variety, which summarize the non-functional, i.e., redundant, phonetic features of that variety. When we consider Abercrombie’s remark about the “play” within the limits of the language patterns, we must remember that it is not totally a game without rules. Each language has its own phonetic (articulatory) redundancies (though there are certain universal conventions involved — see e.g. Stemple 1969, Drachman 1970). The norms have to be extracted from individual realizations: what we actually hear is the realization of norms, the core common to all non-pathological speakers, with a wealth of idiosyncratic features superimposed on the core (lisp, nasal speech, adenoidal speech, earkey voice, permanent labialization, flattening of vowels, etc.) — all those individual characteristics that are either innate, habitual or cultivated. However, the establishment of norms to be studied for descriptive, contrastive, or clozeponary purposes is greatly facilitated by the speakers’ awareness of the norms: even without any particular training they are able to separate acceptable realizations of the norms from those that exceed the limits of acceptability (“hypercorrections”, speech defects, even such deviations that would not be classed as pathological by speech therapists). A representative set of the pronunciations considered to be the most “normal” is taken as the basis for study.

A standard contrastive approach to the teaching of the phonetic norms of the language to be learnt might be called atomistic or postural; although it accounts for some aspects of speech dynamics (articulations, assimilations, prosodic features), it is mainly concerned with giving details of the formation of both the principal and positional variants of phonemes and their distribution. Also, it is often assumed that no special teaching is required in the case of those sounds and prosodic patterns which are more or less the same as those of the native language. Thus Morawiec and Predota (1973:19) write:
The relevance of the notion "basis of articulation"

J. Ozga

...porównana analiza fonetyczna języka polskiego i niemieckiego wyka
dzanie, że niektóre głoski obu języków są, praktycznie biorą, takie same,
że takie same są niektóre połączenia, określone prawo asymilacji, czy
wreszcie pewno typy akcentacji i intonacji. Uczeń polski nieświadome,
bez żadnych specjalnych wyjaśnień i ćwiczeń, głoski te będzie wymawiał
poprawnie. Nauka tych głosek jest więc niepotrzebna'.

Consider, however, the following remark by Szule (1969: 40).

"...Nader rzadko zdarza się ..., aby dwa ałfofy, należące do dwóch róż
nych systemów językowych, miały identyczną aktualizację. Dzieje się
jak dla tego, że nie można w zasadzie dwóch języków o tych samych ogól
nych tendencjach aktualizacji".

The awareness of "general articulatory tendencies", which influence all
segments of utterances in a given language and add a layer of phonetic fea-
tures superimposed on the sequences of postures (not entirely identifiable
with assimilations, coarticulations and presodic features, though), is occa-
sionally voiced in manuals of pronunciation, e.g. "German must be spoken
"... Proper French pronunciation is achieved only by more vigorous arti-
culation and much greater use of lip muscles than for American English"
(Kochan and Collignon 1961: XII, quoted after Kelz 1971: 207). In most
textbooks, however, such non-segmental features are either not men-
tioned at all or described as features of particular segments, whereas un
important and time-saving generalization is missed, by not grasping the gen
eral co-

The spontaneous divining of the articulation basis of the target language
is usually prompted by both visual and auditory clues. However, the aud
itory effect is not a very reliable basis for imitation, because it is of necessity
described in impressionistic terms which are relative and vague. Thus, if
the imitation of English is based on the auditory term "muffled", an idio
synchronous pseudo-basis can emerge, which produces perceptual effects
which are perhaps more offensive to the native ear than straightforward native
basis. The ability of learners to imitate what they hear is questionable. This
has been the reason why not the auditory but the articulatory basis is the
older and the more familiar term. Kolosov (1971: 40) suggests that in the
blocking of the foreign articulation basis the auditory control should be
excluded in the first stages and a series of exercises with silent articulation
("bezsynchrane artikulirovanie") should be devised to "implant", as it were,
the target basis by referring to visual, tactile and kinaesthetic cues (cf. the
standard audio-lingual approach to the teaching of pronunciation).

Most of what has been said so far was familiar to that generation of phone
icians who studied the problem of the articulation basis towards the end
of the nineteenth century (though the notion of the phonological system
was not yet in use and the instrumental methods of investigating speech pro
duction were still imperfect). Most definitions of the term were given for
the purposes of language teaching, e.g.:

"Every language has certain general tendencies which control its organic
movements and positions, constituting its organic basis or basis of arti
culation. A knowledge of the organic basis is a great help in acquiri
the pronunciation of a language" (Sweet 1890: 69-70).

In fact, the descriptions of the articulation bases of languages were the
first attempts at contrastive analysis and it is somewhat ironic that there
is any need to demonstrate the relevance of the term to such analysis. This,
however, is not without reason: during the larger part of the time that has
elapsed between the coming of the term by F. Franke (c. 1884) and the
present day, no standardized parameters were provided for measuring the
basis of articulation of a given language. Although most of the insights of
the earlier phoneticians concerning the phonetic nature of languages were
intuitively felt to be correct, the vagueness of some statements and random
selection of parameters in the description of bases of articulation prevented
the term from being seriously considered in more recent times.

More exhaustive discussions of the definitions, origin, development and
application of the notion "basis of articulation" are given e.g. by Kelz
(1971) and Górka (1973). At this point I shall only review the three main
standpoints concerning the meaning of the term:

1. Articulation basis understood as the relative position of rest or neutral
position characteristic of a particular language ("relative Ruhelage", "In
indifferenzlage", "Sprechstellung") as opposed to the absolute position of
rest ("absolute Ruhelage", "Atennstellung");

2. Articulation basis understood as the position of the vocal tract just
before articulation begins ("aktive Sprechbereitschaftslage");
3. Articulation basis understood as the activity of the speech organs in the speech process (“Grunbaltung der Organe im Sprachprozess”) or as habitual articulatory tendencies of the speech organs in speech.

In the earlier definitions of the basis of articulation there was naturally no reference to the phonological system (pre-phoneme era); system is mentioned in Stopa (1948:17), where he distinguished a **systemic basis**: „Baza systemowa: zespół tendencji lub cech wymawianych wynikłych z rodzaju systemu fonetycznego danego języka” — and a **pronunciation basis**: „Baza wymawianowa: podstawa narzędzi mowy widoczna już w miąższeniu ale jawnie sięgająca najwyraźniej w momencie tuż przed otwieraniem ust dla wymówienia jakiegoś dziecka właściwego danemu językiem. Ma ona duże znaczenie praktyczne przy uczeniu języka obcego. Opanowanie tej bazy, czyli umiejętność przestawiania organów z postawy właściwej językowej ojczystej na postawę odpowiadającą językowi obecnemu, jest równoznaczna z nabyciem tzw. <akcentu owego języka>” (Stopa 1948:16).

In Chomsky and Halle (1968:800) the term “neutral position” is taken to mean a universal position that the organs of speech assume just prior to speaking (the position for the English vowel /e/ in the word bed); it appears that both the position for quiet breathing and the “Sprachberichtsteil” are language-independent. However, there are arguments against such treatment: Annan (1971:18) gives evidence for the language-specific character of the neutral position by examining the so-called “vocalic filled pause” in various languages (“...in my native Scots /ə/ or /e/ dependent on dialect or accent, Erse /a/ or /e/, Portuguese and Romanian /ñ/ or /ñ/, French /ø/, German and Swedish /ø/, Russian /o/ and Cameroons Pidgin /ɛ/ or /ɛ/). In Polish it is, I think, a slightly nasalized /æ/; the English /e/ of bed would probably sound somewhat odd.

The position described by Chomsky and Halle may be universal at early stages of phonological acquisition, which, Drachman states, (1970:467) are: “universal and the corresponding bases of articulation for those stages are likely to show many universal traits too... As the innate phonological system interacts with the abstract system of a particular language, it conspires towards such a basis of articulation as will automatically guarantee in detail the phonetic outputs sanctioned for any given dialect or style of speech in the language acquired”.

The recent date of such publica tions as Drachman’s (1969, 1970) or Kim’s (1972) indicates a revival of interest in the notion “basis of articulation”.

The development of natural phonology (see e.g. Stemple 1989) will undoubtedly provide new insights into the problematic of “programming adaptations” in the vocal tract.

At the moment the most satisfactory (pedagogically) account of the articulation basis is to be found in Honikman (1964). She is the only author to date who has attempted to give a description and comparison of articulatory settings of languages, which is based on a systematic examination of a definite set of articulatory parameters that can be experimentally investigated and verified. She distinguishes two articulatory settings: 1. **external** — which accounts for the over-all positioning of the lips and jaws, i.e., parts that are directly observable, 2. **internal** — the over-all positioning of the internal mobile organs of the mouth for natural utterance (1964:75). This is assessed by reference to the main consonant articulation (i.e., to the character of the phonological system of a language), to the position of the tongue (anchorage, tip, body, underside), and also to the state of the oral cavity — that is, to those aspects of pronunciation which are described with the help of instrumental data (X-ray radiographs, palatograms, linguograms, electromyography, etc.).

To illustrate the way in which the evidence about particular elements of the settings can be collected and used in formulating the over-all articulatory specificity of a language, I shall make a preliminary examination of those elements on the basis of the relevant data from Polish. Simultaneously, a comparison with English will be made on the basis of the equivalent data from the British RP variety of English.

The data used are:

1. visual cues (about the position and “look” of lips, jaws and cheeks);
2. instrumental data (providing evidence about the internal setting);
3. sound statistics (the relative frequency of occurrence of sound-types or phonemes; will provide evidence about the influence of the sound system on both the external and internal settings).

In a full analysis of articulatory settings conclusions should be based on measurements of articulation for different subjects and then “computed to show statistical evidence” (Annan 1971:18). In the first approximation to be given here the statistical evidence is shown in terms of phonemes and only in one case are variants referred to (palatalized variants of consonants). In a more detailed study other variants will have to be considered, e.g. the two-segmental realizations of Polish nasal vowels /ɛ/, /ş/ and the calculations readjusted accordingly. In fact, a statistical analysis of phone-types may be more reliable, as phonemic interpretations which strive for symmetry and economy of notation may obscure phonetic facts (e.g. some interpretations of English diphthongs).

**The external setting of Polish as compared to that of English.**

**Jaws.**

The position of jaws and their movement is to some extent determined by the frequency of occurrence of open vs. close vowels. Diagrams 1 and 2
present the frequencies of occurrence of particular vowels in English and Polish (based on the findings of Fry 1947, quoted after Gimson 1970, and of Steffen 1937). It can be seen from the diagrams that in Polish the vowels in the half-open-to-open region predominate (/e/ /a/ /ö/ /a/ — 69.2% of all), while in English the vowels produced in that region constitute only 24.4% of all vowels (including the four diphthongs whose first element only is found in the region considered). As Delattre (1969: 2) says, "English typically centers its articulation around the neutral vowel /ə/". This means that the lower jaw is more mobile in Polish than in English, because Polish has a higher percentage of the open articulations. Visual cues confirm the statistical result. "In English," says Honikman (1964: 2), "the jaw-movement is so slight and the internal setting such that the tongue is hardly ever visible during utterance." Indeed, the tongue can only be seen when e.g. /i/ is spoken by the deaf or to the deaf and the effect is very striking. The jaws in English are, then, loosely closed and "the aperture between the upper and lower teeth is generally never wide — at most about a finger's width" (Honikman 1964: 89). The mobility of the lower jaw in Polish may be emphasized by the slight clenching of the jaws in palatal or palatalized articulations. The movements are not only more extensive than in English but also more energetic (cf. the combinations V+i/ in Polish and the "unfinished" diphthongs in English).

**Lips**

The percentages of sounds produced with lip-rounding is low in both languages. Both English and Polish have only the front-unrounded and back-rounded series of vowels (cf. French and German); therefore the contrasting vigorous adjustment of lips is unnecessary. Rounding and accompanying protrusion is only intermittent. In English lips "mostly remain rather neutral, slightly and loosely apart, slightly cornered and with only moderate mobility" (Honikman 1964: 74-5). Stopes (1948: 16) remarks that English has "większą usta, wargi niemalże obwieskie.

In Polish the position of lips differs in one detail which has already been mentioned by Stopes (1948: 16): "Lagodne napięcie lekko cofniętych kątów ust" and which is also evident in the photographs of lips in Wierzchosława (1971). The pressure of the corners against the pre-molars is most noticeable in the pronunciation of palatal and palatalized consonants: it may be that this position has become habitual for all sounds (or most) but this strong claim will have to be tested.

**Cheeks**

In English they are neutral and relaxed; in Polish — because of the specific lip position — they appear alternately dimpled and puckered or elongated (stretched downwards) for the open vowels — but the dimpling effect is the most dominant.

**The internal setting of Polish as compared to that of English:**

The internal setting is partly determined by the main consonant articulation. In both languages it is the articulation in the denti-alveolar region which is the most frequent (this is the case in many other languages as well). However, the percentages differ (see diagrams III and IV); in English the predominance of the denti-alveolars is very striking (61.7% of all consonants), while in Polish their frequency is only 46.35%, or — if we subtract the palatalized variants — 45.15%. The second most frequent group in both languages is that of labials (23.3% in English and 26% in Polish). However, if all palatalized variants are added to the true palataals, then the group will become the second most frequent type with 18.4% +5.6% = 24%, as opposed to all non-palatalized labials with 21.21%. Thus there are two forces operating on the phonetic substance of Polish; it has already been remarked that the palatal articulation has a strong influence on the articulatory parameters of non-palataals (lips, cheeks, possibly jaws — which have to be very close for palataals on account of the tongue rising to the roof of the mouth to ensure the wide articulatory contact, as shown in Wierzchosława 1971: 178 "Spółgłoski miękkie").

The main active articulator appears to be the apex for the English sounds and predispos for Polish (cf. Gimson 1971 and Wierzchosława 1971; especially the latter’s discussion on the classification of Polish sounds according to the three basic positions of the tongue: flat, front and back, 1971: 108-9).

The anchorage is in English “latterly to the roof” (Honikman 1964: 81). She states: “almost throughout English, the tongue is tethered laterally to the roof of the mouth by allowing the sides to rest along the inner surface of the upper lateral gums and teeth” (1964: 76).

In Polish the apex is an anchorage of sorts: for most of the time it lies behind the lower front teeth (X-ray tracings in Wierzchosława 1971, esp. 109-9). The proof that it is the best “candidate” for the function is the low distortion of sound when Polish is spoken with the apex permanently in the anchored position (cf. the higher distortion in English in such articulation).

The body of the tongue appears to be concave to the roof in English (very few palatal sounds, apex articulation), while it tends to be convex in Polish (the influence of palatal articulation, apex anchored to the floor of the oral cavity).

Honikman does not include the state of the glottis among the parameters. The reason for this may be that auditory adjustment is necessary in exercises on the degrees of voicing utilized by various languages. The visual, tactile, and kinesthetic pre-programming suggested by Kolosov (1971) for getting
Diagram 1. Polish vowels: frequency of occurrence.
Vowels in the half-open-to-open region constitute 27.8% of all phonemes, i.e., 69.3% of all vowels.

Diagram 2. English vowels: frequency of occurrence.
Vowels in the half-open-to-open region constitute 9.52% of all phonemes, i.e., 24.2% of all vowels.

Diagram 3. Polish consonants: relative frequency of occurrence (4.28% of labials, 1.2% of dentals, and 0.14% of velars are palatalized).

Diagram 4. English consonants: relative frequency of occurrence.
into the foreign articulatory “gear” (Honikman’s term) will at some point have to be aided by auditory training. MacCarthy (1969) lists the auditory distinctions to be practised. The articulatory and auditory pre-orientation that would capture the general aspects of the pronunciation of the foreign language and instil the over-all articulatory and auditory habits of the language in the learner, would facilitate to a considerable extent the correct formation of “particular sounds”. The exercises for acquiring the auditory basis remain to be prepared; those which help in acquiring the articulatory basis have already been prepared by Honikman and Kolosov. The latter reports, moreover, highly successful results in the teaching of the pronunciation of German to Russian schoolchildren (1971: 54) on the basis of an experiment in which a group of learners who had some training in German articulatory settings acquired greater phonetic accuracy and naturalness than a control group taught by standard auditory and postural methods.

The preparation of exercises for the mastery of the basis of articulation may be brought to depend on more factors than those mentioned above with the development of methods of contrastive research (see e.g. Delattre: 1969, where he lists “40 sections to be studied for contrastive purposes in phonetics”). This will be in order, provided that the final formulation presented to the learner is simple. Much of the appeal of the notion “basis of articulation” lies in the fact that e.g. a simple instruction like “keep your jaws closer and your lips neutral!” brings evident improvement where the pronunciation of Polish learners of English is concerned.

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