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Articulatory settings

Beatrice Honikman (1964)

In the study of spoken language, especially in that branch dealing with pronunciation generally and articulation particularly, it would seem that though in our analyses of numerous languages we have described in great or lesser detail the formation of their individual sounds (as well as intonation, rhythm, stress and other phonetic features), yet there is an elusive aspect of articulation which, up to the present, if not totally neglected, has not received the attention it merits. I refer to what is here termed the *articulatory setting* of a language.

By articulatory setting is meant the disposition of the parts of the speech mechanism and their composite action, i.e. the just placing of the individual parts, severally and jointly, for articulation according to the phonetic substance[1] of the language concerned. To put this another way, it is the overall arrangement and manoeuvring of the speech organs necessary for the facile accomplishment of natural[2] utterance. Broadly, it is the fundamental groundwork which pervades and, to an extent, determines the phonetic character and specific timbre of a language. It is immanent in all that the organs do.

Articulatory setting does not imply simply the particular articulations of the individual speech sounds[3] of a language, but is rather the nexus of these isolated facts and their assemblage, based on their common, rather than their distinguishing, components. The isolated articulations are mutually related parts of the whole utterance; they are clues, as it were, to the articulatory plan of the whole; the conception of articulatory setting seeks to incorporate the clues or to see them as incorporated in the whole. Thus an articulatory setting is the gross oral posture and mechanics, both external and internal, requisite as a framework for the comfortable, economic and fluent merging and integrating of the isolated sounds into that harmonious, cognizable whole which constitutes the established pronunciation of a language.

If we are sufficiently expert acoustically and in articulation or endowed with a sufficiently acute linguistic and phonetic sense or

insight, we might divine the articulatory setting of a foreign language from the actions required of the speech mechanism. 'Natural mimics' and the gifted do just this; they adopt the articulatory pattern almost unconsciously. Those less gifted can fall into the pattern but must work at it consciously at first, and for this they need help and training. It was in an effort to aid those struggling to improve their pronunciation of a foreign language that it became clear that the field of articulatory settings might well be explored.

Though there is nothing in this article that is not implied in the many good publications on phonetics, the reader will appreciate the necessity for reintroducing here certain details with which he is already familiar.

It is because the student is inclined to interpret the articulations analysed in textbooks, not as events in a moving continuum but as a manifold of detached articulations, that he so often fails to co-ordinate them satisfactorily. To counteract this tendency and to enable him more effectively to correlate these apparently isolated clues and weld them into a consistent whole, some observations concerning the articulatory settings of various languages are given below.

All languages do not have identical articulatory settings: whereas one language may resemble another in this respect, others may differ considerably. 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.

In this connection, it is enlightening to observe the characteristic movements and lineaments about the lips and jaws of different peoples[4] *during utterance* of their own language.

The cinema or television screen provides a good opportunity for objectively studying these particulars.

Watching the speakers in, say, French, Russian and English films, it is interesting to note (a) the difference between these in 'look' about the mouth and jaw, and (b) the similarity of 'lip—jaw look' of the individual speakers in any one of them.

Comparing individual speakers in French films, one notices the considerable mobility of the lips which, much of the time, seem to round very energetically.[5] This contrasts markedly with Russian, in which the lips appear to be mostly closely spread, well stretched into an almost horizontal line and only intermittently rounded. And, between these two lip-settings, English, in which on the whole the lips neither round vigorously nor spread very much but mostly remain rather 'neutral' —

slightly and loosely apart, slightly cornered and with only moderate mobility — a sort of compromise between French and Russian.[6]

Furthermore, in French utterance the tongue setting and rather frequent lowering of the jaw allows the tongue to be visible, whereas in English,[7] the jaw-movement is so slight and the internal setting such, that the tongue is hardly ever visible during utterance.

This brings me to a remark made by foreign students from many countries who have studied English at home: when asked for their impressions on first hearing English as spoken in England, one of their replies is invariably either, 'The English don't move their mouths when they speak', or, 'You don't open your mouths when you speak.'

These lay remarks are not empty of significance; they are revealing and worthy of more than just passing notice: on closer consideration, one realizes that implicit in them is the observation that the *external articulatory setting* of English is unexpected and different from their own.

This noticeable lack or, rather, near-lack of activity of almost closed jaws together with relatively unvigorous lip-rounding are essential features of good, unaffected,[7] everyday English utterance: they are part and parcel of the articulatory setting requisite for normal English, just as the vigorous lip-rounding of French and German, the close-spread lips of Russian, the slack lips and loosely apart jaws of Indian languages[8] are essentials of the external articulatory settings for those languages.

So far reference has been sketchily made mainly to the 'external setting', but intimately bound up with this, and to a considerable extent governing it, is the *internal articulatory setting*, i.e. the overall positioning of the internal mobile organs of the mouth for natural utterance.

Here again languages differ, the setting depending upon the phonetic substance of the language. The articulating organs require to be so placed that all the actions required of them are easy and comfortable and able smoothly to link and merge with their neighbours. The distribution of sounds in one's own language can, to some extent, be ascertained by concentrating on the feel of the oral cavity *during utterance*. For instance, one becomes aware in speaking English of the constant rapping of the tongue-tip against the alveolar ridge and intermittent closing and opening and other slight motions of the lips; whereas this is not the case in French, where the tongue- tip is hardly palpable and certainly less active than the blade and front and the constantly moving

(rounding and spreading) lips. In both these languages, as in utterance generally, the sides of the tongue are almost impalpable.

The internal articulatory setting of a language is determined, to a great extent, by the most frequently occurring sounds and sound combinations in that language. Since it is the articulation for consonants that interrupts or impedes the free flow of the air stream through the mouth, the setting required for the most frequent consonants has an important bearing on the articulatory setting as a whole — no less important than that required for the most frequent vowels.[9]

Of the internal oral organs, the tongue, with its wide range of mobility and therefore considerable capacity for altering the shape of the resonance chamber of the mouth, is of paramount importance.

As has been mentioned, during utterance the sides of the tongue, and in some languages, e.g. French, even the apex, are not easily felt. This is probably due to the fact that no pressure is exerted by them or because they are lightly tethered or relatively inert compared with some more active and more tense or more stable organ which dominates the articulation and so masks the more passive parts of the 'articulator'. Nevertheless, these less palpable parts are important to the positioning of the tongue as a whole.

Among the consonants of English, cardinal alveolar articulation occurs, in general, considerably more frequently than any other; for this reason, the anchorage described below, i.e. that required for the cardinal alveolar sounds [t, d, n, ɾ, s, z][10], should be regarded as the basis of the internal articulatory setting of English utterance.

THE TONGUE-SETTING FOR ENGLISH

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; the lateral rims of the tongue very seldom entirely leave this part of the roof of the mouth, whereas the tip constantly (or some other part of the dorsum, occasionally) moves up and down, periodically touching the central part of the roof, but generally not for very long at a time, before it comes away. Thus, one might regard the tethered part — in this case, the lateral contact — as the *anchorage*, and the untethered part as the *free* or *operative part* of the tongue-setting.

By anchoring the tongue we, naturally, lessen its freedom of movement. Therefore it is important to note the extent of the anchorage,

for this prescribes the range of play of the free part as well as of the tongue as a whole. The forward limit(s) of tethering might well serve as points of reference in describing the anchorage.

Thus, the alveolar consonants of English — [t, d, n, ɾ, s, z] and generally [l] — require lateral anchorage as far forward as the upper posterior pre-molars (but never beyond the anterior pre-molars).[11] These teeth on either side of the roof of the mouth serve, as it were, as forward mooring-posts for the tongue, allowing the transverse part of the dorsum between them to operate as a hinge which enables the tip and blade to swing comfortably up and down, towards, to, and away from the alveolar ridge, but preventing the blade and tip from ranging much further forward without strain.[12] This anterior lateral contact is released for a following further back consonant or open or back vowel, and very slightly extended forward for dental sounds.[13]

Since this anchorage is not tensely held, but is rather a pliable cushioning of the tongue-rim, adjustments to it such as lowering, retracting, and advancing are comfortably and smoothly made when required, as for some vowels and the less frequent lingual consonants. For example: for the sounds [θ, ð, t̪, d̪, n̪, l̪] there is a minute advancing of the lateral contact and a concomitant reaching or sliding forward of the tip and blade, enabling the apical-rim of the tongue without effort to reach as far as, but not beyond the upper front teeth, the under-surface of the tongue resting lightly upon the cutting edges of the lower teeth; except in the rare cases of great emphasis, the tip is not exposed beyond the upper teeth. For the sounds [r, tr, dr] there is a release of the foremost part of the lateral contact; for [l] a release of the mid and/or back part but generally not of the fore-part of the lateral anchorage.

With regard to the *free* part of the tongue: for the most frequent English consonants [t, n], as well as for [d, l, ɬ, s, z, ɾ, tʃ, dʒ, ʃ, ʒ] the tip is the effective articulator[14]: the tip is somewhat narrowed and tapered by lateral contraction. In [t, d, n, l, ɬ] the tapered tip works energetically up and down as it touches, exerts some pressure on, and comes down away from the rim of the alveolar ridge to or towards the floor of the mouth, thus allowing some other part of the tongue to come comfortably into play for a following vowel or for a following consonant not requiring tip or blade articulation. The upper surface of the tongue just behind the tip, except in clear [l] lies *concave* to the roof; if the jaw were lowered during the stop of these sounds, the underside of the tongue would be clearly visible and seen to be held concave to the roof.

THE TONGUE-SETTING FOR FRENCH

In French the tongue-setting is in many respects very different from that of English. For the greater part of French utterance, the tongue (a) remains broad, i.e. the tip is untapered, there being no lateral contraction. (b) it is anchored medianly, albeit lightly, to the floor of the mouth by the tip tethering to the lower front teeth, either cushioned against their inner surface or held so that the underside of the tip rests upon their cutting edges; thus the under-surface of the tongue is not exposed even when the jaw is lowered, but part of the dorsum — the blade (or tip and blade) — is frequently visible during utterance. Adjustment of this anchorage, by very slightly withdrawing the tip along the floor of the mouth, allows the back of the tongue comfortably to assume the positions required for back vowels and for the back consonants [k, g] and the frequent uvular [ʁ]. (c) the body of the tongue is generally held *convex* to the roof of the mouth; it flattens down, however, as the jaw lowers for the frequent vowel [a] and the back part becomes convex for [k, g, ʁ] and back vowels. (d) of the free, i.e. untethered, part of the tongue, the *blade* (or tip and blade) and the *front* are the dominant articulators — the blade and tip in [t, d, n, l], the blade in [s, z, ʃ, ʒ][15]; the front in all front vowels and the consonants [ɲ, j, ɥ] and to some extent in [l] also. In [t, d, n], though the tip and blade completely contact the upper front teeth (and fore-part of the ridge), it is the blade rather than the tip that exerts the pressure. For [s, z, ʃ, ʒ], while the blade slightly recedes to articulate with the alveolar ridge, the tip lowers to the base of the lower teeth.[15] (e) the sides of the tongue are in contact with the upper gums or teeth for much of French utterance; this lateral contact is not as constant as in English, however, probably due to the fact that in French the open vowel [a] occurs very frequently, more frequently relatively than do the most open vowels in English, and so requires more frequent lowering of the jaw and, consequently, more frequent release of the lateral contact. In the frequent consonants [t, d, n] the lateral contact extends as far forward as the upper canines, thus bringing the entire tongue-rim completely into contact with the upper arcade of teeth.[16]

A tongue-setting different from both French and English is required for Turkish and Iranian, where dental consonants are frequent but are articulated with the tongue well tapered and the pointed tip the predominating ‘articulator’.

Again, the frequent retroflex consonants in the languages of India

and Pakistan are produced with the tongue curled back in such a way that the edge of the rim of the tip approximates or touches the hind part of the alveolar ridge or fore-part of the palate; the open setting of the jaws enables this tongue-setting to be made comfortably.[17]

In Russian, while blade—dental consonants are not infrequent, the profusion of palatalized sounds would seem to require, for ease of articulation, well-spread lips as an accompaniment to the necessary tongue-setting (front — high and spread; body — convex to the palate).

In describing articulatory settings, some reference should also be made to (a) the *muscular tension* of the tongue, lips, cheeks, jaw and pharynx; (b) the *pressure* exerted by the 'articulator' upon its opposite number in those sounds with median closure; (c) the general *positioning of the jaw*, as these aspects of articulation have some bearing on the general articulatory setting and languages may differ in these features too.

TENSION

Thus in English, the lateral tongue contraction, mentioned above, gives to those unaccustomed to this setting the impression that the tongue is somewhat tensed, but the Englishman is not aware of any tension and feels the tongue to be relaxed.

In French, there is no lateral tension of the lingual muscles but strong thrust is felt to be given to the convexed dorsum especially in articulating the front vowels. French people with whom this has been discussed say it feels as if they were 'pushing the words forward out of the mouth'; no doubt, the strong rounding of the lips together with the exertion — drawing-in — of the cheeks contributes to this effect, the contraction of the buccinator muscles (which is reflected in the external setting too) giving a sense of inner rounding, i.e. rounding within the oral cavity. In English on the other hand, there is no sense of tension or contraction of the inside of the cheeks except perhaps when we greatly emphasize an exclamation such as 'Oo!'

With regard to the pharynx, this is generally relaxed in French and English,[18] there being no contraction of the pharyngeal muscle, whereas in Arabic, and frequently in German (especially in men), pharyngeal contraction is usual.

PRESSURE

In consonants with median closure[19] the pressure exerted by the articulator upon its opposite number is firm in English (perhaps

somewhat less firm in aspirated than in unaspirated consonants) and firmer still in emphasis; weakening of the contact produces what is considered 'slipshod speech'; in American English, however, the tendency is to weaken the contact in intervocalic alveolar plosives so that a tapped consonant results. English, German, Italian, Polish and many other languages resemble English in pressure of contact; Danish, on the other hand, appears to be following in the direction of Spanish, where plosive contact has gradually weakened over the ages to such an extent that, except after nasal consonants, the contact has altogether disappeared, with the result that weak (homorganic) fricatives and even frictionless continuants have resulted and now replace the plosives in these two languages. In many of the languages of India and Pakistan bilabial contact is generally very weak, the lips only just touch but do not press together. This, no doubt, is due to the jaw setting (see below).

THE JAWS

In natural colloquial English the jaws are, for the most part, held loosely together but not clenched — no tension is felt; the most frequent vowels appear to be [ɪ] and [ə] which do not require the jaws to be parted. There is from time to time some lowering of the jaw, but relatively infrequent and slight, so that the aperture between the upper and lower teeth is generally never wide — at most about a finger's width, as required for the diphthongs [aɪ, aʊ], less for [æ]. Thus it appears that the greater part of English articulation takes place behind (loosely) closed jaws. It is this feature of English, no doubt, which helps to give foreigners the impression that we do not move or open our mouths when we speak.

In French utterance the jaws, though mostly fairly close, open more often and perhaps more widely than in English, owing to the relatively greater frequency of the most open vowel [a] which is more open than the open English vowels.

The jaw-setting for the languages of India and Pakistan is distinctive: the jaws are held rather inert and loosely apart, so that the aperture between upper and lower teeth is relatively wide and the oral cavity enlarged; this position is appropriate to the frequently occurring retroflex consonants, enabling them to be produced more comfortably than if the jaws were held closer; this setting accounts, too, for the lack of pressure in bilabial stops, and for the characteristic timbre of Indian languages. This distinctive timbre is very noticeable in the English spoken by Indians.

APPLICATIONS AND CONCLUSIONS

Though superficial observations on several languages are included in this article, only English and French have been investigated in any detail; the main differences in 'set' of the organs for utterance of these two languages are summarized below for comparison.

	English	French
Jaws	Loosely closed (not clenched)	Slightly open
Lips	Neutral; moderately active	Rounded; vigorously active in spreading and rounding
State of oral cavity	Relaxed	Cheeks contracted
Main consonant articulation	Tip—alveolar	Blade—dental
Tongue:		
Anchorage	To roof laterally	To floor centrally
Tip	Tapered	Untapered
Body	Slightly concave to roof	Convex to roof
Underside	Concave to roof	Neutral

Perhaps it would not be out of place here to describe an instance or two of the use to which the articulatory setting approach has been put in the teaching of spoken language.

The first opportunity to apply the technique occurred in the course of some private sessions with advanced French students preparing for their finals as teachers of English. They had a considerable knowledge of English phonetics and had achieved a certain proficiency in spoken English, then had come to a standstill. It appeared to me that while speaking English the 'set' of their features was in some elusive way not quite consistent with the English pattern and that English qualities could not possibly eventuate from such setting. To check that they were doing all they should, I, thinking aloud, attempted to express in layman terms what my mouth felt like during utterance of English; as I did so, I noticed them making adjustments here and there to their settings. Whilst I described much of what has been included in the foregoing analysis, they were encouraged to watch closely as I spoke at normal pace, noting the almost motionless jaws and lips and the fact that the tongue is hidden and does not protrude beyond the teeth.

Exercises were devised to taper and concave the tongue, to anchor it correctly, placing it just so, to feel the tip against the rim of the alveolar

ridge (many foreign students, misinterpreting the textbooks, are apt to place it too far forward), practising the minute movements required to link sounds such as [θ] or [ð] with [s] and [z] fluently, stilling the lips, a small adjustment here, another there, patient drills and donkey-work, constant reminders to relax the organs. We had been working in this way for about half a dozen sessions, when, one day, while reading aloud, a student suddenly exclaimed, 'I've got it!', and continued with the passage. The difference was dramatic, and of the two of us, I was the more surprised: she really did sound English and knew it, also her features took on an English 'look'. To both of us it was very satisfying. Of course it needed further perseverance to establish the setting; instructions for obtaining the articulatory setting required were finally reduced to the following formula: taper and concave the tongue, draw it as a whole back into the mouth so that the pointed tip presses against the edge of the alveolar ridge; close the jaws, don't clench them; still the lips; swallow to relax; now to limber up, repeat [t, d, n, l].

This technique with, of course, a different formula, has also been used in teaching French to English students. The formula is devised to assist in positioning the organs preparatory to articulation.

Once the description of the setting had been given and the formula devised, it was found that a blanket term was required to cover all the details included in a formula; for want of a better, the term gear has been used quite successfully, students, at this stage, finding the expressions 'English gear', 'French gear', etc., readily intelligible. At the beginning of a practical class I would say, 'Are you in English gear?' — and as soon as I hear them dropping back to a foreign accent, I might remark, 'You're out of gear', and it is rewarding to see how well they react and get back 'into gear' again.

I have found that insistence on the articulatory setting as a starting-point does away with the need to practise new articulations by the method of exaggerating them. For example, the [θ] and [ð] of English — the bugbear of many foreign students — are found to be less difficult to make and incorporate when the setting is explained and mastered. So, too, the production of dental consonants, uvular [ʁ] and the rounded front vowels of French and German, usually difficult for English people to make and, once accomplished, to co-ordinate and catenate with others, has been facilitated by this method.

In the past, we have dissected the whole into its parts by analysing and describing the individual features; then the student attempts to put them together but the synthesis falls short of the original and is halting.

I would therefore say, establish the setting first, then the details of articulation.

From one point of view we may look upon utterance of a particular language as the sum total or synthesis of its constituent parts, i.e. grammar, idiom, articulations and their distribution, intonation, stress, rhythm, tempo, but it is, from another viewpoint, more than its parts. While it is dependent upon them, it is not exhaustively analysable into them. All the constituent parts are interrelated and interdependent, if you change a part you change its relations. Some thing which links all these parts is necessary for their integration. The link, so far as articulation goes, is the *articulatory setting*, external and internal.

I am aware that I have touched only the fringe of the subject of articulatory settings. From what has been set down here, it will be readily appreciated that the concept of articulatory settings is applicable not only to the study of pronunciation *per se*, but, in addition, has an important contribution to make in the analysis of language at the phonological level. It is much to be wished that others will undertake further investigation of *articulatory settings*; the results of their researches will add not only to our methods of teaching and learning the spoken word, but also to our comprehension of the past and future development of particular languages.

NOTES

1 By *phonetic substance* of a language is meant the assortment of sounds that compose it and their distribution in the context of natural utterance; 'distribution of sounds' includes their 'periodicity', i.e. their recurrence or relative frequency of occurrence; their 'arrangement', i.e. their order of sequence; their 'assembly', i.e. their patterns of sequence in context. An analysis of the substance (noting what does not occur as well as what does) will give one an idea of the *status* of a language, and this would serve as a clue to the articulatory setting.

2 By 'natural' is here meant 'consonant with the character of the language; instinctively felt and recognized by the native to be right; unexaggerated'.

3 These have been meticulously investigated and described in their excellent publications by Daniel Jones, Lilias Armstrong and other phoneticians.

4 I do not refer here to typical facial features in the genetic sense.

5 German lip-action is very similar to French.

6 For other 'settings' see p. 81.

7 The English described in this article is to be taken as that spoken by natives of England, except when otherwise specified. Over-rounding of the lips is sometimes adopted by English speakers as an affectation, under the impression that it makes

English clearer, but it is not usual and, in fact, 'looks' unnatural. English spoken with considerable movement of the lower jaw is sometimes used in entertainment as a 'humorous turn' on the music-hall stage. It is not natural English and 'looks funny' to, and so elicits laughter from, an English audience.

8 See p. 80.

9 Once the main setting is established, adjustments for the lesser used sounds can be comfortably made.

10 Of these [t, n] and, next, [s] are perhaps the most prevalent.

11 Direct observation, as well as palatography, shows this clearly.

12 Watching the tongue repeat quite naturally [t, d, n, l] a number of times in succession, without an intervening vowel, will show the action of the tongue.

13 Nearly all lingual sounds have a certain amount of lateral contact; the only ones that show none are open or far back vowels, far back consonants and, occasionally, clear [l].

14 In [s, z, tʃ, dʒ] the tip plus blade constitute the main articulator; some speakers produce their [ʃ, ʒ] with the blade as the effective articulator, the tip being held somewhat lower.

15 Except in those who use the variety of [l, ʃ, ʒ] with tip raised.

16 Cf. English, where only in the relatively rare cases of dental stoppage is the entire tongue-rim in contact with all the upper teeth.

17 See p. 80.

18 There are individuals who speak with contracted pharynx, but this is not usual.

19 Plosives, affricates, nasals, laterals.

Adapted from the obituary by Jack Windsor Lewis in *The Phonetician* No. 83, 2001 pp 23-24 - http://www.yek.me.uk/honikman.html

Beatrice Honikman (1905-1997)

Beatrice Honikman, known familiarly as "Trixie", was born in South Africa at Cape Town on the 28th of September 1905 and died there in 1997. She graduated at her native city in 1926 and followed up her BA with an MA in the field of the phonetics of African languages. Then in 1928 she made her way to University College London to study in Daniel Jones's Department of Phonetics, also spending some time at the University of Hamburg. Thereafter she returned to her home university where she held first an assistantship and then a full lectureship in phonetics. But she had conceived a great affection for London where she returned obtaining by the late thirties a post at the University of London School of Oriental and African Studies under J. R. Firth.

Jones had a high opinion of her, awarding her the unusual accolade of thanking her for "helpful suggestions" etc in the acknowledgements of no less than three of his books, and having her edit for publication a manuscript left behind at her sudden death at the end of 1937 by Jones's much venerated close colleague Lilias Armstrong which came out in 1940 as *The Phonetic and Tonal Structure of Kikuyu*. She published very little on her own account but is certainly remembered for her seminal article on "Articulatory Settings" which appeared in 1964 in *In Honour of Daniel Jones* edited by D. Abercrombie and others.

The last stage of her career was spent from 1955 to 1971 at the University of Leeds Department of Phonetics. She had wide linguistic and phonetic interests and long maintained her fascination with African languages. She was outstanding for her whipcrack productions of African click sounds that seemed to make any other teacher's puny by comparison.

She got on very well with colleagues and students alike all of whom respected her dedication and liveliness. She had a good sense of humour and was a "fantastic mimic". She was very interested in music and ballet and especially in mime. She was no homemaker, preferring to live in small hotels or hostels, and she never married but this is not to say that she wasn't a perfectly sociable person. She eventually used to spend her winters in Cape Town and her summers in her beloved London. One of her closest friends particularly remembers an outing on her 90th birthday she made with great vigour to show her the newly reconstructed Shakespeare's Globe theatre on the South Bank. She is remembered with affection by all who knew her.