Basis of articulation and articulatory setting in pronunciation teaching: Focusing on English and Russian

by

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Abstract

This dissertation investigates the notion of the basis of articulation (basis of articulation) in relation to the widely used concept of articulatory setting (articulatory setting) with specific focus on English and Russian as examples. After a detailed survey of the original sources and contemporary literature it is concluded that the basis of articulation and articulatory setting represent two distinct although closely related ideas that are not fungible. The term 'basis of articulation' was originally conceived as a language specific posture of the tongue continuously held in speech-ready and inter-utterance positions. Based on modern research, this posture is associated with a language specific centre of mass of the tongue maintained during speech which affects all aspects of speech production such as vowel quality, place of articulation etc. Such gross position generally corresponds to the articulatory targets of language specific 'neutral' vowels and hesitation vowels. Speech production is viewed as a heterogeneous Complex System with multiple 'nested' subsystems. The commonly used articulatory setting is taken as such subsystem in which the basis of articulation plays the role of a causative agent and a stabilising centre. The final part the paper gives an assessment of the history of application of the basis of articulation and articulatory setting concepts in pronunciation teaching and shows some implications and advantages of their differentiation within the proposed framework.
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1 Introduction

1.1 General introduction to the topic

Pronunciation is the most perceptible aspect of L2 acquisition. It is also one area where the complete ‘nativelikeness’ is almost impossible to be achieved for learners past critical age. In their study on nativelikeness, Abrahamsson and Hyltenstam (2009) demonstrated that even with the highest performing late learner phonetic aspects of speech production and perception were the only area of performance which deviated from native-speaker norms. Yet the history of pronunciation teaching is sometimes dubbed as a “study in extremes” (Levis; 2005). It was either given a prominent place in L2 teaching during the era of the audio-lingual method in 1950s and 60s, or almost entirely neglected with the arrival of the contemporary Communicative language teaching (CLT).

However, recently it is on the agenda once again, even becoming a hot topic in ELT (Bamkin; 2010). Despite this re-gained importance with L2 teachers, pronunciation research remains a marginalised area in Applied Linguistics (Derwing and Munro; 2005). A simple search for the word ‘pronunciation’ in the journal Applied Linguistics (within abstract and title) from January 2000 produced only one match: an article by Jenkins (2002). Similar search for ‘foreign accent’ did not produce any result at all. Pronunciation is not given much attention even in ESL/SLA research journals. According to Derwing (2010), only 2.7% to 7.4% of articles published there relate to pronunciation aspects.

This lack of interest to pronunciation certainly does not help teachers wishing to dedicate more effort to teaching pronunciation. Without the essential scientific basis teachers are often forced to work guided by intuition or by trial and error (Derwing; 2010).

Of course, there is a wealth of handbooks on this topic (O’Connor; 1967; Kenworthy; 1987; Hancock; 1995; Kelly; 2000; Hewings; 2004; Maniruzzaman; 2008; Celce-Murcia et al.; 2010; Rogerson-Revell; 2011), to name just a few, but most of them are based on the notion that students have to learn (imitate) separate phonemes. The prevailing approach is still ‘atomistic’ and pronunciation instruction tends to be ‘reactive’ with teachers trying to fix specific problems (Kelly; 2000) instead of preventing them. A good example of such approach is the manual of Hewings (2004).

Apparently, this reactive method does not produce desired results. As Bryan Jenner (1987a) noted “however good our teaching of phonemes, the majority of our students just do not sound English at the end of the process”. Although this was written at the time when the audio-lingual method was
already widely applied, the problem was not in methodology. Quoting Jenner again: “[t]here is some vital ingredient missing”.

1.2 Research targets

This paper is an attempt to summarise and, possibly, extend the search for this elusive ‘vital ingredient’ within the framework of a more systemic approach to pronunciation teaching based on the concepts of BASIS OF ARTICULATION (BA) and ARTICULATORY SETTING (AS), which have been in circulation for many decades but still failed to find their way into classrooms.

Besides exploring the declared topic, it pursues another important goal: to introduce new sources and, particularly, the research in this field done in Russia which remains largely unknown to Western linguists. Because many of them are difficult to access, some higher than usual direct quoting appeared justified.

1.3 Paper organisation

The paper is organised as follows: Section 2 is a review of the genealogy of the idea of the basis of articulation. Its aim has been not to duplicate the in-depth historical accounts done by Kelz (1971, 1970?), Laver (1978) and Jenner (2001), but to analyse the differences in perception of this concept by various proponents. The main goal of this section is to demonstrate that the original term, ‘basis of articulation’, and a more recent one, ‘articulatory setting’, should not be treated as synonyms because they represent two distinct, although interrelated, concepts.

Section 3 proceeds with the analysis of the basis of articulation concept in connection with the neutral position, resting position and inter-utterance or inter-speech posture (ISP). The role of the tongue as the principal articulator is discussed. The section continues with the comparison of the notions of BASIS OF ARTICULATION and ARTICULATORY SETTING within the framework of the COMPLEX SYSTEM approach. It concludes with a suggestion to adopt a revised and more precise terminology in this field both for English and for Russian.

Section 4 gives an assessment of the history of application of the basis of articulation and articulatory setting concepts in pronunciation teaching and shows some implications and advantages of their differentiation within the proposed framework.

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1The article of Kelz (1970?) is available through ERIC database. Unfortunately, it is not dated. Since it appears to be a draft of his article in Phonetica (1971) I presumed that it was published a little earlier hence the date “1970?".
Section 5 is a conclusion. It also outlines directions for future empirical research describing the setup of a possible experiment for objective verification of the preliminary hypothesis following out of discussions in Sections 3 and 4.

The attachment contains a tentative description of Russian and English Bases of Articulation done within the framework of the re-formulated basis of articulation concept proposed in this paper.

2 Towards defining the basis of articulation

2.1 Ambiguity of the term

Lawrence Schourup (1981) started his paper on the basis of articulation with the words: “[m]ost of those who have written about the basis of articulation have done so with mixed feelings” and quoted Leonard Bloomfield who, while admitting its existence, believed that any attempts of observation of the basis of articulation “are bound to be vague” branding them as ‘hazy and inaccurate’ (1933, 127-128). Malmberg (1963, 71) defined the basis of articulation as “[…] a convenient, but not strictly scientific label for all the articulatory habits which characterise a language”. Among other ‘epithets’ of the basis of articulation there are “nebulous” (Broch; 1911; Kelz; 1971) and a “mysterious entity” Matisoff (2004, 322).

It is not surprising that this concept has not found any significant practical implementation in language teaching. As was noted by K. M. Kolosov:

[Insufficient research into the subject, disorder in its interpretation, vagueness of notions of the genesis of the basis of articulation - all this sometimes creates distrust in the possibility of the practical implementation of the accumulated facts and observations for (foreign) pronunciation teaching2]3(Kolosov; 1971).

Indeed, much about this term may appear ambiguous if not mysterious. This uncertainty is reflected even in dictionary definitions. So in Webster’s Unabridged Dictionary basis of articulation is defined as: “a configuration of the speech tract that represents the most neutral articulatory configuration for

2Недостаточная исследованность этого вопроса, разной в его интерпретации, размытость представлений о генезисе артикуляционной базы - все это порождает некоторое недоверие относительно возможности практически использовать накопленные факты и наблюдения в обучении (иностранныму) произношению.
3Unless indicated otherwise, translations were done by the Author.
a given language” (Random; 2005). The Routledge Dictionary of Linguistics lists it under “articulation base” and defines it in two completely different ways:

1) Group of articulatory characteristics common to all speakers in a speech community. 2) Starting position (=resting position) of the articulators in the articulation of a speech sound” (Bussmann; 1996, 91).

Heinrich Kelz (1970?) quotes some definitions from German dictionaries. According to him, the Schweizer Lexicon, (Zürich, 1945) defines basis of articulation as “[location and setting of speech organs in articulation]” while Der Grosse Brockhaus, (Weisbaden, 1952) has it as “[the resting position of speech organs, which is peculiar to each language]”. His own definition is different and rather cloudy:

[Characteristics, which do not particularly refer to individual segments of articulations, but rather to the nexus of the individual facts; the basic attitude of the Articulators in the speech process and the manner of movement of the speech musculature] (Kelz; 1976, 87).

According to Arnold and Hansen (1975) the basis of articulation is:

[The configuration of the speech organs in anticipation of speech and the characteristic movements of the active articulators [...] (Arnold and Hansen; 1975, 21, cited by Jenner, 2001).

In Russia the commonly used term Artikuljacionnaja Baza [articulation base] was defined by L. R. Zinder as “[the summation of movements and positions of organs of speech which are habitual for the given language]” (1979, 80). The Russian academician Lev Ščerba (1963[1937]) spoke of the “[general direction of movements during the articulation of [...] phonemes of vow-

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4 Lage und Einstellung der Sprechorgane bei der Artikulation
5 die Ruhelage der Sprechorgane, die für jede Sprache eigentümlich ist
6 Eigenarten, die sich nicht auf partikulare Artikulationen einzelner Segmente beziehen, sondern auf den Nexus dieser einzelnen Faktoren, die Grundhaltung der Artikulatoren im Sprechprozeß und die Art und Weise der Bewegung der Sprechmuskulatur.
7 Die Grundhaltung der Sprechwerkzeuge in Sprechbereitschaft und die Besonderheiten der Bewegungsart der aktiven Sprechwerkzeuge [...]. Translation by Jenner (2001)
8 Артикуляционная База
9 соотвествуют признакам для данного языка движений и положений произносительных органов
10 Also transliterated as Ščerba.
els and consonants\(^1\)\(^{11}\) (1963[1937], 77). A similar definition can be found in \^[characteristic for a given language skills of movement of the active organs\(^12\)\(^{13}\)]\(\)\(^{13}\). The commonality of the above definitions is that they view the basis of articulation as a set of certain dynamic features or skills. An alternative, and less widespread among Russian phoneticians, view was expressed in Kolosov (1971, 44) who defined the basis of articulation as \^[pre-tuning and the optimal working posture of the organ of speech\(^13\)]\(\)\(^{13}\). This definition is particularly interesting because it treats basis of articulation as a static position and agrees with the definition of Arnold and Hansen (1975).

Such understanding of the basis of articulation is characteristic of many German phoneticians. Speaking about Russian, Prokosch (1920, 8) defined basis of articulation as “the favourite position of the tongue”. Heffner (1952, 98) took it as “the position of the tongue from which its articulatory movements start and to which it tends to return […]”.

Finally, the presumed synonym ‘articulatory setting’, introduced by Honikman (1964), is defined by her in such a remarkably comprehensive way that it could have been written by a lawyer and needs to be cited in its entirety:

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

Articulatory setting does not imply simply the particular articulations of the individual speech sounds 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

\(^{11}\)общей направленности движений при артикуляции [... фонем согласных и гласных]
\(^{12}\)характерные для данного языка танцы движения активных органов речи
\(^{13}\)преднастройку и оптимальную рабочую позу речевого аппарата
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 (Honikman; 1964).

At this point a reader might be confused and even bewildered by the inconsistency of terminology and the contradictory definitions. However, at least seven cardinal notions may be distilled from the multitude of the above definitions:

1. Language specific neutral position of speech organs.
2. Language specific resting position of speech organs.
3. Language specific starting (anticipatory) position of speech organs.
4. Optimal working position of speech organs.
5. Nexus (summation) of language specific articulatory movements.
6. Language specific overall arrangement and manoeuvring of the speech organs.
7. General direction of movements during speech.

The first four definitions refer to some static ‘position’ and may be grouped together. The three latter ones refer to speech dynamics. If these are regarded as one, it would leave us with the contrasting pair: ‘neutral (starting, optimal) position’ versus ‘nexus, overall arrangement, general direction’ which may be further simplified to ‘static’ vs. ‘dynamic’.

This cardinally different understanding of the basis of articulation is evident from the following example. The Special Part of the Manual of Phonetics (Kaiser; 1957) contained several articles dedicated to phonetic systems of several language groups including the Slavonic Languages (Håla; 1957) and the Finno-Ugrian Languages (Sovijärvi; 1957). It was prefaced by an introduction by Laura Kaiser who was at that time the Secretary of the Permanent Council of the International Congress of Phonetic Sciences (ICPhS).

In the introduction Kaiser set up the general purpose of this Special Part as follows: “to characterise the phonetic aspect of the Romance, Germanic, Slavonic and Finno-Ugrian languages”. Authors were requested to adhere to the same general scheme and “to deal with the specific articulation and with articulation basis” (1957, 277).

The Finnish contributor Antti Sovijärvi, describing the Finno-Ugrian languages, dedicated a special section to the basis of articulation which he defined as the “preparatory position of speech organs”: 
If we compare the basis of articulation in Finnish to that of Western European languages we notice that in Finnish the preparatory position of the speech organs is nearest to the position of physiological repose. If we consider the relative front or back position of the tongue, Finnish will occupy the last place in the series French, Swedish, German, English and Finnish (Sovijärvi; 1957, 314).

Although Sovijärvi also mentioned the relatively slight movement of the lower jaw and lips, his main focus was on the tongue posture as the key factor determining the ‘preparatory position’ which he clearly distinguished from the ‘position of physiological repose’.

When dealing with the specific differences of the basis of articulation within the Finno-Ugrian languages, Sovijärvi described the Hungarian basis of articulation as follows:

Hungarian differs from Finnish in that the preparatory position of the tongue is situated slightly more in front, Hungarian resembling English in this respect (Sovijärvi; 1957, 314).

It is significant that the section on the basis of articulation was placed after the section titled *Manner and place of articulation*. This shows that Sovijärvi clearly distinguished the basis of articulation from the ‘manner and place of articulation’.

A totally different perception of the basis of articulation is expressed in the article of Bohuslav Hála (1957). He described the basis of articulation of Slavonic languages as the summation of the following features: 1) expiratory breath-stream; 2) precise articulating as in French; 3) general medium type of the vowel system; 4) rich consonant system; 5) medium stress force (stronger for Russian); 6) specific intonation curve, common to movable word-stress languages. Although in the following section Hála did mention the ‘dorso-palatal’ type of articulation characteristic for Slavonic languages, this was not related in any way to the description of the basis of articulation. Importantly, such perception of the basis of articulation as a ‘summation’ of features was not accidental. In his other work Hála specifically spoke against the understanding of the basis of articulation only as a resting position of the tongue (1962, 375).

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14 This is an interesting observation. Sovijärvi clearly positions Finnish as having the tongue even more retracted than in English and still considers it “nearest to the position of physiological repose”. This is a good demonstration of a subjective perception of the basis of articulation by native speakers. This example should be kept in mind for the successive discussion of ‘relaxation’ in 4.2.

15 *Articulatory Characteristics of the Slavonic Languages.*
The above example shows the level of disparity in the understanding of the basis of articulation concept. Clearly, any academic discussion would be difficult, if not impossible, unless there is a certain agreement on terminology and definitions.

To understand the inherent causes of this dichotomy we shall have to return to the very origin of the term ‘basis of articulation’ which calls for some extensive quoting from German sources.

2.2 Origin of the term

By the 1870s Comparative Linguistics, born in the wake of the German romantic and later nationalist movement, became established as a precise science. A new generation of linguists known as Junggrammatiker [Young Grammarians or Neogrammarians] laid the foundations for many concepts of the modern Linguistics and coined a multitude of terms which are still widely used today. Since they were largely concerned with the idea of the regularity of sound change, Phonetics was central in their studies. Neogrammarians saw the sound level of language, which was regarded “as a psychological as well as a physical activity”, as “the most important level of description” (Bussmann; 1996, 793).

One of the key protagonists of the Neogrammarian school was Eduard Sievers (1850-1932). The term ‘Operationsbasis [basis of operation]’ appeared in the first edition of his Physiologie of Speech16 (1876) in footnote (11) of the Conclusion to § 7 titled Die Vocale [The vowels]. The footnote17 referred to the passage in which Sievers discussed variations of vowel quality between dialects. According to him, these variations were caused by the differences in their Articulationsweise [way (manner) of articulation]. Next he mentioned that such differences did not follow from the relationship between separate sounds but between phonetic systems18. Therefore, in studying such variations one should not analyse separate sounds but rather the main principles of corresponding systems. It was at this point that Sievers made the note:

Such principles include the participation of higher or lower lips [...] various stages of nasalisation [...]. Particularly, here also belongs the storage position of the tongue, constantly held throughout all vowels of the system, stemming from differences in the

16 Grundzüge der Lautphysiologie
17 Curiously, many of the early references to the basis of articulation were contained in footnotes.
18 Verhältniss der Systeme
resting position of the organs\(^{19}\) (Sievers; 1876).

And it was in this context that the term *Operationsbasis* first appeared in the text as:

>[Attempting to speak e.g. the pithy North-German dialect such as Holstein, I as a Central German speaker, should first of all make the tongue somewhat withdrawn and broadened; once the correct position, to some extent the Operationsbasis, is found and understood as being the same when switching between different vowels, characteristic sound nuances of the dialect will follow all by themselves \(^{20}\)] (Sievers; 1876).

The expression ‘[constantly held throughout all vowels of the system\(^{21}\)]’ is of the key importance to the current discussion. It is argued in this paper that the true significance of this concept, proposed by Sievers, has not been adequately appreciated by the researchers investigating the “genealogies of an idea” (Kelz; 1970?, 1971; Laver; 1978; Jenner; 2001) of the basis of articulation and articulatory setting.

It has become customary to start the account of the history of the basis of articulation from works of early European phoneticians. So Laver (1978) commenced his article by quoting Isidor of Seville (560 – 636) who noted some obvious differences in the speech of different peoples. In his *Etymologiae* he made this observation:

>[Also, all the Eastern nations press (together) their speech and words in their throats as the Hebrews and the Syrians. All the Mediterranean nations thrust (hit, knock) their speech (on) to the palate as the Greeks and the people of Asia Minor. All the Western nations, break their words on the teeth, as the Italians and the Spaniards\(^{22}\)] (Lindsay; 1911, IX, 8).

\(^{19}\) Solche Principien sind beispielsweise die stärkere oder geringere Betheiligung der Lippen (S. 46), verschiedene Stufen der Nasalirung (S. 47). Ferner gehört hierher namentlich auch eine durchgehends bei allen Vokalen des Systems abweichende Lagerung der Zunge, die von Differenzen in der Ruhelage der Organe herrührt.

\(^{20}\) Versuche ich als Mitteldeutscher z. B. eine prägnant nörddeutsche Mundart wie etwa die holsteinische zu sprechen, so muss ein für allemal die Zunge etwas zurückgezogen und verbreitert werden; hat man die richtige Lage, gewissermassen die Operationsbasis, einmal gefunden und versteht man dieselbe beim Wechsel verschiedener Laute festzuhalten, so folgen die charakteristischen Lautnuancen der Mundart alle von selbst.

\(^{21}\) Eine durchgehends bei allen Vokalen des Systems abweichende

\(^{22}\) Omnes autem Orientis gentes in gutun linguam et verba condunt, sicut Hebræi et Syri. Omnes mediterraneae gentes in palato sermones ferunt, sicut Graeci et Asiani. Omnes Occidentis gentes verba in dentibus frangunt, sicut Itali et Hispani.
These words, written almost a thousand five hundred years ago, were echoed in the works of more recent phoneticians. So we find in the *Tractatus de Loquela* of John Wallis (1616 - 1703) this comparison of the German and French pronunciation:


A more general observation of pronunciation habits can be found in *An Essay towards a Real Character, and a Philosophical Language* by John Wilkins (1614 – 1672):


Similar accounts were common with Cooper (1685), Bayly (1758) and other English linguists copiously cited in Laver (1978). What unites them is a general impressionistic view on the characteristic phonetic aspects of various languages as a manifestation of different habits or manners of pronunciation.

Returning to Sievers, we can see that he discussed two interrelated but distinct concepts within a more general notion of *Articulationsweise* [way of articulation]: the *Lagerung der Zunge* [tongue storage position] and the *Ruhelage* [resting position]. Because it is not clear from the above quote which of these two terms referred to ‘Operationsbasis’ this could have been the starting point of the subsequent confusion in definitions.

The word ‘*Ruhelage* [position of rest]’ was not properly defined and it was not clear whether Sievers meant by it an inter-utterance position (more likely) or a position of complete physiological rest (e.g. at normal breathing). It is also important to note that the word ‘Lagerung’ has several meanings: 1) “storage”; 2) “setting, mounting”; 3) “support, bearing, pier”. Because of the ambiguity of this term it could had been understood, interpreted and translated in different ways which also contributed to the general confusion.

This initial haziness had been further aggravated by the contribution of another remarkable educationalist Felix Franke (1860-1886). His name is almost forgotten today but during his very short scientific career he produced two important works (1886; 1890).

23Franke died of tuberculosis.
The term “Artikulationsbasis” appeared in Franke’s work only once when he was discussing the need for training of vocal organs quoting Sweet and stressing the importance of mastering a specific ‘Artikulationsbasis’ of the studied language. So the bond between ‘Artikulationsbasis’ and pronunciation teaching was forged from the very start.

Unlike Sievers, Franke understood this term wider, as encompassing not only the specific ‘tongue storage position’ but also the position of lips and, most importantly, some other undefined features:

[It is especially important to provide in advance a precise, clear idea of the “basis of articulation” of the relevant foreign language: i.e. the tongue storage position, the kind of lip action, in one word, of the characteristic features of the entire speaking mechanism of a given language, from which then naturally follow individual sounds] (Franke; 1890, 15).

The final phrase is significant because, on one hand, it proves that Franke did understand the ‘Artikulationsbasis’ as the causative factor “[from which then naturally follow the individual sounds]” but, on the other hand, by including some undefined ‘characteristic features’, he laid the foundation for the future controversy. Kelz (1971) quite correctly noted that Franke’s definition was ambiguous.

Perhaps Franke was aware of this ambiguity and understood that the ‘Artikulationsbasis’ did not quite equal Siever’s ‘tongue storage position’ so he used a parallel term ‘Indifferenzlage’ [position of indifference] in his other work (1886):

[As general characteristics could be given: The indifference position is similar to French, but it differs from it by lesser energy as,

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24 In the case of those who have only an average ear, and still more of those who have a defective ear, organic training is indispensable. There can be no question that flexible Organs well trained together with only an average ear, will yield better results than even an exceptionally good ear without organic training. Nor must it be forgotten that fineness of ear is not necessarily accompanied by flexibility of the vocal organs. Indeed, what is commonly called ‘an ear for sounds’, that is, the power of initiating sounds, depends quite as much on organic flexibility as on fineness of ear (Sweet; 1877, 21).


26 aus der dann die Einzellaute natürlich folgen

27 somit charakteristischen Einstellung
in general, the articulations are consistently a bit limp\(^{28}\) (Franke; 1886, 29).

The reasons for this change of terminology are not clear but it certainly did not help to diminish the confusion. Already at that time Otto Jespersen, obviously perplexed by such inconsistency, made a footnote to clarify that for some reason Franke preferred to use ‘Indifferenzlage’ instead of ‘Artikulationsbasis’ which had “[had become a common practice in Phonetics]\(^{29}\)” (Franke; 1886, 29f).

Apparently, Sievers preferred to adopt ‘Artikulationsbasis’ because it probably sounded less military than his initial ‘Operationsbasis’\(^{30}\). So in the revised edition of his *Physiology of Speech*, published in 1985 under the title *Phonetics of Speech*\(^{31}\), Sievers changed it to “Artikulationsbasis”\(^{32}\) with an addition of a reference to Felix Franke:

\[\text{[...]}\text{the storage position of the tongue, constantly held throughout all vowels of the system, stemming from differences in the resting position of the organs and which is now most usually described (by F. Franke) as the specific Artikulationsbasis [sic] of the above mentioned languages (formerly, I proposed the name ‘Operationsbasis’\(^{33}\)}] Sievers (1893, 105-106).

Often the significance of this definition is not given its due importance. It clearly demonstrates that for Sievers “Artikulationsbasis”, proposed by Franke, referred specifically to the tongue storage position\(^{34}\) and not to the other aspects of ‘Artikulationweise [manner of articulation]’ but, by adopting this term, he unwittingly brought with it the inherent dichotomy of Franke’s definition.

Sadly, because of his untimely death Franke did not leave any other more precise definitions of either ‘Indifferenzlage’ or ‘Artikulationsbasis’ so it is unclear as to what exactly he understood by each of these terms. Nevertheless, there is evidence that at this period ‘Artikulationsbasis’ often referred

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\(^{28}\) Als allgemeine charakteristika liessen sich anführen: die indierenzlagen ist der französischen ähnlich, unterscheidet sich aber von der ihr durch mindere energie, wie überhaupt die artikulationen durchgängig etwas schlaß sind.

\(^{29}\) [...] in der lautwissenschaft allgemein üblich geworden ist.

\(^{30}\) The principal meaning of *Operationsbasis* in German is: ‘the sum of all bases and naval bases of the armed forces in the area, from which an operation has its beginning’.

\(^{31}\) *Grundzüge der Phonetik*

\(^{32}\) Spelled as ‘Artikulationsbasis’

\(^{33}\) [...] Lagerung der Zunge, die von Differenzen in der Ruhelage der Organe herrührt und die man jetzt meist mit F. Franke als die specifische Artikulationsbasis der betreffenden Idiome zu bezeichnen pflegt (früher hatte ich den Namen ‘Operationsbasis’ vorgeschlagen).

\(^{34}\) Lagerung der Zunge
specifically to the tongue position. For example, Hermann Hirt (1894, 37) used the expression "basis of articulation of the tongue" when describing dialectal variation. A few years earlier Techmer used the same expression in his description of French (1890, 284 f.).

2.3 Establishment of the term “basis of articulation” in language teaching

As we have seen so far, both Sievers and Franke understood ‘Artikulationsbasis’ as an aspect of ‘Artikulationweise [manner of articulation]’, but somewhat differently. This was the primary cause of the “confusion of the basis of articulation concept of Franke with the Basis of Operation concept of Sievers” (Abel; 1982, 30).

Both Sievers and Franke mentioned ‘Artikulationsbasis’ in passing without giving it much attention so it would have probably remained largely unnoticeable if not for Wilhelm Viétor who dedicated to it three paragraphs of his Elements of phonetics and orthoepy of German, English and French (1887).

Importantly, the basis of articulation appeared in the final chapter titled Sounds in connected speech after a remarkable and innovative, for his time, description of individual articulations of German and English sounds in which Viétor used explicit diagrams demonstrating, particularly, various tongue postures.

Clearly, the fact that nowhere throughout this description did Viétor make any reference to the basis of articulation, shows that he never considered it as a causative basis. Instead Viétor placed it in the section dedicated to suprasegmentals:

So far we have considered each sound separately. If, however, we consider all the sounds of a language, comparing them with all the sounds of any other language, we find that there is something characteristic in the mode of articulating them. We might say, that they all presuppose the same basis of articulation; and this we shall have to determine for each language (Quoted by Ripmann; 1899, 98).

In the following paragraphs Viétor described articulation bases of French and German (French and English in the German version (Viétor; 1887))

35 'Artikulationsbasis' der Zunge
36 die Vermengung des Begriffs der 'Artikulationsbasis' bei Franke mit dem Begriff der Operationsbasis bei Sievers
37 Elemente der Phonetik und Orthoepie des Deutschen, Englischen und Französischen
in a rather broad way. For instance the French basis of articulation was formulated as follows:

The French mode of articulation is more definite, more ‘narrow’ than ours: the tongue is in general much further forward in the mouth. The lips are very active: they are strongly rounded or protruded, or the corners of the mouth are well drawn back; and the mouth is smartly opened. The timbre of the voice is bright and clear; and there is enough modulation to make us easily distinguish the musical intervals. The exhalation of breath is more uniform than in English (or German), and indeed tends to increase in force as it goes on (Quoted by Ripmann; 1899, 98).

Similar definition of ‘Artikulationsbasis’ was repeated in his Kleine Phonetik (1903).

One can see that this passage is, in fact, an extended version of Franke’s definition of the ‘Artikulationsbasis’, quoted earlier. Although typical positions of the speech organs (tongue, lips, jaw) were duly noted and described, the notion of the basis of articulation in this interpretation did not relate to the ‘tongue storage position’ or the ‘resting position’, which were not even mentioned. Instead, Viëtor preferred to deal with other features like timbre, modulation and the ‘exhalation of breath’. In this respect Viëtor’s assertion is essentially not very much different from that of Wallis since it also refers to the dynamics of speech production and the voice quality aspects. This was well noted by Fritz Abel who remarked that Viëtor had missed the important element about the ‘classic’ definition and pointed out the difference of the understanding of ‘Artikulationsbasis’:

[The phrase of Sievers certainly refers only to the formation of vowels and to a specific tongue storage position. In the context of the quote by Viëtor restrictions are not mentioned\(^\text{38}\)] (Abel; 1982).

Viëtor was notorious as a ‘militant theorist’\(^\text{39}\) of the language teaching movement known as the ‘Reform Movement’ which became influential in this period (Howatt; 1984). It is not surprising that the concept of the basis

\(^{38}\) Der Satz von Sievers bezieht sich ja ausdrücklich nur auf die Bildung der Vokale und auf eine besondere Lagerung der Zunge. Im Kontext des Zitats ist bei Viëtor von solchen Einschränkungen nicht die Rede.

\(^{39}\) Viëtor was commonly known as “Quousque Tandem” (Latin: How much longer) by the name of his famous pamphlet in which he “castigated the errors of his contemporaries in the language-teaching world in terms which left little to imagination: ‘appalling confusion [...] nonsense [...] rubbish [...]’” (Auroux; 2001, 1587).
of articulation in such interpretation, presented as an important element of his doctrine, had become an undisputed part of pronunciation teaching (Abel; 1982). Viètor’s Elemente was reprinted several times and influenced a whole generation of language teachers not only in Germany, but also in the English speaking countries where it was published as Elements of Phonetics (Ripmann; 1899).

At about the same time in England Henry Sweet published his Handbook of Phonetics (1877). In the introduction Sweet gave credit to the German phonetic school and listed some German phoneticians singling out Sievers and his Grundzüge as a book which had “summed up [...] in a most masterly manner” the results of phonetic studies in Germany.

2.4 The ‘Organic Basis’ of Henry Sweet

Although in the chapter titled Synthesis Sweet provided some detailed comparison of articulatory habits of English, Scottish, Saxon German, German and French, nowhere in the text did he use any specific term for these phenomena, including them under the ‘voice quality (timbre)’ title. In this respect Sweet continued the tradition of earlier English phoneticians (Wallis, Wilkins (1668); Cooper (1685); Bayly (1758) whose works he, undoubtedly, knew. However, in the reworked edition Sweet extended this chapter by adding a paragraph on the ‘organic basis’ which he described immediately after the voice quality features:

In English we flatten and lower the tongue, hollow the front of it, and draw it back from the teeth, keeping the lips as much as possible in a neutral position. The flattening of the tongue widens our vowels, its lowering makes the second elements of our diphthongs indistinct, front-hollowing gives a dull resonance which is particularly noticeable in our ɪ, its retraction is unfavourable to the formation of teeth-sounds, and favours the development of mixed vowels, while the neutrality of the lips eliminates front-round vowels. [...] In French everything is reversed. The tongue is arched and raised and advanced as much as possible, and the lips articulate with energy. French therefore favours narrowness both in vowels and consonants, its point-consonants tend to denticity, and, compared with the English ones, have a front-modified character, which is most noticeable in the ɪ, while the rounded vowels are very distinct.
As Jenner (2001) correctly noted, the idea of the ‘organic basis’ (‘Artikulationsbasis’ in his *Primer of spoken English* (1885, XX)) could have been borrowed by Sweet from the works of Sievers and Viëtor. The influence of Sievers, whom Sweet held in high esteem, is reflected in his concentration on tongue postures. Sweet did describe them as a causative factor influencing vowel quality, but the ideas of the ‘tongue storage position’ and the ‘resting position’ are completely missing here replaced by ‘keeping the lips as much as possible in a neutral position’.

Interestingly, on the next page of the English edition Sweet did make a reference to the ‘neutral tongue position’ (absent in the German text): “[o]ur neutral tongue position is the low-mixed or mid-mixed one in the vowels in *further*” (1890, 70). Nevertheless, this phrase looks like an isolated insert without any effect on his phonetic analysis of vowels. It can be taken as the literal translation of the ‘Indifferenzlage’ mentioned by Franke. Most probably, Sweet felt compelled to include it the English edition because it was widely used in German linguistic literature of that time.

Unlike in Germany, where the term ‘basis of articulation’ has been continuously used until now, in England its usage was quite limited even in the time of Sweet. In fact, Jenner (2001) mentions only Dumville (1909) who not only supported the idea but, as will be discussed in Section 4, was the first to apply it in practical pronunciation teaching.

To this could be added an interesting work of Kjederqvist (1904) on the dialect of Pewsey (Wiltshire). This little-known essay is remarkable because Kjederqvist actually opens it with a description of the basis of articulation of the dialect in question.

A book of Arwid Johannson (1906) is also worth mentioning as another example of the use of the basis of articulation in English phonetics texts.

With the death of Henry Sweet in 1912 and the advent of the phonologically-based segmental approach of Daniel Jones, which dominated the Phonetics field in Britain until the 1960s, the concept of the basis of articulation became completely extinct in the British linguistic tradition, although it continued to be used in the USA ((Prokosh; 1920; Graff; 1932; Heffner; 1952)) and, of course, in Germany.

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40 Organic seems to be Sweet’s preferred word which he repeatedly used in different contexts in his works.
41 *Elementarbuch Des Gesprochenen Englisch*
42 Sweet was particularly interested in vowels and created an original system of their classification and transcription.
43 Sweet developed an original system of transcription of vowels based on the frontness or backness of the tongue and its height.
3 Resurrecting the basis of articulation concept

3.1 The ‘Indifferenzlage’ or the resting position

Although the terms ‘Indifferenzlage’ [position of indifference] and Ruhelage [rest position] were used in relation to the ‘Artikulationsbasis’ by Sievers and Franke, the idea was not new. Some twenty years earlier a German philologist and historian of literature Wilhelm Scherer had made extensive use of these notions, although he named them as the ‘Indifferenzzustand [state of indifference]’ and the ‘Ruhezustände [position of rest]’ (Scherer; 1868).

Importantly, Scherer clearly distinguished the ‘[physiological state of indifference]’ which he understood as the total inactivity of speech organs, from the ‘[speech or normal state of organs]’ which he defined as “[the position of organs to which in their activity they return better and easier]”. He also clearly stated that the ‘normal state’ was language and dialect specific: “[and this normal state is different for all languages and for every particular dialect of a language]” (1868, 23).

Even the term ‘Indifferenzlage’ was not Franke’s invention. For example, in the chapter Lautlehre [Phonetics] of his The reform of foreign language education Bierbaum (1886) quoted a very clear definition of the ‘Indifferenzlage’ by Dr. A. Schröer (1884):

[The position of indifference is known as the state of rest, in which the speech organs are located during a pause in speaking, and from which they can most easily access the various special provisions in the individual sounds, without us being aware of it] (Schröer; 1884, Quoted by Bierbaum (1886, p. 31)).

This definition is particularly interesting because it directly correlates with the modern inter-speech posture (ISP):

[...] in inter-utterance pauses, in preparation for speech, different languages may exhibit a specific physical oral posture [...]
‘Indifferenzlage’ has been extensively used in German language phonetic literature ever since. However, the word ‘Indifferenz’ was sometimes understood and translated as ‘neutral’ so in English texts it was usually translated as the ‘neutral position’ although there is a slight semantic difference between ‘indifferent’ and ‘neutral’.

It was also often applied to the state of physiological repose. For example, Max Kaluza (1906), who dedicated a paragraph to the ‘[position of indifference (basis of articulation)]’, understood it as a language specific state of speech organs in ‘[quiet breathing]’. This implied that the basis of articulation was an inherent biological feature differing between peoples or races.

Another example is a book of Arwid Johannson (1906) where he not only merged ‘Indifferenzlage’ with ‘Artikulationsbasis’ but also defined it as ‘[the position in which these organs are in quiet and regular breathing, wherewith no speaking can take place]’.

This view, quite widespread in the literature of this period, may be forgivable in the case of Kaluza but this example demonstrates that even at this early stage there was already a lack of distinction between the ‘absolute rest’ and ‘speech ready (inter-speech)’ positions.

Such misconception of the basis of articulation as a hereditary biological feature was expressed most clearly by Van Ginneken (1933). Although this theory was later dismissed by the linguistic community, it was sometimes used as an excuse to discard the very idea of the basis of articulation. However, despite Francescato (1968), the ‘classic’ definition of the basis of articulation had nothing to do with innateness and, as we could see, referred only to the resting position of the tongue - ‘Lagerung der Zunge’.

Because of this ongoing confusion, the difference between the ‘resting in a state of physiological repose’ and ‘resting in a speech-ready state’ had to be continuously clarified. For instance, Jespersen (1912, 185) had to introduce a special term ‘aktive Indifferenzlage’ to distinguish it from the absolute rest position. Despite these efforts, the misapprehension persists to this day, as can be seen from the dictionary definitions quoted earlier.

Although basis of articulation and the ‘state of indifference’ are often used as fungible terms they should not be treated as exact synonyms. The
‘state of indifference’ or the ‘neutral position’ should be taken as a general
cover term for the overall disposition of speech organs in the speech mode in
the ‘speech ready state’ or between utterances while the basis of articulation
is a particular active element of this disposition which, as it will be shown
further, makes it language specific.

3.2 Universal vs. language specific nature of the ‘neutral position’

Since the notion of ‘neutral position’ is regularly used in modern transforma-
tional-generative phonology it needs clarification. The Universal Grammar
of Noam Chomsky has its roots in the structuralist school of linguistics and
his earliest works “drew directly from the papers of Bloomfield and Jakob-
son” (Newmeyer; 1996, 11). One of the fundamental tenets of structuralism
was the notion of ‘distinctive features’ in phonology. A phonetic system of
a language was described as a ‘sound pattern’ of such features. To build
such a system there was a need to postulate a zero reference point (Annan;
1972; Melis; 1978) which Chomsky and Halle found in a presumed language
universal ‘neutral position’ postulated as follows:

In most X-ray motion pictures of speech\(^{54}\), it can readily be ob-
served that just prior to speaking the subject positions his vocal
tract in a certain characteristic manner. We shall call this con-
fuguration the “neutral position” and shall describe some of the
ways in which it differs from the configuration of the vocal tract
during quiet breathing.[...] The body of the tongue, which in
quiet breathing lies in a relaxed state on the floor of the mouth,
is raised in the neutral position to about the level that it oc-
ceives in the articulation of the English vowel [e] in the word ‘bed’; but
the blade of the tongue remains in about the same position as in
quiet breathing (Chomsky and Halle; 1968, 300).

The validity of this universal was challenged theoretically by Annan (1972)
at that time and it was later negated by empirical research (Skalozub; 1979;
Gick et al.; 2004; Kedrova et al.; 2008; Ramanarayan et al.; 2010)\(^{55}\).

\(^{54}\)Unfortunately, no reference to the exact sources is given. Perhaps, they took the data
from Perkell (1969) published by the MIT Press.

\(^{55}\)It should be noted that this is not the only “Universal” that proved to be a “myth”.
The whole idea of the reality of such presumed “Universals” is currently debated (Evans
and Levinson; 2000a,b; Levinson and Evans; 2010).
Although not embracing the transformational-generative approach, John Laver (1980; 1994), had a similar concept of a ‘neutral position’ which he also required as a point of reference in describing the voice quality settings.

The importance of this concept for his work is obvious from the fact that his *Principles of Phonetics* (1994) opens with an X-ray picture and a diagram of the ‘neutral position’ (Fig. 1). Since Laver did not label it as a specifically English neutral position, it could be understood as being language universal.

Laver gave a detailed formant-based characteristic of the sound [a], corresponding to this position (1980, 11-18). This is not far from the specification of /e/ postulated in Chomsky and Halle (1968, 300).

While such idealised universal ‘neutral positions’ may be convenient for abstract phonetic analysis, in reality they are language specific. This was confirmed by the experimental research by Gick et al. (2004) who concluded that neutral positions

[...] (a) are language-specific; (b) function as active targets; (c) are active during speech, corresponding with the notion of ASs\(^{56}\), and (d) exert measurable influences on speech targets, most notably including effects on the properties of neutral vowels such as schwa” (Gick et al.; 2004, 231).

Among other things, this is also a confirmation of the organic connection of the neutral vowel in a language and its basis of articulation. In other words, the tongue position for the neutral vowel in a given language or dialect may be taken as largely corresponding to the particular basis of articulation.

Such an organic link has, actually, been clearly voiced. Having described the English articulatory setting by the resting position of the tongue, Kulešov

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\(^{56}\)articulatory settings
and Mišin made this important connection between the articulatory setting and the neutral vowel:

[Vocalisation of the articulatory setting, which can be represented in the form of voiced pauses [my emphasis], shows that the characteristic setting of the organs of phonation is close in its sounding to the mid-central vowel [a] \(^{57}\) (Kulešov and Mišin; 1987, 23).

Kulešov and Mišin stressed the language specific nature of the ‘neutral vowel’ in general:

[[...] it needs to be kept in mind that [a] is not just a mere reduced sound but a sound based on a certain setting of articulatory organs having its support in the articulatory setup of the given language\(^{58}\)] (Kulešov and Mišin; 1987, 29).

Speaking of Russian, Kulešov and Mišin proposed that, based on the typical Russian articulatory setting, the neutral vowel in Russian should be close to [i] \(^{59}\).

There are teachers who intuitively feel the connection between the neutral vowel and the basis of articulation. This is an interesting account of schwa by a Japanese teacher of English:

[Schwa] is the most elusive, selfless and yielding vowel of all. Teaching schwa is almost like teaching “nothingness.” Schwa is in the path from the previous segment to the next segment without having its own identity [...] acquiring schwa means the acquisition of the co-articulatory pattern of English, and it seems to greatly improve the level of pronunciation [my emphasis](Kondo; 2001, Quoted by Gilbert, 2008).

\(^{57}\) Вокализация АУ [артыкуляторной установки], которую можно непосредственно представить в виде озвученных пауз, показывает, что характерная установка органов фонации близка по своему звучанию к гласному смешанного ряда среднего подъёма [a].

\(^{58}\) [...] необходимо помнить, что [a] - ни какой-то редуцированный звук, а звук, в основе которого лежит определённая установка органов речи, опирающаяся на артикуляционный уклад данного языка.

\(^{59}\) This is generally correct although oversimplified. Because of the centralised basis of articulation, Russian does not have a clear phonological schwa /a/ so the function of the ‘neutral’ vowel is performed by a number of ‘reduced’ vowels which appear in unstressed positions. The reduced form of [a] and [o] is usually [y]. Other vowels are reduced to a range of various shades of [a], [i] and [v] (Bryzgunova; 1972, 14). It is this variety that gives Russian what Prokosh (1920) called the “elusive elasticity” and the “insinuating grace”.

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Schwa is indeed an ‘elusive’ sound, however, there may be a way of capturing its phonetic nature through the so-called ‘hesitation vowels (HV)’. These are sounds like ‘ah’, ‘er’, ‘hm’ etc. which often fill pauses in speech (Schourup; 1981). They have been traditionally associated with neutral sounds. For example, Roger Lass (1976, 44) regarded them as a “source of information about a truly linguistic ‘neutral position’”. The phonetic realisation of HVs differs in every language\(^{60}\) (Candea et al.; 2005; Stepanova; 2007) and can give an insight of the specific basis of articulation of a given language.

These sounds are sometimes regarded as a defect of speech but they may have an important function - to keep the respiratory system in the speech respiration mode (Schönle and Conrad; 1985) and therefore can be considered as an acoustic realisation of the general ‘ready to speech position’. Since HVs occur in pauses, their link to the ISP is also quite natural.

Hesitation vowels could be particularly convenient for the visualisation and controlling of the basis of articulation tongue postures in pronunciation teaching.

\(3.3\) Evidence of the existence of language specific Bases of Articulation

Although the concept of the language specific ‘position of indifference neutral position’ and ‘resting position’ was widely accepted (at least in Germany) it was not based on any solid experimental proof as the technology for observing and measuring speech production dynamics was absent. Even the sophisticated systems of mirrors described in the fundamental work of Techmer (1890) could not capture the elusive ‘resting position’.

The situation did not change even with the arrival of the revolutionary X-Ray photography. The first systematic attempt to apply this method to the study of vowel articulation was undertaken by Meyer (1911). His work is especially interesting because Meyer made a comparative study of several European languages.

Since the idea of the ‘Indifferenzlage’ was widely accepted in Germany, it is not surprising that it appeared in Meyer’s book in the chapter describing German, particularly, a Northern German dialect. Meyer used the ‘Indifferenzlage’ of the tongue as a reference for describing vowels and referred to it as the relative ‘Indifferenzlage’ which he clearly understood as a “[position, which holds the tongue in speech readiness\(^{61}\)]” and defined it as the “[tense

\(^{60}\)This may be another argument against the “universal neutral sound”.

\(^{61}\)Lage, welche die Zunge bei Sprechbereitschaft einnimmt
Figure 2: Laryngoscope described by Techmer (1890, 29) which could also be used to view certain tongue positions and vowel articulation.

Figure 3: Tongue contours of the vowels of N. German. The *Relative ‘Indifferenzlage’* posture is shown as ++++++++ (Meyer; 1911, 24-25).

Interestingly, the impressionistic tongue position used as ‘*Indifferenzlage’* by Meyer Fig. 3 is strikingly similar to the instrumentally proven ‘mean tongue position’ in a modern research on German vowels shown in Fig. 4.

However, the relative ‘*Indifferenzlage’* was not mentioned or shown anywhere else in his work for other languages. There is an obvious reason for this: while the ‘*Indifferenzlage’* position was so widely debated in Germany that it appeared as an established fact, this concept was missing in other European languages so Meyer did not have ‘*Indifferenzlage’* descriptions for other languages and he could not measure them with X-Ray equipment of his time.

\[^{62}\text{gespannte Ruhelage' der Zunge}\]
Figure 4: The mean tongue position for German is shown by dotted line (other lines show limits of tongue movement in this direction). From Hoole and Mooshammer (2002).

Oscar Russell (1928; 1934) made an extensive research of vowels and consonants using X-Ray but his method was also static and it did not allow him to view articulatory dynamics.

Similar X-Ray measurements were performed in Russia by Vassiliy Bogorodickij (1857-1941) and made part of his Russian Phonetics in the light of experimental data Bogorodickij (1930). Bogorodickij did mention ‘Indifferenzlage’ and described it in the same terms as used by German phoneticians distinguishing between the ‘absolute’ and ‘relative’ indifferent setting of the speech organ\(^{63}\). By ‘relative’ he understood the ‘[transitive base to a start of speaking\(^{64}\)]’.

Bogorodickij did not report any such setting for Russian, firstly because his equipment could not record it reliably and, secondly, because he saw it as a factor obscuring his research. However, it is important to note that he did consider ‘Indifferenzlage’ as the starting point in the pronunciation of sounds and presupposed that it could vary for sounds of various categories and for different languages.

The lack of reliable methods of measurement of the basis of articulation

\(^{63}\)абсолютный и относительный индифферентный уклад аппарата речи
\(^{64}\)переходную базу к началу произношения
did not allow any further development of this concept let alone its practical application in language teaching. Hefner (1952, 99), while calling for more attention to the basis of articulation concept, remarked that no method existed at his time to measure it.

The first breakthrough was brought by the development of the method of X-Ray cinematography (cinema-roentgenography, cineradiography) which was developed in the 1930s (Reynolds; 1934) but was seriously applied in phonetic research only in the late 1960s.

Perkell (1969) was among the first to employ it in his study of speech physiology. He used such terms as ‘speech posture’ and ‘pre-speech posture’ which referred to the neutral state or ‘the generalized vowel state’. Importantly for the current discussion, Perkell observed a common feature consistently repeating at consonant release:

[…] the fluctuation in movement toward the vowel target during the aspiration suggests that movement of the tongue body toward a particular vowel configuration is preceded by a gesture which is either a necessary component of consonant release, and/or a physiological feature common to all vowels. This latter feature could be a relaxation toward a generalized vowel state (observed in these examples during aspiration) (Perkell; 1969, 19).

In other words, before the beginning of articulation of a separate vowel the tongue repeatedly moves to some neutral schwa-like posture which also closely resembles the pre-speech posture (Fig. 5), behaving dynamically and spatially quite similarly for the two vowels /æ/ and /æ/ (1969, 20).
In Russia the X-Ray cinematography method was extensively used in Skalozub (1979). Importantly, a few years earlier Skalozub performed a comparative study of Russian and Korean articulations using conventional X-Ray photography (Skalozub; 1963) so her research was multilingual from the beginning.

Skalozub was aware of the ‘anticipatory settings’ of Kolosov (1971) so she paid particular attention to inter-speech pauses. Examining the dynamics of sound articulations in several languages Skalozub noted certain language specific postures of the tongue to which it continuously returned between utterances:

[One would expect that the contour of the neutral line of the tongue on the diagrams should correspond to the configuration of the palatal dome, and that it could be universal for the tongue positions in pauses and non speech situations for all languages. Really, [...] on all the inspected diagrams the tongue root is somewhat pulled back, however the shapes and positions of the frontal, middle and real parts of the tongue surface are far from being identical. This speaks in favour of the supposition that the functioning of a speech system determines the activity of certain articulations and that it finds some average statistical realisation in the neutral position or the state of speech resting position which, in this connection, acquires some “own proper” features.]

(Skalozub; 1979, 17).

This agrees with the observations of Perkell (1969) for American English but the importance of the research of Skalozub was that she produced neutral position profiles for several languages. This could be the first empirical confirmation of the language specific “neutral position” postulated almost a hundred years earlier (Fig. 6). In this respect her research preceded the study of Gick et al. (2004) and Schaeffler (2010).

Gick et al. (2004) used X-Ray film data to investigate the ‘inter-utterance postures’ of Canadian English and Québécois French. They concluded that

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65 Можно было ожидать, что контур нейтральной линии языка на схемах должен соответствовать конфигурации нёбного свода, и это могло быть общим для положения языка во время молчания в перечной ситуации для всех языков. Действительно, [...] на всех сравниваемых схемах корень языка несколько оттянут назад, но формы и положения переднего, среднего и заднего участков спинки языка далеко не тождественны. И это говорит в пользу предложения, что функционирование звуковой системы определяет активность определенных артикуляций и находят некое усредненное статическое выражение в нейтральном положении или положении речевого покоя, которое в каждом языке приобретает в этой связи какие-то “собственные” признаки.

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such a posture was not just a "transition point[s] solely determined by immediately surrounding sounds" but that it was "tightly specified as actual speech targets" and that such postures were language specific and generally corresponding to the earlier impressionistic descriptions of ASs. However, since Gick et al. used data with limited spatial resolution and clarity they could not measure the tongue dorsum so their results were incomplete as noted by Wilson (2006, 13).

The research of Wilson (2006) is particularly relevant because the object of the study was specifically the "posture of the articulators, and not the mechanics (i.e. static, not dynamic properties)" (2006, 4).

Wilson (2006, 10) supported the view of Gick et al. that such 'underlying' postures could be considered as 'the most representative, least biased configuration at which to measure the position of the articulators in order to infer a language's articulatory setting'. However, he did not discover any significant difference between the tongue root (TR) and tongue dorsum (TD) shapes in Canadian English and Québécois French. This goes against both the impressionistic descriptions for English and French by some earlier phoneticians and the results obtained by Gick et al. (2004). Wilson gave a number of possible reasons for this in his paper (2006). Nevertheless, Ian Wilson has confirmed that he still believes that TR and TD could vary cross-linguistically although he did not find any perceivable difference in his particular research (p. c. Wilson, 2011).

Schaeffler et al. (2008) engaged electropalatography (EPG), ultrasound tongue imaging (UTI) and a motion capture system VICON in their ongoing study of the ISPs. Although they reported a number of problems
in identifying and registering ISPs they did not question the existence of language specific articulatory settings (Schaeffler; 2010, 63). We are awaiting the results of their study.

In Russia the research of Skalozub was continued by (Kedrova et al.; 2006, 2007, 2008) using the modern MRI method. Kedrova et al. (2008) made an extensive research of the ‘anticipatory positions’ in Russian which showed that they actually displayed much greater variability because of many factors such as pauses duration, the phonetic context prior and after pauses and even their linguistic function.

One of their conclusions was that the neutral configurations produced by Skalozub should be treated with caution as rather simplified representations. The reason for this could the methodological differences in defining the exact point of measurement. The ‘anticipatory positions’, which Kedrova et al. (2008) studied, did not exactly correlate with the notion of the ‘resting position’ because they were, in fact, snapshots of the initial stage of phonation when the tongue was already set in anticipation of a specific vowel and could not be considered as neutral or indifferent.

Nevertheless, such anticipatory positions revealed “[not only the considerable similarity of articulatory profiles for each specific vowel, but also a certain coincidence of contours for different vowels]. So Kedrova et al. (2008) confirmed that the tongue profiles at the end of phonation of vowels of different types and before adopting a vowel specific anticipatory position for the next vowel (i. e. in the point corresponding to the classic ‘resting position’) were quite similar even for vowels of different classes like /u/ and /a/ (2008, 19). It is this intermediate position (Fig.7) that could be considered as the “physical instantiation” of the basis of articulation in Russian.

Figure 7: Profiles of the vocal tract postures after the articulation of the Russian /u/ and /a/ and before moving to the ‘anticipatory position’ (Kedrova et al.; 2008, 19).
In modern research it is common to study the ISP of all articulators (lips, tongue velum etc.) although the classic notion of the basis of articulation was limited to the tongue posture. While not diminishing the importance of other articulators, such an approach appears to be particularly convenient for application in teaching pronunciation due to the important role of the tongue in speech articulation.

3.4 The role of the tongue as the principle articulator

In many languages the tongue is a synonym of either ‘language’ or ‘speech’. This is the recognition of the central place of the tongue as “the most important speech organ that forms vocal tract shapes for producing most of the vowels and consonants” (Fang et al.; 2009). It plays a crucial role in transforming articulatory configurations into production of speech acoustics (Honda; 1996).

We often perceive the tongue as a rather small flat organ, but in reality what we see externally is like the tip of an iceberg with the main part of the tongue body concealed in the depths of the mouth.

The tongue is, in fact, a complicated and interconnected complex of muscles (Fig. 8). They are traditionally divided into two groups: intrinsic and extrinsic. The intrinsic muscles are more superficial and their principal function is to alter the shape of the tongue (lengthening and shortening) and also to perform fine movements like curling and uncurling its apex and edges, flattening and rounding its surface which is essential for sound articulation. The deeper lying and also more powerful extrinsic muscles elevate and depress, protrude and retract the tongue, arch or flatten its base (Hardcastle; 1976, 93-93).

Notably, one of the extrinsic muscles - hyoglossus is attached to the hyoid bone which is interconnected with the larynx. Therefore, any movement of tongue muscles affects cricothyroid muscles and vice versa forming a system which may be defined as a HYOLINGUAL COMPLEX (Hiiemae and Palmer; 2003).

Consequently, the direct link between the elevation of the larynx and retraction of the tongue root, which is typical for languages rich in pharyngeals (Esling; 1999), is not accidental. Interestingly, a similar connection exists between the action of the hyoid bone and the fronted tongue position: “[t]he

\footnote{Such clear-cut division is now considered untenable. Recent findings show that the interaction between the two groups may be more complex, however, the role of the extrinsic muscles in moving the tongue body is not questioned (Hiiemae and Palmer; 2003).}

\footnote{For an objective and instrumentally verified description of the function of each of the main tongue muscles see Fang et al. (2009).}
more anterior the tongue articulations, the higher the hyoid bone” (Eriksson; 2003, 142).

The tongue is also connected with the larynx in another more indirect way. *Palatoglossus* (*glossopalatinus*) is a paired muscle which primarily serves to control the velum, however, it is also connected both with the tongue and the larynx (Hardcastle; 1976, 99). Importantly, this is the only extrinsic muscle innervated via the *vagus* or *pneumogastric nerve*. The *vagus nerve* controls, in particular, the larynx muscles and plays a major role in breath function innervating such important respiratory muscle as the *diaphragm*. So, in this respect, it functions as a bridge between the three important articulatory organs and the respiratory system.

Other extrinsic muscles are attached to the lower jaw which is, in its turn, also connected with the hyoid and the larynx. The whole tongue-hyoid-larynx-jaw unit may be considered as a good example of a local dynamic system in which the tongue is the ‘dominant’ agent par excellence.

The primordial function of the tongue was to serve as an organ of taste and an auxiliary part of the masticatory and deglutitive mechanism so its function as an organ of speech articulation is secondary. The tongue is truly ‘the articulator’ because it takes part directly or indirectly in every sound articulation. In vowel production it alters the volume of the vocal tract changing its resonance properties and the resulting acoustic formant characteristics (Hoole; 1999, 1020).

As can be seen from Fig.9, regardless of which of the two principal articulatory models we consider, the tongue takes a major part in vowel articulation (not to be confused with phonation). The function of the lips and the lower jaw are, of course important, but their action is auxiliary to that of the tongue. Since the only determining factor is the shape of oral cavity, it is
Figure 9: Two models of vowel articulation: the conventional IPA system (left) and the alternative throat-tongue-lip model (TTL) (right). (after Wood (1993)).

possible to produce all vowels without changing the jaw position. This shape depends mostly on the distance between the tongue and palate and the lip position (Malmberg; 1963). However, even the lip position greatly depends on the tongue posture. This relationship will be discussed in more detail in 4.5.

Traditionally, extrinsic muscles are considered responsible for vowel articulation, while intrinsic muscles are assigned the major role in the articulation of consonants. Based on the specific functions of the principal groups of tongue muscles, Perkell (1969, 65-66) identified two centres of articulation: the extrinsic vowel producing system and the intrinsic consonant-producing system. He also assigned to extrinsic muscles the role of positioning the ‘semi-rigid tongue body’ into the speech-ready position. These two centres could be taken as corresponding to the ‘tongue-body’ (TB) and ‘tip-blade’ (TBL) systems in Hardcastle (1976) (Fig. 10).

As already mentioned, the gross TB system serves as the positioning agent for the TBL system. This interaction of the two systems is not so much subordinate as complementary. Perkell (1969, 66-65) described this interaction as a superimposition of the consonant-articulatory gestures on the “continuously varying vowel producing system”. He assigned to the TB system the co-articulatory function affecting the manner of articulation and being primarily responsible for such secondary features of articulation as palatalisation, velarisation and pharyngealisation - areas traditionally assigned to the articulatory setting domain.

Although Perkell did not mention that such speech-ready position of the

69However, as empirical research has demonstrated, intrinsic muscles also participate in vowel articulations to some extent (Perkell; 1969; Fang et al.; 2009).
TB system could be language specific, cross-linguistic research does indicate that its ‘neutral’ position or ‘centring’ is actually language specific.

3.5 Tongue body centring and the basis of articulation

In articulatory phonetics speech is viewed as a chain of articulatory gestures. Each gesture is a constellation of movements of various articulators (Brownman and Goldstein; 1992a). These movements are subject to a number of physiological constraints. One of them is known as the ‘economy of speech gestures’ rule which was defined by Lindblom (1983) as follows: “In human speech extreme values of parameters are avoided”. Its principle was very explicitly shown by Lindblom in this humorous picture (Fig. 11).

The apparent solution of how to make this overstretched (extreme) movement (on the left) more comfortable would be to walk to a more advantageous position (on the right). However, there is at least one other solution: to change the section of the window to clean.

The picture of Lindblom is convenient for explaining the basis of articulation concept to students but it is also quite insightful. Returning to the idea of separate vowel producing (extrinsic) and a consonant producing (intrinsic) systems, we may imagine the person as the TB system and his arm with the sponge as the TBL system. Going further along this route we may consider the window as the oral cavity. Integrating into this modified picture the idea of the presumed multiple TB centres, it would look as shown on Fig. 12.

Applied to the tongue, this would mean that in each language it would tend to retain a certain position which could allow it to perform articulations,

\footnote{For the possible physical factors underlying this see (Nelson; 1983)}
Figure 11: Extreme vs. comfortable movement. (after Lindblom; 1983).

Figure 12: Multiple TB centres (Adaptation of (Lindblom; 1983))
defined by the specific phonetic system of a language, with the least effort and in a most efficient way, avoiding redundant movements (or, continuing our comic metaphoric description, to take a position from which the sections of the window, which needs to be cleaned, could be comfortably reached).

Because of the variety of speech movements this position has to be a certain compromise between the habitual articulations forming a point of equilibrium\(^{71}\). Phonetically, this point is embodied in a neutral (schwa) vowel which is sometimes defined as ‘the mean tongue-tract variable position for all the full vowels’ (Browman and Goldstein; 1992b).

It is this position to which Sievers referred as ‘Lagerung der Zunge [the storage position of the tongue]’ or ‘Artikulationsbasis’, Schröer (1884) as ‘Indifferenzlage’, Gick et al. (2004) as inter-utterance positions and Schaeffler et al. (2008) as inter-speech posture (ISP).

We may reformulate this idea in a more formal way. The model of Wood (Fig. 9 (right)) presupposes a single default TB centre from which the three main movements are performed, which may be true for each individual language. The single TB centre in Hardcastle (1976) was chosen arbitrarily as the centre of reference for X-Ray photography so it does not correspond to an actual tongue body centre.

Laver (1980, 44-45) proposed to take as a reference point “the long-term average speech position of the approximate centre of mass of the tongue” (Fig. 13). This model is generally correct but, probably, too simplistic. It may give a deceptive idea of a single centre of gravity universal for all languages and create an impression of the tongue being a round blob by not taking into consideration the two articulatory centres (TB and TBL) and

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\(^{71}\)It would be interesting to explore this area in the framework of the ‘equilibrium-point hypothesis’. See e.g. Perrier et al. (1996).
their non-symmetrical interaction.

In extra-linguistic literature this centre is often referred to as “the centre of mass (gross position in space)” (Hiiemae and Palmer; 2003, 420). Importantly, Hiiemae and Palmer noted the relative stability of this centre of mass during speech. Although they did not mention any cross-linguistic peculiarities, from the point of view of the basis of articulation, it may be presumed that such centre of gravity could be language specific. The actual cross-linguistic differences in its position could range from small, almost imperceptible differences, to some fairly noticeable divergences in various languages. If so, it would serve as a platform or basis for the on-lying surface shape alterations making them somewhat different in every language even for the same phonemes, particularly, the so-called cardinal vowels.

The research by Kedrova et al. (2007) provides some confirmation of this theory. Because ISPs in Russian were not found to be very informative and were subject to being obscured by various factors, Kedrova et al. (2007) attempted to determine, what they called “[the general articulatory setup]” analysing cross-linguistically articulatory profiles of cardinal vowels.

Comparing such contrastive languages as Russian and Korean, they discovered that in Korean the articulation of all vowels was “[considerably more oriented towards the posterior part of the oral cavity (more pharyngeal) than the articulation of their Russian analogues [...]”54. Importantly, the difference was not in the position of the TBL system but in the gross positioning of the TB system:

[[...]] namely the shift of the main mass of the tongue into the pharyngeal region and the convex shape of the posterior part of the dorsum distinguished Korean vowels articulation from their corresponding Russian analogues75 (Kedrova et al.; 2007).

These results largely correspond to the diagram in Skalozub (1979) shown in Fig.6 and provide some additional support for the validity of ISP in determining the basis of articulation.

Extrapolating these findings to other languages, it could be presupposed that their TB centres of gravity may vary from [+fronted] to [+retracted]...
Figure 14: A simplified model of the variable tongue body centres (adaptation of Hardcastle (1976)).

with certain languages having an intermediary \([-\text{fronted}]\) or ‘neutral’ position.

Keeping to the three-way classification, these centres can be schematically shown as per Fig.14. For convenience, they are drawn somewhat exaggerated and in real life the difference could be smaller. The three tongue body shapes (very approximately!) correspond to the three recognised tongue ‘settings’: retracted (as in English), neutral (as in Russian) and advanced (as in French and German). Each of these positions has a specific effect on the performance of the corresponding TBL system.

The advantage of this approach is in its predictive capability. For example, from the point of view of the economy of speech gestures principle, it is obvious that in a language with the predominantly laryngealised (backed) centring the TBL would not be in an ideal position to produce dental stops since its natural function is lifting and lowering the blade. From this backed basis of articulation it would be more economical to articulate them with the tip of the tongue on the alveoli as in English or Korean.

This theory finds confirmation in empirical research. For example, Kedrova et al. (2007) noted that the back gravitated tongue articulation in Korean caused some distinct velarisation of the Korean [i] which agrees with the above model. Comparing the parameters of Korean and Russian consonants Kedrova et al. mentioned that they were also affected by this specific TB backness. While in Russian consonants tend to be dorsal, articulated in the front (dental) with only two velars, Korean has five distinct velars including the tense (faucalized) [k] and its dorsals are alveolar, some are even post-alveolar which also agrees with the model shown in Figs. 11 & 12.
As for vowels (and liquids), since the basis of articulation affects the shape of the vocal tract, changing in a specific way its resonance parameters, this would lead to a systemic change in their formant patterns\textsuperscript{76}.

John Esling (1982, 7) quite correctly noted that "the vowels and consonant phonemes of a language share features which can be taken together to constitute the habitual articulatory posture of language". This statement can be reversed and the whole phonetic system of a language can be analysed (and even predicted to a large extent) using the key element of the 'habitual posture' - the basis of articulation as a reference point.

The above model also agrees with the concept voiced by Kolosov who defined the basis of articulation as

\[ \text{[the model-prognosis of the established phonetic relations in a language, expressed and fixed externally in the anticipatory articulatory setting and in the general articulatory setup]} \text{\textsuperscript{77}} \] (Kolosov; 1971).

This approach has some important implications for pronunciation teaching. If a language specific basis of articulation indeed predetermines articulatory properties, then changing it to match as close as possible the basis of articulation of a target language would lead to a natural and systemic change in both vowel and consonants quality leading to a more native-like pronunciation.

The last question which remains to be cleared up before moving to the practical ways of application of the basis of articulation in pronunciation teaching is the relation between the reinstated BASIS OF ARTICULATION and the widely accepted in the English language literature ARTICULATORY SETTING.

### 3.6 Basis of Articulation vs. Articulatory Setting

The revival of interest to the basis of articulation in the modern English linguistic literature is usually connected with the article of Honikman (1964) which was cited earlier. The story behind it is so intriguing that Bryan Jenner (2001) dedicated most of his article to the "implied originality of Honikman's paper". Honikman's article is remarkable for several reasons. First, it is her only published work (Jenner; 2001, 133). Also she was actually a specialist

\textsuperscript{76}See more on the relation between tongue position, coronal consonants and vowel quality in Flemming (2003) although he believes that the tongue position is secondary to the place of articulation.

\textsuperscript{77}модель-прогноз сложившихся фонетических связей в языке, внешне выраженного и закрепленного в предшествующей артикуляционной установке и основном артикуляционном укладе.
in African languages and, as Jenner noted, the subject of the paper ‘does not seem to have been reflected in her phonetics teaching, either in London or subsequently at Leeds’. Secondly, it is a truly ‘odd’ piece of work, again using Jenner’s words, to be found in a volume dedicated to Daniel Jones because it went against all his principles. The complete absence of any references is also unusual for an academic paper.

The definition of Honikman, which was quoted earlier, is quite complicated but the gist of it was clearly expressed in Abercrombie (1967, 92-93) as ‘various muscular tensions which are maintained by a Speaker the whole time he is talking, and which keep certain of the organs of Speech adjusted in a way which is not their relaxed position of rest’. Importantly, this was written in the chapter Voice Quality and Voice Dynamics in the section Features of voice quality so the keywords here are ‘voice quality’ and ‘voice dynamics’. In this respect this idea of articulatory setting was in line with the central premises of the Edinburgh phonetic school. Not surprisingly, it was particularly supported by John Laver (1978; 1980).

The newly coined term completely replaced the earlier ‘basis of articulation’ (which was practically extinct by this time anyway) in English language phonetic texts. However, the important question is - are these two terms really equal and mutually interchangeable?

Wadsworth insisted that ‘articulatory setting’ should be preferred to ‘base’ or ‘basis’ because it is

\[...\] an implicitly dynamic term and thus obviates the dichotomy inherent in the essentially static term basis. Namely, the confusion between the position of the organs of speech at rest and their overall configuration during speech (Wadsworth; 1979).

He justified his approach by the intention to “to avoid the reductionism inherent in the dichotomy, since the concept of setting is part of a holistic descriptive apparatus”. However, it is questionable whether it would be methodologically correct to obviate the dichotomy simply by ignoring one of its sides. In doing so it is easy to throw out the baby with the water. Also, a mere listing of a larger number of individual features of something does not always make it holistic. Perhaps, even the very notion of ‘holism’ can hardly be applied to the phonetic system of a language which is something more than a mere totality of various singular features.

Recently the view of a language as a complex system that emerges from interaction of its components (Larsen-Freeman and Cameron; 2008) is gaining support. Such a system is also considered as heterogeneous i.e. made up of both agents and elements and may include other subsystems ‘nested’ in one another (2008, 201). The agents, elements and subsystems of a complex
system are in a state which can be described as “mutual causality” (2008, 202), however, such relations are not always symmetrical and there may be some agents which exert more influence and form a nucleus of stability for the system.

Kolosov (1971) did not use the term ‘complex system’ but his approach to the basis of articulation generally agrees with the model of a system described above. He viewed it as an essential regulatory agent of the articulatory setting. In full compliance with the complex system theory Kolosov imagined this regulation not as linear but as having a “star-like form” (Fig. 15) in which the central element A represented the ‘articulatory base’ and B, C, D, E, F... - individual ‘articulatory settings’.

The initial idea of the ‘classic’ basis of articulation actually related to one such global agent - the ‘active (relative) rest position’ of the vocal tract and, specifically, that of the tongue which was seen as a ‘basis’ or “the natural foundation for the different articulations of the apparatus of speech” (Johansson; 1906).

The word ‘basis’ was not chosen by Sievers accidentally. It was a deliberate choice and it should be taken for its true value: “foundation, support for something; the main or determining principle or ingredient” (BCA; 1990).

Therefore, rather than rejecting the term ‘basis of articulation’ outright it would be more constructive to restore it to its original meaning, perhaps replacing the ambiguous ‘Ruhelage [rest position]’ with the modern concepts of ‘inter-speech (inter-utterance) posture’.

This does not mean that the well established articulatory setting should be discarded. Contrarily, it should remain as a convenient and generally accepted all-inclusive cover term. The notion of the articulatory setting as a dynamic system is well established (Wadsworth; 1979; Lowie and Bultena; 2007), therefore, elevating it to a complex dynamic system we can include the basis of articulation in it. By doing this, we shall be able use both the
basis of articulation and articulatory setting, taking them for what they really are: the causative static agent or ‘basis’ in the case of the basis of articulation and the complex system or ‘nexus’ comprising both static and dynamic aspects, for the articulatory setting. The special role of the basis of articulation within such system is that of a causative agent and a stabilising centre.

3.7 Intermediate conclusion to Sections 1 & 2

The vision of the basis of articulation as an (active) resting position of the tongue was a remarkable insight. This originally simple idea became ‘nebulous’, ‘hazy’ and ‘not strictly scientific’ only after it started to be taken as a generic term for a wide range of voice quality phenomena. BASIS OF ARTICULATION should not be equalled or used as another name of the ARTICULATORY SETTING as it was postulated by Honikman. The two terms refer to two distinct aspects of the same complex system of speech articulation: static and dynamic. It is also important not to confuse ARTICULATORY SETTING and ARTICULATORY SETTINGS (in plural) as they are described in Laver (1978) or used in Esling and Wong (1983) because these refer exclusively to various voice quality aspects. The inter-relation between the basis of articulation and articulatory setting is shown in Fig.16.

As for Russian, the well established term ‘Artikuljatsionaja Baza’\textsuperscript{78} [artik-

\textsuperscript{78}Артикуляционная база

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articulatory base]’ is too vague. The meaning of [base] here is similar to the meaning of ‘base’ in ‘database’ in English. To make it more clear Kulev and Misin (1987) proposed to unite the static and dynamic aspects under one cover-term ‘Artikulyatsionnyy uklad’ 79 [Articulatory setup]. This exactly corresponds by form and content to the notion of ARTICULATORY SETTING as understood here. For the sake of clarity it would be worthwhile to define the static agent as ‘Bazis artikulyatsii’ 80 [Basis of articulation]’ in its primordial meaning.

In this narrow sense BASIS OF ARTICULATION should be regarded primarily as a language specific habitual gross position of its TB system (3.5.). Such gross position generally corresponds to the articulatory targets of the language specific ‘neutral vowels’ and the ISPs. For linguo-didactic purposes it seems particularly convenient to use language specific hesitation vowels as examples of acoustic instantiation of the basis of articulation.

4 Basis of articulation and pronunciation teaching

4.1 Practical implementation of ‘basis of articulation’ and ‘articulatory setting’ concepts

As could be seen from 2.2. and 2.3., the concept of the basis of articulation was directly connected with pronunciation teaching from its emergence. Curiously, the phoneticians, who proposed and popularised this idea, were more concerned with the introduction of phonetic transcription to pronunciation teaching then in the practical application of the basis of articulation concept. In modern terms their approach would be qualified as ‘segmental’.

Henry Sweet (1890, 69) stated that: “[a] knowledge of the organic basis is a great help in acquiring the pronunciation of a language” but without any practical implementation this remained just a declaration of good intent.

A more recent declaration was made by O’Connor (1973, 289). Whereas in his earlier book Better English Pronunciation (1967) he still held firmly on the position of the conventional phonemic-base method advising students “to be able to produce 44 vowels and consonants which are different”, in his Phonetics (1973) O’Connor mentioned ‘bases of articulation’ as a subject which “will repay investigation”. Notably, although he defined the basis of articulation in Honikman’s terms and her article appeared in the list of refer-

79 Артикуляционный уклад
80 Базис артикуляции
ences, O’Connoor preferred, for some reasons, not to use the term ‘articulatory setting’.

There are few examples of implementation of the basis of articulation concept in practice. Dumville (1909) was one of the first to use this idea in teaching English pronunciation to French students. His method is particularly relevant to the topic because of the concentration on the tongue posture.

It had long been noted that the tongue in English is more retracted than in French with the tip being positioned by the alveolar ridge. Dumville designed a special insert (Fig. 17) which was intended to be put behind the upper teeth restricting the forward movement of the blade. He reported significant improvement in the pronunciation of his students using the insert.

Importantly, Dumville maintained that this not only improved consonant quality but actually automatically affected post-consonantal vowels. The reasons for this are obvious from the articulatory model proposed in 3.5. What Dumville achieved with his device was forcing the tongue into a position similar to the English basis of articulation which led to a natural realignment of vowels towards native-like parameters.

A similar experiment was performed by Wenk (1979) also involving French students of English. Since Dumville did not appear in the list of his references it may be presumed that Wenk arrived at the same idea independently.

The ‘alveolizer’ of Wenk consisted of a .021" wire placed along the upper teeth bridge with a small loop positioned at the centre of the alveolum (Fig. 18). Unlike Dumville’s insert, this device did not physically restrict the tongue blade but created a sensitive point for the student to target the tip of the tongue.

Wenk’s particular interest was in the production of TH sounds. The experiment proved that this ‘bugbear of many foreign students’ was easily eliminated once students learned the correct tongue position with the help
of the alveolizer.

Although Wenk's experiment did provide some empirical support that the articulatory setting would be highly relevant to the acquisition of the pronunciation of the target language and could be a big help in the phonetic 'de-fossilization', he did not go as far as to extend the results to vowels. In this respect the earlier experiment of Dumville was more advanced.

Two papers of Erazmus (1982) and (1983) are worth mentioning. Influenced by Honikman's article, Erazmus proposed to use the language specific 'anchorage' for teaching English and Polish pronunciation. His understanding of the basis of articulation was rather simplistic - Erazmus considered it "the tongue's position relative to the teeth"\textsuperscript{81}.

He recognised the key importance of the habitual tongue posture and regarded it as "a secret of the articulatory setting in all languages" (1982, 58). According to him, any linguo-didactic description of phonetics of the target language should start from a clear definition of its anchorage\textsuperscript{82}. Erazmus found empirically that the anchorage of Polish was on the upper front teeth - different from that of English. By teaching the correct anchorage he reported significant improvement in pronunciation.

He strongly believed that it was unfair to make students search for the correct posture by imitation based only on intuition, and that learning a language should be a joyful experience whereas attempts to produce sounds of one language with the setting of another language is a 'dehumanizing experience', impeding learning and causing frustration (1982, 68, 69).

Importantly, Erazmus grasped the system-forming role of the correct basis of articulation, although expressing it rather categorically:

With the proper setting one can't make a mistake or deviation in the language on the phonetic level. [...] With the anchorage

\textsuperscript{81}This is, actually, similar to the way basis of articulation was understood by Prokosch (1920) or Bithell (1952).

\textsuperscript{82}As his understanding of this term.
established all other movements of the tongue and articulators follow up in a secondary fashion (Erazmus; 1982, 66, 69).

According to him, speaking with an improper setting "does violence to a language" while doing it with the correct articulatory setting "opens the beauty of the language" (Idem). Once learners grasp the essence of the articulatory setting of a target language they could make individual special adjustments corresponding to their psychology, personal needs and requirements. On the whole, this appears to be a sensible approach.

Unfortunately, the articles themselves were written in a pamphlet style. Most of the evidence used was 'anecdotal' as Erasmus himself admitted in the conclusion. There was no continuation and these works are mostly forgotten and extremely difficult to find which is regrettable because they were in many ways insightful.

A more scientific comparison of English and Polish bases was performed by Janina Ozga (1976; 1977). In her earlier article Ozga made an interesting synthesis of the German notion of the basis of articulation, Honikman's 'articulatory setting' and the 'preparatory position' of Kolosov (1971).

Using Honikman's framework, which was central in her study, Ozga made a detailed comparison of the principal features of English and Polish settings. In the section dedicated to 'anchorage' her descriptions clearly demonstrated a better comprehension of this concept which she understood to be the habitual resting position of the tongue and not just a preferred point of articulation. She defined the Polish anchorage as being immediately behind the lower teeth.

In her next article (1977) Ozga reported the results of an experiment in which she attempted to compare the effectiveness of teaching the English basis of articulation to Polish students and worked out an interesting methodology for transition from the Polish to English bases which she divided into two stages.

Stage 1 (Early) included "[p]ronouncing Polish utterances with the introduction of an increasing number of features of the English setting (1977, 124) with many original drills and activities including the 'silent articulation'. The aim of this stage was to make students aware of the differences between the English and Polish 'gears' and to teach them the skill of switching between them consciously. Stage 2 was built around pronouncing English "utterances of increasing length and complexity with the organs of speech in the English gear" (1977, 125).

The pronunciation quality of the experimental group (16 students) was evaluated before and after the instruction using a simple scale (0-1-2) and
compared with a control group which received conventional phonemic-based instruction. Ozga reported significantly better ratings for the experimental group confirming the effectiveness of her method.

A similar experiment was performed more recently by Mompeán González (2003) with Spanish learners of English. His description of the articulatory setting of English strictly followed Honikman, placing more emphasis on tongue postures. Out of seven main features of the articulatory setting one referred to the lip position, one to the jaw, two to the larynx, whilst three to the tongue. They were presented to students by means of a number of original and interesting techniques.

The experiment demonstrated some positive results but, as in the case of Ozga, Mompeán González only used a subjective ‘listener-judgement’ method of evaluation. Also the size of the experimental group (7 students) was not representative enough. It would be interesting to repeat the experiment with a larger number of participants adding some form of a more objective (instrumental) evaluation method.

Concluding this subsection one cannot leave unnoticed the dearth of empirical study in this field. More objective research is definitely needed.

4.2 Articulatory setting in pronunciation teaching

In Britain it was Bryan Jenner who actively promoted the importance of articulatory setting based teaching. In the initial article on this topic published in Modern English Teacher journal (1982), which was clearly inspired by Honikman, Jenner and Bradford suggested that teaching English pronunciation should begin “by establishing a general articulatory setting for English, before working at individual sounds” (1982, 38).

Bryan Jenner gave a detailed description of the English articulatory setting (lips, lower jaw, cheeks, tongue etc.) but, unfortunately, as in the case of Honikman, this description was largely impressionistic and not systemic.

Nevertheless, Jenner particularly stressed the specific apico-alveolar nature of English consonants and suggested several consonantal drills to fix this habit. Notably, he believed that once the correct articulation of consonants is achieved, vowels would “largely take care of themselves, in that the internal shape is right” (1982, 41). Considering the organic connection between the basis of articulation and place of articulation (3.5) such attitude essentially corresponds to the ‘classic’ understanding of the basis of articulation.

Jenner gave a more detailed description of English articulatory setting in his later paper having a characteristic title The wood instead of the trees

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84Received pronunciation
The key word of this article is ‘relaxation’ for all features except the tongue tip. However, ‘relaxation’ can hardly be considered a scientific term and it is also rather subjective and relative. While the English setting may appear relaxed to a native speaker\textsuperscript{85}, for Russian speakers it would appear tense as they try to keep the tongue withdrawn from the teeth. The basis of articulation concept could be a more compact and productive way of describing crosslinguistic differences of articulatory settings.

Bryan Jenner ended the article with a summary of implications of this approach for pronunciation teaching. Although he returned to this topic on several occasions (Jenner; 1987b, 1996, 1997, 2001), the concept of the articulatory setting does not appear to have made any significant impact on pronunciation teaching in Britain but it has been taken up elsewhere in the world.

Collins and Mees (1993) made an interesting attempt to compare articulatory settings of more than two languages. Although, following Honikman’s scheme, they traditionally started from lip setting, the tongue setting constituted the central part of their descriptions of articulatory settings of Danish, American English and Dutch although their description of the tongue setting was not systemic enough. For example, when describing tongue postures of Danish they started from the front of the tongue (tense and raised - palatalised) then treated separately the tongue root position (tense, drawn down towards the pharynx wall). Nevertheless, Collins and Mees did try to integrate these separate features into a single framework using the model of Laver (1980) (Fig. 13) and thus approximating to the basis of articulation idea.

This multilingual analysis highlighted the importance of a differentiated approach depending on the L1 background of each student. Unfortunately, this article was also not based on any experimental data and, as Collins and Mees admitted, much of their description of articulatory setting was impressionistic and called for more empirical research.

4.3 ‘Basis of Articulation’ vs. ‘Voice Quality Settings’

The 1980s was the period when the Communicative Language Teaching method (CLT) was in the ascendant but it was also the period when pronunciation teaching “has fallen to the wayside and has suffered from serious neglect” (Elliott; 1997). Since the CLT method was centred on input, it was believed that given sufficient amount of input, pronunciation would develop by itself (1997, 95). It is important to view the article of John Esling (1982)
dedicated to voice quality setting in this context.

The article opened with the Abercrombie - Laver definition of the articulatory setting as ‘various composite postures or long term features of speech’. Although John Esling set the aim of his article as “to draw attention to the investigation of aspects of setting in several languages by Beatrice Honikman” his perception of the articulatory setting was different.

Honikman spoke of the ‘articulatory setting’ (in the singular!) of a language as an “over-all arrangement and manoeuvring of the speech organs”, “the gross oral posture” and the “harmonious, cognizable whole which constitutes the established pronunciation of a language” (Honikman; 1964, 73). Contrarily, Esling continuously used the word ‘settings’ applied to a single language. These ‘settings’ were also referred to as ‘features’ resulting in the articulatory setting being presented as an assembly of various voice quality features. So he wrote:

The most important benefit for the ESL student who acquires the awareness of voice quality settings [my emphasis] in English is improved spoken communication (Esling; 1982).

It would be unfair to say that John Esling did not recognise the habitual articulatory posture of a language, which he mentioned when writing of vowels and consonants, but his main accents were on individual ‘features’ rather than the ‘gross oral posture’ as a system.

The CLT method did not provide much room for explanation of articulatory aspects. In the framework of this method “[t]he focus is not [...] on description and explanation” and teachers and students are expected to be engaged in “mutual endeavor and exploration” (Esling and Wong; 1983, 468-469). In order to increase input Esling and Wong proposed a number of techniques for incorporating awareness of articulatory setting into classroom activities.

The articles of Esling (1982) and Esling and Wong (1983) inspired several publications on the possibilities of application of voice quality settings in pronunciation teaching (Thornbury; 1993; Jones and Evans; 1995). They reflected a specific trend in pronunciation teaching known as ‘the top-down approach’ which “begins with patterns of intonation and brings separate sounds into sharper focus as and when required” (Luchini; 2005) instead of starting from individual sounds and working up towards suprasegmentals (intonation, stress etc.) as in the traditional ‘bottom-up’ approach. However, the notion of ‘voice quality settings’, discussed in the top-down paradigm, is only distantly related to Honikman’s articulatory setting and even less so to the basis of articulation concept.
There are some positive signs of convergence of the two approaches. So Pedro Luchini started from a purely supra-segmental method (2002; 2004) but he is now oriented towards a more balanced approach, combining the teaching of both segmentals and suprasegmentals, “with a specific focus on teachable and learnable core phonological items” (Luchini; 2005, p. c. Luchini, 2011). Hopefully, the fundamental notion of the basis of articulation could become one such core item, contributing to the convergence of the two methods of pronunciation teaching.

4.4 Recent developments

Surprisingly little has been published on this topic since the end of the 1980s. Jelislava Sethna (2002) made an interesting attempt to apply Honkimian’s concept of the articulatory setting for teaching English to Japanese students. Besides providing a detailed description of Japanese articulatory setting, Sethna also proposed some interesting learning techniques.

The article of Mompeán González (2003) has already been mentioned. Interestingly, after a long break his interest in articulatory setting is renewed. He is currently giving a series of lectures for teachers at Santander, UIMP (Mompeán; 2011) on the methodology of the articulatory setting based teaching and is working on a new article (p.c. Mompeán González, 2011). As can be seen from the title of his lecture Voice and linguistic background, Mompeán’s approach is focused on voice-quality features and suprasegmentals of speech but in part 4 Accent-specific articulatory settings he also gave a detailed summary of the most salient articulatory features (lips, jaw, tongue, larynx), although without showing their systemic co-relations.

Among the most recent publications, there is an article of Hernández (2009) intended for Spanish teachers of Italian. Although the general direction of the paper follows the traditional phonemic-based method, Hernández dedicated a section to the comparison of Spanish and Italian bases of articulation. Hernández saw the main distinction between the bases of Spanish and Italian in different degrees of ‘articulatory tension’86. This specific understanding of the basis of articulation appears rather simplistic. Such ‘tension’ is consequential and the real difference should be sought in the peculiarities of their articulatory bases. Besides, the notion of ‘tenseness’ is itself not free of controversy (e.g. Lass; 1976).

Piers Messum (2010) made an interesting attempt to explore English articulatory setting in connection with aspiration - another salient feature of English phonetics. Among the other benefits of this article is a detailed

86tensión articularia
description of English setting, particularly the lingual setting.

In Russia the ideas of Kolosov did not find any significant support. The predominant approach to teaching pronunciation continues to be phonemic, based on the oppositions of distinctive features, but there appears to be a growing awareness that the strictly phonological analysis is not sufficient.

A good example is the article of (Loginova; 2006) in which she made an attempt to demonstrate that the “[phonological descriptions of language in their essence do not touch many important moments of articulatory organisation of speech]”; such as a division between active and passive speech organs, modes of articulation of individual phonemes, co-articulation and that, importantly, they miss “[the interaction of operation of all active organs of speech in performing of principal and additional articulations in the framework of the articulatory setting]” (2006, 26).

Loginova took as an example the phonemically similar French [e] and [ɛ] and Russian [e] and demonstrated that it would be much easier to explain the difference between them by combining the notion of articulatory settings (distinctive lingual postures) with phonological descriptions. It is remarkable that from all other vowels she picked the [e] sounds. Their intricate connection with the basis of articulation was shown in 3.1. & 3.2.

As mentioned above, Schaeffler et al. (2008; 2010) are working on a project funded by the ESRC exploring articulatory settings of English/German bilinguals.

Wilson et al. (2007, and p.c. Ian Wilson, 2011) plan to complete a similar project on the Japanese articulatory setting which was on hold for some time. The results of these studies are much anticipated as they will provide the much needed empirical data.

Bryan Jenner is no longer directly involved in classroom language teaching but he had a Phonetics lecture every semester for twelve years to around 300-400 students with sessions on the articulatory setting and voice quality features so he is still actively interested in this subject (p. c. Jenner, 2011).

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87 Фонологические описания языка по своей сути не касаются многих существенных моментов артикуляционной организации речи.

88 Взаимодействие работы всех активных органов речи при осуществлении основных и дополнительных артикуляций в рамках артикуляционного уклада.

89 Open-Mouthed or Stiff Upper Lip? Exploring Language-Specific articulatory settings in English-German Bilinguals (ESRC / RES-000-22-3032). http://www.phonetik.uni-muenchen.de/~sonjab/zuhause.html
4.5 Basis of articulation in pronunciation teaching

There could be several advantages to resurrecting the notion of the basis of articulation in its original meaning. Mainly, it helps to resolve the confusion in terminology and obviate the notorious dichotomy of definitions. But the real advantage is that it functions as the base principle and does not displace, disrupt or diminish the generally accepted concept of the articulatory setting, formulated by Honikman. On the contrary, it serves as a system-forming nucleus without which the various ‘voice setting’ and ‘voice quality’ features may appear as an assembly of random units.

All the specific features listed in Wadsworth (1979) or Esling (1982) do exist in various languages but their mere listing as ‘lip settings’, ‘jaw settings’, ‘tongue settings’ etc. may create a false impression that they are independent features comparable to different shape building blocks in LEGO which can be assembled arbitrary in any order to make up an articulatory setting of a language. As the result, a teacher may decide to concentrate only on some of them, or even on a single feature in the target language which appears most salient like the ‘lip settings’.

An example of such approach could be the treatment of French lip rounding. While it is quite correct to advise students “to keep the lips rounded and tense throughout speech” (Esling; 1982), taken out of the general gross articulatory setting it could be counterproductive for some of them for the following reasons.

From the basis of articulation point of view, lip rounding is a secondary dependent feature specific to languages with an advanced palatalised basis characterised by a reduced volume of the vocal chamber. As the result of such basis of articulation there is not enough physical volume to articulate front and middle vowels. Protruded lips may serve to create an additional acoustic space extending the resonance chamber (Brunner et al.; 2010). Suggesting the use of active lip-rounding to students whose habitual basis of articulation is retracted would make them resort to some uncomfortable muscular over-stretching. Similarly, trying to articulate English sounds keeping the lips neutral, while maintaining the advanced and raised French basis of articulation, would be an equally daunting task.

Of course, some students would manage to find the right tongue posture intuitively but it would be more efficient to make them aware of the peculiar aspects of the basis of articulation of the target language and teach them to change to it consciously from their native basis of articulation. Secondary features like lip-rounding, palatalisation etc. would follow more naturally from the proper setting with less effort. Importantly, students will not perceive individual articulatory features as strange or even ‘bizarre’ when they
see that they logically follow from the particular basis of articulation.

Lip activity feature, randomly taken out of the general system, may also appear unscientific to language teachers. It is not surprising that the advice to improve pronunciation by controlling the lip movement holding a pencil between the upper lip and the nose, advocated by some (Stuparyk; 1996) could be taken as a sort of alchemy only to “waste students’ time and money” (Derwing and Munro; 2005, 390).

Such understanding of the basis of articulation as a higher level system-forming agent can be incorporated into both articulatory setting based and voice quality based methods. In the former case, the principle, formulated by Jenner and Bradford (1982, 38), needs to be modified as follows: pronunciation instruction should start by establishing the basis of articulation and its consequences for the articulatory setting before working at individual sounds.

Importantly, the basis of articulation concept is not in conflict with neither the traditional bottom-up nor the more recent top-down approaches. In fact, it can help to form a common platform between them. Critiques of the top-down approach point out its serious weakness: students often have difficulty with suprasegmentals since many sounds of the target language “are virtually impossible to produce unless the articulators adopt the same positions, types of movement, and degree of muscular activity as those employed by L1 speakers” (Jenkins; 2000, 157). Introducing the basis of articulation of the target language at an early stage may help students to grasp the gist of the articulatory setting. Once they are armed with this essential basic knowledge, they can continue the ‘mutual endeavor and exploration’ but with some guidance and not relying on chance.

The traditional bottom-up method may also benefit from explaining the basis of articulation of the target language before moving to individual sounds. Instead of presenting the 44 phonemes of English in some arbitrary manner they will appear as a system centred on the basis of articulation. Importantly, students will become aware of the internal logic of the particular phonetic system. Once they realise that the specific retracted basis of English predetermines the apico-alveolar type of articulation not only of the majority of English consonants but also the quality of vowels, and that his posture should be maintained during speech and even in pauses, they will be less likely to do some typical mistakes like those described in Kulešov and Mišin (1987). They noted that usually Russian students were well aware of the apico-alveolar articulation of [t] an [d] in English so they made an effort to pronounce them correctly, but immediately after they relaxed and slipped

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50 It has become customary to start with cardinal vowels and then proceed to consonants.
into their habitual Russian setting: they lowered the tongue blade causing additional articulation so the sounds started to resemble affricates [tʃ] and [dʒ] or [tʃ'] and [dʒ'] (1987, 30).

Making students aware of the specific basis of articulation and teaching phonemes as a system and not as a set of discrete articulations could help to cut down the time of explaining each individual articulation and free it for practical work, for instance, exploring suprasegmental features.

5 Conclusion and directions for future research

5.1 Conclusion

Speech production is a vast and complicated area of linguistics. It is also an area in which Physiology plays a major part. Without diminishing the importance of a more abstract phonemic analysis, some of its aspects cannot be fully comprehended without involving such extra-linguistic sciences as Neuro-Physiology, Biology, Bio-Mechanics and Acoustics.

One of the aims of this paper was to collect and systematise information from many areas. In this respect it may be considered a response to the emotional appeal voiced in the much debated article *Time for a sea-change in linguistics* by Levinson and Evans (2010). They called for a multidisciplinary approach aimed at changing linguistics from “a wholly armchair discipline rooted exclusively in the humanities” to a science dedicated to the study of language that would

[... ] encompass all the new lines of data, the new methods and the new insights coming from all the other disciplines that have increasing interest and expertise in the study of language" (Levinson and Evans; 2010, 2747).

The concept of the basis of articulation has a long history. It proved to be viable and received empirical confirmation so its re-installment as an active agent of the speech production, viewed as a Complex System, could introduce clarity into the current understating of the articulatory setting and, perhaps, assist in the developing new methods of pronunciation teaching.

5.2 Directions for future research

The recurring motive of many articles dedicated to this topic is the dearth of empirical research. This includes the scientifically based and instrumentally proven description of articulatory settings of various languages and practical
research into the effectiveness of implementation of articulatory setting and basis of articulation concepts in pronunciation teaching.

Since the basis of articulation in its original meaning was imagined as a language specific position from which sounds of this language ‘flow naturally’, it appears worthwhile to conduct a series of experiments taking as models the researches of Ozga (1977) and Mompeán González (2003) but on a larger number of L2 learners and bilinguals concentrating on languages with contrastive bases of articulation (e.g., English and Russian). In the light of the proposed refined understanding of the articulatory setting incorporating the basis of articulation as its core agent, such experiments should not focus only on some salient (often superficial) features like lip position, but on the basis of articulation as the language specific TB speech posture. One of the hypotheses to verify could be:

- Teaching students to assume and maintain the basis of articulation of the target language will lead to the automatic change of vowel quality towards greater native-likeness without the traditional phonemic-based training.

It is important to complement the traditional subjective listener judgement method with modern instrumental methods. Since the basis of articulation posture has a specific phonetic realisation and it directly affects vowel quality, the easiest way would be to introduce a formant-based acoustic analysis comparing formant parameters of the target language vowels before and after basis of articulation fixing drills. Comparative studies by Flege et al. (2003, 2006), which combine subjective and objective evaluation methods, could be particularly suitable models.

Such experiments will help to provide the much needed empirical data and answer the calls for a ‘Research-Based Approach’ (Derwing and Munro; 2005) in pronunciation teaching.
Attachment

Bases of articulation of English and Russian

English

Out of many varieties of English, it is the British ‘received pronunciation’ (RP), mainly based on South England dialects, which has been traditionally used as a standard for ESL teaching in Europe and in many other places around the world.

The peculiar tongue position of English has been described by some early phoneticians. John Wallis while not mentioning the tongue noted that “the English [...] push forward the whole of their pronunciation into the front part of the mouth, speaking with a wide mouth cavity” (Quoted from the translation of Kemp; 1972). To achieve the wide mouth cavity one has to either lower the jaw or retract the tongue from the teeth to create more space in the front.

Christopher Cooper (1685, 10-11) wrote that the English ‘speak their syllables and words distinctly and outwardly from the lips (cited by Laver (1978, 4)). English was often contrasted with German as not being guttural.

Wallis and Cooper only mentioned the tongue position indirectly. It was Henry Sweet who clearly described it as “broadened and flattened, and drawn back from the teeth (which it scarcely ever touches), and the forepart of it is hollowed out [...]” Sweet (1890, 4). This was repeated on page 72 dealing with the ‘organic basis’: “In English we flatten and lower the tongue, hollow the front of it, and draw it back from the teeth”. This description was repeated later by Heffner (1952, 98) who described the basis of articulation of English as ‘relatively low and retracted, with the tongue surface quite broad’.

German phoneticians mentioned the same general tendency of the tongue position in English. So Viêtor (1887, 193) wrote: “[The English manner of articulation is different from the German in general by pulling back and widening of the tongue [...]”91. Storm (1896, 32) quoted Sievers that in English “[the tongue must be pulled back slightly and broadened92]”.

Although writing in English, Prokosh (1920) maintained the German approach93. His description of the English basis of articulation is particularly relevant because he made a comparison with Russian. Prokosh described

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91Die englische Artikulationsweise unterscheidet sich von der deutschen im allgemeinen durch Zurückziehen und Verbreitern der Zunge
92muss die Zunge etwas zurückgezogen und verbreitert werden
93Eduard Prokosh (1876-1938) was a historical linguist who specialized in Indo-European and Proto-Germanic studies. He studied in Vienna and immigrated to the US in 1898.
the ‘preferred tongue position’ (which he equalled to the basis of articulation) in English as: “[...] the tip of the tongue is apt to be withdrawn from the teeth and raised in the direction of the front palate, while the body of the tongue is comparatively inert, being neither raised nor lowered to any marked extent” (1920, 15).

According to Heffner, the English basis of articulation is ‘low and retracted, with the tongue surface quite broad’ (1952, 98).

As we can see, generally the tongue was described as either ‘retracted’ or ‘withdrawn from the teeth’. Modern empirical research largely confirms such impressionistic accounts. For example, Gick et al. (2004) observed that “English has a narrower pharynx width [implying retraction], a higher tongue body, and a higher tongue tip”. The basic tongue profile for the English basis of articulation extracted from X-Ray pictures (Fig.1) clearly shows the TB system centre as slightly retracted and raised. The TBL system is held at some distance from the lower teeth.

The tip of the tongue may be slightly raised forming a concave profile. The degree of the tip rising is subject to considerable dialectal variation. In some English and most American dialects the tip of the tongue is markedly raised giving the neutral vowel a specific [r] sound. Such rhotacism causes some additional backward displacement of the tongue root (Gick; 2002).

The basis of articulation of English has some important consequences. Its notable secondary feature was described in Honikman (1964) who defined it as the ‘tongue anchorage’:

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 (Honikman; 1964, 76).

Physiologically, such locking of the lateral parts of the dorsum to upper molars is quite natural for the specific English basis of articulation. The tongue being a hydrostatic body any contraction needed to withdraw the tip from the teeth would be compensated by the increase of the height of the tongue body which would push the rear part of the dorsum to upper molars creating the characteristic ‘anchorage’.
The secondary feature, directly relating to this anchorage, is the so-called ‘grooving’ which is well attested in English. Stone et al. (1988) measured the continuous lateral contact with the upper molars throughout the production of all English vowels (Fig.19), particularly, the middle and front ones. The 3-D tongue images clearly show the groove, particularly, for [e] (Stone and Lundberg; 1996). Grooving has a functional explanation. The retracted and raised English basis of articulation causes the specific lateral anchorage. The groove in the central part of the dorsum is needed to allow the air to pass during phonation. It should be noted that this anchorage also creates an additional constriction of the air passage requiring some extra expiratory effort, partly explaining the aspiration.

The basis of articulation of a language has its specific acoustic representation. As noted by Delattre (1969, 2), “English typically centres its articulation around the neutral vowel /a/” which has also been singled out as the principal hesitation vowel in English (Schourup; 1981). Candea et al. (2005) reported that English HV is in the area of low-central vowels (between [a] and [ə]). Due to considerable dialectal variations it is difficult to pinpoint a specific value so for linguo-didactic purposes it would be convenient to consider [ə] as the acoustic instantiation of the English basis of articulation.

**Russian**

From the definitions of the basis of articulation by Russian phoneticians quoted in 2.1. we could see that most of them, with the exception of Kokosov, perceived it as a ‘summation’ of individual articulatory movements without
connecting it to the “position of indifference” or a certain tongue posture. The ‘classic’ view on the basis of articulation was dismissed in Russian Phonetics at an early stage. Olaf Broch wrote in his influential Essay on the Physiology of the Slavonic Speech⁹⁴:

> [...] regarding some special position or [...] a general ‘basis’ from which allegedly departs Slavonic speech in the production of its vowels, the latter [...] do not give any grounds⁹⁵ (Broch; 1910, 76).

However, in the next paragraph Broch described a peculiar retracted position of the tongue body in a dialect of Eastern Slavonic bordering Hungary. The explanation for this inconsistency lies in the particular type of Slavonic and, specifically, Russian basis of articulation which is neither notably retracted or advanced and could be defined as the “neutral” with the “general gravitation of the tongue body to the centralised position” (Kedrova et al.; 2008, 23). It is because of this neutrality that the Russian basis of articulation is not as clearly expressed as in languages with fronted or retracted bases so to is more difficult to pinpoint.

Honikman (1964, 79) described the Russian tongue-setting as: front - high and spread; body - convex to the palate. Comparing it with the interspeech position of Skalozub in Fig. 6 (of the main part) we can see that this is generally correct if we understand ‘front’ as being more advanced than the English retracted position, however, it is still perceived as retracted in respect of languages like German (?f, 353). Therefore, in formal terms it may be defined as \[
\begin{bmatrix}
−\text{fronted} \\
−\text{retracted}
\end{bmatrix}.
\]

Such basis allows having comfortably two independent articulatory setups: ‘palatalised’ ([+\text{fronted}]), in which most of the muscular tension is concentrated in the frontal and middle part of the dorsum, and ‘nonpalatalised’ ([+\text{retracted}]) which is characterised by some bulging of the rear part of the dorsum. However, most of the articulations are performed in the frontal part of the buccal resonator (Skalozub; 1963, 61-62).

Russian does not have a clear phonological schwa /ə/ so the function of the ‘neutral’ vowel is performed by a number of ‘reduced’ vowels which appear in unstressed positions. The reduced form of \([\text{a}]\) and \([\text{e}]\) is usually \([\text{e}]\). Other vowels are reduced to a range of various shades of \([\text{a}],[\text{i}]\) and \([\text{i}]\) Bryzgunova (1972, 14).

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⁹⁴ Очерк физиологии славянской речи
⁹⁵ [...] о каком-либо общем положении или, скажем, общей базе, от которой как будто отправляется славянская речь при образовании своих гласных, последние [...] не дают основания (quoted in modern spelling).
Figure 20: Tongue profiles for English (adaptation of Hardcastle (1976)) and Russian (adaptation of Panov (1967)). The mid-vowel area is highlighted.

Phonetically, values of hesitation vowels in Russian lie in the central vowel region between /e/ by its F1 frequency ($\approx 400\, Hz$) and /a/ by the F2 frequency ($\approx 1400 - 1500\, Hz$)\textsuperscript{96} (Stepanova; 2007). On this basis Stepanova defined it as an "intermediate vowel" and as "neutral as possible". Interestingly, such formant characteristics largely correspond to an unrounded vowel lying in the region of [u] - [v] - [a] in some dialects of English\textsuperscript{97}.

The exact parameters of hesitation vowels in Russian are more difficult to pinpoint, but for linguo-didactic purposes we do not require such precision so it would be convenient to consider the typical HV in Russian as an unstressed near-open central vowel [e].

**English and Russian bases compared**

As can be seen from 4.1. and 4.2., characteristics of the articulatory bases in Russian and English are quite different. The English basis of articulation is relatively retracted while the Russian basis is more centralised. This is also clearly seen from this comparison of the cardinal vowel profiles in Fig. 20.

The centralised nature of the Russian basis is also quite obvious from this rough comparison of the phonemic inventory of the two languages shown in Fig. 21.

\textsuperscript{96}Median formant values for Russian were taken from Halle (1971, 168).

\textsuperscript{97}Median formant values were taken from Ferragne and Pellegrino (2010, 28).
Figure 21: Comparison of consonantal phonemic inventories of Russian and English

![Graph comparing consonants in Russian and English](image)

Figure 22: Tongue profiles for English and Russian [p] and [k] extracted from X-Ray pictures of Hardcastle (1976) and Skalozub (1963).

The vowel system\(^{98}\) of Russian is also well balanced:

<table>
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<tr>
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<th>Front</th>
<th>Central</th>
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<tr>
<td>Closed</td>
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<td>Mid</td>
<td>e</td>
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<tr>
<td>Open</td>
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<td>a</td>
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</table>

As expected from the model in 3.5., this centralised or ‘neutral’ basis of articulation does have a distinct effect on consonants as can be seen in Fig. 22 showing simplified tongue profiles for the two divergent consonants [p] and [k]. The shapes for [p] are particularly interesting because the co-articulation of the tongue for labials approximates most closely the ‘neutral’ shape (Hardcastle; 1976).

\(^{98}\)Phoneme [i] is not officially recognised by the Moscow phonemic school which considers it an allophone of [i] but there are different views on this (Kulešov and Mišin; 1987, 33-34).
Such radical difference of the articulatory bases creates obvious problems for the pronunciation acquisition. However, this difficulty is not symmetric because the centralised position of the Russian basis of articulation allows to produce both palatalised and non-palatalised sounds while the retracted centering of the English basis of articulation significantly restricts palatalisation. In other words, English pronunciation might be physiologically easier for Russian speakers (although with a specific strong accent) than vice versa.
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