Foreword

Vadim KASEVIČ

This small book presents an overview of the origins and evolution of a phonological school known as the Leningrad (St. Petersburg) School. It is also often referred to as the Ščerba School.

The compilers, editors and other contributors to this volume certainly realize that the subject deserves more than the fragmentary exposition afforded by this book. Yet this book-length essay, supplemented by a reader, may serve as an introductory 'front-door': an invitation to learn more about the subject.

The genre of this particular section of the book can be thought of as an extended encyclopaedia article highlighting are the 'distinctive features' of this intellectual edifice. The reader of the section is expected to be familiar with basic ideas in the realm of phonology, the author considering his primary goal to be to outline the specific approaches associated with Ščerba. In some instances, the coverage includes exposition of ideas that do not belong to the Ščerba School. This is to show how the School developed against the background formed by its 'theoretical environment'.

When an historian of science comes to choose a single author or a single theme as his/her subject, their motives for doing so can be various: the significant role played by that theme or author in history and/or in present-day science;[1] the need to do justice to a person who has crucially anticipated current ideas; the conviction that the professional readership is not sufficiently acquainted with certain important ideas; and indeed any number of other reasons right down to personal likes and dislikes. To our minds, there seems to be more than just one reason why Ščerba's legacy is not properly appreciated outside Russia. One of these is undoubtedly the linguistic barrier — aptly epitomized in the Latin expression popular among Russians, *Rossicum est, non legitur,* which naturally (and

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[1] It should be stressed that, in many cases, the differentiation between historical science and that of the present-day is artificial. For instance, in mathematics, Pythagoras's theorem clearly belongs to history, but, at the same time, it belongs, by virtue of its being true, just as much to the present. (see Kasevič et al. 2014).

regretfully) applies not just to linguistic scholarly texts but to Russian writing in general.[2]

INTRODUCTORY REMARKS: WHAT IS A SCHOOL IN SCIENCE?

An informal definition of the concept of a 'school' can be found in the standard dictionaries, cf. for instance Chambers Dictionary: 'those who hold a common doctrine or follow a common tradition' (Chambers 1964: 988). Practically, such an understanding is not far removed from that found in the more specialist discourses of (the philosophy of) science (see below).

It is believed by most researchers that sciences are normally organized into *schools* (*schools of thought*), language sciences being no exception. Thus linguists speak of the Prague School of Linguistics, the Firthian School of Phonology, Structural Schools of Thought, etc. To tell one school from another, the adherents or opponents of the schools in question choose either a quasi-geographical principle (cf. the Prague School above), or the personal name of the school's founding father (cf. the Firthian School above), or, yet again, the technical term to which the school presumably owes its uniqueness or originality (cf. the Structural Schools of Thought above).

This apparently prevailing understanding has been problematized by Thomas Kuhn's (1962/2012) epochal contributions to the philosophy of science (cf. also some important ideas of Gilles Gaston Granger 1960). According to Kuhn, hard sciences — such as physics or chemistry — differ significantly from the humanities or social sciences — such as history — in as much as the former do not exhibit a clear tendency to be subdivided into schools, whereas, precisely this tendency is highly typical of the latter. This distinction is attributable to the different role of the *paradigm* in these two basic domains of human knowledge. In the hard sciences, there is a commonly shared set of ideas, scientific and analytical tools, etc., which is termed the *paradigm* and which makes the process of investigation a collective endeavour whose very existence is due to the paradigm's commonly accepted statements and principles. Thus, sciences like physics are labelled *paradigmatic*, and represent so-called *normal science*. Sciences such as history, on the other hand are labelled *non-paradigmatic* or proto-paradigmatic, since it is difficult to isolate a set of universally accepted statements (*the* paradigm) which would underlie them.

Yet, such a sharp differentiation does not seem fully justified. Using standard linguistic terminology, one could say that the so-called

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[2] It should be noted that Ščerba's seminal ideas were (and still are) extremely influential in many domains of linguistics in Russia but, undoubtedly, his phonological legacy is especially important; suffice it to say that Ščerba was the first to introduce the still valid definition of the *phoneme* into world linguistics (see below).

paradigmatic disciplines typically operate with subdisciplines which form an *opposition*, whereas the non-paradigmatic disciplines are typically split into branches which show a *complementary distribution*. In other words, schools can be found within any science, although their status is different. It would in fact be fair to say that the evolution of the so-called paradigmatic sciences goes through a process of intermittent paradigm shifts: a series of scientific revolutions, where one set of the mainstream theories is replaced by another (the 'old' paradigm often being retained as a specific or limited case, such as how Newtonian physics has maintained a limited validity alongside its Einsteinian replacement).

One more great name should be mentioned here. Karl Popper argued that, instead of the *verification* of scientific ideas, one should rather demonstrate the idea's' resistance to *falsification.* According to Popper, while it is logically impossible to claim that, for instance, a given human being will never die, it *is* possible to reject, on purely empirical grounds, statement that all human beings will live forever. If a statement is not falsifiable, it doesn't belong to the realm of science at all, but is rather a matter of belief (cf. Ludwig Wittgenstein's famous maxim: "Was sich überhaupt sagen, läβt sich klar sagen; und wovon man nicht reden kann, darüber muβ man schweigen").

ŠČERBA'S PHONOLOGY: BASIC PRINCIPLES AND THEIR EVOLUTION

THE ISSUE OF PSYCHOLOGISM

Earlier authors, if they used the term 'phoneme' at all, didn't attach any special meaning to the word. Their usage makes it obvious that for them (including, with some reservations, de Saussure[3]) the phoneme is no more than a speech sound. Some of these (for example, Henry Sweet) apparently 'felt' that there should be some linguistic entities that underlie audible speech sounds and that the former could not be entirely reduced to the latter; yet most of them didn't use the term 'phoneme', nor did they try to develop a rigorous phonological theory.

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[3] Saussure's indifference to the special sense of the term 'phoneme' as a meaning-differentiating elementary unit shouldn't be overestimated, however. Suffice it to recall such pronouncements of his as, 'the phonemes are above all oppositive, relative and negative entities" (Saussure) or "we shall take into account only the differential elements, those that are salient to the ear and capable of delimiting acoustic units in the chain of speech" (Saussure 19..: 83). Pieter Seuren is quite positive in maintaining that "de Saussure did have a notion of the phonological fact that in each language some sound differences serve to distinguish different words (morphemes) while others are in free variation or anyway indifferent" (Seuren 1988:151).

It is to Jan Baudouin de Courtenay and his pupil Mikolai Kruscewski (who had coined the term 'phoneme' as a special technical term in its own right) that we owe the beginning of the development of phonological theory. In Pieter Seuren's words, Baudouin "is rightly regarded as the prime founder of phonology, the functional study of speech sounds" (Seuren 1988: 144). The same author quotes Daniel Jones's recollection of how "the students of Baudouin, whom he met in England just before the First World War, made him see the importance of the notion of phoneme, with the result that by about 1915 the theory of the phoneme as the psychological principle behind the realization of speech sounds began to find a regular place in the teaching dispensensed by the Department of Phonetics at University College" (Seuren 1988: 144-145).

To be more precise, Jones's approach to the notion of phoneme was 'physicalist' rather than psychological. This can be seen from his remarks in "The phoneme: Its nature and use" (1950, para. 24) where he defines allophones as "the *members* of a phoneme" (our italics). In other words, there are two opposed approaches, where one is associated with Jones (and such linguists as Leonard Bloomfield) for whom the phoneme is a class of sounds (grouped together due to acoustic/physiological similarity or complementary distribution), while the other is typical of Baudouin, for whom phonological identity is rooted in psychological identity; in turn, the psychological identity of 'sounds' is provoked by an assignment to the same morpheme (for more details, see below).

It should be emphasized that even in his earlier works Ščerba's approach was never reducible entirely either to 'physics' or psychology. Let us look at the definition of the phoneme we find in his 'Russian vowels…': "Phoneme is the shortest phonetic entity recurrent in the language that is capable of being associated with a semantic entity and can differentiate words" (Ščerba 1912: 14; translated by the writer). In the above English translation, the word 'entity' stands for the *predstavlenie* of the original text, where *predstavlenie* is used as a technical term in psychology (its nearest English equivalent is *representation*). Ščerba himself admitted a perceivable psychological note in his theory. Nikolaj Troubetzkoy, a Russian scholar who is regarded by many as the founder of 'classical' phonology, reproached Ščerba for his allegedly psychological bias and praised Nikolaj Jakovlev for having 'cleansed' the phoneme of any psychological 'overtones'.

Yet even today, the problem of how we should free phonology from psychological notions and terms is not a simple one. In his article **Fonema** written for *Wielka Encyclopedia powszechna illustrovana* (Warszawa 1899, t.22; see also its Russian translation (M. 1963), Baudouin says: "When pronouncing, for instance, the word *noga* in Polish, we pronounce four sounds, organized into two syllables. But as the respective phonation terminates, left in our soul are acoustic and phonetic traces" (Baudouin 1963: 351). Baudouin's wording is strikingly reminiscent of that of St. Augustine's explanation of the measure of time. According to St.

Augustine, the Past is no longer with us and the Future is not yet here, while the Present has no duration at all. "It is in my soul that I measure Time", - concludes Augustine (Augustine the Blessed, 11, XVII). St. Augustine is widely acknowledged as the first great psychologist of history. Both Augustine and Baudouin refer to the **Soul**; if we replace "Soul" with, say, *man's mental mechanisms* or, even more specifically, with man's *memory*, the result will be acceptable to many. In order to square the circle, we will need perhaps to admit that our reasoning is applicable to the domain of psycholinguistics (should such a thing exist) rather than that of 'pure' linguistics.

In other words, Ščerba and even Baudouin are not really 'guilty' of doing psychology in the guise of phonology;[4] rather their terminology simply reflects the usage of their time.

DISCOVERY PROCEDURES IN ŠČERBA'S TEACHINGS

SEGMENTATION

In his programmatic paper entitled "Three possible approaches to language and speech and the linguistic experiment" (1931), Ščerba presents his own version of the theory of language and speech that was first advanced by Ferdinand de Saussure (1916). Unlike the latter, Ščerba differentiates (to use modern terminology) between **language, speech** and **verbal (language) behaviour (**Ru**.** *rečevaja dejatel'nost',* which covers speech production and speech perception). We can see, that the two systems match each other numerically (three terms in both), but the opposed terms overlap rather than coincide. Ščerba's system accounts for one of the most important aspect of language: its ability to make human communication possible, while Saussure's 'third term' *language* practically defies any clear interpretation.

Insisting upon *la langue* as the linguist's sole subject, Saussure admits that, in principle, *la linguistique de la parole* may emerge at some future date, at which *la parole* would be analogous to verbal behaviour rather than to speech. Within the Ščerba school, these ideas have been developing very actively (cf. Bondarko 2000). This can be partly explained by the important role traditionally attached to applied linguistics: automatic speech recognition, testing communication lines, etc. have always been attractive to Ščerba, his associates and followers right down to the present day.

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[4] In his earlier works, Baudouin, as we know, was inclined to treat even alternants belonging to different languages as one and the same phoneme as long as such 'sounds' were associated, etymologically or otherwise, with the same morpheme (Baudouin 1895).

Alongside Saussurian language and speech, one more important type of verbal behaviour should be mentioned, namely, language acquisition and how it is mirrored in the modelling of language by professional linguists.

Here we come close to what has been dubbed 'discovery procedures' in some works by American 'descriptive' linguists. The discovery procedures system takes texts (speech) as its input and, as its output, reconstructs a set of rules (the grammar) that presumably underlie the given texts.

The procedures are applied in a hierarchical order. As far as phonological modelling is concerned, the first step is to recode an amorphous acoustic entity that lacks any systematic internal structure into a sequence of discrete further unanalyzable *phones.*

It is very important to stress that the Ščerba's school is unique in its recognition of segmentation as constituting a special step in the unfolding of discovery procedures. All other schools confine the problem of segmentation to dealing with ambiguous cases, in which the mono- / bi-phonemic problem arises (cf. the so-called Troubetzkoy's Rules, where it is recommended that one should rely on such factors as consonant or vowel duration to decide whether the 'sound' in question is mono-phonemic or not). Yet such a restricted use of segmentation is clearly fallacious; the text, which is the starting point of any kind of phonological analysis, contains no natural markers, of whatever kind, on which to rely for segmentation: any text is continuous, while the phonemic structure is discrete.

When effecting segmentation in phonology, one should realize that the phones referred too above are *(pre)phonological* entities. Although at this stage of analysis, the phones are not yet identified paradigmatically (which phone is a manifestation of which phoneme), they are identified syntagmatically, since all of them present the limit case of segmentation, any further linear analysis being impossible.

Last but not least, it is in Ščerba's phonology that the **criteria** for segmentation are afforded particular attention. According to Ščerba and his followers, no phonological segmentation of text is possible unless one refers to its morphological structure; as a matter of fact, phonological boundaries are simply derivatives of the morphological boundaries. E.g., in Ukranian, /aj/ from /maju/ '[I] have' is not a phonemic (phonological) diphthong since it is dissected by the morphological boundary.

There is every reason to consider the logical structure of the above-mentioned 'phonology-via-morphology-analysis' as a special manifestation of Goedel's famous incompleteness theorem. According to the aforesaid theorem, any closed system is incomplete in that it potentially contains propositions which can be neither proved nor falsified. To do that, one has to address the system which stands at the next level up in relation to the given one. For instance, in geometry some planimetric formulae cannot be either verified or falsified unless stereometric arguments are used. But this

is precisely our case: when carrying out phonological segmentation, we encounter boundaries which are ambiguous (non-unique, cf. Chao 1958) but can be disambiguated through morphological considerations (cf. above).

Supplemented by one more feature, called *resyllabification*, the adopted functional approach makes it possible to identify a new special class of (*mono)syllabic* languages (such as Chinese, Vietnamese, etc. predicted by Ščerba long ago). Resyllabification is a shift in syllabic boundaries, like Ru. /tok./ → /to.ka/ where the dots point to the syllable boundaries. Both the impossibility of analyzing the syllable into smaller constituents *and* the stability of the syllabic boundaries point to the same conclusion: functionally, the syllable in syllabic languages is 'monolithic', thus displaying its affinity to the **phoneme** in a number of ways. No matter how 'heretical' it may sound, *there is no fully-fledged analogue of the phoneme in syllabic languages.*

PHONE IDENTIFICATION

As already mentioned above, each phone, whether vowel or consonant, should be interpreted in terms of the phonemes relevant to a specific language. This means that the general set of phones arrived at as the result of segmentation procedures are distributed among equivalence subsets, each of which corresponds to a specific abstract entity: the phoneme of the language L.

It is important to emphasize that the oft repeated allegation that the Ščerbian understanding of the phoneme rests entirely on phonetic similarity misses the point. In reality, there are **three** main criteria — two distributional and one functional — which together are both necessary and sufficient for two (or more) phones to be identified as allophones of the same phoneme. The two distributional criteria, alluded to above, are free variation and complementary distribution, while the functional criterion is an alternation of phones within a morpheme that do not compromise the latter's identity. E.g. Eng. $[p^{\#}]$ and $[p^h]$ (non-aspirated and aspirated [p], cf. *spit* and *pit*) are distributed complimentarily, while [ʔa] and [a] (checked and plain [a], cf. *at*) are in free variation. The functional criterion is, of course, decisive — cf. [fĩl.] ~ [fĩ.liŋ], where syllable-initial and syllable-final liquids, complementarily distributed, can alternate while keeping the morpheme intact (*feel ~ feeling*).

The phonemes arrived at through the above procedures are opposed to one another. In other words, phonemic oppositions constitute the final stage of segmental phonological analysis rather than its initial one. A corollary is very important: the central function of the phoneme is constructive rather than distinctive; in other words, the phonemes are there not to differentiate morphemes but, rather, to be elementary 'building blocks' for the latter.

It is the oppositions that make the inventory of individual phonemes a phonological (phonemic) **system**. However classified, these oppositions form the basis for representing each phoneme in terms of its **distinctive features**.[5]

It is presupposed by many that the set of distinctive features defined for a given language is relevant to all the phonemes in all the relevant contexts in that language. For instance, if such a feature as 'sonorant ~ obstruent' is relevant for, say, /m/ ~ /b/ opposition, it should feature as well in the bundle of distinctive features assigned to /l/, despite the fact that there is no obstruent counterpart of /l/ in the system.

This approach triggered the greatest and, perhaps, best-known theoretical quarrel between the Ščerba Phonological School and the Moscow Phonological School.[6] Let us give a simple example. In Russian, word-final obstruent consonants are regularly devoiced, cf. *roga* /roga/ 'horn', Acc. Sing. → *rok* [rok] 'horn', Nom. Sing. According to the Moscow School, the devoiced consonant must be phonologically interpreted as /g/, since there is no voiced/voiceless word-final opposition and, at the same time, the /g/ ~ /k/ alternation doesn't violate the morphemic identity. Contrary to that, the St. Petersburg approach is to treat the word-final [k] as /k/, which is a phonologically voiceless entity. The chief reasons for this are twofold. First: The voiced/voiceless distinction is *phonemicised* in the Russian language; given that, any occurrence of [k] is just /k/ (cf. above). Second: No allophone of X should coincide with an allophone of Y, where X and Y are different phonemes (which is precisely what is advocated in the Moscow approach outlined above.

A few more points should be added to make these cursory remarks more informative.

Another, apparently bizarre, solution to the problem discussed here is offered by the Prague School. Their point of departure is the same as that already presented; namely, it is based on the fact that no opposition exists with respect to the distinctive feature voiced ~ voiceless in such instances as Ru. *roga* ~ *rok*. This makes the problem of the phonological qualification of word-final obstruents actually *unsolvable*. The consequences of this very radical answer to the problem prove to be just as radical: the Prague theorists propose the introduction of a new phonological entity, an archiphoneme, which is only to be found in no-oppositional contexts. The archiphoneme is defined by the appropriate set (bundle) of distinctive features *minus* the feature which is impossible in the given context.

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[5] We need to admit that the problem of distinctive features has not yet been satisfactorily solved by any of the existing phonological schools. It seems clear that distinctive features are **not** phonetic entities. Traditional labels such as "apical" or "nasal" consonants are apparently misleading. But, unlike phonemes, these distinctive features resist any linguistically justified algorithm capable of demonstrating their functional independence.

[6] For details see Zinder 2007.

Such contexts are referred to as those of *neutralization*. Ironically, the notion of neutralization introduced to account for non-oppositional **phonological** contexts have nothing to do with phonology. It is morphemes that are neutralized rather than phonemes. As mono-lateral entities, phonemes are deprived of any expression plane, whereas neutralization presupposes that neutralized entities merge so far as their expression plane is concerned, the content plane becoming semantically ambiguous. This is easily understood in terms of morphemes but cannot be interpreted in terms of phonemes.

One further remark suggests itself in connection with the notion of neutralization as expounded here. The usual result of neutralization is *homonymy*. Taking the example already used above, we can see that the *rog ~ rok* opposition can be neutralized in favour of /rok/ 'horn' / 'destiny'; as a result, the number of homonyms increases. By definition, homonyms are entities possessing an identical expression plane but different content planes. The identity of the expression plane means that homonyms originated in this way must be perceived identically, a postulate that is easily tested using simple experiments. This would, however, be impossible should we differentiate between /rok/ 'horn' Nom.Sg. and /rok/ 'destiny', or /roK/ where /K/ stands for the archiphoneme, with the same meaning.

Such are the principal theoretical tenets in the realm of phonology as viewed from the inside the of School by one of its own adherents.

Many theoretical niceties have been ignored, nothing, for example, has been said about the relationship between the Ščerba School and Generative Phonology or other phonological schools of thought which have developed from from the beginning of the twentieth century to the present. And yet this first round of discussion provides a working outline of the Ščerba style of phonology and will hopefully serve the reader as a common thread with which to trace the story.