From the history of St. Petersburg (Leningrad) phonological School:
On the formation of morphological criteria in phonology

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This article discusses some aspects of the formation of the morphological (or to put it more precisely morphemic) criterion in the procedures for establishing the phoneme inventory. Mainly it will be a matter of the St. Petersburg (Leningrad) School of phonology (alias the Ščerba School, or School of Ščerba) and the Moscow School, since both, while solving phonological problems, attach importance to the morphological data, though in different ways.

Both the St. Petersburg and Moscow Schools differ considerably from the Prague Linguistics Circle with respect to the use of morphological information in phonemic analysis. As is well known, N.S. Trubetzkoy dissociated himself not only from 'psychologism' (psychological approach) but also 'morphematicism' (morphemic approach) in phonological procedures. Suffice it to mention his rules for the establishment of phoneme inventory (Trubetzkoy 1935; Trubetzkoy 1960: 52-59, 62-71): seven rules of mono- or polyphonematic status of speech sounds (principles of phonological segmentation) and four rules of discrimination between a distinct phoneme and a variant of phoneme (principles of phonological identification of phones). There is no rule, among them, based on morphemic boundaries or alternations within the same morpheme. In these rules Trubetzkoy takes into account different criteria: the articulatory and acoustic characteristics of speech sounds, their length, syllabification, phonological features, compatibility of phonemes, symmetry of phonological system and simplicity of its description. The only criteria that are not present in the analysis are morphological ones. Further, the only criterion connected with meaning used by Trubetzkoy is the notorious 'minimal pairs' which is of no use at all for the establishment of a phoneme inventory. The importance attached to the criterion of 'minimal pairs' is not surprising and of course it is connected with the fact

that according to the Prague Circle, the fundamental function of the phoneme is not *constituent* but *distinctive*.

It is all quite different with the St. Petersburg and Moscow Schools. For both, it is the *constituent* function of the phoneme (which from the listener's viewpoint is at the same time *identifying*) that is most important. The constituent/identifying function of the phoneme is that phonemes serve as construction material for the plane of expression of morphemes and words, i.e. units of higher levels of linguistic structure. Accordingly, the establishing of phoneme inventory should rely on meaning, i.e. on the semantic level of language.

As for the *distinctive* function, both schools, but especially St. Petersburg, regard it as an immediate corollary of the *constituent* function of the phoneme[1].

The St. Petersburg and Moscow Schools use morphological information in different ways. The difference between them lies principally in regard to the autonomy of the phoneme as a linguistic unit: to what extent is the phonological system and its main element, the phoneme, independent of the morphological system and its meaningful unit, the morpheme? In this respect, the Moscow School is much more 'morphemic' than that of St. Petersburg. The 'Moscow' phoneme is connected to the morpheme much more strongly than the 'St. Petersburg' phoneme. Such a view on the differences between the two schools is more or less common.

But there is a less known fact (especially outside but, according to my observations, also inside the St. Petersburg School) that in some respect, the St. Petersburg School (at least in its current state) relies on the morphological criterion more consistently than does the Moscow School. That is why the former can be considered even more 'morphemic'. Most of all it is related to the procedures of establishing the phoneme inventory, and particularly the division into phonemes (phonological segmentation).

A few words about these procedures. It is clear that to establish the phoneme inventory two procedures are necessary, viz. (1) to divide the speech chain into minimal functional sound units (phonemes), that is to find phonemic boundaries or, bluntly speaking, to decide whether there is a realization of one or two or even more phonemes; and (2) to identify segmented units, that is to establish which of them realize one phoneme, and thus to determine the phoneme repertoire of a given language. Of course, the task of establishing the phoneme inventory is experimental, rather than formal and logical. Its solution is based on the native speakers' speech behavior and is realized through the process of interviews with the informant, as well as on the text produced by him. Nevertheless, the criteria of final solutions should be provided with a theoretical foundation. As a

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[1] As early as in 1912 Lev Ščerba in his definition of phoneme put the constituent function on the first place and the distinctive function on the second: "The phoneme is the shortest general phonetic notion of a given language which is capable to be associated with notions of meaning [constituent function – *M.P.*] and to differentiate words [distinctive function – *M.P.*] …" (Ščerba, 1912, p. 14).

matter of fact, the principal task of every phonological theory is to elaborate these criteria.

Let me mention the criteria developed by the St. Petersburg School. This phonological school suggests the following common principle for the segmentation of the speech chain: division into phonemes is connected with division into morphemes, and a morphemic boundary cannot split a phoneme. Hence, in order to carry out phonological segmentation, we should know morphemic boundaries. Thus, if there is a morphemic boundary in a sound combination, there is a boundary between phonemes. By analogy, the same sound combination that is not on the morphemic boundary is also divided into two phonemes. For example, the sound combination [ˈkɑ] in Ru. [rukɑ] *ruka* 'hand' or [ˈkɑrkʲɪ] *k arke* (*к арке* 'to the arch') is split by a morpheme boundary, and that means that it is divided by a phonological boundary as well. Using the principle of analogy, we conclude that the same sound combination [ˈkɑ] in the word *karta* ('map'), although not divided by a morphemic boundary, is also a realization of two phonemes, because theoretically in can be split by a morphemic boundary. On the other hand, according to the St. Petersburg School, the sound segment [ʔa] including a prevocalic glottal stop, which is normal in Russian at the outset of a syntagma (e.g. Ru. [ˈʔɑrkə] *arka* (*арка* 'arch')) and optional after the vowel inside the syntagma (e.g. Ru. [ˈʔɛtə ˈʔɑrkə] *eto arka* ('it's an arch')) manifests one phoneme because a glottal stop in Russian is never separated from the next vowel phonologically being a part of the vowel /a/.

The principle of analogy follows from another fundamental thesis of the St. Petersburg School: phonetic distinction is a necessary condition for phonological distinction, therefore sound combinations identical for a native speaker should be interpreted phonologically in the same way. It is the use of the principle of analogy that decisively distinguishes the St. Petersburg School from that of Moscow. So when dividing into phonemes (the first stage of the establishing phonemic inventory also called the *syntagmatic identification of phoneme*), the St. Petersburg School uses the morphemic boundary criterion.

At the next stage, during paradigmatic identification of phonemes the St. Petersburg School also uses morphemes. According to this approach, the principle of paradigmatic identification says: two allophones are realizations of the same phoneme if they are in complementary distribution and simultaneously alternate in the same morpheme. This principle can be exemplified by the following example. In the auslaut, the Russian word form [kʷot] *kot* ('he-cat') has is a voiceless non-sonorant [t] which is articulatorily and acoustically different from the prevocalic [t] in the word form [kʌˈtɑ] *kota* (Gen. and Acc.) and from the labialized [tʷ] in the Dative [kʌˈtʷu] *kotu*, and Instrumental [kʌˈtʷom] *kotom*, and yet the three sound types are identified as allophones of one phoneme since they alternate in the same morpheme *kot-* and cannot be found in the same phonetic position (they are not opposed to each other). According to the

principle of analogy the same segments [t], [tʷ] in the non-alternating contexts (e.g. in Ru. [tas] *taz* 'basin', [tʷur] *tur* 'aurochs', etc.) is also a manifestation of the phoneme /t/.

Despite some difficulties which this approach faces (maybe they are not worth mentioning here[2]) the St. Petersburg School has always been and still is the only phonological school that systematically uses functional ("morphological") criteria when establishing the phoneme inventory[3]. Even the Moscow School is not so methodical on this point. For example, one of the founders of this School, P.S. Kuznecov in his article "On the basic concepts of phonology" (1959) maintains that the fundamental criteria of the phonological segmentation into "speech sounds" (*zvuki reči*)[4] and uniting them into 'language sounds' ['*zvuki jazyka*'][5] are articulatory and acoustical. In this context, I cannot help quoting one of the prominent linguists of the St. Petersburg School, Lija Bondarko: "Kuznecov's idea that it is a device that segments speech sounds most accurately, allows us to assert that, according to Kuznecov, the criteria of segmentation are physical rather than linguistic. The same can also be said about the definition of the language sound introduced by Kuznecov" (Bondarko 1981: 46). So as late as the late 1950s, one of the founders of the Moscow School still maintained virtually prephonological views.

The first thing I want to do in this paper is to draw attention to how the approach to morphological criteria was changing inside the St. Petersburg School. The concepts presented above as a creed of the St. Petersburg School were clearly defined in their final shape only in the sixties-seventies and canonized in the 2nd edition of Lev Zinder's *General*

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[2] In more detail about these difficulties and possible way out of them within the framework of St. Petersburg School see (Popov, 2004, p. 42-72).

[3] At the Phonetic Department of St. Petersburg university has been preserved a copy of pamphlet "Anleitung zu phonologischen Beschreibungen" (*Manual for phonological description*) (1935) by N. Trubetzkoy with marginal notes of L.V. Ščerba. In the text of Trubetzkoy's 3rd rule of discrimination between a distinct phoneme and a variant of phoneme ("If two articulatorily and acoustically related sounds never occur in the same environment they are combinatory variants of the same phoneme") Ščerba underlined "related" and wrote "Bad!" (*Ploxo*!) (Zinder, 1994, p. 404). Of course for Ščerba the application of criteria of the articulatory and acoustic relationship of phones in order to prove their belonging to one phoneme was unacceptable.

[4] "Any speech sound can be separated from the preceding and subsequent speech sound. It can be done with different ranges of accuracy and the means are not important. Though there are articulatory and acoustical transitions from one speech sound to the next, the delimitation can be done by any native speaker, with more accuracy by a linguist, and with even greater precision by a device" (Kuznecov, 1959 [1970], p. 473).

[5] "Language sound is a multitude of speech sounds partly identical, partly close to one another in articulatory and acoustical respect, which occur in most different speech flaws and in most different meaningful units (words, morphemes). Limits of the domain formed by this multitude can be somewhat different depending on the means we use when setting them up. These means can be: 1) the feeling of native speakers of a given language, 2) the feeling of a researcher with a linguistically attuned ear, 3) experimental phonetic devices" (Kuznecov, 1959 [1970], p. 474).

Phonetics (Zinder 1979: 36-42, 45-55). In this book, the use of morphological criteria was illustrated by various cases of many languages.

As regards the founder of the St. Petersburg School, L.V. Ščerba, it is well known that he tried to avoid both straightforward polemics and theoretical statements which were too sharp and definite though his views clearly follow from his specific phonological solutions. For example, Ščerba's approach to the problem of phonological segmentation can be seen in his analysis of the palatalized affricate [ǯʲ] (in Ru. [ˈjeǯʲǯʲu] *jezžu* (*езжу* '(I) drive'), [dʌˈžʲǯʲi] *doždi* 'rain' (Nom. Pl.), etc.) in his own pronunciation which was not, by the way, standard[6]. Concerning this, he wrote: "since the this sound (affricate [ǯʲ] – *M. P.*) occurs only in combination with the preceding *ž*, and the morphological boundary rarely divides them, I almost never take it as independent, and I am somewhat inclined to consider the whole combination [žʹǯʹ] as one phoneme" (Ščerba 1912/1983: 16-17). This idea is formulated even more clearly in his later works. For example, in the "Theory of Russian writing" (written in 1942-43): "in a number of cases long consonants are divided by a morpheme boundary, *pod-dat'* (Ru. *поддать* 'to strike'), *sten-n-oj* (Ru. *стенной* 'mural')... On the other hand, now there is no morpheme boundary in such words as *strann-yj* (Ru. *странный* 'strange'), *ssor-a* (Ru. *ссора* 'quarrel')… I think that since in a number of cases long consonants are without doubt interpreted as "double" (i.e. as biphonemic combinations as a result of being split by the morpheme boundary – *M.P.*), this interpretation, naturally, applies to such combinations where a morphological boundary is not clear" (Ščerba 1983a: 35–36). In the same works ("Russian vowels from qualitative and quantitative point of view" (1912) and "Theory of Russian writing" (1942-43), he wrote about phonological identification of phones in connection with the phonological status of Russian [y]. According to Ščerba, [i] and [y] could be interpreted as variants of the same phoneme, /i/, on the ground that these two vowels are in **complementary distribution**: [i] (in unstressed syllables, [ɪ]) found initially, after vowels and after palatalized consonants, [y], after nonpalatalized consonants, and can **alternate in the same morpheme**s (e.g. Ru. [ˈirə] *Ira* (*Ира* 'Irene') – [zʌˈirəɪ] *za Iroj* (за Ирой 'after Irene') – [ˈsyrəɪ] *s Iroj* (*с Ирой* 'with Irene'), [ɪˈgratʲ] *igrat'* (*играть* 'to play') – [pʌɪˈgratʲ] *poigrat'* (*поиграть* 'to have had a game') – [ˈsyrəɪ] *sygrat'* (*сыграть* 'to have played'), etc.)[7]. Nevertheless Ščerba considered this not a case of complementary distribution because in Russian some words with initial [y] can be found (the name of the letter "*Y*" (*Ы*), *ykat'* (Ru. *ыкать* 'to use the sound [y]') opposed to "*Y*", *ikat'* (Ru. *икать* 'to use the sound

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[6] In the early 20th century the words like these should have been pronounced [ˈježʲːu] *jezžu*, [dʌˈžʲːi] *doždi* and so on.

[7] In "Russian vowels…" Ščerba stressed the importance of morphological criteria in the procedure of identifying phones as members of one phoneme: "if each [y] and [i] after palatalized consonant alternated in the root then [y] would not be interpreted as an independent phoneme and we would identify it as [i]" (Ščerba, 1912 [1983], p. 50).

[i] instead of [e] in an unstressed syllable', technical term of Russian phonetics) and some others). So in this particular case, violation of complementary distribution allowed him to maintain that there is /y/ in the Russian phoneme inventory (Ščerba, 1912/1983: 52–53).

Let us return to Ščerba's closest disciple Lev Zinder. In the 1st edition of his *General Phonetics* (Zinder 1960), he formulates the morphological criterion for the procedure of phonological segmentation, but does not apply it logically enough regarding the autonomy of phoneme, viz. the principle of analogy which is so important for the theory of the St. Petersburg School. For example, he believes that three types of phonological solutions for long consonants are possible in different languages, viz.

1. a long consonant is a single phoneme in languages where it never occurs on the morphemic boundary (the example of Daghestanian geminates is proposed);
2. a long consonant is a biphonemic combination in those languages where it occurs on the morpheme boundary (long consonants of the Even language are given as an example);
3. but for languages where long consonants can occur both on the morpheme boundary and inside morpheme he, unexpectedly, proposes a solution depending on the quantity proportion of such cases, the problem being solved individually for different phonemes. As a result, Russian long [s:] according to Zinder, should be interpreted as a combination of two phonemes /ss/, while the long consonant [n:], as a single long phoneme, /n:/. Such a decision has been taken because in Russian cases like *sdelannyj* (*сде́ланный* 'made'), *kuplennyj* (*ку́пленный* 'bought'), etc. (passive participles) are much more frequent than cases like *sonnyj* (*сонный* 'sleepy'), etc. (where the long consonant is clearly divided by the morphemic boundary) (Zinder 1960, p. 126-130).

In the 2nd edition of *General Phonetics*, Zinder's interpretation was revised and the principle of analogy was taken into account exactly as it had been in Ščerba's works (Zinder 1979: 127-131).

As regards the morphological criterion in the procedure of paradigmatic identification of phonemes, there is nothing about it in the 1st edition of Zinder's *General Phonetics*. So in 1960, this criterion was not yet realized and formulated by Zinder, which is to say that the complementary distribution criterion was not yet supplied by the criterion of alternation of phones in the same morpheme.

Substantial changes in Zinder's position can be observed in his well-known article on the Russian long palatalized hushing sibilant [š�()ː] (Zinder 1963). There he methodically bases and applies the criterion of morphemic boundary which was then provided with full theoretical substantiation in later Zinder's later writings, as well as in the works of his

colleagues on syllabic languages: first of all, in Mirra Gordina's writings on Vietnamese (Gordina 1959; Gordina 1966).

Concerning the clear substantiation of the criterion of morphemic boundary in the procedure of paradigmatic identification (which as I have just mentioned was absent in the 1st ed. of *General Phonetics*), it was first formulated by Zinder in his short article *Phoneme and Morpheme* in 1977 (Zinder 1977 [2007]). This criterion acquired its canonical form in the 2nd ed. of *General Phonetics* (Zinder 1979: 39-40), and was later further developed in the fundamental monograph *Phonological Problems of General and Oriental Linguistics* Vadim Kasevič (1983: 44-67).

In conclusion I would like to make one conjecture. It seems to me that the morphemic or morphological criterion in the procedures for establishing a phoneme inventory in the theory of the St. Petersburg School probably gets its final shape in the course of a rather heated debate between the two Russian schools of phonology in the 1950s-70s. This discussion was accompanied by constant and obviously unjust criticism of the St. Petersburg School as being 'purely phonetic' and even 'physicalistic' (i.e. non-phonological). One of the leaders of the Moscow School, Alexander Reformatskij, jokingly called School of Ščerba "*uŠČERBnaja*" 'defective'. First of all it is a question of the procedure for the paradigmatic identification of phonemes. As regards the syntagmatic delimitation of phonemic units, the St. Petersburg School was a pioneer and this problem became in a certain sense a "brand" of the School while for the Moscow School it was peripheral and remained virtually undeveloped.

One of the few 'Muscovites' who as early as the 1950s mentioned the necessity of the methodical application of morphological criteria in paradigmatic identification of allophones (or, in the traditional terminology of Moscow School, *variations* in traditional terminology of Moscow School (— which is important because the concept *variation* is the only one that corresponds to the concept of *allophone* in other Schools) was Mixail Panov. That is extremely significant because linguists of the Moscow School, with all their morphological tendencies, do not usually apply this criterion while identifying *variations* (see the quotation of P. S. Kuznecov's article in footnotes above)[8]. Even Mixail Panov himself did not write about this in his later writings.

When speaking about the 1950s, I principally intend Panov's early article "On the importance of the morphological criterion in phonology" (Panov, 1953/1970). It appeared in the context of the discussion about the concept of the phoneme in Soviet linguistics, but was aimed not so much at S. K. Šaumjan (and it was published as a comment on Šaumjan's article "The problem of the phoneme") as the School of Ščerba. In this article Panov cites Zinder's paper "Do speech sounds exist?":

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[8] Making an exception only for the problem of [i] and [y] (see above).

> A phonetic range of variants of one phoneme can be very wide but still it has certain limits. This range is limited by the acoustic and articulatory characteristics of variants of all the other phonemes of a given language. (Zinder 1948, p. 300)

Panov ironically commented on this quotation:

> It all comes to this: the range of the phoneme /p/ is determined by the range of the phoneme /b/, and the range of the phoneme /b/ is determined by the range of the phoneme /p/. It is all rather distressing. Everything becomes clear if we remember the morphological criterion. (Panov 1953 [1970], p. 370)

And then he expounds the essence of the morphological criterion, which it transpires is very similar to what we read in the 2nd edition of Zinder's *General Phonetics*, except of course that it bends to the interpretation of the Moscow School. He concludes his paper as follows: "It seems, we cannot do without the morphological criterion in phonology. And instead of using it secretly from oneself, one should apply it methodically in one's phonological research" (Panov 1953 [1970]: 373).

Speaking about applying the morphological criterion "secretly", Panov probably hinted at Zinder's words from the article "Do speech sounds exist?": "Autonomy of speech sounds is determined after all by the morphological analysis" and "though the way to the phonological analysis goes through the morphological analysis, the notion of separate speech sound is constituted exactly by the phonetic (for Zinder "phonetic" here means "phonological" – *M. P.*) analysis" (Zinder 1948: 299).

It looks like M. V. Panov misunderstood Zinder. For Zinder and for the St. Petersburg School, phonological analysis and, first and foremost, the establishment of the phoneme inventory does depend on morphological analysis, but this dependence is limited to the principle of analogy. L. R. Zinder, on the other hand, took into account his opponent's misinterpretation and in his late writings Zinder formulated the limits of the use of the morphological criteria in phonology more precisely.

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