

The following is a pre-print version of an article not yet published. As such it is subject to changes. It has been made available because it is being referred to in my thesis *Phonematics of Czech: An axiomatic-functionalist view*. A few notes are due in this respect:

1. The affricates [ts] and [tʃ] are analyzed as single phonemes /c/ and /č/ in this article, not as /Ts/ and /Tš/ (*Phonematics*). The reasons for this were purely practical: if I put forth the analysis I preferred, I would have had to explain my reasons and thus to lengthen the already long article. I rather chose the traditional analysis which required no special explanation. Likewise, the diphthongoids were analyzed as two-phoneme combinations. In the preferred analysis the examples mentioned in the article would be: /#oTseknöT#/ instead of /#očeknoutT#/, /#óT#seknöT#/ instead of /#óT#seknouT#/, /#prāTse#/ instead of /#práce#/, /#poTšiT#/ instead of /#počiT#/, /#raTSTsi#/ instead of /#racci#/ etc.
2. The issue of accent/stress in Czech has been further discussed in my forthcoming article “Ne-volnost přízvuku v češtině” [Non-freeness of stress in Czech] (to be published in *Varia Slavica*, Praha, 2008). The article offers additional examples of distinctiveness of the placement of accent in Czech, though it does not openly operate with the axiomatic-functionalist framework. The gist of the Czech article is, however, included in “Accent and diaereme in Czech”.
3. Different phonation types before Czech vowels are discussed by Radek Skarnitzl in “Acoustic categories of nonmodal phonation in the context of the Czech conjunction ‘a’”, published in *Acta Universitatis Carolinae, Phonetica Pragensia X* (2004), pp. 57-68. This discussion has some relevance on the ways diaereme is manifested in Czech.

ACCENT AND DIAEREME IN CZECH

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PRELIMINARIES

The theory adopted for the present discussion is that of Axiomatic Functionalism (henceforth AF). Detailed background of the theory and of phonology in AF in particular is to be found elsewhere¹. Here only those notions relevant to the discussion of accent and diaereme will be mentioned. The language analyzed is present standard Czech. Phonetic transcriptions are in the IPA.

Like other theories, even phonology in AF distinguishes between *phonematics* and *phonotactics*. Phonematics is a sub-theory dealing with unordered complexes of phonological entities. The most complex phonematic entity is *phoneme*, defined as an unordered bundle of distinctive features. Phonotactics deals with the syntagmatic (ordering) aspect of phonological entities, namely with ordered complexes of phonemes. Whether a complex is ordered or not should be decided by functional criteria only. A certain sequence of items may be linearly ordered in realization but the order is functional if and only if it could be different and/or if the relation between the items could be different.

The most complex entity in phonotactics is *distributional unit*. It is a self-contained bundle of positions in all of which an entity can stand and commute with other entities or with \emptyset (' \emptyset ' is functional zero). *Self-contained* means "representing all relative dependencies of its members (or constituents), as members (or constituents) of the set (or combination) in question"². As the name suggests, it is a model upon which the distribution of phonemes is described. The entities in the positions enter in mutual relations. The most important relation for phonotactics is the relation of sub-ordination or government. An entity in one position is

1. See MULDER, Jan, 1968, *Sets and Relations in Phonology: An axiomatic approach to the description of speech*, Oxford, Clarendon Press, and MULDER, Jan, 1989, *Foundations of Axiomatic Linguistics*, Berlin – New York, Mouton de Gruyter. See in particular "Postulates for axiomatic linguistics" in the latter work, p. 435-457.

2. MULDER, *Foundations*, p. 436.

sub-ordinate to or governed by an entity in another position. In other words, the governed entity is dependent for its phonotactic function on the governing entity. The governing position is called *nuclear* whereas the governed ones are *peripheral*.

For the distributional unit to be a useful notion at all there have to be at least two positions within it. However, for most languages it is useful to define a special set of positions constituted by a nuclear position and a pre-nuclear and post-nuclear peripheral position or position groups. This can be conveniently called *syllable*³. The syllable, defined here as a bundle of positions, is a purely phonological notion and should be distinguished from a phonic syllable. Usually a phonological syllable is realized by one phonic syllable but this is not a rule.

An instance of a distributional unit is called *phonotagm* (the name reflects *syntagm*). In a phonotagm every position of the distributional unit is filled with a phoneme or with \emptyset (which is to say that not all positions are necessarily filled with phonemes in every phonotagm). Distributional unit is a model upon which the distribution of phonemes is mapped; phonotagms are then actual instances of phoneme complexes in a given language. In many languages phonotagms have the form of syllables, i.e. it is the syllable upon which the distribution of phonemes can be described in many languages.

Phonotagms are self-contained bundles in phonotactics, sc. they represent all relative dependencies of its immediate constituents, phonemes. By virtue of being self-contained, phonotagms in phonological forms are therefore merely in juxtaposition, because no phonotactic relations obtain between them. A group of juxtaposed phonotagms may be called a *compound phonotagm*.

Phonological forms of words are usually built of compound phonotagms, so we have to determine what phonotagms are juxtaposed. Consider /lano/, a phonological form of Czech *lano* “rope”. It follows from the concept of phonotagm as a unit of distribution that it is functionally irrelevant whether the phoneme /n/ is assigned to the first syllable (i.e. /lano/ being /lan/ and /o/) or to the second one (i.e. /la/ and /no/) or to both (i.e. /lan/ and /no/) as long as the assignment of /n/ to either syllable does not violate general distributional rules. Because

3. MULDER, *Sets...*, p. 177-178.

the choice between the first and the second solution is arbitrary and because /n/ can occur in a pre-nuclear position as well as in a post-nuclear position (cf. /lan/, *lan* “rope (genitive plural)”, /noS⁴/, *nos* “nose”), the axiomatic functionalist methodology prefers the last solution, according which /n/ belongs to both syllables. The phonological form /lano/ is then said to be formed by juxtaposition of syllables /lan/ and /no/ that share the marginal phoneme /n/ by so-called *functional amalgamation*⁵ (in other approaches this is usually called *ambisyllabicity*).

Yet there may be additional criteria according which we could assign overlapping phonemes to separate phonotagms. One of them is that of simplicity of descriptions—in phonotactics it is simplicity of distribution of phonemes. Consider the phonological form /loŋiŋ/ (English *longing*): a description of the distribution of English phonemes would be simpler if we assigned the medial /ŋ/ to the first syllable rather than to the second or to both. This is because the phoneme /ŋ/ does not otherwise occur in initial (pre-nuclear) positions and the alleged syllable /ŋiŋ/ would spoil the generalization. So /loŋiŋ/ is best treated as a juxtaposition of /loŋ/ and /iŋ/ with no functional amalgamation (ambisyllabicity).

In addition to the phonematic and phonotactic levels, AF recognizes another phonological level called *para-phonotactics*⁶. Its function is to account for structures and relations that cannot be adequately accounted for in phonematics and/or phonotactics. Though not exhausting it, para-phonotactics lumps together so-called prosodic or suprasegmental features. The reason why, in AF, the term para-phonotactics is preferred is because it strengthens its relation to phonotactics: para-phonotactics is, as it were, superimposed on phonotactics.

To para-phonotactics also belong features determining the order of phonotactic entities (phonotagms/syllables). As phonotagms are self-contained entities, i.e. closed fields of phonotactic relations, it follows that no phonotactic relation obtains between juxtaposed phonotagms. Their order may be necessitated by realizational needs. For instance, if we have syllables A and B, in realization their order will be AB, not BA, because B can never precede

4. The ‘voiceless’ ~ ‘voiced’ opposition is neutralized in Czech at the end of a phonotagm, hence the archiphoneme written by a capital letter. The same neutralization takes place in the context before any consonant for which the ‘voiceless’ ~ ‘voiced’ is relevant, hence e.g. /StāT/, [stat], *stát* “to stand”. This correlates with the fact that so-called assimilation is predominantly regressive (anticipatory) in Czech.

5. MULDER, *Sets...*, p. 179-180.

6. Mulder gives definitions for para-phonotactics in *Foundations...*, p. 449-452. The definitions given here are somewhat modified.

A. An example may be syllables /Stār/ and /l/ in Czech: because the syllable /l/ (i.e. syllabic /l/) can never be the first syllable of a phonological form, the sequence of the syllables will be /Stārl/, not /lStār/ (cf. Czech /Stārl/, *stārl* “(he) was getting old”; forms like /lSti/, *lsti* “tricks” are monosyllabic, not dissyllabic!). The order of juxtaposed phonotagms may, however, be functional by being opposed to a different order. In that case we say that it is determined para-phonotactically. An example may be syllables /ma/ and /sa/ in Czech: because the difference between /masa/ and /sama/ (cf. Czech *masa* “mass” and *sama* “alone”) is distinctive, the order of the syllables in the phonological forms is determined by para-phonotactic features.

Entities in para-phonotactics are called *para-phonotactic entities*; they consist of a *base* and *para-phonotactic features*. The para-phonotactic features are features that accompany, but not determine the identity of the respective base. The bases correspond to entities further describable on the phonotactic or para-phonotactic level. This means that para-phonotactic features are, as it were, superimposed either on phonotactic entities (simple or compound phonotagms) or on para-phonotactic entities. The latter case takes place when para-phonotactic entities are accompanied by additional para-phonotactic features. An example may be phrase-accent groups: they are para-phonotactic entities with bases formed by word-accent groups, themselves para-phonotactic entities.

There are two basic types of para-phonotactic features: distinctive ones and contrastive ones. As the concept of distinctiveness is, in the present methodology, entailed in the concept of opposition, it follows that something is distinctive if it is in direct opposition with something else. Distinctive para-phonotactic features are hence those features that are in a relation of direct opposition with one or more para-phonotactic features or with \emptyset . These include so-called tones or tonemes. In this paper I will not go more into tones. However, I will mention a type of distinctive para-phonotactic features that are connected with accent, namely the distinctive accentual pattern.

The second type of para-phonotactic features are contrastive para-phonotactic features whose function is that of groupment over and above phonotactic or para-phonotactic

groupment⁷. In other words, contrastive para-phonotactic features are those features that give unity to the base they accompany. If the base is simple, the function is trivial, but if the base is constituted by several juxtaposed entities, the function of para-phonotactic features is to group them under one structure.

ACCENT AND DIAEREME

Under the rubric of contrastive para-phonotactic features I will distinguish between *accent* and *diaereme*. The latter is connected with the concept of juncture.

By accent is usually meant certain prominence attributed to a phonic syllable within a portion of speech (usually called *accent group*). The prominence of the syllable cannot be expressed absolutely but only relatively in relation to other, less prominent syllables. Hence there has to be at least two phonic syllables for accent to be perceptible at all. The phonic substance of accent (be it pitch, intensity, length or others) is immaterial for this discussion; it may actually be the same as the phonic substance of tones. The crucial difference between accent and tones is in the fact that accentual prominence is either present or absent on a syllable, whereas a single syllable can bear several different and mutually opposed tones. The difference between accent and tones is therefore in their function⁸.

From the fact that accent is conceivable only if one degree of prominence is contrasted with another degree, it follows that accent is not connected with only one syllable but with a bundle of syllables. Accent is therefore a complex phenomenon, and the sketch of speech upon which accent is realized is characterized not only by the peak of prominence but also by other phonic features (such as melodic curve) that unite the whole under one phonic segment.

Moving back to axiomatic functionalist phonology, we can define accent in this way:

7. Mulder does not mention 'para-phonotactic groupment' in Postulates just as he does not speak about 'para-syntactic groupment' in the case of contrastive para-syntactic features. However, just as the latter notion is justified, so is the former. On para-syntactic groupment see GARDNER, Sheena F. & HERVEY, Sándor G. J., 1983, "Structural sentence types", *La Linguistique*, Vol. 19/3, p. 3-19.

8. See MARTINET, André, 2000 [1st ed. 1954], "Accent et tons", *La Linguistique*, Vol. 36, p. 299-314; introduced by Jan W. F. Mulder.

‘Accent’ for ‘para-phonotactic features whose function is groupment over and above phonotactic or para-phonotactic groupment and that, at the same time, are not opposed to other para-phonotactic features’.

Tones, though primarily distinctive, can also function contrastively. This is to say that they also give unity to the base they accompany. On the other hand, the function of accent is *only* to give the unity, and it is what distinguishes it from tones. Due to the phonic constraints mentioned above, accent is realized upon at least two phonic syllables one of which is characterized by certain accentual prominence as contrasted to the other, less prominent syllable(s). We may say that the most prominent syllable is *accented* whereas the less prominent ones are *unaccented*.

The para-phonotactic entity constituted by a base and accent can be conveniently called *accent group*. We can make a distinction between *word-accent group* if the para-phonotactic entity corresponds to a phonological form of a word; between *syntagm-accent group* (or *phrase-accent group*) if the corresponding meaningful unit is a syntagm; and between *sentence-accent group* if the para-phonotactic entity corresponds to a phonological form of a sentence.

I will now move to diaereme, the other type of contrastive para-phonotactic features. The concept behind diaereme is—despite the unusual name—not unfamiliar to phonologists; in fact, it has been much discussed in literature. Diaereme is meant to account for practically the same features as so-called *juncture*. The choice of the name is actually immaterial, though there are certain reasons I prefer the term *diaereme*⁹. The most important of these reasons is the fact that, in the American structuralist practice, juncture was viewed as a phoneme and there was generally more than one type of juncture recognized. This view is incompatible with the present methodology.

First of all, it is redundant to operate with more than one diaereme (juncture) if the function of all of them would be the same, i.e. to indicate boundaries between entities. It is better to distinguish between various extensions of the delimited entities rather than between different

9. On the term *diaereme* see BIČAN, Aleš, 2007, “Notes on Diaereme”, *Linguistica* ONLINE, <<http://www.phil.muni.cz/linguistica/art/bican/bic-002.pdf>>.

delimitating features. Secondly, we should realize that the delimitating features are not characteristics of a certain segmental (or suprasegmental) unit but are features pertinent to the whole entity that is thus delimited. In this sense diaereme is closely related to accent: in languages where, say, the first syllable of (a phonological form of) a word is always accented, there is no need to differentiate between accent and diaereme, because the accentual prominence is only one of the means by which diaereme is manifested. Finally, phoneme is defined as a simultaneous bundle of distinctive features, which diaereme (juncture) cannot be by not being opposed to anything else.

Bearing this in mind, we can define diaereme as follows:

‘Diaereme’ for ‘para-phonotactic features with the function of groupment over and above phonotactic or para-phonotactic groupment in such a manner as to indicate boundaries of the groupment, and that, at the same time, are not opposed to other para-phonotactic features’.

The difference between accent and diaereme is therefore in the latter’s capacity of indicating the precise boundaries of the underlying bases. Accent does not, in itself, have this capacity. Accentual prominence is usually manifested by certain prominence superimposed on the whole syllable, but the beginning and the end of the syllable is uncertain unless other features intervene.

Diaereme may be manifested in actual speech by a number of phonic characteristics. The most obvious is a pause between utterances, but pauses are seldom employed in connected speech. More usually, phonemes across boundaries of phonological forms tend to be realized in a conspicuously different way than in contexts with no boundaries. A fairly common realization of boundary-initial vowels is with a glottal stop.

In Czech the occurrence of a glottal stop functions as a means of indicating boundaries and hence may be regarded as a manifestation of diaereme. It usually occurs before word-initial vowels or at junction of two vowels due to prefixation. A glottal stop is not the only way of indicating boundaries and is not even always realized; in fact its use is in decline. A detailed analysis of boundary features in Czech is still missing but at least a partial analysis was done by Ilse Lehiste. She investigated the difference between *mouka* “flour” and *kradmo ukazuje*

“he shows by stealth”, that is, the difference between a diphthong [ou] (in *mouka*) and a sequence of two vowels [o.u] across a word-boundary:

In one out of 14 cases, the [boundary] segment was manifested as a glottal stop. In the remaining instances the segment was characterized by breathy and irregular phonation, accompanied by a drop in intensity to an average level of 29.2 db from an average of 46.3 db for /o/, 41.9 for /u/, or approximately 15 db.¹⁰

Czech has syllabic consonants [ɾ], [l] but the syllabicity is not distinctive—it is given by the surrounding context. They occur only between two consonants and at the end of words. It follows that if a vowel follows a syllabic consonant, there must be a boundary between them. Lehiste investigated this situation, in particular the difference between *Petra poštvali* “they set Peter at” and *Petr apoštol* “Peter apostle”, the second of which contains a syllabic [ɾ]. She concludes:

Only four such segments [i.e. glottal stops] were observed in the 16 instances described here. In the other twelve cases, the boundary segment [in *Petr apoštol*] was realized as a period of irregular or breathy phonation or as a voiceless vocoid, acoustically manifested as a period of noise with energy concentrations at approximately the formant positions of the following vowel.¹¹

In what follows diaereme will be indicated by ‘#’ at the beginning and the end of a phonological form (e.g. /#lano#/). This transcriptional device should not induce readers into thinking that diaereme is a segment of some kind. The double crosses /#...#/ only indicate the extension of the phonological form. In the case of /#lano#/ it is trivial, because the extension is already given, but in the case of e.g. /#poT#okem#/ (*pod okem* “under an eye”) this is non-trivial. For the sake of convenience we can say that there is diaereme in between /poT/ and /okem/, but this should be understood only as meaning “there is a boundary between /poT/ and /okem/ indicated by a para-phonotactic feature, diaereme”.

The entity delimited by diaereme may be conveniently called *diaereme group*. We can distinguish between *phonological words* if the diaereme group corresponds to a phonological form of a word; between *phonological syntagms* (or *phrases*) if it corresponds to syntagms; and between *phonological sentences* if it corresponds to a phonological form of a sentence.

10. LEHISTE, Ilse, 1965, “Juncture”, *Proceedings of the Fifth International Congress of Phonetic Sciences*, eds. E. Zwirner & W. Bethge, Basel, S. Kager, p. 186.

11. LEHISTE, *op. cit.*, p. 184.

Sometimes the diaereme group may even correspond to a form that is not a phonological form of any sign. This applies, for instance, to German *Theater* [tʰeˈʔa:tɐ] whose phonological form, due to the presence of the glottal stop, might be set as /#te#atr#/. The forms /#te#/ and /#atr#/ are not, however, phonological forms of any sign in German.

Interesting is also the relation between accent groups and diaereme groups. For instance, in the phonological form of *pod okem* “under an eye” we have two diaereme groups but one accent group (indicated by underlining): /#poT#okem#/. This shows that, though related, accent and diaereme are two separate para-phonotactic features in Czech. Yet in many phonological forms, especially when isolated, accent groups and diaereme groups coincide, cf. /#potokem#/ (Czech *potokem* “through a rivulet”), being both an accent group and a diaereme group.

DISTINCTIVE ACCENTUAL PATTERN

As already mentioned, para-phonotactic entities are comprised of bases and para-phonotactic features. The features are either distinctive or contrastive. The bases correspond to entities describable on a phonotactic level or a para-phonotactic level. The latter takes place when para-phonotactic entities are accompanied by additional para-phonotactic features. For instance, two or more word-accent groups can be grouped by phrase-accent under one unity and form a phrase-accent group. Accent is a contrastive para-phonotactic feature. In this section I will discuss a situation when accent groups are accompanied by a distinctive para-phonotactic feature. The features in question will be called *accentual pattern*.

However, we must first resume the discussion on accent. Accent is not distinctive, because it is not in direct opposition with at least one other para-phonotactic feature. Yet in many languages phonological forms are distinguished by means of accent. The point is, however, in the fact that it is the placement of the accented syllable that is distinctive, not the accent by itself. Compare English *import*, noun, accented on the first syllable, with *import*, verb, accented on the second syllable; the difference between them is ensured by a direct opposition between an accentual pattern “Accented-Unaccented” and an accentual pattern “Unaccented-

Accented”¹². Because accent is only contrastive and because sometimes differences in the placement of accentual prominence may be distinctive, I distinguish between accent and accentual pattern.

The following definition of accentual pattern is proposed for the framework of AF:

‘Accentual pattern’ for ‘distinctive para-phonotactic feature determining the placement of the peak of accentual prominence’.

The phonological form of the noun *import* (and similarly for the verb *import*) provides an example of a complex para-phonotactic entity whose base corresponds to a para-phonotactic entity. The latter para-phonotactic entity is constituted by a compound phonotagm /iMport/ and contrastive para-phonotactic features of accent (leaving aside diaereme). Upon this there is superimposed another para-phonotactic feature—this time distinctive—that specifies the placement of the peak of accentual prominence. The phonological form of the noun *import* is therefore /iMport/; that of the verb is /iMpórt/ (the acute accent mark indicates the peak of accentual prominence). Both are complex para-phonotactic entities whose bases correspond to the same para-phonotactic entity /iMport/, accompanied by either of the mutually opposed accentual patterns. The para-phonotactic entity /iMport/ is of course further analyzable to a compound phonotagm /iMport/ and features of accent.

The distinctive para-phonotactic features of different accentual patterns are conceivable only in languages with a so-called free accent (English is one of them). It means that in such languages the para-phonotactic features of “distinctive accentual pattern” determine the placement of accentual prominence within an accent group. On the other hand, in languages with a so-called fixed accent, distinctive accentual pattern is not operative, because the placement of accentual prominence is pre-determined by the structure of phonological forms. For instance, in Polish it would fall on the penultimate syllable in phonological forms of two or more syllables.

Czech is also said to be one of the languages with a so-called fixed accent, i.e. a language where the placement of the accentual prominence is predictable by being on the first syllable

12. On distinctive accentual patterns see also AKAMATSU, Tsutomu, 2000, *Japanese Phonology – A Functional Approach*, München, LINCOM Europa., p. 241ff.

of a phonological form of a word. The situation is, however, not that simple. First of all, not every word is accented on the first syllable, as examples like */#pót#okem#/*, [ˈpotʔokɛm], *pod okem* “under an eye” show. The words *pod* and *okem* constitute one unit, not only from the phonetic and phonological point of view but also from the grammatical point. The first syllable of the word *okem* “eye (instr. sg.)” is not accented here, though it is accented in isolation. It is better then to operate with so-called measures¹³ rather than words. But even then it does not hold that the first syllable of a measure is always accented. Compare the following pair. Each item may be a response in a conversation *Kup mýdlo!* “Buy a bar of soap!” *Jaké?* “What soap?”.

[ˈnɛʔobitʃɛjnɛ:]¹⁴ *neobyčejné* “extraordinary (one)”

[nɛʔobitʃɛjnɛ:] *ne obyčejné* “not ordinary (one)”

Both of the items have a glottal stop between *ne* and *obyčejný*, even though in the former *ne* “not, un-“ is a prefix and in the latter a separate word. Since a glottal stop is utilized in Czech as a boundary-marker, it is reasonable to posit diaereme here. When in isolation and pronounced without pauses, the items are distinguished only by placement of accentual prominence.

The whole problem boils down to the status of so-called *pre-measure segments* (in Czech usually called *taktová předrážka*). A measure (Czech *takt*) roughly corresponds to our accent group. Simply said, a pre-measure segment is a monosyllabic phonological form of a sign occurring between the beginning of an utterance and a phonological form of another sign, which is accented on the first syllable. Examples are: [dnɛsˈvɛʃɛr], *dnɛs večer* “tonight”, [ʔaˈʃɛl], *a šel* “and he went”, [panˈnová:k], *pan Novák* “Mr Novák”. A subject of disagreement was whether disyllabic words may function as pre-measure segments, too, like in the case of [panɛˈnová:ku], *pane Nováku* “Mr Novák (vocative)”. This problem will not be discussed here.

Yet another subject of disagreement was whether the pre-measure segment forms a measure of its own or whether it is grouped with the following segment and they form together a

13. The term is taken from KUČERA, Henry, 1961, *The Phonology of Czech*, ‘s-Gravenhage, Mouton & Co..

14. The pronunciation [ˈnɛ.obitʃɛjnɛ:] without the glottal stop is possible, too; it is perhaps even commoner. The use of the glottal stop is, however, recommended here for standard Czech, see PALKOVÁ, Zdena, 1997, *Fonetika a fonologie češtiny* [Phonetics and phonology of Czech], Praha, Karolinum, p. 326.

measure. In other words: whether *dnes večer* etc. are two measures *dnes* and *večer* or only one measure *dnes večer*. The first view can be abandoned because, as some linguists pointed out, the unaccented monosyllabic words cannot be measures by failing to comply with the defining characteristic of measures: the presence of an accented syllable. The latter view is the one prevalent in Czech linguistics¹⁵ and will be therefore further pursued here.

Let us return to the example of *neobyčejné* vs. *ne obyčejné*. By agreeing that a pre-measure segment forms a measure with the following word, we are compelled to say that both examples constitute one measure, the second of which contains a pre-measure segment. In our terminology it means that both utterances correspond to one accent group. Due to the fact of there being a glottal stop before the medial [o], it is reasonable to speak about two diaereme groups in *neobyčejné* as well as in *ne obyčejné*. The difference between them must be inevitably ascribed to the placement of accentual prominence. Hence their phonological forms are:

/#né#običejně# for [ˈnɛʔobitʃejnɛ:] *neobyčejné* “extraordinary”, and

/#ne#óbičejně# for [nɛʔobitʃejnɛ:] *ne obyčejné* “not ordinary”.

The situation is parallel to the English pair *import* (noun) vs. *import* (verb): we are dealing here with distinctive para-phonotactic features “accentual pattern”. The outcome of this analysis is such that Czech is also a language with a so-called free accent, i.e. a language where the placement of accent (accentual prominence) can be distinctive.

Though I have discussed here only one, more examples can be brought up: [nɛʔurtʃiti:] *ne určitý* “not certain” vs. [ˈnɛʔurtʃiti:] *neurčitý* “uncertain”, [nɛʔu:pɫni:] *ne úplný* “not exhaustive” vs. [ˈnɛʔu:pɫni:] *neúplný* “incomplete”, or [nɛʔofɛbni:] *ne ohebný* “not bendable” vs. [ˈnɛʔofɛbni:] *neohebný* “inflexible”. The whole problem can be generalized. Given the pattern /#X#A₁A₂...A_n# where X represents a phonological form of one syllable and A₁A₂...A_n stands for a phonological form of two or more syllables, it is impossible to pre-

15. It is advocated in recent phonetic and phonological descriptions of Czech, see PALKOVÁ, *op. cit.*, p. 281, and KRČMOVÁ, Marie, 2006, *Úvod do fonetiky a fonologie pro bohemisty* [Introduction of phonetics and phonology for students of Czech], Ostrava, Ostravská univerzita v Ostravě, p. 155. To prof. Krčmová I owe for several insights which led to improvements of this article.

determine from the phonological structure of the particular syllables whether the syllable X will be accented or not (because it can be either). Compare also these:

/#to#póle#/ [to'póle] *to pole* “that field”,

/#dó#pole#/ ['dopóle] *do pole* “into a field”.

These are, too, examples demonstrating that the placement of accentual prominence is distinctive in Czech, because the difference in accentual pattern cannot certainly be ascribed to the difference between /t/ and /d/. The placement of accentual prominence is not dictated by the phonological structure but only by the fact that /to/ is a phonological form of a pronoun *to* “that” and that /do/ is a phonological form of a preposition *do* “into”. By the rules of accentuation, prepositions acquire accentual prominence in this situation. However, this fact is not derivable from the phonological structure of the prepositions but only from their grammatical status! Otherwise we should claim that *na* [na] “on, upon” and *na* [na] interjection “here you are” are phonologically different, which is rather questionable, as they are homophones. Compare these examples:

/#na#vóle#/, [na'vóle] *na, vole* “here you are, dude”,

/#ná#vole#/ ['navóle] *na vole* “on the crow (of a bird)”.

The placement of accentual pattern is therefore distinctive in grammar, which in other words means that Czech is a language where the difference in placement of the accented syllable can change the meaning of signs!

A-PHONOTACTIC BASES

The bases of para-phonotactic entities correspond to phonotactic entities or para-phonotactic entities. There is yet another type of a base: an *a-phonotactic entity*¹⁶.

By a-phonotactic entity I mean such an entity that resembles the phonotagm but that does not have the defining characteristics of phonotagms. It follows from the definition of the phonotagm *qua* distributional unit 1) that it must be a self-contained bundle of at least two

16. The notion and the term were inspired by Gardner and Hervey's article cited in Note 7. They discuss the structure of sentences as para-syntactic entities and differentiate between sentence bases corresponding to syntactic entities, para-syntactic entities or a-syntactic entities.

positions (self-contained bundle meaning “representing all relative dependencies of its constituents”), and 2) that it must be a model upon which the distribution of phonemes can be sufficiently described. An a-phonotactic entity does not meet these conditions.

To illustrate this, let us discuss an actual example. In English the phonic syllables with [ə] in the nucleus are not only unaccented but also distributionally dependent on accented syllables. It is not then appropriate to regard these syllables as independent phonotagms; it is also not appropriate to regard [ə] as a realization of a nuclear phoneme of a phonotagm¹⁷. The schwa [ə] is a common realization of the indefinite article *a*, which is a bound element within a nominal syntagm like *a name*. So in the utterance [ə.'neɪm] *a name*, the phonic syllable [ə] would be dependent on [neɪm]. Hervey assigns the unaccented [ə] (a realization of the phoneme /r/) to the adjacent syllable due to the distributional constraints of the schwa. In the case of *a name* its phonological form would be a *simple* phonotagm /rneɪm/, realized by *two* phonic syllables.

Hervey’s analysis should be reconsidered in light of the fact that realizations of *a name* are distinguished from realizations of *an aim* (i.e. [ən.'eɪm]¹⁸). Admittedly, Hervey does not discuss these examples and does not even discuss the status of *an*. However, he explicitly states that “it is more suitable to regard /ðr/ and /r/ [i.e. forms of *the* and *a*], when realized as unstressed syllables, as realizations of phonological forms dependent on – and part of – the phonotagms that are forms of signs immediately succeeding ‘the’ and ‘a’, in particular nominal syntagms”¹⁹. As the pre-vocalic variant of the indefinite article is also a bound element within a nominal syntagm, and is realized as [ən], we may imply that the phonological form of *an aim* would also be analyzed as corresponding to a simple phonotagm, namely to /rneɪm/.

The phonological forms of *a name* and *an aim* would then be undistinguishable on the phonematic or the phonotactic level, though they are differentiated in realization. The difference should be accounted for and it is the para-phonotactic level that is suitable for doing

17. Discussed in HERVEY, Sándor G. J., 1978, “On the extrapolation of phonological forms”, *Lingua*, Vol. 45, p. 37-63. [ə] is analyzed as an allophone of /r/. The schwa is discussed in detail also in HESELWOOD, Barry, 2007, “Schwa and the phonotactics of RP English”, *Transactions of the Philological Society*, Vol. 105/2, p. 148-187.

18. Cf. HOARD, James, 1966, “Juncture and syllable structure in English”, *Phonetica*, Vol. 15, p. 96-109.

19. HERVEY, *op. cit.*, p. 51, n. 12.

so. Phonological forms of *a name* and *an aim* would be, respectively, /#r#neim#/ and /#rn#eim#/, i.e. with intervening diaereme. The bases /neim/ and /eim/ are well-formed phonotagms but, for the reasons mentioned above, this is not true for /r/ and /rn/. As phonotagms *qua* instances of distributional unit are models upon which the distribution of phonemes is described, /r/ and /rn/ can hardly be well-formed phonotagms because, being unaccented, they cannot account for the distribution of phonemes that occur in accented syllables. /#r#neim#/ is then a para-phonotactic entity constituted by a base compounded of a phonotagm /neim/ and an a-phonotactic entity /r/.

The account on a-phonotactic bases begs a question whether they occur in Czech, too. So far I have not been able to find one but there might seem to be a candidate requires as discussion.

Czech has so-called non-syllabic prepositions *s* “with”, *z* “from”, *v* “in” and *k* “to”. They do not occur by themselves; they adjoin the following word with which they form a phonetic unity: [ˈvlɛsɛ] *v lese* “in the forest”, [ˈskɯfɪɾ] *z knihy* “from a book”. If the phonological form of the following word begins with an identical consonant or with a cluster, syllabic variants [sɛ], [zɛ], [vɛ], [kɛ] of the prepositions may be used: [ˈvɛʃkɔlɛ] *ve škole* “at school”, [ˈvɛvlaku] *ve vlaku* “in a train”, [ˈkɛpʃtrosovi] “to an ostrich”. If the following word begins with a vowel, the vowel may be realized with a glottal stop to indicate the boundary.

This is the case of *k osmi* “toward eight”, realized [ˈkʔosmi] (it may also be realized as [ˈkosmi] or [ˈgosmi] but neither, though common, is regarded as standard pronunciation). It is therefore reasonable to analyze it as /#K#ósmi#/, this being an accent group with the base of two diaereme groups /#K#/ and /#osmi#/. The bases of the latter are /K/ and /osmi/. Now, while /osmi/ is a well-formed (compound) phonotagm, it may be argued that /K/ is in fact not a well-formed phonotagm due to its being constituted of one phoneme only (actually an archiphoneme) that is not even a nuclear element (only vowels and /r/, /l/ are nuclear elements in Czech). It should be recalled that the phonotagm is an instance of distributional unit which is defined a self-contained bundle of positions such that in every such a position an entity can stand and alternate with other entities or with \emptyset (i.e. functional zero). This means that a position in a phonotagm may be filled with \emptyset , even the nuclear position. The functional zero

must, however, commute with a non-zero entity. The phonological form /#ku#ósmi#/ [ku'ʔosmɪ], (*jedna*) *ku osmi* “(one) to eight” (expression of ratio, different to *k osmi* “to, toward eight”) shows that there is commutation between /Ø/ and /u/ and therefore /K/ is a well-formed phonotagm, though not realized by a phonic syllable like other phonotagms in Czech. Hence the phonological form of *k osmi* is actually /#KØ#ósmi#/. There is here an archiphoneme /K/ because the neutralization of the ‘voiceless’ ~ ‘voiced’ opposition takes place in close proximity with diaereme.

PHONOTACTIC AND PARA-PHONOTACTIC BOUNDARIES

As mentioned above, the bases of diaereme groups (i.e. para-phonotactic entities constituted by a base and diaereme) may correspond to simple or compound phonotagms. Since the function of diaereme is to indicate the beginning and the end of the underlying base, it follows that diaereme indicates where one phonotagm ends and the other begins.

It is to be recalled that a compound phonotagm is a juxtaposition of two or more phonotagms. The juxtaposed phonotagms may share their marginal positions (or phonemes in those positions) if it does not conflict with general distributional restrictions. In order to avoid arbitrary decisions, AF operates with the concept of functional amalgamation which means that, for instance, the phonological form /poStel/, *postel* “bed” is best regarded as a juxtaposition of phonotagms /poST/ and /Stel/ in order to avoid arbitrary decisions whether it is /po-Stel/ or /poS-tel/ or /poST-el/. In other words, the phonemes /st/ (including the archiphonemes /ST/) are shared by two phonotagms because they can occur in pre-nuclear positions as well as in post-nuclear ones (cf. /Stan/, *stan* “tent” and /koST/, *kost* “bone”). Now, diaereme may be a means to indicate precisely the extensions of phonotagms. Cf. /#poT#okem#, consisting of two phonotagms /poT/ and /okem/ with no amalgamation. This form can be compared to /#potokem#, *potokem* “through a rivulet”, consisting of phonotagms /poT/ and /tokem/ with functional amalgamation of /t/.

Although juxtaposed phonotagms may be, as it were, fused together, sometimes there are criteria according which we can assign phonemes to one or the other phonotagm by setting a

phonotactic boundary between the phonotagms. The criteria for non-arbitrary boundaries of juxtaposed phonotagms are usually based on the principle of simplicity in distribution of phonemes (cf. /loŋiŋ/ discussed above). However, such boundaries should not be accounted for by diaereme, though some linguists have used this solution by employing junctures.

Let us consider /ritʃrSk̄/, a phonological form of Czech *rytířský* “knightly”. The statement of distribution of phonemes will be much simpler if we set the phonotagm boundary between /ritʃr/ and /Sk̄/ rather than assuming functional amalgamation of /ritʃrSK/ and /řSk̄/. This allows us to maintain a distributional rule such that the phonemes /ř/ and /s/ (or /S/) are never combined within one phonotagm in Czech. To posit diaereme between /ritʃr/ and /Sk̄/ would be a tempting solution but not an appropriate one. The segmentation of these two phonotagms was carried out on purely phonotactic distributional criteria, not because some additional accompanying (para-phonotactic) features intervened as in /#poT#okem#/ . Diaereme (juncture) should not act as an omnipotent device which could be invoked every time the need be, though the concept of juncture has been “abused” in this manner and has been rightly criticized for.

The difference between phonotactic boundaries and para-phonotactic boundaries can also be shown on the Czech superlative prefix *nej*. In the phonological form of *nejjednodušší* “simplest” (realized: [ˈnejjednoduʃiː]) the boundary between phonotagms /nej/ and /jednoduʃi/ is phonotactically determined, because, by the principle of simplicity, it is better to assign two identical phonemes to separate phonotagms rather than to have a combination of two identical phonemes within one phonotagm. On the other hand, in the phonological form of *nejvidentnější* “most evident” (realized: [ˈnejʔevidentnejʃiː]) the boundary between phonotagms /nej/ and /evidentnější/ is para-phonotactically determined, because the initial /e/ in /evidentnější/ is realized with a glottal stop, which is a way diaereme is manifested in Czech.

It should be stressed that, though marked here with a hyphen, the phonotactically determined boundary is not an entity or feature of any kind. It is a mere notational analytical device. Alternative analyses are still possible. An analysis that would suppose that /loŋiŋ/ is an amalgamated juxtaposition of /loŋ/ and /ŋiŋ/ is not a priori impossible; it would be

nevertheless arguably less simple, as it requires a statement that the phoneme /ŋ/ occurs in a pre-nuclear position.

SOME MORE EXAMPLES

This section offers a further analysis of Czech phonological forms. The examples are illustrative rather than exhaustive; they show some interesting types. Note that various types of underlining indicate accent groups; the acute accent mark stands for the peak of accentual prominence in the cases where it is not structurally pre-determined. Double crosses indicate the beginning and the end of a diaereme group. The ‘-’ represents a phonotactically determined boundary between phonotagms (not an entity or feature of any kind!). The capital letters stand for archiphonemes resulting from the neutralization of the ‘voiced’ ~ ‘voiceless’ opposition.

1. /#zelenomodrī#/ (accent and diaereme group)

[ˈzɛlɛnomodriː], *zelenomodrý* “green-blue”. Features: accent and diaereme, base: compound phonotagm /zelenomodrī/. The accent group and the diaereme group are here merged. This is a phonological form of a sign spelled *zelenomodrý*, indicating a shade of blue. It is different to /#zeleno#modrī#/, realized [ˈzɛlɛnoˈmodriː], a phonological form of *zelenomodrý* “green and blue”, denoting something that is both green and blue, e.g. something striped. The difference is carried out by the presence of accentual prominence on the syllable [mod] and by the features indicating the onset of the prominence.

2. /#je#dén#/ (accent group with distinctive accentual pattern)

[jɛˈdɛn] or [jɛ ˈdɛn], *je den* “it is a day”. The form is different to /#jeden#/ (accent and diaereme group), [ˈjɛdɛn] *jeden* “one”. When *je den* is realized without a pause, the difference between it and *jeden* is in placement of accentual prominence. However, because *je den* may be realized with a pause, its phonological form is /#je#dén#/, i.e. with distinctive accentual pattern. The form is opposed to a possible, though unattested phonological form /#jéd#den#/ (the accentual pattern is attested: cf. /#vé#dne#/, *ve dne* “in the daylight”).

3. /#to#si#ud'elām#sām#/

[ˈtosɪˈʔuɟɛlamˈsa:m], *To si udělám sám*. “I will do it alone.”. First of all, the phonological form is a sentence-accent group—it corresponds to a sentence—though this accent group is not, for technical reasons, specially indicated. Noteworthy is the accent group /sām/. I have mentioned that, by logical necessity, accent groups have to be realized by at least two phonic syllables, which /sām/ by itself is not. The reason it is an accent group here is due to the fact that the accented syllable of /sām/ is contrasted with the unaccented syllables of the preceding accent group /ud'elām/. In isolation, a phonotagm realized by one phonic syllable does not form an accent group.

4. /#zá#obliT#/ (accent group with distinctive accentual pattern)

[ˈzaʔoblɪt] or [ˈza.oblɪt], *zaoblit* “to round off”. Feature: accentual pattern, base: accent group (with the base corresponding to two diaereme groups, /#za#/ and /#obliT#/). The realization with a glottal stop has become less common. In fact, the employment of the glottal stop in standard Czech is in decline. Yet it is still a possibility. This form can be compared with /#vakuovī#/ (accent and diaereme group), realized [ˈvaku.ovɪ:], *vakuový* “vacual”. If two vowels happen to stand in close proximity due to prefixation as in *zaoblit* (*za-* is a prefix here), the second of them may be realized with a glottal stop as a means of indicating boundary. On the other hand, a glottal stop is never realized in standard pronunciation if two vowels stand in close proximity due to suffixation, as in *vakuový* (with *-ový* as a suffix). The boundary between the two vowels in /#vakuovī#/ is therefore phonotactic, because it holds that the vowels *qua* nuclear elements belong to separate phonotagms in Czech. The form will be analyzed as /#vaK-ku-ovī#/ . The same is true for words of so-called foreign origin whose phonological forms have two vowels in close proximity, e.g. /#xa-oS#/ , realized [ˈxa.o:s], *chaos* “chaos”: they are not pronounced with a glottal stop.

5. /#oeknouT#/ (accent and diaereme group)

[ˈotseknout], *odseknout* “to cut off”. Although the realization with an affricate is fairly common, the phonological form of *odseknout* may be realized with a distinct occlusive [t] followed by a constrictive [s] as [ˈot.seknout], though such pronunciation would not

probably be perceived as neutral and would only be used when the speaker wants to highlight a boundary between *od* “off” and *seknout* “to cut”. In this case we should operate with an intervening diaereme and analyze it as /#óT#seknouT#/. The pronunciation [t.s] is otherwise attested only across word-boundaries (i.e. where a pause may occur), where it cannot be replaced by affricate [ts], and hence it may be regarded as a means for indicating boundaries in Czech. Cf. also /#práT#se#/, [ˈprɑt.sɛ], *prát se* “to fight”. This has to be pronounced with a distinct [t] and [s], otherwise it would merge with /#prāce#/, [ˈprɑtʃɛ], *práce* “work”.

6. /#póT#šiT#/ (accent group) or /#počiT#/ (accent and diaereme group)

[ˈpɔt.ʃiːt] or [ˈpɔtʃiːt], *podšít* “to line”. The situation is similar to the previous example: even here the realization with an affricate is commoner and the pronunciation [t.ʃ] will be used for highlighting the boundary. However, if realized as [ˈpɔtʃiːt], the form is indistinguishable from /#počiT#/, [ˈpɔtʃiːt] *počít* “to conceive”, and therefore speakers may show preference for the non-affricate pronunciation to avoid ambiguity.

7. /#kúP#me#/, /#snáŠ#me#/

[ˈkɯpmɛ], *kupme* “let us buy”; [ˈsnaʃmɛ], *snažme* (*se*) “let us try”. The sign *-me*, though appearing as a suffix, behaves as it were a word. I will leave aside grammatical reasons. The phonological reason is the context of neutralization before the phonological form of *-me*. In phonetic terms it means that only voiceless consonants can stand before it, hence /#kúP#me#/ for *kupme* (cf. /#kupovaT#/ for *kupovat* “to buy”), and /#snáŠ#me#/ for *snažme* (cf. /#snažiT#/ for *snažit* (*se*) “to try”). Note that for some speakers (the present writer included) the forms /#kúP#me#/ and /#snáŠ#me#/ are realized as [ˈkubmɛ] and [ˈsnaʒmɛ]. While the pronunciation [ˈkubmɛ] is still regarded as non-standard, the pronunciation [ˈsnaʒmɛ] is accepted as a local variant of the prescribed pronunciation [ˈsnaʃmɛ].

8. /#raCci#/ (accent and diaereme group)

[ˈrats.tɕi], *racci* “gulls”. Due to there being two identical consonants in close proximity, it is reasonable to assign them to separate phonotagms as /#raC-ci#/. It is one of the few examples of geminates in Czech. They do not normally occur and if they do, they tend to be

simplified to single consonants (e.g. [ˈmɲɛkki:] > [ˈmɲɛki:], *měkký* “soft”, cf. [ˈmɲɛktɛ], *měkce* “softly”). In the phonological form *racci* “gulls”, the geminated pronunciation is usually retained because otherwise it would merge with /#raci#/ [ˈratsɪ], *raci* “crabs”.

9. /#māŠ#kóla#/, /#mā#Škóla#/

[ma:ʃ.ˈkɔla], *máš kola* “you have the wheels”, and [ma:ˈʃkɔla], *má škola* “my school”. Kučera²⁰ mentions these as instances of distinctive placement of onset of accent (in his terminology: contrastive place of onset of strong stress). Though a detailed phonetic analysis is necessary, I transcribe here the difference as a syllable break (marked by IPA [.] between either [ma:ʃ] and [kɔla] or [ma:] and [ʃkɔla]. Whatever the reason of the difference be, it is evident that there are certain features that disintegrate the phonotactic combination /māŠkola/ either into the bundles /māŠ/ and /kɔla/ or into /mā/ and /Škola/. In other words, there are features that indicate boundaries of the respective bundles. So rather than speaking about distinctive placement of onset of accent, it is more adequate, in the present methodology, to operate with diaereme. Needless to say, the boundary may be indicated by a pause rather than the syllable break or “contrastive place of onset of strong stress”. The situation is comparable to English [ə.ˈneɪm] *a name* vs. [ən.ˈeɪm] *an aim* discussed above.

10. /#pó#učeK#/, /#petr#a#páve!#/

The first of the forms is realized [ˈpoʔutʃɛk] or [ˈpo.utʃɛk], being a phonological form of *pouček* “precept (gen. pl.)”. It is different to /#poučeK#/, [ˈpoutʃɛk] *pouček* “little hockey puck”. The words are homographs but have different phonological forms. The second of the forms is realized [ˈpetrʔa.ˈpaveɫ] or [ˈpetr.a.ˈpaveɫ], being a phonological form of *Petr a Pavel* “Peter and Paul”. It is different to /#petra#paveɫ#/, [ˈpetra.ˈpaveɫ], *Petra Pavel* (*viděl*) “Paul (saw) Peter”. As to the succession of phonemes the pairs are identical but they are different in the configuration on the para-phonotactic level. The forms are alternative examples for the problem discussed above in the case of *mouka* vs. *kradmo ukazuje* and *Petra poštvali* vs. *Petr apoštol*. Unlike them, they provide the exact phonotactic environment.

20. KUČERA, *op. cit.*, p. 63.