

CZECH PHONOLOGY AND THE AXIOMATIC FUNCTIONALIST APPROACH – À PROPOS OF *PHONOTACTICS OF CZECH*, PHD THESIS BY ALEŠ BIČAN^[*]

Paul Rastall (*United Kingdom*)

Abstract. The article briefly describes Bičan's successful PhD thesis, discusses some specific issues in it, makes some recommendations, but focuses on a number of issues of theory and practice arising from the thesis. It considers issues in the selection of phenomena and variety, the axiomatic functionalist view of description and the construct-phenomenon distinction, the limits of "delicacy" in a description, and key concepts – the distributional unit, phonotagm, archi-phoneme, and archi-position.

Foreword by Tomáš Hoskovec

There is an important matter of concern, whenever the exterior face (which is a term by far preferable to that of "public relations") of science is concerned: objectivity. And there is an important matter of concern, whenever the interior life of science is concerned: collectivity. The aim of this foreword to Paul Rastall's review of Aleš Bičan's treatise *Phonotactics of Czech* is to dissipate a shadow of concern shared by both authors concerned: when in a scientific journal a member of the editorial board reviews a work of the executive editor, doubt might be cast on the collectivity of the journal (which is, obviously, a kind of concern).

Let me start with a personal testimony. I was the chairman of the board before which Aleš Bičan passed, in 2012, the final exams and defended his PhD thesis on the phonotactics of Czech, at the Masaryk University, Brno, Czechia. My main objective was to conclude his doctorate programme in an international framework, so that the student would be endowed with the largest possible discussion of his work: under the contemporary scientific overproduction, the scientist remains with his own work cruelly alone, having actual access to actual discussions limited, in the most cases, to a very restricted circle. Submitting a doctorate thesis seemed, and still seems to me to be an exceptional occasion when a large discussion formally can – and morally should – be organised to expose the young scholar to academic environments he has not experienced hitherto. That's why I asked several experts from different domains to write a report on Bičan's thesis, although formally only two reports would have been sufficient. Three reports actually appeared in Bičan's viva voce: one by Jan Volín, Charles University, Prague, representing the contemporary Czech research in phonetics and phonology of Czech, one by Patrice Pognan, Institut National des Langues et Civilisations Orientales, Paris, representing a long tradition of lin-

[*] Previously unpublished.

guistic research in Czech abroad, one by Barry Heselwood, University of Leeds, representing the axiomatic functionalist framework used by Bičan. All three reports may be found at the address <http://is.muni.cz/th/64391/ff_d/> together with the thesis itself.

Paul Rastall, another representative of axiomatic functionalism, was unable then to deliver his report in the due time, but his detailed analysis of Bičan's work was such that I immediately proposed to publish it as a review. Now, when a revised version of Bičan's thesis is about to appear at Peter Lang's, the time for publishing Rastall's review has come. Bičan's first book bears witness to a usual sin of young (and even not so young any longer) scholars, who most often write as if it were for a narrow *milieu* only, peculiar to themselves, without bothering about how to make their work understandable, if not appealing, to a larger scientific community. Rastall's comments are not only a valuable means to help understanding Bičan's treatise, but also a clear presentation of axiomatic functionalism, which ought to be read for their own sake.

There is a peculiar image of objectivity, largely spread in the media: strictly anonymous evaluations, Chinese walls between those who submit and those who accept, etc. Yet, what may serve as an ingenious tool for improving cogency of a random sample analysis, might prove naïve (rather than straightforward and ingenuous), when blindly applied to scientific understanding. Scientific understanding does not exist, if not getting spread through the scientific collectivity; and then, contact between those who share their understanding is unavoidable. Other criteria must be adopted, above all, manners and taste. That these are "subjective" does not harm. As Hubert Beuve-Méry, founder of the French political journal *Le Monde* said: objectivity is unachievable, what we must struggle for is disinterested subjectivity. The journal *Linguistica* ONLINE profiles as a forum of functional linguistics. I welcome that. I invite anybody who is not afraid of a certain intellectual effort to read what follows (and afterwards, to read also what is in what follows referred to). It will provide the reader with a good insight into what functional linguistics may be like.

* * *

[The review by Paul Rastall:]

In his PhD thesis, *Phonotactics of Czech*, Aleš Bičan presents us with a description of Czech phonology from an Axiomatic Functionalist (AF) point of view with particular attention to an analysis of how Czech phonemes are combined into sequences and their distribution is described. In order to achieve this, in effect, he had to present a full phonological analysis of Czech. Phoneme distribution, phoneme inventory, and the analysis of phonemes into distinctive features must constitute a coherent whole. Bičan covers the following areas in his analysis: some theoretical background; the phonematics of Czech; the principles of phonotactic analysis and the presentation of the key concepts of the distributional unit and phonotagm; the application of the theory in the Czech distributional unit and specific phonotagms; the distribution of phonemes in position classes; the nuclear position; pre- and post-nuclear phoneme combinations; detailed analysis of phonotagmic combinations leading to a high level of "delicacy" in the treatment of the uneven distribution of phonemes in combination; summary and conclusions; and appendices and references.

Bičan's work is principally a contribution to Czech phonotactics through a thorough, exhaustive, and competent application of AF, rather than a theoretical work on AF. The work presents relevant aspects of the theory and presupposes some familiarity with it. It does not give a systematic exposition of the theory in its entirety, but presents theory as and when required. This article will focus mainly on the selection of AF and its consequences, in particular on a number of points of wider theoretical interest that are raised by the work, and on the range of phenomena that are described by Bičan, and looks briefly at how that range is determined. The latter issue is suggestive of areas for further research. It is a strength of the thesis that, while providing results in its intended scope, it gives a foundation for further work. From the point of view of AF, the successful application of the theory is a strong demonstration of the value of the approach and directs attention to the theory behind the description.



Linguistic description has sometimes been seen in a rather negative light, but that has largely to do with a narrow and misleading interpretation of the word “description”. In AF, a major purpose of the theory is to provide a means for the analysis and understanding of how communication takes place in any given speech community. Such an analysis is called a “description” in AF. It could also be called a kind of theory of a language (or language variety), but the term “theory” is used for other purposes in AF. Linguistic description is neither narrowly mechanistic nor lacking in explanatory power in this approach, as Bičan points out. An adequate, consistent, and relatively simple description is a necessary condition of understanding communication and of presenting explanations of communicational phenomena in a given speech community. Our knowledge of languages comes through description.

In completing his work, Bičan makes a significant contribution to the understanding of Czech phonology and presents an up-to-date application of AF methodology to a field which had not previously been addressed. The principal tool for phonotactic analysis in AF is the “distributional unit” (see below). As Bičan notes, several other languages have been analysed phonologically from an AF point of view, but Bičan's work is the first *full-scale* AF treatment of a Slavonic language. Because of the well-known phonological complexity of Slavonic languages, Czech constitutes an interesting and testing choice. The loss of the Common Slavonic short vowels and the move from open syllables with rising sonority to closed syllables have left the Slavonic languages with a significant number of archi-phonemes, as well as significant phonotactic complexity with a high number of relative positions and complicated distribution of phonemes. The same historical forces have also led to a significant number of cases of neutralisation of opposition (archi-phonemes). A complex set of phonological positions and distribution of phonemes also means that there are some systematic restrictions on phoneme combinability, leading to the establishment of “archi-positions” (suspensions of contrast between phonological positions). AF has developed clear methods to deal with such problems and Bičan has used them very effectively to arrive at an impressive analysis. The concept of the “archi-position” is a logical conse-

quence of the AF theory and is unique to it¹. With the distributional unit in phonology, it is a key concept used by Bičan to achieve such a high level of delicacy in the description. In Russian, by comparison, there is the additional complication of the assimilation of South Slavonicisms into the literary and high-style language with some phonological effects. Bičan's discussion touches on similar problems in Czech, and these would be interesting areas for further research (see below). Some further consideration of language style would improve the work, for example in the discussion of examples of free variation (ch. 6) and sociolinguistic variation.

Bičan's work is, furthermore, of inherent interest and it brings into focus a number of issues of wider theoretical interest. Those wider questions are intimately linked to the selection of an AF approach, which has always insisted that a key criterion of success is adequacy in leading to consistent, exhaustive, and relatively simple, explanatory descriptions. Bičan achieves those goals, but could be a little more explicit in relating his work to the criteria of adequacy developed in AF (and broadly comparable to those in glossematics), rather than to the extrinsic (and somewhat contentious) criteria of Chomsky (in the concluding chapter). While there is a very clear application of AF to Czech and Bičan rightly places his work in the context of other approaches to phonology, the reason for the selection of AF is not fully explained. Readers with an AF background will be familiar with the approach, but others might wonder why it was chosen and what the consequences of the choice are. Bičan's work is certainly an impressive demonstration of AF in action, but acceptance of his results will, of course, be dependent on acceptance of the theory and methods used. AF is distinctive not only in its methods and explicitly stated theory for the description of languages, but also in its philosophy. To that extent, Bičan's work is not self-standing. It comes with the AF approach as a whole. Non-AF readers of Bičan's work will,

¹ From the point of view of AF, the archi-phoneme is much misunderstood. It is simply a logical consequence of the theory. Phonemes are sets of distinctive features. Any pair of sets can overlap. An archi-phoneme is just the case where the overlap corresponds to a unit with a separate distinctive function, i.e. where the non-overlapping features are systematically irrelevant (suspended). In English, the phonemes, /m, n, ŋ/ overlap in the feature /nasal/ and are differentiated by the features, /labial, apical, velar/, but in the context of a following stop there is a systematic suspension of opposition in words such as "limp", "lint", "link", where /nasal/ is the only feature distinguishing such words from "lisp", "list", "lilt" and "lip", "lit", "lick" (where the nasal commutes with zero). An alternative way of looking at this is as follows. For all sets, there is a power set containing all the sub-sets of the set, the members, pairs, triples, n-tuples, and the sets defined through set-theoretical operations such as union and intersection. An archi-phoneme is a sub-set (combination) of distinctive features which happens to correspond to a phoneme. Of course, there are many potential combinations without a communicational function. In this sense, communicational function is the principle of relevance or "criterion of linguistic reality" (as Martinet 1961: 5 puts it). Given the misunderstanding of the archi-phoneme, one can expect misunderstanding of the concept "archi-position". But the argument is analogous. A distributional unit is a set of functionally contrasting positions. The archi-position is just the case where the contrast between positions is systematically suspended, i.e. where the positions overlap, or alternatively it is a sub-set (combination) of positions in the power set. In English, there is a maximum of three positions before the phonological nucleus as in /strap/, but if a /θ/ occurs then one phoneme may follow it before the vowel (as in /θraʃ/ "trash") but no phoneme may precede /θ/. The phoneme, /θ/, occupies an archi-position which is the combination (pair) of positions occupied by /s/ and /t/ in /strap/. The archi-position helps to account for this restriction of distribution and avoids the consequence of implying the existence of impossible combinations, such as */sθr/.

I hope, be impressed with the solid achievements of the description, and hence of the method. Success in achieving clear and consistent descriptions is a necessary condition of the acceptability of an approach in Linguistics, but a further necessary condition is the statement of the theory and its justification².

The text would for those two reasons probably benefit from some re-working in any move from a PhD thesis to a monograph publication. While matters of presentational convenience and emphasis need to be taken into account, an initial overview of the approach and theory (including the phonological part) might have been helpful to the reader. The progressive theoretical introductions tend to leave the reader with uncertainties, even if they are gradually resolved. No doubt, the PhD format was an important consideration. However, the work deserves a wider audience as a contribution to the understanding of Czech, as an application of AF, and as a demonstration of its value in description.

Theory Issues

Bičan has chosen the axiomatic functionalist approach, which was first developed by Jan W.F. Mulder in a series of many works (but especially 1968 and 1989). His work includes the explicitly stated *Postulates for Axiomatic Functionalism* (in Mulder 1989). These have been updated and modified over the years and most recently an annotated version has been made available by Bičan (Mulder and Hervey, 2009). The *Postulates* contain the basic principles (axioms), definitions, models, units, and relations of the theory (including the phonological theory) and the associated methodology for the application of the theory in describing languages. The purpose of the theory is to provide a method for describing languages, although it can do so only by embodying a theory of language as a semiotic system. Space does not permit a full description of all that is in the theory or its epistemological foundations. For that the reader must refer (mainly) to Mulder's published work. Further contributions to the phonological theory have been made by Hervey (1978) and Rastall (1993). Several PhD theses applying the theory have been written (and are referred to by Bičan). A variant version of AF, but not used by Bičan, is found in Dickins (1998).

One cannot perform linguistic analyses of any sort without a clear and consistent theoretical and methodological framework. It is important, then, to understand the reasons for the choice of AF and the consequences of its adoption. It is here that wider issues come in. On the other hand, linguistic analysis implies the selection of a field of speech phenomena to be analysed. Any speech community contains a range of varieties correlated with such sociolinguistic factors as regional or ethnic origin, socio-economic status, generation, peer-group and personal identity factors, communicational purpose and context, etc. Bičan is clear on this point for Czech. The variety to be described needs to be clearly delimited and, while this issue may be of lesser importance in this case and Bičan certainly addresses the issue, somewhat more attention could have been devoted to it, not least because phono-

² A sufficient condition of acceptability might be possible for a theory in its own terms (by defining its own scope and criteria), but is unlikely to be developed in absolute terms (in the comparison of theories) because different theoretical perspectives and ranges of data are always possible and different criteria of acceptability can be used.

logical descriptions gain in interest as it becomes possible to compare them or to see where and how there is variation in the community. No doubt Czech scholars have no problem in knowing which variety is under discussion³, but, perhaps that comparative sociolinguistic approach could be an area for further research following the general framework of French linguists, such as Henriette Walter and her followers (see below for further discussion of the data under description).

AF offers a number of advantages in linguistic description and (as noted above) has been applied to a significant number of languages to produce clear phonological (and grammatical) analyses. However, it must be remembered that the adoption of AF implies an acceptance of its distinctive characteristics and thereby a rejection of other approaches as well as some of the concerns of other approaches. The central disputes between approaches to Linguistics are, then, theoretical. Experience shows that different approaches can account for the same sets of observable speech phenomena in their own terms, so differences between linguists are differences in the choice of theory and evaluation of arguments. In AF, one would say that descriptions based on different approaches lead to different constructs, each with a strong theoretical element. This means there cannot be a simple comparison of descriptions relative to the phenomena for the purposes of evaluation. Here again, although Bičan is justified in his selection of AF and he presents some reasoning for it, there could be more on his choice of AF and its consequences.

AF consciously presents a method for describing languages. In order to do that, it presents a theory of language and linguistic entities and relations based on consistent analytical principles and a clear ontological framework. AF is firmly in the general tradition leading from the precursors of functionalism (mainly in Russia and Eastern Europe as well as Switzerland) through the Prague School and its later developments (mainly in the French speaking world), but in philosophy and presentation it is also influenced by the (different) functionalism of Glossematics and, with significant reservations, the philosophy of science of Karl Popper. The AF theory adopts a semiotic point of view, regarding speech behaviour as fundamentally acts of communication and accounting for communication through a theory of semiotic entities, relations, and systems. It adopts the functionalist principle of separate relevance as the criterion of membership of a linguistic system and it adopts the duality (or double articulation) principle that all languages show economy in systems of purely differential entities as well as in form-meaning entities. AF theory invokes a range of relations which can be contracted by linguistic entities to produce sets of classificatory and analytical predicates and relations. It is anti-universalist in making no substantive claims about the language-specific features which emerge from analysis. For AF, a linguistic description is a function of the observable phenomena and the application of the AF methods. The descriptive outcome is, of course, not a mechanical result, but the creation of an explanatory construct on clear principles. There is no “discovery procedure” and the quality of description also depends on the ability and insight of the describer. Bičan’s work is a good example of this intelligent application of theory to the phenomena. AF differs from other functionalist approaches in its philosophy (in particular its lack of ontological commitment and its relation to views in the philosophy of science), its use of set-theory, its

³ Although it is notoriously difficult to define precisely the range of phenomena under description. That is certainly true of “standard” forms of English.

explicitly stated set of definitions and methods (forming an integrated theory), and the distinction between ordered and unordered constructions in both phonology and grammar.

Of course, not all approaches to linguistics accept duality of structure as a key feature of language. In particular, it can be difficult to persuade some of the importance of phonology, or of the need to have a separate phonological level of communicational economy. In some approaches, phonetics and phonology are barely distinguished. The preoccupation with phonology from about 1925 to 1960 can seem strange to some. However, when one bears in mind the communicational need to differentiate messages, it soon becomes clear that the capacity in all languages to convey indefinitely many messages and to have very high numbers of formally distinct signs depends on phonological economy. Having a highly complex phonological level of economy is a key means to the “universal purport” of all languages. One of the great contributions of the Prague School was to show the systematic nature of phonological economy. All languages display an organisation of small numbers of formally differentiated units and combinations of those units, which permits such enormous numbers of distinctions in communication. While AF incorporates features inherited from the Prague School (particularly Trubetskoy’s work) and its development by Martinet, AF lays much greater emphasis on the role of phonotactics in linguistic economy. It applies set theory for a more explicit analysis and distinguishes unordered collections from ordered groups (see the footnote above for an application of set theory). Thus, for AF, in phonematics phonemes are self-contained sets of functionally unordered distinctive features, but in phonotactics phonemes form functionally ordered groups. In English, the features {labial, voiced, occlusive} form a self-contained set (= /b/), but the phonemes {a, b, d} can be ordered to form /bad/ and /dab/, and systematically exclude other combinations such as */bda/. The order of distinctive features is never communicationally relevant (“pertinent” as the French say) while the order of phonemes always is. It is this view of linguistic units in set-theoretical terms with the relations defined in the sets which is a major characteristic of AF. The principle of communicational relevance is what organises all linguistic sets. Bičan applies the ideas of AF clearly and does so in a way that leads to a solid AF description and, no doubt, has his audience in mind, but the reader unfamiliar with AF would need to know the relevant theory more while the reader familiar with AF might want the description grounded in more theory. That, perhaps, can come later.

The key concept for AF phonotactics is the distributional unit. The set of all possible phoneme combinations in any language is indefinitely large, but it is obvious that only a subset of combinations is permissible. The distributional unit is a macro-level descriptive unit whose purpose is to express the subset of possible combinations while excluding impossible combinations. The distributional unit restricts the scope of phoneme combinations by identifying nuclear phonemes (usually corresponding to vowels in phonetically described syllables, although semi-consonants may also correspond to nuclear phonemes, as in Czech). Nuclear phonemes determine the distribution of other phonemes. This distribution is described by setting up positions in which phonemes commute⁴. A distributional

⁴ The distributional unit brings together different subsets (the set of certain unions of subsets) when there are pre-nuclear and post-nuclear combinations (as in Czech). This is obvious when the same phoneme may occur both before and after the nucleus, as in English /pip/, which is the union of /pi/ and /ip/, where /i/ = /i/. /p/ would not occur twice in the same ordered combination.

unit is thus an ordered bundle of positions. A specific well-formed example of a combination is a phonotagm. In this approach, the distributional unit is projected onto the phonetic chain of syllables. In each syllable⁵, one will find a phonetic exponent of a nuclear phoneme. The sounds surrounding the nuclear exponent and combining with it are described relative to the nuclear elements, either before or after or both. Thus, one does not define indefinitely long strings of phonemes. One can imagine a series of syllabic centres in a phonetic chain with peripheral sounds in between. Clearly, one of the key jobs for the linguist is to determine which phonemes belong with which nuclei. Bičan provides a very clear picture for Czech with extensive arguments for his solutions. In many cases, the assignment is quite straightforward. In the English expression “bookshop”, for example, the group /kš/ can never be an initial group or a final group, so it is clear that the first distributional unit ends in /k/ and the second starts with /š/. In “passport”, however, the group /sp/ can occur initially or finally (in “spill” and “clasp”). Also, /s/ can be final and /p/ can be initial, so three possibilities are defined as phonologically well-formed in the case that the first vowel corresponds to /a:/: “pa-(s)port”, “pass-port”, “passp-ort”. In actual pronunciation, the first is the *most common* phonetic exponent, but the phonological analysis allows for all possible pronunciations. Clearly, the distributional unit is an efficient way of describing the distribution of phonemes and determining the well-formed combinations. From the point of view of communicational effectiveness, the patterning of phoneme combinations is useful in giving an orientation in the utterance. Initial /š/ in English, for example, must be followed by /r/ or a nuclear phoneme and after a nuclear phoneme its occurrence implies a phonotagmic division. Such clues help with sign identification and are supplemented with phonetic demarcative signals. The description of such signals would involve an extension of the theory to allow for non-functional (contrastive) features. Bičan addresses the above issues in the case of Czech and gives a clear account of the communicational signals. His discussion of syllable division (see below) is in line with AF thinking. It would be interesting to see how – with additional theoretical apparatus – the contrastive signals of Czech (or any other language) might be handled. Bičan’s concept of the “diaereme” (p. 27 ff) could well be incorporated into such a development.

As mentioned above, AF is strongly in favour of a duality principle as a key feature of all languages and thus of the separate phonological level of economy. An important part of the justification lies in the *ontological* difference between purely differential and differential/significative units⁶. This is an instance of the philosophical perspective of AF having an influence on the theory and of questions of the acceptability of an approach going well beyond success in description. Phonological and grammatical descriptions of a language must, of course, be integrated, but it should be remembered that phonology and grammar are different ways of looking at the same set of verbal acts, leading to ontologically differ-

⁵ As Bičan says, the identification of (phonetic) syllables is not always clear. The purpose of an AF account is, however, to give an account of communicational functions. Each phonotagm corresponds to a temporal sequence in the phonetic chain regardless of whether phoneticians can agree on the physical status of that stretch of speaking as a syllable or not. Purely parasitic vowel-like transitions, such as one finds between [s] and [t] in English [stand] have no communicational function and so cannot be nuclei of phonotagms.

⁶ Just as there is an ontological difference between phonetic and phonological entities. Phonological entities have phonetic forms AND communicational functions.

ent constructs. AF does not regard linguistic descriptions as some sort of cognitive machine for “generating” (analogues of) observable verbal phenomena, but as ways of accounting for (explaining) the communicational properties of verbal acts from multiple, but connected, points of view. Also, it rejects Martinet’s “second articulation” of monemes into phonemes. Apart from the fact that monemes are classes (of allomorphs) and hence cannot be “articulated” in this way, monemes have both form and meaning. The second “articulation” leads to meaningless entities and the mysterious disappearance of the meaning. One must be dealing with a more complicated ontological relation between grammatical and phonological entities. Bičan makes laudable efforts to contrast his work with other approaches to phonology, but the AF viewpoint on ontological issues increases the distance from other approaches, and that needs to be given more prominence.

AF is also unusual in insisting on a clear distinction between real-world speech events, which are a large part⁷ of the explananda of linguistic analysis, and the constructs of linguistic descriptions, which have both an empirical interpretation (ultimately observable in speech events) **and** a theoretical content. Thus, the claim that English has a phoneme, /k/, involves the construct /k/, its interpretation in [k] events in speech⁸ and the theoretical characteristics of phonemes (distinctive feature constituency, set of allophonic variants with the same distinctive function, phonotactic distribution) as well as the relation of /k/ to other phonemes in English using those theoretical parameters. Each part of a description remains subject to refutation, however well established. The AF approach implies that constructs are part of our world of understanding. There is no claim that they correspond to real-world entities (mental or otherwise). It also implies that, while languages may have similarities, they each have their own characteristics. AF, as noted above, rejects substantive universals. The theoretical categories provide a framework within which there can be (and is) great variation in particular languages⁹. It should be clear, then, that there is some “distance” between the descriptive models in AF and the observable events they account for. This distance is bridged by an explicit ontological framework in the theory that links relatively abstract phonological units, such as phonemes, via allophones and phonetic forms to the real-world sounds they classify. Bičan’s analysis is obviously consistent with this and has the afore-mentioned delicacy in connecting macro-level constructs to observables, but again the ontological framework could be made a bit more explicit to show how the phonotactics links to actual speech events. It might be noted that all of these issues could be problematic for linguists of a more realist persuasion.

The rejection of substantive universals does not prevent the identification of *tendencies* in verbal communication systems or typological studies, but one should note that such tendencies (such as phoneme combinability in phonotagms, extensively and inventively discussed by Bičan for Czech) presuppose common bases of analysis. Dissimilar theories lead

⁷ One should distinguish between data from observable speech behaviour and data from the comparison of speech events (in commutation tests, for example) or judgements about speech phenomena (such as well-formedness or relevance to the scope of the description). All are explananda.

⁸ This apparently innocuous statement hides many complexities, as [k] events are themselves constructs of complex physical events.

⁹ In fact, followers of AF would assert that languages must be substantively different because the identity of the units and relations of each language is determined by each other in a system. Thus, the identity of /k/ in English must be different from the identity of /k/ in other languages.

to non-comparable constructs. This needs more prominence in Bičan's otherwise useful discussion of alternative approaches to phonotactics.

Bičan's discussion of "syllabification" and (in particular) the form, /jelen/, p. 52 *ff*, (whether the /l/ belongs to the first or second syllable – or both as Bičan proposes in consistency with the AF approach) is relevant here. What distinguishes AF views is that the description is proposed as a way of understanding the speech phenomena we are dealing with and is "projected" onto them (to use Hjelmslev's image). This means that in AF there is no claim to state "how things actually are" in the noumenal world (which is in fact unknowable) but to create a world of understanding in which explanations are possible for selected aspects of the phenomena. The solution to the /jelen/ problem comes in AF not from some sort of phonetic truth but from the phonotactic models we set up to describe the distribution of phonemes. Those models allow for two interpretations of the facts through their overlap (/jel/ and /len/ both being well-formed). AF theory allows for this possibility. The insistence of some approaches on the absolute correctness of one solution or another in such cases seems to be based on a misunderstanding of the relation of construct to phenomena and on a "realist" hankering after some sort of direct knowledge of real-world phenomena. Such an approach raises, for AF theorists, important questions about ontological commitment, i.e. the extent to which scholars claim the actual existence of descriptive constructs and their attribution to speakers' mental states or capacities. This is a complex issue, but most philosophers would be very wary of asserting the actual existence of explanatory constructs (hypostatisation) or of the properties (intensions) of classes. Phonological units such as phonemes or phonotagms are class names ultimately connected to models of actual speech events as the extensions of the classes named. Actual existence in space and time should be distinguished from our constructed realities, amongst which are our linguistic descriptions and the entities in them¹⁰. Our constructs have a lot of theory in them. One consequence of this is that "well-formedness" is a matter of how we set up our models. While descriptive models cannot be inconsistent with observables, what we consider "well-formed" depends on how we choose to view the phenomena. This is clear in the case of /jelen/ and Bičan's treatment of /-tr/, /-tl/ etc., but few other approaches to Linguistics adopt the AF viewpoint in these matters.

A further consequence of this AF viewpoint is that one must distinguish understanding of phenomena as expressed in a model from the way it is presented or the way it is put into words. One can speak, as Bičan does, of the building of phonemes from distinctive features or phonotagms from phonemes for the purposes of presentation, but those are merely ways of talking and should not be taken literally. Similarly, and Bičan is clear on this, the "freightyard schemes" Bičan gives are convenient and interesting ways of calculating the potential phonotagms of the description for the purposes of testing. They have some similarities to the process views devised by stratificational linguists. Other AF scholars have devised alternative methods of calculation. The main point is that the freightyard schemes are not to be taken as some sort of cognitive production model. They are a way of testing the output of the description to determine its adequacy. Bičan's method, in effect, contains a set of rules for operating on the distributional unit to produce well-formed sequences of

¹⁰ And also our private conceptions of our languages of whatever degree of subtlety and whether or not influenced by our school learning or prejudices about "correctness".

phonemes. Rastall's (1993) description of English has a similar objective and contains a different approach. However, the wider point is that any testing through determining the "consequence class"¹¹ of the description (i.e. the set of forms implied by the description through calculation) implies the establishment of a rule system that goes beyond the existing theory and is really a matter of the logical operations on a descriptive model. Bičan's "structural rule" (p. 49) is a case in point. In phonotactics, this goes beyond the application of Cartesian multiplication, which is largely adequate for phonematics. One should repeat that rules of this sort are not intended as models of "generation" or cognitive processes. What has not been clarified or generally accepted (in AF or elsewhere) is the nature of the operational rules for models or the relationship of models to statements containing references to them. This is significant when one comes to the expressions of generalisations, such as those Bičan proposes, about phoneme distribution in phonotagms.

Not all approaches to linguistics share the AF viewpoint on these matters. There is a long history of scholars making the category mistake of confusing the construct with the phenomenon and of attributing descriptions of verbal phenomena to speakers' "knowledge" or mental states on the basis of unsupported assumptions about what the linguist is doing.

The adoption of AF, then, brings with it a flexible and subtle tool for analysis, but also a distinctive view of what linguistics should be about and what it can tell us.

As mentioned above, another key issue is the coherence of phonematic and phonotactic analyses. That is why a full phonological analysis is necessary. What one recognises as phonemes affects the phonotactic analysis. Frequently, this comes down to how one gives a phonological interpretation of tricky cases such as phonetic affricates and diphthongs. If one has two phonemes to analyse a diphthong or affricate, one will need two phonotactic positions, rather than one position for a mono-phonematic solution. Either solution must be consistent with phonotactic models for the language as a whole. This is the problem called "un ou deux phonèmes" by Martinet (e.g. 1956, p. 43), but it is the phonotactic consequences of the solution and its consistency with other parts of the phonotactic analysis that AF focuses on. Bičan addresses this problem in setting up his phonemic inventory. His solution is likely to be a matter of debate for Czech scholars and that is not a matter I can pronounce on, although one should guard against any assumption that there is a "correct" solution stemming from a direct inspection of the phenomena. The solution must be a matter of the application of the method to the data.

However, in AF, the key issue (as Bičan observes) is to determine the potential orderability of the components. In AF, the strongest test is permutation. Thus, in a given language, in the same context, [ts] must be functionally different from [st] etc. for a two-phoneme solution but, in the case of diphthongs, we must be able to establish that two positions are occupied through separate commutation¹². In general, it is easy to see that dif-

¹¹ The expression is taken from Popper and must be used with care. As noted above, calculated possibilities can be referred to in statements and indirectly tested through determining the truth of those statements, but models themselves cannot be either true or false.

¹² Of course, phonemes may not be permutable but still differing in peripherality with respect to the nuclear element, as we find in comparing English pre-nuclear phonemes; /ap/ ("app"), /rap/, /trap/, /sTrap/, where the pre-nuclear positions may or may not be filled but no permutation is possible although /s/, /t/, and /r/ have different degrees of peripherality with respect to the nucleus /a/. But this is not a matter of the identity of phonemes, rather a consequence of their establishment.

ferently ordered phonemes have different communicational values (e.g. in English, /asp/ ≠/sap/ ≠/pas/), whereas the order of distinctive features is irrelevant (/labial, nasal/ = /nasal, labial/ = /m/). However, in establishing phoneme identity, a particularly difficult point is that permutations must take place in the *same* relative positions. Thus, a combination [ja] and a combination [aj] are not valid permutations because [j] is pre-nuclear in the first case and post-nuclear in the second with [a] nuclear in both cases. Valid evidence would be the commutation of [aj]/[oj]/[aw]/[ow] and the possibility of commuting the second element ([j]/[w]) with zero, showing the separate phonemic relevance of the components. Obviously, that could not be done in the case of the indispensable, nuclear element. This procedure is rather like the converse of Martinet's (1968: 112ff.) argument for the mono-phonemic treatment of /č/ in Spanish. In Spanish, [š] never occurs without a preceding [t] and does not separately commute with anything. The opposite case shows that a bi-phonemic solution is appropriate. Usually, one would also have to show that [i] and [j] and [w] and [u] were in complementary distribution and with the same distinctive features¹³. Since phonemes are maximum phonematic units and occupy phonotactic positions, ordering would be implied. Any such conclusion would have to be consistent with the proposed distributional unit in phonotactics. One would like to see more argumentation along those lines, especially as some potential for commutation seems to exist in the system in the case of Bičan's marginal diphthongs, which are treated mono-phonematically. At any rate, Bičan's decisions here clearly affect his phonotactic analysis, although one is dealing here with clearly marginal phenomena.

One of the key features of AF is its use of the notion of dependency in phonotactic analysis. Phonemes are taken to contract constructional relations (i.e. phoneme /a/, in English, is in construction with phoneme /t/ to form the construction /at/) and to contract dependency relations. AF distinguishes functional and occurrence dependency. Occurrence dependency is a relation involving the presence of one or other phoneme for the presence of the other. Functional dependency is a relation in which one phoneme determines the communicational function of the other. Frequently in phonology, the two dependencies overlap, but they need to be distinguished. In the example, /t/ is occurrence-dependent on /a/, but its communicational function is also determined relative to /a/ as a post-nuclear phoneme. In some languages, there are phonemes which can function as nuclear or non-nuclear entities, i.e. in some cases they determine the functions of other phonemes and in other cases they are functionally dependent on another nuclear phoneme. This is the case with the phonemes, /l/ and /r/, in Czech. They are not able to stand alone but, when nuclear, they do determine the distribution of (preceding) pre-nuclear phonemes. When non-nuclear, their distribution depends on nuclear phonemes which can stand alone. The cases of /l/ and /r/ illustrate the difference between occurrence and functional dependency. It could be given more prominence in Bičan's account. Bičan's analysis also usefully raises the possibility, identified by other AF researchers (for Russian and English), of functional

¹³ An effect of the AF approach is generally to reduce the number of phonemes and to increase the number of allophones (in complementary distribution). This leads to a radical simplification in the analysis of English vowel phonemes in Mulder's description (in various publications, e.g. 1968 and 1989) in comparison with the traditional approach. The AF approach is theoretically justified by a strong application of the "functional principle", but can be shocking to traditionalists.

and occurrence dependency relations between phonotagms, where minor types are dependent on major types (as in /-tr/). It is likely that this possibility needs to be allowed for more explicitly in the theory.

It is worth mentioning that there is a possibility of running into a circularity as the procedure of commutation must take place in a defined phonotactic context, but the phonotactic context presupposes the phonemic inventory. That problem was unresolved in Tagmemics (see Pike, 1947), for example, where phonotactics followed phonematics in a series of procedures. The AF view is that the linguist presents the phonological description in its entirety as an overall hypothesis, in which all the components are also conjectural – i.e. open to refutation. The phonematic and phonotactic solutions are simultaneous and stand or fall together. There is, in other words, no sequence of discovery procedures (as in Tagmemics). Naturally, the description must be *presented* sequentially in a logical order – and that Bičan does in a very clear manner – but one must be aware that sequential presentation is a matter of convenience. It does not mean any logical precedence of phonematics before phonotactics. The description comes, so to speak, complete and entire. Naturally, there is a great deal of thinking and revising prior to the presentation. The linguist goes through a process of conjectures and refutations before arriving at a workable solution, but that process is a matter of history rather than the logic of the description. Particular solutions may, of course, be justified by comparison with unacceptable alternatives. A small criticism would be that Bičan’s choice of a sequential presentation at times gives the *impression* of a temporal sequence in the approach, e.g. by using certain phonemes as templates for the distribution of others (ch. 6), although Bičan is aware that his approach is a matter of presentational strategy. Perhaps, he was concerned to satisfy an audience unfamiliar with AF, but a warning to the reader would be advisable.

In order to be considered a significant contribution to knowledge Bičan’s work must be a clear improvement on previous analyses of Czech phonology and add to our understanding of AF through its application. The two issues are connected in that it is through the use of AF methodology that a more precise understanding of Czech phonotactics is achieved and it is through confronting the complexities of Czech that the effectiveness and limits of AF can be seen. It can reasonably be said that Bičan has achieved both goals, although the work would benefit from further reflection on those theoretical issues. Readers not familiar with earlier phonotactic analyses of Czech (and particularly that of Kučera) might welcome a fuller presentation of those analyses for the purposes of comparison and to see where the improvements are, i.e. Bičan’s appendix on this topic could be expanded. Broadly speaking, AF is unusual in its development of a clear framework for phonotactic analysis and insistence on the equal importance of phonematics and phonotactics. It is not surprising, then, that AF should lead to perspicacious phonotactic analyses, but their acceptability to a wider audience will depend on its understanding and acceptance of the theory. It must be emphasised that Bičan’s application of AF has achieved a high degree of “delicacy” – overall distributional patterns are broken down into a range of phonotagm types to handle the details of specific contextual constraints and to avoid implying impossible combinations. He gets very close to the data and has dealt with the details of phoneme combinations in a very inventive and thorough manner in the later chapters of the work that connect the distributional unit to the complications of specific combinations. As Bičan has found, the limits to delicacy come in the form of unsystematic “accidental” features of non-

occurrence and marginal features introduced by loanwords with an imitation of “foreign” pronunciation, such as the loan word “boršč”. In English, similarly, one can find French loanwords with French pronunciation features (“agent provocateur”, “aide memoire”, etc.), but they should not be allowed to distort the analysis. Here again, the issue of language style (and possibly code-switching) raises its head. The question is linked to the intended range of phenomena to be described (see below).

A more general point is that Bičan has managed to maintain a clear sense of what is central to the description and what is relatively marginal. All functionalists aim to provide descriptions which are not distorted by exceptional, or marginal, phenomena. This is a point which Martinet (e.g. 1960, ch. 4 especially emphasised. AF is in agreement on that. A connected point is that, in functionalist approaches, structures or systems *emerge from* a mass of small-scale functions as macro-level constructs. A phoneme, /t/, in a given language is set up to account for the many cases in which [t] events are distinguished from [p], [k], [d], [n], etc. events in a variety of contexts. As Bičan shows for Czech, and as is true in all descriptions so far, the establishment of a phoneme does not imply that the phoneme will actually take part in commutations in every context and the establishment of phoneme distribution does not imply that all calculable possibilities actually occur. Furthermore, there may be marginal distributional structures which do not fit the main pattern, which Bičan describes also for Czech. What is more, some combinations are used far more frequently than others. In such cases, it is important to allow for a certain anomalousness and to avoid forcing the facts into a pre-conceived mould. Bičan’s minor phonotagm types help him to avoid arbitrary solutions and any forcing of the facts here. However, it is also important to bear in mind that what we regard as anomalous is so only in relation to the models we establish as the norm. Similarly, archiphonemes and archi-positions only make sense in the context of the chosen approach. While Bičan’s approach involves the establishment of structures as macro-level constructs, his results tend to confirm functionalists in their avoidance of excessive commitment to *structuralism* or, at least, to any form of structuralism which puts constructs before a respect for the diversity of communicational means within a language. The delicacy of Bičan’s description, mentioned above, links the neatness and overall explanatory power of macro-level constructs to the somewhat anarchic nature of the facts to be described. The state of a language at any point in time is, after all, a function of many, often diverse, sociolinguistic forces leading to considerable variation.

Range of Phenomena under Description

This leads us to a more difficult point – to determine the limits of a phonotactic description (or indeed any phonological description) in relation to speech events. Bičan chooses to focus on the (phonological form of the) word. Despite the discussion of this concept, it remains somewhat undefined. Bičan constantly refers to the (phonological) word, but at one point declares that it is used “without incorporating it into our analysis” (p. 49). One needs a clear set of data to refer to, but it is unclear which portions of the speech data are encompassed. The treatment of how connected syllables are to be analysed remains controversial and will be an issue for Czech scholars. An especially complex question in Slavic languages is how to deal with “grammatical” prefixes and suffixes as well as word

groups acting as phonological units (as also in English). One must decide whether such groups fall under the same phonotactic combinations or should have separate analyses. The issue is clear in Bičan's discussion of Ludvíkova's analysis (p. 100), which incorporates grammatical considerations. Bičan rejects that approach on general grounds but one may still wonder whether in Czech grammatical features in some cases coincide with phonological ones, e.g. in prefixes, enclitics, or pro-clitic prepositions. Also, where stressed syllables differ markedly from unstressed ones (as in Russian), one may opt for a differentiation of distributional units. The discussion of the theoretical status of the (phonological) word comes somewhat after its initial use and that is a little confusing (although that may be a matter of presentational strategy), but the main point would be to decide whether the phonological word is restricted to the phonological form of allomorphs of monemes (where that is made up of phonemes and is not a contrast of forms or zero¹⁴) or whether it allows combinations of phonological forms (such as preposition + noun). With either approach, one must consider the possibility of different types of distributional unit. In other languages with contrastive stress, such as Russian or English, the constituency of unstressed syllables differs from that of stressed syllables. Similarly, one might consider whether combinations of phonotagms or phonemes in Czech are partially grammatically determined (as in French). That would be to opt for the latter solution, but requires a justification in the phonetic data in order to specify which stretches of phonetic events are to be accounted for by a distributional unit. The decisions on this matter are central also to the bi-phonotagmic analysis of forms such as /vitr/ and also in those where /-tr/ or -tl/ are involved (p. 114 ff). While agreeing with Bičan's solution (in so far as I can pronounce on the matter), some further consideration of the range of data to be accounted for by the description would be welcome, i.e. how it is to be defined and made consistent with the phonological word. I cannot make a pronouncement on Czech, but the solution is similar to the minor phonotagm types I have described for Russian. It should be emphasised that Bičan's AF solutions are certainly consistent and workable.

However, it should be clear that all descriptions in linguistics are concerned with some aspect of the communicational phenomena – whether it is the formal means of communication, the meaning of signs, the combinability of signs, the uses of signs in interpersonal relations (pragmatics), their aesthetic aspects, their relation to social context, or their associations, or historical origins, etc.. That is we always have a way of viewing the phenomena in mind. This determines the intended scope of the description and determines what is relevant. Testing is related to the comparison of the achieved scope of a model and the intended scope, but we must bear in mind that the full range of possible phenomena is much wider. AF descriptions could be *used* in, for example, aesthetic studies of phonotactic contrasts, but those issues would not be relevant to testing the adequacy of the proposed description. The description can be valid only in its own terms and potentially *useful* in other respects (such as a sociolinguistic or aesthetic study). Bičan's study clearly has potential for such usefulness.

¹⁴ The form of an allomorph does not always consist of phonemes. "Plural" in English may be formally conveyed by, for example, a "vowel change", i.e. the contrast between one form and another as in "mouse/mice", i.e. /...ai.../ as opposed to /...au.../ in the context of the sign "mouse". In "loaves" as opposed to "loaf", "plural" is indicated both by /z/ and /v/ as opposed to /f/ in the sign "loaf".

A particularly important point in this respect, addressed by Hervey (1978) and Rastall (1993) earlier, concerns the juxtaposition of phonotagms and their potential overlap. This question of the connectedness of phonotagms in describing connected speech beyond the syllable may or may not be included in one's scope. The issue takes on particular significance if we ask what it is that Bičan's analysis is intended to do. Here there is some lack of clarity. On the one hand, Bičan is rightly concerned to account for "phonological words", as noted above. At least, the linguist must have an eye on the integration of the phonotactic description in the second articulation with the forms of morphs and allomorphs in the first articulation. But, on the other hand, the linguist is concerned with the communicational aspect of observable phonetic phenomena (as discussed above in the context of the distributional unit). That is looking in a different direction, and it is not surprising that there should be mismatches, involving – for instance – enclitic or pro-clitic signs¹⁵ or differences between phonetic syllables and phonological distributional units, as discussed by Bičan. At other points, Bičan's scope seems to be determined by the need to describe the distribution of phonemes. This is a third (and different) perspective. An account of the distribution of phonemes is, of course, necessary (and well done in Bičan's work), but one must bear in mind that it cannot be the purpose of the analysis or the determinant of the scope of the analysis. After all, the parts of the description hang together. The distribution of phonemes presupposes the distributional unit just as the distributional unit presupposes the phonemic analysis. The overall aim is not just to show how phonemes are distributed, but to show how this accounts for a selected field of communicational phenomena. One needs to know what that field includes (and excludes).

The scope of the phonological description is determined by the communicational properties one aims to account for in the observable phenomena. The restriction to "phonological words" in the data (noted above) seems too limiting for the purpose of testing (and difficult to define). And this is clear from Bičan's correct discussion of accidental gaps and potential phonotagms. Obviously, a potential form is *not* an observed phonological word. The idea of a potential phonotagm arises from a mismatch between the set of calculated phonotagms and the (smaller) set of observed ones. It accounts for the acceptability of unobserved combinations and predicts future forms. In other words, correspondence with the observed phenomena is necessary but not sufficient for the scope of the analysis either. An associated point concerns zero forms. Zero forms are, of course, unobservable... they are the non-occurrence of phonemes. It is our model distributional unit which is invoked to show how different phonotagms can be accounted for within a single overall construct, provided we allow for the potential non-use of a position. Such a view is consistent within the approach, where commutation with zero is possible for non-nuclear units. However,

¹⁵ In Russian, for example, the groups /Vz/ and /Zv/ can occur word-initially (/Vzvod/ ("unit"), /ZvoT/ ("vault")) but also as a result of the combination of the prepositions "v" ("in", "into") and "s" ("with") – /Vzal/ ("into the hall"), /Zvami/ ("with you"). This evidence suggests that the distributional unit in Russian is not co-extensive with the word. On the other hand, the set of prefixes in complex words is phonologically limited, so the most peripheral initial phonemes in phonotagms come from a limited subset of phonemes. This demarcative feature signals, therefore, an onset of a group and shows an inter-relation between the phonological system and grammatical features. Similarly, in English, the plural forms in /s/, /z/, /S/ are the sole most peripheral phonemes after the nucleus and signal a word boundary. One would like to know if similar features are found in Czech. Bičan's analysis could be extended to deal with such issues.

one should bear in mind that zero forms are part of our way of accounting for the data through a process of comparison – another case where the model determines our view of the data. One cannot claim that somehow zero forms “exist” – examples are merely illustrations from our adopted point of view. They are “evidence” in the sense that some data comes from comparing speech events. This is another point where the relatively nominalist approach of AF is consistent with modern views in the philosophy of science. The data are seen from the point of view of the construct. However, one can see why the necessary self-limitation on the validity of descriptions can be frustrating to some, who may find phonological descriptions of limited usefulness or “academic interest” only.

The issue of the difference between the overall set of phonemes and the much more restricted sets of phonemes in strict contexts is also related to the question of the scope of the description. It is another way of looking at accidental gaps. The move from “micro-phonemes” in fixed contexts (to use Twaddell’s (1935) terms) to “macro-phonemes” requires some justification for functionalists as micro-phonemes in different contexts clearly have different functions. One has to argue that the function of /p/ in the context of /-et/ is not different from the function of /p/ in the context /ki-/ and that overall the same distinctive features are represented in both cases, even if different sets of commutations are involved. A phonological unit, such as a phoneme or distinctive feature, is not a single function, it is a macro-level construct which represents a set of non-different functions in complementary distribution in strictly (contextually) defined paradigms (micro-phonemes) – see Mulder, 1968 and 1978 for a very clear view of the issues with inventive solutions. One wants to be able to provide an overall description which is useful for the explanation of communicational difference in all contexts without being committed to the idea that all the features of a phoneme must be involved in each context. One must allow that a sub-set of those features may be sufficient in a given context. Otherwise, one will arrive at a very inefficient analysis with massive numbers of phonemes. But those decisions are linked to what one wants to be able to describe including differences in the details of strict paradigms. In his description of Czech phonemes, Bičan addresses those problems in line with AF theory.

On the other hand, AF descriptions, Bičan’s included, typically allow a very detailed and subtle analysis, which goes beyond previous descriptive approaches (as noted above, one would like to see more detail on previous phonotactic analyses of Czech to determine where the improvements in Bičan’s description are). This is particularly so in the case of phonotactics, and Bičan’s selection of phonological distribution as his focus is particularly apt. Phonotactics has been a relatively neglected area in most approaches to linguistic description, either because of a lack of detail (as in standard functionalism or tagmemics) or because of a lack of theoretical underpinning (as in Firthian approaches, where however much greater detail was achieved).

Terminology

Part of the issue of the relation between the model and the phenomena is the choice of terminology. Terms like “consonant”, “vowel”, “contoid”, “vocoid” etc. clearly belong to phonetics. However, in many approaches, phonology is barely distinguished from phonetics and a phonological analysis is taken to be a way of representing the phonetic reality of

languages. This is clear also from Bičan's useful discussion of other approaches and descriptions of languages (at various points in the work). In those other approaches and descriptions one finds a very marked realism, in the sense that constructs and phenomena are closely identified. This leads to the problems of the definition of syllables and the mapping of phonemes and phonotactic models to phonetic phenomena, discussed above. In AF, phonological models are explanatory constructs whose purpose is to account for the *communicational aspects of phonetic phenomena*. This means that the AF describer must be able to project the model onto the phenomena to provide a useful and meaningful communicational analysis. As the AF describers do not claim to represent some putative cognitive or social reality existing outside the description (there is no existence postulate in AF), their attitude to the above-mentioned issues will be quite different. AF rejects any simple form of realism for ontological and methodological reasons, so the absence of a convergence of phonological models and phonetic syllables or of a direct correspondence of phonetic units and phonemes is not unexpected or criterial to the acceptability of a description so long as that description is consistent with phonetic fact. To demand otherwise or to make linguistic theory dependent on observed language variation implies an unacceptable ontological viewpoint, i.e. the hypostatization of constructs, which Popper has called "naive realism" (1972, p. 65). (It also leads to circularity, because observation itself implies a theory or method of observation.) The selection of terminology like consonant, vowel, etc. in non-AF approaches is linked to that viewpoint and at least invites attempts to see languages in a naive-realist light. The fact that such terms are well-known makes them appear innocuous, but that is misleading – they may carry undesirable theoretical presuppositions like any other term. We have already highlighted similar problems in the discussion of "syllabification". For those reasons, it would be better to differentiate phonological from phonetic terminology in Bičan's treatment at an earlier stage. Bičan uses "explosive" (pre-nuclear) and "implosive" (post-nuclear) when presenting his analysis but could have usefully highlighted the terminological and conceptual differences earlier. (Of course, one assumes that presentational strategy may have also played a role in Bičan's discussion.)

An associated issue is the discussion of other theories and descriptions. Bičan is quite right to compare and contrast AF with other approaches and to consider the claims of linguists about other languages. One should be careful to remember, however, that the terminology, theory, and ontological assumptions of other linguists are usually quite different from those of the proponent of AF. One simply cannot make the assumption that linguists of different persuasions are talking about the same things, even if they use a common terminology, or that their aims are the same. This makes the use of terms like "consonant" and "vowel" somewhat hazardous.

Conclusion

Bičan's analysis of the phonotactics of Czech is a work of substantial scholarship and inventiveness. It is a very welcome AF description, which adds usefully to the existing set of applications of AF in descriptive work. While Czech scholars will find points of detail debatable, there is no doubt that Bičan has achieved a perspicacious and detailed analysis for his chosen variety. His analysis is clearly consistent with AF methodology and theory and

a good illustration of AF in practice. The fact that AF can be used to achieve a coherent, simple, and explanatory description with reference to a wide range of data shows the applicability of theory and justifies its claims for wider attention. It was not the intention of the work to give a systematic presentation of AF theory. Theory and methods are, however, explained at relevant points and that is suitable for a doctoral thesis. Furthermore, the description provides the basis for further research, for example in the comparative study of sociolinguistic variation in the varieties of Czech and in studies of phono-aesthetic effects or non-functional contrastive features. That is a considerable strength of the work.

As we have noted, Bičan's work raises many points of theory, methods, and particularly of perspective, i.e. of what we understand a description to say and how it relates as a construct to the real world of communicational events. That is true of any descriptive work, but the explicit use of AF brings those issues to the fore. The work deserves a wider audience – not just among Czech scholars but also among linguisticians generally. For a monograph version of the thesis which can address such a wider audience, more highlighting of those theoretical issues and differences from other approaches would be welcome. I look forward to further developments.

References

- DICKINS, James. 1998. *Extended Axiomatic Functionalism*. Berlin: Mouton.
- HERVEY, Sándor G. J. 1978. "On the Extrapolation of Phonological Forms", *Lingua* 45.37–63.
- MARTINET, André. 1956. *La description phonologique*. Paris, Geneva: Droz.
- . 1960. *Éléments de linguistique générale*. Paris: Colin.
- . 1961. *A Functional View of Language*. Oxford: Clarendon Press.
- . 1968. *La linguistique synchronique*. Paris: Presses Universitaires de France.
- MULDER, Jan W. F. 1968. *Sets and Relations in Phonology*. Oxford: Clarendon Press.
- . 1978. "Phoneme Tables and the Functional Principle", *La Linguistique* 14/1.3–27.
- . 1989. *Foundations of Axiomatic Linguistics*. Berlin: Mouton de Gruyter.
- MULDER, Jan W. F. – HERVEY, Sándor G. J. 2009. "Postulates for Axiomatic Functionalism" (annotated and edited and with an introduction by Aleš Bičan). *Linguistica ONLINE*, <<http://www.phil.muni.cz/linguistica/art/mulderhervey/muh-001.pdf>>.
- PIKE, Kenneth L. 1972. *Phonemics* (first published 1947 and with many subsequent editions). University of Michigan: Ann Arbor.
- POPPER, Karl R. 1972. *Objective Knowledge*. Blackwell: Oxford.
- RASTALL, Paul. 1993. *Empirical Phonology and Cartesian Multiplication*. Lewiston, Lampeter: Mellen.
- TWADDELL, William F. 1935. *On Defining the Phoneme* (= Language Monographs 16). Baltimore Linguistics Society of America.