

REVIEWS

JULIETTE BLEVINS, *Evolutionary Phonology: The emergence of sound patterns*. Cambridge: Cambridge University Press, 2004. Pp. xix + 366. ISBN: 0-521-80428-0 (hbk).
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With *Evolutionary Phonology*, Juliette Blevins presents a theory of where phonological explanation is to be found (critically NOT in phonology) and what SHOULD, therefore, go in phonology proper. The book is divided into three main parts, with the first part (Preliminaries) setting out the general outlines of the theory and the backdrop to its intellectual development, the second part (Sound Patterns) providing the empirical evidence on which the theory has been developed, and the third part (Theoretical Implications) discussing what the theory means for how we do both synchronic and diachronic phonology, and potential for other areas of linguistics.

Chapter 1, 'What is Evolutionary Phonology', argues for the importance of examining and understanding the mechanisms and observable patterns of sound change, and summarises the main points of the theory. The central premise is that 'principled diachronic explanations for sound patterns have priority over competing synchronic explanations unless independent evidence demonstrates, beyond reasonable doubt, that a synchronic account is warranted' (p. 5). A major adjunct to this is the proposal of an extremely pared-down core phonology, consisting of little but distinctive features and prosodic categories (which may or may not be innate). Everything else is assumed to be acquired. Perhaps the most controversial claim, at least for current theories of formal phonology (in particular Optimality Theory), is that markedness is not intrinsic to phonology (i.e. is not encoded in grammar). Other notable claims of the theory are that sound change is not goal-directed, and that rare and common sound patterns are to be distinguished only in terms of their origin.

Chapter 2, 'Evolution in language and elsewhere', explores aspects of the evolutionary metaphor and the usefulness of its application to the understanding of phonological patterns and change. The author stresses that the chief parallels being drawn are between change in the genetic make-up of a biological organism (through errors in DNA replication) and change in the sound system of a particular language (through errors in sound replication).¹ Blevins is also at pains to point out that what is NOT being theorised here is the evolution of language in the human species (which is more properly to be viewed as part of evolutionary biology, and not a metaphor of it). The replication referred to in *Evolutionary Phonology* (EP) is that of a sound (and the linguistic association of this sound) during transmission of a language from one generation to the next. It is NOT the error-ridden replication of the genetic code that has arguably over a huge span of time led to the evolution of the human capacity for language.

The comparison that EP makes with evolutionary biology is two-pronged. A comparison of equivalents (be these organisms or phonologies) raises the need to explain both variation and similarity. Though Blevins does not explore this explicitly, it is as pertinent to ask why

¹ Sources of genetic variation among organisms other than by mutation are not discussed, e.g. genetic recombination and the transfer of genes across populations, though both may yield possible analogies in phonological variation.

two members of a given population have similar characteristics as it is to ask how and why they may differ (which, in turn, is especially interesting if we know or suspect they are related). Blevins identifies direct inheritance as the primary source of shared characteristics in phonology as in biology (though other sources are also recognised for both, such as parallel evolution and convergence). In doing so, she is following in neogrammarian footsteps, and rejecting the need for abstract, teleological principles/constraints (such as markedness).

For source of variation, she draws a parallel between the replication of DNA² and the replication of sounds during language acquisition. Her CCC model (CHANGE, CHANCE and CHOICE) sets out the different contexts in which replication error can occur. CHANGE results from an error in perceptual interpretation: a phonetic signal is MISHEARD as something to which it is perceptually similar. CHANCE results from an error in phonological interpretation: the listener perceives the correct phonetic signal but associates it with a different phonological form. CHOICE results from an error in mapping the ‘correct’ variant to the phonological form: the speaker produces multiple variants and the listener selects a different variant from the speaker as her prototype. The multiple variants result from the intrinsic variability of speech along a continuum of hyper- and hypo-articulations (cf. Lindblom 1990).

Chapter 3, ‘Explanation in phonology: A brief history of ideas’, gives a concise and insightful discussion of the key theoretical positions on explanation in phonology and how these developed against the backdrop of a schismatic relationship between synchronic and diachronic linguistics dating from the early 20th century. Blevins asserts that synchronic phonological structure is largely the artefact of diachronic change and that genuine explanation of recurrent sound patterns is to be found in phonetics. Seeking explanation in phonology itself, then, is inadequate and largely redundant: ‘synchronic constraints incorporating naturalness or markedness are misguided, since whether a sound pattern is natural, crazy, or somewhere in between, is wholly a function of its history. Sound change is phonetically natural, but phonological constraints need not be’ (p. 71). The chief claim, then, of *EP* is not to have discovered a new kind of explanation for phonology – phonetic-historical explanation is already a well-established and successful research programme. Rather, its goals can be seen as (i) advocating the scientific case for phonetic-historical explanation; (ii) advocating the case for not duplicating explanation within formal phonology; (iii) stripping ‘core’ phonology to its essential parts; and (iv) providing a framework within which synchronic phonology and phonetic-historical explanation can sit together as a complete account of phonological structure. In Blevins’ own words: ‘[b]y combining historical phonetic accounts of sound change with synchronically defined constraints on pathways of phonologisation, Evolutionary Phonology provides a synthesis of neogrammarian and generative approaches to sound patterns: historical explanation is combined with precise description of the form and content of synchronic grammars’ (p. 71).

The main body of the book, part II, ‘Sound patterns’, is devoted to evidence from empirical studies of sound patterns and their origins. Chapter 4, ‘Laryngeal features’, reviews common cross-linguistic patterns in the distribution of laryngeal features and attributes them to common types of phonetically motivated sound change. Laryngeal features are more salient in some contexts than in others, a perceptual fact that can help explain their distribution, spread, and apparent sensitivity to grammatical boundaries (e.g. prosodic, word). Some examples of this include the tendency for final obstruents to devoice, and for pre-aspiration of consonants to occur post-vocally and post-aspiration to occur pre-vocally. Rather than accounting for this (non-contrastive) distributional distinction by importing phonetic detail into phonological representations (cf. Steriade 1999, Kirchner 2000, Flemming 2001), thereby blurring the distinction between phonological and phonetic representations, *EP* claims that the sensitivity to phonetic detail is only apparent, being merely an artefact of phonetically motivated sound

² It is to be assumed in germline cells, since these are the only cells whose genetic material is inherited in offspring.

change, and is therefore not to be encoded in the phonology. These are presented as examples of parallel evolution. In the case of pre-aspiration occurring in post-vocalic consonants, various characteristics point to their having a distinct historical origin from post-aspirates. Their longer duration in particular suggests that pre-aspirates may have descended from geminates or clusters, which themselves tend to have distributional restrictions cross-linguistically, and more often than not appear intervocalically (Blevins & Garrett 1993). In the case of final obstruent devoicing, quantifiable articulatory and aerodynamic factors are put forth as influencing what is actually produced (namely glottal abduction in anticipation of a pause and insufficient transglottal airflow).

Chapter 5, 'Place features', carries out a similar exercise in reviewing patterns in the distribution of place features and suggesting an evolutionary explanation for these (e.g. the asymmetricality of place cues in stops means that place neutralisation in stops is much less common in CV than in VC, cf. Repp 1977, Fujimura, Macchi & Streeter 1978, Ohala 1990). More controversially, Blevins states that 'coronal' is 'just another place' (p. 125), and not the 'unmarked' place it is claimed to be in many accounts of synchronic phonology (cf. Kean 1975, Paradis & Prunet 1991). She argues that the high frequency of coronals in the phonological inventories of the world's languages may in part merely reflect the fact that there are more types of coronals than there are labials or dorsals, and the high frequency of /s/ in particular. Evidence from child language acquisition (Stemberger & Stoel-Gammon 1991, Vihman 1996) does not support the claim that coronals are in some way 'easier' and less marked. Observed asymmetries in assimilation and metathesis (cf. Blust 1979) may be explained by differences in articulatory timing. There MAY BE something special about coronals, but as Blevins argues 'there is little evidence that their special phonological status reflects anything more than repeated phonologisation of the uniqueness of the articulatory and perceptual properties of sounds produced with the front part of the tongue' (p. 128).

Chapter 6, 'Other common sound patterns', presents possible explanations for 'other common sound patterns', grouping them according to the source type of sound change. With regard to mis-perception, changes may be due to CHANGE or CHANCE, and examples are discussed of both context-free changes, e.g. [θ] > [f] in English, Venetan dialects, and Rotuman) and context-sensitive changes (e.g. the role of acoustic/perceptual factors in velar palatalisation before palatal segments). Sound changes with their source in articulatory variation are described as cases of CHOICE, and the variation may result from three kinds of articulatory transformation: timing (resulting in coarticulation or non-overlap, e.g. vowel nasalisation before a nasal consonant, epenthesis); gestural reduction or lenition (resulting in e.g. degemination, voicing, shortening, loss); and gestural strengthening or fortition (resulting in e.g. gemination, lengthening, diphthongisation). A third source (what the author calls 'feature localisation', p. 148) is the confusion that arises from acoustic properties which are typically realised over several segments (prosodies, in the Firthian sense), and through the operation of CHANCE, may lead to e.g. dissimilation, metathesis, harmony, and compensatory lengthening. Structural Analogy is argued to be 'not a property of grammars, but a property of the cognitive processes which give rise to grammars' (p. 154), with pre-existing structure leading to priming effects on the learner. Finally, in this chapter, sound patterns are discussed that have no apparent explanation (e.g. the loss of word-initial or utterance-initial consonants in a large number of Australian Aboriginal languages; cf. Blevins 2001).

Chapter 7, 'The evolution of geminates', considers the genesis of geminate consonants, identifying at least seven different sources (various kinds of assimilation processes, vowel syncope, different types of prosodically conditioned lengthening, reinterpretation of a voicing contrast, and the reanalysis of false geminates). Phonetic reasons for geminate distribution, inventory asymmetry, inalterability and integrity are presented. Inalterability is explained, for example, as a consequence of geminates generally being longer in duration and therefore more resistant to gestural reduction.

Chapter 8, 'Some uncommon sound patterns', looks at uncommon sound patterns (e.g. final obstruent voicing), segments (e.g. clicks, pharyngeals), contrasts (e.g. voiceless vowels)

and phonotactics (e.g. tautosyllabic sequences of VVVV or CCCCC), and discusses how to determine the cause for their rarity (accident or not?). Uncommon PATTERNS are explained as the result of analogical change, rule inversion, rule telescoping or accidental convergence on a particular surface regularity. It is to be expected also that such patterns, where they do exist, decay over time (though nothing intrinsic in the grammar compels them to do so). Here Blevins makes a seemingly obvious but important point: ‘sound pattern frequency is, in general, not only a function of frequency of genesis but also of frequency of destruction’ (p. 193). The pressure to maintain paradigmatic contrast (through hyperarticulation) is cited as a probable explanation for why uncommon sound patterns stick around for as long as they do. Language-specific phonetic priming may also enhance the likelihood of retention.

Part III discusses the implications of the position proposed for linguistic theory. Chapter 9, ‘Synchronic phonology’, concludes that markedness is an emergent not intrinsic property of synchronic phonologies. Phonological acquisition is explored. Blevins argues that though the properties such as the feature system and prosodic organisation may very well be innate, much of the rest of phonology is acquired. She argues that just because a sound pattern is more common or natural, this does not mean it occupies a special, universal place in phonological knowledge. Phonetic naturalness, and its influence on speech behaviour and therefore on phonological patterns, are not being brushed aside here, they are merely not being encoded in core phonology: ‘the productivity of alternations is important, but non-productive alternations are also learned, and unnatural rules seem no more difficult to acquire than alternations whose phonetic origins are still transparent’. Pursuing the implications of Blevins’ position a little further, we could conclude that the knowledge that a speaker/listener has of her phonology is functional-symbolic in nature: she knows that certain sounds mean certain things and can pattern and be used in certain ways, but from her perspective as a phonology-user, nothing in those sounds or how they combine stands out as more or less unnatural.³ Chapter 10, ‘Diachronic phonology’, discusses the extent to which Evolutionary Phonology is compatible with other models of sound change, while chapter 11, ‘Beyond phonology’, considers the possible extension of the underlying principles of Evolutionary Phonology to other parts of grammar.

While there is little that is particularly new or ground-breaking about seeking phonetic-historical explanation for sound patterns, what is innovative in *EP* is the way in which the author pieces together a large body of powerful evidence, in terms that are meaningful and pertinent to formal synchronic phonology. The argument is very well supported and exemplified with empirical data, and there is a very clear intent to engage critically with many of the core issues and debates central to synchronic phonology. Indeed, although the book will be of appeal to a wide variety of scholars, both linguists and non-linguists, it is clear that one of the most important audiences are synchronic phonologists. Blevins does not contest the independence of the phonological domain – indeed it is a central tenet of *EP*. Rather, she contests what lies IN this domain. What might be called ‘core’, or ‘pure’, phonology consists of those properties (features, prosodic organisation) which may indeed affect the historical shaping of specific language phonologies, but which are not themselves historically contingent, and which can be taken to be universal because determined by or dependent upon shared cognitive capacities. Whether these are particular to language or not remains an open question for Blevins, and either way is compatible with the framework she sets out in *EP*.

Two aspects of the book will be evaluated in more depth: the parallel with evolutionary biology, and the position on markedness. On the biological metaphor, the parallels drawn are useful in that they help conceptualise the mechanisms at work, even when the parallels are shown not to be valid. However, several points could usefully be developed further.

³ Presumably, if something sounded marked it would be because it is not something she would expect, because imported from another variety of her language, or another language, or used in a way which she has not encountered before. This interpretation of markedness as a property of (limited) experience is not incompatible with the position taken in *EP*.

Firstly, *EP* limits the possibility of replication error leading to sound change to the period during which a child acquires language. The possibility that replication errors occur and may lead to sound change throughout the speaker/listener's lifetime is, disappointingly, not explored, but is not incompatible with the framework proposed. Indeed, though she does not incorporate this into her theory, Blevins gives an example of how such change might happen: 'if two people speak "the same language" and have ample exposure to the speech of the other, then the probability that one will talk like the other may be increased if one likes, admires, or identifies with the other in some general way, and will be increased the more the two people talk to each other' (p. 269). The fault does not lie in a forced analogy with biology, since here the analogy is inexact to begin with: error in replication takes place in the adult BEFORE being passed on. In phonology, error in replication takes place DURING the transmission.

Secondly, for the purposes of the comparison being made, it is not clear what the equivalent of phonology in the paradigm of evolutionary biology could be. Is it the genotype, the underlying genetic code that determines (together with environmental influences) phenotypic characteristics (how an organism develops, what form it takes and how it behaves)? Or is it the phenotype itself? Given the potential for great variability in environmental influences, the potential for variation in phenotype is also very great. However, phenotypic characteristics are not necessarily, and certainly not directly inherited by offspring.⁴ Information in the genotype IS directly inherited by descendants and variation in the genotype arises through mutation (for the most part occurring through replication error). According to the theory of natural selection, genes which offer advantage to the organism in which they reside may increase the chances of reproductive success of that organism and therefore their own (i.e. the genes') propagation. This may lead to a new statistical bias in the population in favour of the gene in question. In this, there is a critical relationship between the two types of information. As Cronin (1991: 60) notes, 'genes do not present themselves naked to the scrutiny of natural selection, instead they present their phenotypic effects'. Dawkins (1999: 4) remarks: 'replicators are not . . . selected directly, but by proxy'. So, there is a relationship of direct genotypic INHERITANCE between an organism and its offspring, though the mechanism by which this comes about is INDIRECT (through the medium of the phenotype).

Perhaps the most obvious candidate of equivalence is the genotype. However, in language it is questionable as to whether inheritance is direct: there is not a direct mapping from the adult phonology to the child phonology as there is between parent and offspring genetic material. Phonology is transmitted through the phonetic (or sign) medium; indeed it is as a result of this medium that errors in replication come about. We could posit the phonetic medium to be cognate with the phenotype, and certain aspects of this comparison arguably work. For example, there are parallels in the following claims: (i) the genotype extends its effects through its phenotype (cf. Dawkins 1999) and this phenotype constitutes the external interface with another organism through which information about the underlying genotype is deduced; and (ii) phonology extends its effects through the phonetic domain, and the phonetic domain is the external interface through which information about the underlying phonology is deduced. So far, all well and good. However, the mechanisms of variation and selection are quite different in the two paradigms. In biology, any variation in the genetic code is due to mutation and occurs in the parent before being passed on to offspring. In phonology, 'mutation' (an error in the replication of sound) occurs precisely through the external interface (the phonetic medium) between adult and child, as a result of some form of mis-mapping (although its success throughout the population takes more than this).⁵

⁴ The extent to which they are inherited even indirectly may depend on the extent to which they depend on the genotype.

⁵ On page 269, Blevins does acknowledge these problems to some degree, pointing out that the source of variation is random in biology and systematic in phonology, while the distribution of change across populations is systematic in biology and highly irregular in phonology. However, she may overstate the

Blevins herself expresses scepticism about stretching analogies with biological evolution, stressing there are no direct counterparts to many if not all of the key units and mechanisms under comparison. Even where they work, she cautions against the possible over-application – in biology and linguistics – of what are powerful explanatory devices, repeating a warning issued by evolutionary biologists Rose & Lauder (1996) against seeing everything in terms of possible adaptation. While it is true that dipping one's toes into cross-disciplinary metaphors carries a risk (acknowledged also by Joseph & Janda 2005), there is also a danger of being frightened off entirely, and treating linguistic change as a conceptually unique kind of change. Biology does not possess a copyright on evolutionary theory *per se*. Although there can be little doubt that it is the discipline in which the theory has been most famously and successfully developed, this does not mean that general principles and observations are forever to be considered primarily 'biological' and, only by artificial grafting, applicable to something else. More general principles about change in systems can be abstracted. Furthermore, the finer points of evolutionary theory within biology itself are subject to very active internal debate and disagreement (on the unit of selection, to take one controversial example, cf. Williams 1966, Dawkins 1999, Gould 2002, Okasha 2006). Thus, while it may be appropriate for Blevins at a certain point to 'leave behind' the biological metaphor (p. 60), that does not have to entail leaving behind evolutionary theory as more broadly conceived.

The position that Blevins proposes is that synchronic phonology does not, indeed CANNOT explain itself. That is not its job. Its job is descriptive, albeit in a non-trivial way. For any given language, it should answer questions of the following type: What are the functional sound elements? How can they be combined? How do they alternate systematically? What kind of function do they have? This knowledge, according to *EP*, has to be acquired.

What does it mean to say that there are no INTRINSIC principles of naturalness or markedness? One thing it does not necessarily mean is that naturalness has no part to play in the formation of sound patterns. Although the point is not made explicitly in *EP*, or indeed in other phonetic-historical accounts of sound patterns, the inevitable conclusion of the approach it adopts is to place markedness SOMEWHERE ELSE. One would be hard pushed to deny that, at some level, unevenness in sound patterns does exist: the real question is whether or not you choose to ENCODE it in the phonology, and if you do not, where does it come from. From the perspective of external typological analysis, patterns may emerge that may be considered more or less natural, based, for example, on statistical frequency. Furthermore, though not explicitly explored by Blevins, notions of naturalness could arguably be applied to the parameters of speech performance that shape how the speaker/listener transmits and receives her phonological knowledge. Flexibility in these parameters is instrumental in shaping phonologies, as part two of the book amply illustrates. Greater articulatory effort, or hyperarticulation, could be seen as introducing a form of behavioural markedness, while default, minimal effort hypoarticulation could be equated with naturalness. However, articulation is only one side of the equation and has to be balanced with perceptual 'success' (cf. Lindblom 1990). Hyperarticulation may facilitate perceptual 'naturalness', while hypoarticulation may impair it, creating markedness for the listener. These factors, together with serendipitous phonetic realities which interact with performance (e.g. the greater perceptual robustness of sibilants, the greater articulatory ease of certain sound combinations) introduce unevenness into the sound system. However, at any given time (i.e. for any snapshot of synchronic phonology), the elements and patterns of a given phonology function perfectly, and the question of markedness is irrelevant. Markedness is only relevant

regularity with which biological change is distributed. What constitutes a 'biological change' depends on which level you are looking at. At the level of the genotype of a single organism, change is discrete and complete. At the level of the species, it is likely that both variants co-exist for some time (especially if there is no barrier to breeding). A wholesale, systematic change at the level of the species only occurs when the frequency of the mutated variant is such as to dominate the more conservative variant (a process which is not necessarily linear). In this respect, the spread of a particular phenotype may be quite strikingly similar to the spread of a sound change.

to phonology when this is viewed dynamically, and even then not to be interpreted as exerting a teleological pull.

Since the biological metaphor plays no small part in *EP*, it is useful to consider whether there exists also a parallel of markedness. In biology, if certain characteristics are typologically rare, this may simply be due to the limitations imposed by the starting point (the genetic inheritance), which constrains what is likely to emerge through change. This is true at each step, resulting in a paradoxically conservative process, as Fodor (2007) points out. Considering why, given the apparently wild creative potential of evolution, we do not find pigs with wings, he writes ‘once you’re well along the evolutionary route to being a pig, your further options are considerably constrained; you can’t, for example, go back and retrofit feathers’. So, in biology as in language there are structural ‘gaps’ which arise through historical ‘accident’. Rarity may also be the result of rare environmental factors shaping a rare pathway of adaptive gene selection. Historical external factors may, in this way, leave an indirect trace, but are not directly encoded in the genotype. ‘Peculiarity’ (in whichever sense) may shape the evolution of an organism, but from the internal perspective of a fully functioning organism, no genotype is more or less marked than the next. Concurrent environmental factors will influence the phenotype of the organism, but this is not inherited (at least, not in the conventional sense of this term) by the next generation. There is no justification to devise a theory of intrinsic markedness in the genotype or phenotype of an organism (with the possible exception of genotypic characteristics which impair normal development).

On one level, *EP* is a thesis, not against markedness *per se*, but against the codification of markedness in grammar, and a large body of evidence is presented in support of this thesis. At the same time, though external to phonology, some form of markedness (in the sense of non-equivalence e.g. in behavioural patterns) can be seen to leave its imprint on phonological patterns. There can be little doubt that physical and psychological factors shape and constrain the form and functioning of phonology, but the question is – and herein lies the crux of the matter – what precisely is the relationship between these external influences and the resultant phonology? An extreme form of phonetic determinism (which *EP* admittedly avoids), finding perfect explanation in the way we hear and speak, is invalid: there may be a phonetic rationale for why, for example, final obstruent devoicing is so common cross-linguistically, but there is no natural law against final voiced obstruents, and indeed they are to be found. Within the boundaries of what is physically possible, there are many viable pathways. At the other extreme, and characteristic of most synchronic accounts of phonology, is the position of phonological determinism. In its extreme form, this places constraints of the same degree of force as phonetic determinism, but within linguistic competence (innate or otherwise). The existence of final voiced obstruents is a problem for cognitive determinism because they violate abstract markedness constraints. Optimality Theory famously gets round this by ranking constraints and then allowing low-ranking constraints to be violated. A seemingly neat fix this may be; however, a low-ranked constraint is little more than a way of formalising the thought ‘there is something that I, in my capacity as linguist, do not like about Property X because I know that it is uncommon and historically unstable, even if I know also that it occurs in Language Y with no evident communicative impairment’. For versions of the theory that hold that constraints are innate, there is also the implicit claim that native speakers of Language Y know, at some unspecified level, that there is something ‘not quite right’ about Property X, though it does not in the least affect their speech behaviour (for the moment at least).

Evolutionary Phonology takes a bold and important step in challenging the notion of phonological markedness, and makes a convincing case. Finding motivation for synchronic sound patterns in historical phonetics flexes much greater explanatory muscle. Core phonology is still deemed to be universal, but is stripped to a minimum (psycholinguistic necessity). Blevins seeks to redraw the dividing line between what is internal to phonology and what is external, stresses the role of the latter in influencing the former, and claims to recast the latter in a conceptual framework that modern synchronic phonology can recognise. However, if we do not accept extreme phonetic determinism, and, with Blevins, also reject extreme phonological determinism, the mechanisms by which one domain (external) influences

the other (internal) remain to be explored and better understood. Physical and cognitive capacities may define the boundaries of what is acoustically, articulatorily, perceptually and computationally possible, but within these boundaries linguistic structure is hugely variable, and not solely due to differing linguistic inheritance. What happens BETWEEN (universal) phonetic and phonological determinants – how an inherited structure W becomes structure X, taking phonetically determined factors Y and universal phonological capacities Z into account – is a language-specific dynamic, or rather is the DYNAMIC PHONOLOGY OF A SPECIFIC LANGUAGE. The question here is not ‘what are the underlying general principles that can help explain the status quo’ but ‘what is it that is PARTICULAR TO THIS LANGUAGE that can help explain the status quo’. In other words, the phonologies of individual languages may have their own internal markedness narratives.

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