The nature and origin of language. By DENIS BOUCHARD. (Studies in the evolution of language 18.) Oxford: Oxford University Press, 2013. Pp. xiii, 385. ISBN 9780199681631. $46.96.

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Denis Bouchard has been at the center of linguistic theorizing for more than three decades, and unlike many other forceful critics of the generative enterprise, B has always kept on top of every important ongoing development of this research program, offered substantial and useful modifications, made seemingly radical suggestions (later to be adhered to by the mainstream), and pointed out ill-conceived notions and conceptual flaws in the current consensus. Thus one does well to listen when this author publishes a new book.

As suggested by the series title, the main topic of the book is on how language may have evolved in the human species, but as B points out, 'before we can assume anything about how language emerged in humans, we have to determine what language is, and what those properties of language are whose origin we are trying to account for' (7). Thus, a central concern is to advocate a different view on how the crucial properties of language should be characterized. Rather than putting emphasis on the formal apparatus describing the computational system, B advocates the view that all relevant properties of language follow from what Chomsky (2005) refers to as 'third factor' principles, that is, in B's words, the design properties of the conceptual and perceptual properties of signs. This eliminates 'the need to postulate an innate, language-specific set of conditions—Universal Grammar (UG), this residue of unexplained properties—thus finishing business that remains problematic in current generative theorizing' (xiii). That means that there is no UG—which is a good thing, since UG is what remains to be explained in a theory of language, and even more so in a theory to explain the emergence of language.

B thoroughly discusses and mostly dismisses a range of recent and more classical works approaching the evolution of language (like recent publications by Marc Hauser, Noam Chomsky, and W. Tecumseh Fitch; Steven Pinker and Ray Jackendoff; William Calvin and Derek Bickerton; Bickerton; James Hurford; and Chomsky). In his own approach to the emergence of language, B arms himself with the recent discovery of so-called offline brain systems: 'a system of neurons that can be activated *in absentia*: the individual does not have to see or hear an action for these neuronal systems to be activated. These Offline Brain Systems (OBS) are triggered by representations of events instead of the events themselves, and produce representations of events with no brain-external realization' (107). These systems of neurons give rise to a range of properties (a cluster of characteristics dubbed 'the human-specific adaptive suite', encompassing cognitive, neurological, physiological, and behavioral traits), unique to humans, whereof language is but one aspect. Thus, language or, more specifically, the emergence of signs in the human brain is a by-product of an underlying change, an emergence of a particular type of neurons in the human brain. This change was not due to a rewiring of the brain that installed some kind of language-specific apparatus in our minds, since these OBS neurons have many different functions and effects besides language.

The book consists of a short introduction plus four parts partitioned into ten chapters. Part 1, 'The emergence of language', sets the scene for the central inquiries and outlines recent approaches (see above). Two broad approaches are particularly relevant: language is culturally evolved in response to communicative necessities, or language is biologically and genetically inscribed in the human brain. Here B quotes Tooby and Cosmides (1990:762) that '[i]t is magical thinking to believe that the "need" to solve a problem automatically endows one with the equipment to solve it', and he sees 'form before function' as a premise in the discussion, since 'our ancestors had to have the capacity to form Saussurean signs before they could use them for any communicative function' (15). B discusses these previous theories thoroughly and then concludes this discussion with his diagnosis that all of these approaches lack an approximately correct theory of what language is; this prevents them from answering the basic questions about the origin of language (60). Thus, B sets out to set the records straight as to what language actually is. This is the topic of Part 2, 'What is language that it could have evolved?'.

Against Chomsky's principles of efficient computation, treated in the generative paradigm as important and self-evident guiding lines logically prior to the study of language, B objects that computational efficiency is not a known feature of biological systems (Ch. 2). Instead, he wants to search in the sensi-motor (SM) and conceptual-intentional (CI) interfaces for the relevant constraints observed by human language. And he finds these constraints in the Saussurean sign.

A confessed neo-Saussurean (74), and using Saussure as the all-important fundament of his theory, B presents his own SIGN THEORY OF LANGUAGE in Ch. 3. An important principle here is compositionality, and according to B, this principle has methodological value only if we exclude all covert elements from the theory. Language consists in words (U(nit)-signs) and morphology/syntax (C(ombinatorial)-signs). Unlike in mainstream generative theories, there is no sharp distinction between these two types of signs. C-signs may take the perceptual form only of a juxtaposition or a superimposition of a vocal (or gestural) percept, a limitation on the combinatorial SIGNIFIANTS due to properties of the human sensi-motor systems (95–96). The semantics of the C-sign is always PREDICATION, used here to cover both subject-predicate, topic-comment, and saturation (e.g. a noun phrase as the complement of a preposition or a verb; p. 90).

Part 3, 'The origin of language: From neurons to signs' (Chs. 4–7), outlines a number of recent theories on the continuity problem, on how the available systems of neurons may have adapted from their previous uses (with comparable uses in other primates) to take on a role in communication. B is skeptical of continuity hypotheses since they seek 'continuity at the functional behavioral level' (105), using selection pressures as an explanation, whereas one should ask instead how human neurological structures differ from those of other primates, how these structures have plausibly emerged in humans, and how they make human brains ready for language (Ch. 4). Chs. 5 and 6 revolve around the emergence of linguistic signs, and the evolution of syntax and morphology, whereas Ch. 7 concentrates on the protolanguage hypothesis, that is, the idea that there must or may have existed a phase in the emergence of human language characterized by the presence of words, but with no syntax (e.g. Calvin and Bickerton).

In Part 4, 'Explaining the properties of language' (Chs. 8–10), the author argues (Ch. 8) that the minimalist program struggles with its failure to come to terms with the constraints that the SM and CI interfaces place on (narrow) syntax, since this has no effect on the actual analyses put forth for various grammatical phenomena. Instead, the framework continues to propose epicyclic-like analyses to save the assumptions. Thus, refusing to take in the fact that semantic features play an important part in the Merge operation forces the theory to introduce instead uninterpretable features, 'stipulative' assumptions that 'add to the cost of the theory' (223). B quotes Koster (2009:84) for the claim that this is no progress from Chomsky 1965, since Merge essentially functions like a phrase structure rule: lexical items have features that say what kind of element they take as a sister. For the features of the phonological interface, the role of interface features in a derivation is also far from clear:

> The computational system deals with all the features of the objects in the first phase in which they enter the derivation, but then their interface features are temporarily forgotten, not carried along … . After it has 'forgotten' the interface features, the system must be able to retrieve this material later in the derivation to provide a complete surface string for a sentence. It is rather unclear what it means for a feature to be in limbo for part of the derivation, and how this really restricts the functioning of the system, since the features are nevertheless kept in this obscure storage facility. (224)

Ch. 9 deals with structure dependence in human language, and B attempts to show how structural dependencies, binding, bounding, *wanna*-contraction, and long-distance dependencies can be resolved within his own sign theory of language (STL). Of particular importance is the restriction against covert elements and semantically empty elements; this means, for example, that expletives must have a semantic contribution (section 9.3.1) and that traces cannot exist (section 9.3.2). As B admits, his own proposals can account for only some of the central cases, whereas 'a complete resolution of all UG arguments would require hundreds of additional pages', but what B offers is nevertheless 'a new starting point' (332). The five-page-long Ch. 10 sums up B's major assumptions.

In my view, this is an important book. It is well written, well structured, and thought-provoking, and it should be accessible to a wider audience. I would not hesitate to recommend this book to stu-

dents even at undergraduate levels. It is characteristic of the book that it is not just concerned with linguistic modeling and theory, but also draws on a wide variety of sources, from genetics, psycholinguistics, neurobiology, anthropology, archeology, art, music, language acquisition, paleoanthropology, comparative biology, research into animal call systems, and experiments of teaching language to apes.

One of B's definitive strengths is that he expresses himself so eloquently; another is that he is very knowledgeable about the generative theory and that he can refer to the relevant statements by Chomsky or any other proponent of the generative enterprise at any point to underpin his criticism. His overview of the theoretical developments is impressive, making the criticism so much more effective than it would have been otherwise. It is one of the framework's own experts who here raises his voice. Many readers will benefit from the historical overviews on crucial constructs of the generative theory, whether one agrees with B's approach or not. And the issues he raises go right to the heart of the theory.

His own accounts of the chosen phenomena come across as a bit more sketchy, in my opinion. Although the arguments and data concerning long-distance dependencies may be convincing enough, there is clearly much more to be said about things like the left branch condition and the function of tense and deixis in human language. One may also—somewhat rightfully—accuse B of using certain notions that are poorly defined and explained; for example, his portmanteau effect (308) is used to explain certain differences between English and French, but is not in itself sufficiently explained, and it is also not clear that it derives from anything else—except maybe the arbitrariness of signs. But this principle is described in too hasty a manner to have much explanatory value as it stands in this context. Nevertheless, these minor objections do not subtract from the pleasure of reading this thought-provoking book.

Although B is critical, he is in no way dismissive about what the generative enterprise has contributed to the field of linguistics, as he clearly acknowledges that the observations he discusses are in great part, 'if not entirely, due to the remarkable work of generativists' (318). However, 'putting the emphasis on the computational system made [the framework] discover important properties, but this overly formal bias is what prevents it from moving beyond repeatedly listing the facts by means of novel forms of diacritics, as we see in its culmination in cartography' (318). B clearly sees his own research program, the STL, as the natural continuance of the generative enterprise: 'The way out of this cycle is to appeal to the properties of the substances that underlie language. The STL program makes essential use of the perceptual and conceptual substances of language to motivate its theoretical primitives. The result is that the observations make sense and follow from undisputable primitives' (318).

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Mouth actions in sign languages: An empirical study of Irish Sign Language. By SUSANNE MOHR. (Sign languages and Deaf communities 3.) Boston: De Gruyter Mouton, 2014. Pp. xviii, 231. ISBN 9781614514978. $140 (Hb).

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While the hands are the most important articulators in signed languages, there is a lot of mouth activity when deaf signers sign among each other. This has been shown and studied for many sign