

From linguistic analogy to diagrammatic ontology: Rethinking the language of life

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Review of: Ludmila Lacková, *Language of Life: A Peircean Approach to Living Organisms*, Peter Lang, 2025. <https://doi.org/10.3726/b22291>

On the contemporary scene of theoretical biology, the “language metaphor”, the idea that life is fundamentally a text written in a genetic alphabet, has served as a powerful heuristic for decades. It provided the conceptual scaffolding for the molecular revolution, allowing scientists to speak of “transcription”, “translation”, and “editing” with a clarity that has accelerated discovery. However, as we move deeper into the post-genomic era, marked by the rise of epigenetics and systems biology, this metaphor has begun to show its age. The sheer complexity of biological regulation, protein dynamics, and organismal development resists reduction to a simple linear script. In her recent monograph, *Language of Life: A Peircean Approach to Living Organisms*, Ludmila Lacková addresses this epistemological challenge with a nuanced and ambitious proposal: to refine our understanding of biological information by moving beyond the dyadic linear approach that has historically constrained both linguistics and biology.

Lacková’s work is a constructive attempt to build a new theoretical framework. Her primary objective is to bridge the gap between the humanities and natural sciences, demonstrating that the semiotic logic of Charles Sanders Peirce offers a more robust ontology for living systems than the deterministic models inherited from the 20th century. Lacková’s approach is an attempt at intellectual folding. She brings together strands that have historically been kept separate, synthesizing the rigorous structuralism of the Prague School with Peirce’s expansive, process-oriented semiotics. Throughout the text, there is a clear dialogue going on between

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the works of Roman Jakobson and the deep semiotic structures proposed by Louis Hjelmslev, both of which are mobilized by Lacková within a rich linguistic tradition. Particular attention is given to the use of structuralism as a springboard, a way to enter the conversation before expanding it into Peirce's triadic and diagrammatic reasoning.

The book opens by situating the language of life within a rich historical and sociological context. Lacková offers a compelling contrast between the initial public anxiety regarding Darwinian evolution, often associated with chance, indeterminacy, and the "gospel of greed", and the enthusiastic embrace of the genetic code in the mid-20th century. She suggests that the popular view of DNA as an unambiguous, flawless script was welcomed because it seemed to restore a sense of order and predictability to the biological world. It satisfied a cultural desire for determinism, promising a clear definition of identity written in the very molecules of our being.

To illustrate the limitations of this view, Lacková examines forensic case studies, such as the investigation into the murder of Yara Gambirasio. She uses this example to highlight how genetic identification, when abstracted from its interpretative context, can lead to ambiguity rather than certainty. This critique serves as a theoretical argument: that a linear, text-based understanding of life, while useful, is ultimately insufficient for capturing the dynamic reality of the organism. The flawlessness of the genetic code, she argues (p. 14), is a romanticized construct that obscures the messy, interpretative nature of biological processes.

Crucially, Lacková does not reject the structuralist tradition that gave us the language metaphor. Instead, she engages with it in a spirit of refinement and expansion. She explicitly argues that "structuralist thinking in biology need not necessarily point to the movement of biological structuralism from the last century" (p. 62). She aligns her project with a more dynamic understanding of structure, invoking Jean Piaget's insight that biological structures are not immutable static forms, but are potentially dynamic and evolving.

This perspective allows her to revisit Roman Jakobson's famous analogy between the genetic code and natural language with a fresh eye. Lacková suggests that the standard isomorphism, where DNA bases correspond to letters and genes to sentences, might be semiotically misaligned. Drawing on insights from quantitative linguistics, she proposes a "lowering" of the analogy. She advocates that DNA bases behave less like independent letters and more like distinctive features (the smallest units in phonology, defined by binary oppositions). By recalibrating the structuralist model in this way, she demonstrates that genes function more like "rhemes" (in Peircean terms), signs of possibility that require

the syntax of the cellular context to become meaningful propositions. This is a subtle but profound shift, because it moves the gene from the position of a dictator to that of a participant in a larger dialogue.

If one point invites further scrutiny, it is the scope of the “lowering” analogy between DNA bases and phonological distinctive features. Lacková herself flags, in a footnote (p. 66, note 19), the tension between the simultaneity of distinctive features and the strict sequentiality of nucleotide bases, a tension that might reward fuller discussion in the main text.

The core of the book’s innovation lies in its application of Peirce’s Existential Graphs (specifically the “Betagraphic” system developed with the Interdisciplinary Seminar on Peirce group in Texas Tech University) to the problems of molecular biology. Lacková posits that proteins are best understood not merely as chemical substances, but as “iconic diagrams” that embody a logic of relations.

Standard chemical formulas are excellent for describing composition, but they struggle to capture the dynamic potential of a molecule. Lacková argues that Peircean graphs can represent “potentiality” (p. 115) and “valency” (p. 108) more effectively. They allow us to visualize the Thirdness (mediation and habit) that characterizes life. For instance, in discussing protein folding, she reframes the process not as a mechanical assembly line, but as a logical inference. The linear sequence of amino acids provides the premises, but the final three-dimensional structure is a conclusion reached through interaction with the cellular environment. This diagrammatic approach offers a way to visualize the epistemic cut between the linear genetic code and the functional organism, helping the readers see how a one-dimensional code becomes a three-dimensional living form.

Through this lens, the organism is seen as an active interpreter that incorporates environmental signs into its biological memory. It stabilizes chance variations into law-like habits, allowing the experience of the lineage to be preserved through semiotic continuity. This perspective offers a sophisticated defence of a nuanced neo-Lamarckism, suggesting that the environment plays a much more direct role in shaping heredity than the strict Modern Synthesis allowed. She paints a picture of life that is deeply reactive and interconnected, a continuity that folds back on itself and finds its foundations in biological semiotics.

The significance of *Language of Life* for the field of biosemiotics and the philosophy of biology is substantial. By integrating Louis Hjelmslev’s participative logic with Peirce’s triadic pragmatism, Lacková provides a formal language that respects the immense potentialities of living systems without falling into the trap of rigid causal determinism. The book successfully demonstrates that the complexity of post-genomic biology requires a plurality of perspectives. It challenges the reductionist view that life can be explained solely through the

bottom-up causality of the gene, advocating instead for a top-down understanding where the organismal context helps determine the meaning of the molecular text.

For general semiotics and the philosophy of science, this work offers a compelling argument for the reality of relations. Lacková shows that the logic of relations is not an abstract philosophical concept but a material necessity for understanding biological organization. By replacing the metaphor of the static text with the logic of the dynamic diagram, she provides a robust ontological foundation for a biology that is truly relational, interpretative, and alive. *Language of Life* is undoubtedly a demanding text, yet a rewarding one, a reading that brings a fresh debate to the general semiotic, as well as the specifically biosemiotic, approach. It must be said that understanding the deep semiotic grammar underlying the biological complexity of the 21st century cannot present itself as a casual stroll, nor as a pleasant invitation to the drastic reduction of complexity. For this reason, this text stands as a work to be ruminated upon, as Nietzsche would say, a thought that perhaps deserves the attention of semioticians as much as biologists, seeking that transdisciplinary soul which is required by our confrontation with the complexity of studying the life of signs and the signs of life.