

## Introduction: Mentis Naturalis

Liz Stillwaggon Swan · Louis J. Goldberg

Received: 6 January 2013 / Accepted: 18 February 2013 / Published online: 3 March 2013  
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### Part 1

#### Introduction

This special issue is an extension of a project begun in 2010 when I sent out a call for papers for an anthology dedicated to exploring the biological origins and evolutionary development of organic mindedness. I expected a dozen or so submissions and received over 60. Some of those were published in *Origins of Mind* (Springer 2012), some appear in this special issue and more are forthcoming in a second special issue dedicated to the topic. It became clear to me that the question of how mindedness evolved or emerged in the natural world and why is important to researchers across philosophy and the bio-, neuro-, and medical sciences. What I have aimed to do in the origins of mind project, which includes this special issue, is collect a variety of novel, thought-provoking, and intuitively plausible accounts of the where, when, why, and how of organic mindedness in the natural world.

An important historical fact of the history of philosophy is that the majority of 20th century philosophy of mind, dominated as it was by the analytic tradition, enjoyed a robust existence completely insulated from discoveries and insights generated in the bio-, neuro-, and medical sciences. It did, of course, engage with computer science in that the then reigning philosophy of mind, functionalism, was based on comparisons between machine functionality and human consciousness. Though artificial intelligence is an important historical paradigm that has generated insights into what mindedness might be and what it is not, my own project in philosophy of mind has been to work toward a naturalistic (i.e., consistent with evolutionary theory) account of organic mindedness that will have implications for medicine, mental and physical health, and our species' understanding of itself.

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Special Issue “Origins of Mind” edited by Liz Stillwaggon Swan and Andrew M. Winters

L. S. Swan (✉)  
Longmont, CO, USA  
e-mail: lizstillwaggonswan@gmail.com

L. J. Goldberg  
Center for the Humanities, Autzen House, Oregon State University, Corvallis, OR, USA

A central underlying premise of the origins of mind project is that we will make more progress on understanding the phenomenon of mindedness if we conceptualize it as a natural process instead of as an object. The long tradition in the philosophy of mind and cognitive science of conceptualizing the mind as an object leads to the practice of forcing poor analogies between the mind and some object mainly because we are in a better position to understand the object—I am thinking here, of course, of the computer. Computationalism, the idea that the human brain is a computer and thus discoveries made in silicon are applicable to the human brain, has ultimately led us further away from a genuine understanding of organic mindedness. We are now stuck in the mud of questions such as, what does it mean for an organic brain to ‘compute’? What is it that is being computed, exactly? If one proposes that the brain computes symbols, what do these ‘symbols’ look like in the wet, grey matter of the brain? But more to the point, I want to ask, is there a more useful paradigm for understanding organic mindedness than a machine that we created from non-organic materials?

I contend that there is no such thing as ‘a mind’ per se; rather, the term ‘mind’ acts as a conceptual placeholder for a whole host of abilities that we and some other animals are able to do with our brains and bodies working in concert, such as, communicate, show affection, imagine, satisfy our needs, learn, remember, hold beliefs, plan, etc. All living organisms have a host of abilities uniquely attuned to their particular environments, which in some cases, e.g., the human case, we’re inclined to conceptualize as ‘having a mind’.

It is an implicit assumption of the majority of the authors included in this special issue that mindedness is a biological phenomenon, dependent upon a central nervous system in complex organisms such as humans and other primates, and a more decentralized kind of nervous system in less complex organisms. This simple observation implies that mindedness exists in degrees in the biological world, which entails that it certainly is not unique to humans, and that our particular kind of mindedness is just the most recent design in nature—its having existed in various forms long before hominins evolved.

The big question of how and why mindedness evolved necessitates collaborative, multidisciplinary investigation. Biosemiotics provides a new conceptual space that attracts thinkers in the biological and cognitive sciences and the humanities who recognize continuity in the biosphere from the simplest to the most complex organisms, and who are united in the project of trying to account for even language and human consciousness in this comprehensive picture of life. The young interdisciplinary of biosemiotics has thus far been largely focused on codes, signs and sign processes in the microworld. What philosophers of mind and cognitive scientists can contribute to the growing interdisciplinary are insights into how the biosemiotic *weltanschauung* applies to complex organisms like humans where such sign processes and codes constitute human society and culture.

## **Part II - Meaning-making in Organisms**

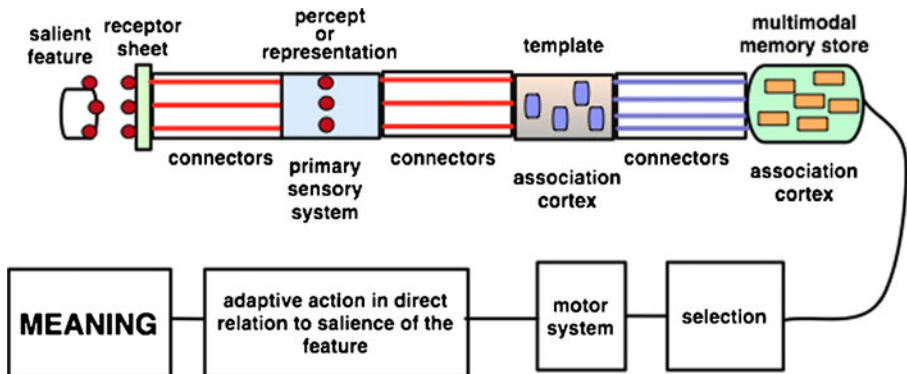
This past Fall, my research colleague, Lou Goldberg, and I were invited to present our account of the interpretive mind at the meeting of the Distributed Language Group in

Odense, Denmark. The central question of the meeting was, “How did the human mind emerge from the animal mind?” In our presentation, we focused on the process of meaning-making in organisms (see Fig. 1), which we believe is a necessary prerequisite for the evolution and execution of the interpretive mind of humans and other complex animals. Our 2010 publication in *Biosemiotics*, “How is Meaning Grounded in the Organism?” poses and then attempts to answer the question, why and how can certain features of an organism’s environment become *meaningful* to it?

This figure depicts the structure of a neural pathway that supports the process by which a salient feature of the environment leads to a meaningful action that is adaptive to the organism. On our account, there are 3 main features of the meaning-making process in organisms with brains. They are 1) the *environmental features* that are salient to the organism for survival reasons, 2) the *representations*, within the organism’s brain, of those salient features of the environment (which we call brain-objects (see Swan and Goldberg, 2010)), and 3) the *adaptive action* taken by the organism that results from this entire process. We opted to talk about meaning-making instead of meaning because we believe it is a more useful concept in the context of living organisms and how they go about their business in the world. We see meaning-making as pertinent to the field of biosemiotics because it encompasses living organisms from simplest to most complex.

In our description of the meaning-making process, brain-objects are the neurobiological intermediary between the environment and the consequent organismic behavior. These brain-objects (which are explained in much greater detail in our 2010 publication) have 4 essential features: 1) they are the foundational neurobiological symbols essential to the meaning-making process in organisms, 2) they are comprised of subsets of neurons that represent salient features of the environment, 3) they are real, spatiotemporal objects, 4) they are necessary for the successful performance of consequent adaptive motor acts.

Although our current research focus is the transition from simpler forms of animal mindedness to the particularly human kind of mindedness, this is only one facet of the philosophical and scientific endeavor of understanding the nature of organic mindedness in the natural world; there are many more facets to explore. This special issue



**Fig. 1** A schematic of the meaning-making process in organisms. Thanks to Lou Goldberg for creating the figure, which is based on the work of Antonio Damasio and colleagues on what they termed the “anatomic substrate” and “physiological mechanisms” of face recognition and word and concept retrieval (Damasio et al. 1982, Damasio et al. 2004)

makes a contribution to this set of questions by including contributions from philosophy, computer science, biology, astrobiology, physiology and medicine.

The issue's contents are pluralistic; it follows suit with the tradition established by Marcello Barbieri in welcoming various viewpoints on mindedness to the table. One element that most of the papers in this special issue have in common is their adherence to the principle, endorsed by philosopher John Searle, and reflected in our own philosophical writings, that the phenomenon of mindedness, including the peculiarities of human mindedness, is a biological phenomenon.

The papers in this issue have been arranged to highlight their overlapping themes. In many places, some papers offer support for one another, while others offer different perspectives on the same topic. These topics include: the initial framing of the question of mindedness (Gautam and Kak, and Newsome); the relationship between mindedness and learning (Bueno and Cardenas-Garcia); the relationship between human and non-human mindedness (Beever and Cisney, Kawade, Villalobos, and Vitti); and the connection between mind and life in general (Gill and Grandpierre).

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