

EVOLUTION AND ACTION

Organized by John Pickering and Timothy Johnston

Empowering the Organism

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In contemporary biology, dominated by the modern synthesis, organisms have disappeared as real entities. They have been replaced by a set of internal causes from the genome and external causes described by natural selection. An examination of the conceptual basis for the neo-Darwinian view of organisms and their evolutions shows that there are fundamental factual errors regarding the capacities of genomes to generate organisms and inconsistencies in the causal structure of evolutionary theory, necessitating a reconstruction. This involves a reinstatement of organismic life cycles, particularly development understood as a self-generating process, as the foundation of biological action underlying the phenomena revealed in evolution. A theory of organisms as dynamic forms with memory and a particular type of agency will be described. This results in a biological perspective within which organismic form (morphology, behavior) and transformation provide a basis for understanding the distinctive order of the living state. This has deep affinities with the views propounded by Gibson, Piaget and Waddington, and recently by Ingold and Ho.

Rethinking Biological and Cultural Evolution: Goodwin and Gibson

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Recent anthropological attempts to account for the evolution of human behavior with a neo-Darwinian framework have been founded on a dichotomy between genes and analogous units of culture, regarded as program elements from which are assembled, respectively, 'physical' and 'mental' models for the construction of the individual and its activities. However, certain approaches in developmental biology, notably that of Goodwin and his associates, have challenged the idea that morphology and behavior can be understood as the realization of a preconstituted genetic program. Likewise Gibson's ecological psychology challenges the idea that perception and action can be seen in terms of the processing of sensory stimuli or the organization of motor responses in terms of given cognitive schemata. For both Goodwin and Gibson, form and pattern are explained not as the outcomes of pre-programmed projects of construction, but rather as generated within a dynamic system of relations that cuts across the emergent interface between the (human) organism and its environment. This paper explores the striking parallels between these approaches, and shows how, put together, they offer the possibility of a synthetic account of behavioral evolution that obviates the Cartesian dichotomy between 'genes' and 'culture'. This synthesis, however, entails a fundamental overhaul of conventional notions of evolution and history.

Socio-Naturalism, Epigenesis, and the Development of Representation

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The cognitivist paradigm in psychology and cognitive science employs a concept of 'mental representation' rooted in that philosophical tradition which views mind as a "Mirror of Nature" (Rorty). Ecological, social constructionist, and other critics of cognitivism have repeatedly pointed out the inadequacies and contradictions of this paradigm. Such criticisms have been reinforced by the emergence within cognitive linguistics of non-objectivist accounts of semantics, which view bodily and cultural experience as primary sources of meaning, and which discard the distinction between literal and metaphoric meaning (Lakoff, Johnson). A crucial question faced by those who wish to forge a new, non-cognitivist paradigm for the cognitive sciences is: Is it possible to reformulate the concept of representation in a way which departs radically from the mentalistic and objectivist presuppositions of cognitivism, yet gives full recognition to the central role played by language and symbolization in human mental life, and its development and evolution?

I argue that an epigenetic-developmental, socio-naturalistic account of language and representation provides a coherent and adequate alternative to cognitivism. The socio-naturalistic approach has behind it a long tradition in philosophy, the human sciences and biology, but the details of its theoretical formulation present many new features. I shall show that the socio-naturalistic approach, in contrast to cognitivism,

- (a) is fundamentally developmental and evolutionary in orientation;
- (b) sees culture and nature not as opposing terms, but as non-reductively co-present in human cognitive development and evolution;
- (c) couples a communicational (pragma-semiotic) epistemology with a naturalistic ontology;
- (d) sees representation not (after Descartes) as a "Mirror of Nature", but (after Spinoza) as expression, implication and developmental unfolding;
- (e) is naturally associated with new developments in connectionist (PDP) computational modeling.

An Ecological Account of the Evolutionary Emergence of Language

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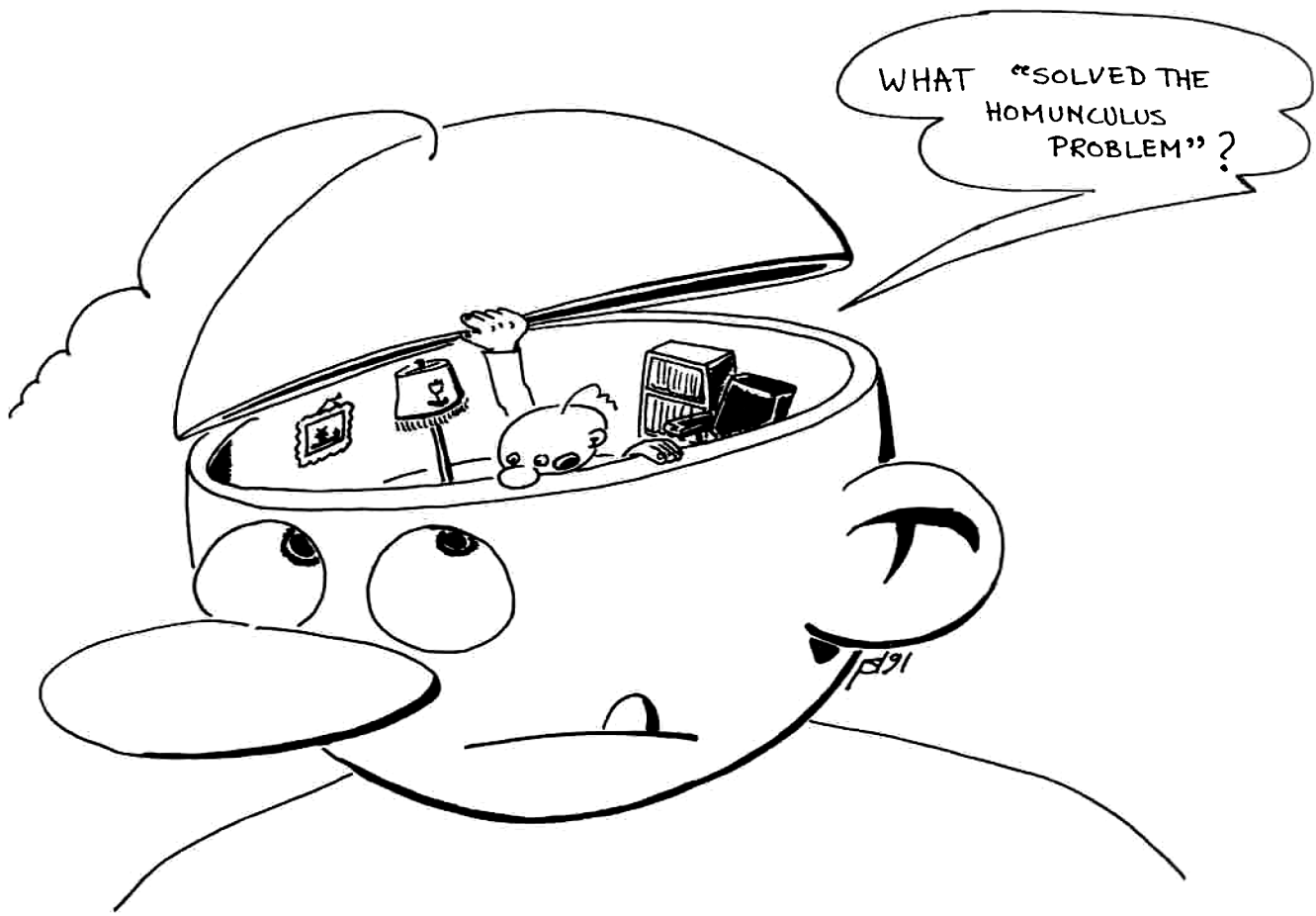
James Gibson argued that the 'meanings' of objects and events are external to perceivers, rather than applied by them to sensory data specifying such objects or events. This argument can be considered in relation to communicative gestures, for instance, the different warning cries made by vervet monkeys in the face of different sorts of predators (e.g., Seyfarth et al., 1980). It is plausible to say that the meanings of these gestures are directly perceived, as can be witnessed in the coherence and immediacy of the monkeys' responses to them.

There is no evidence from observations of these animals, nor of chimpanzees (e.g., Menzel, 1971) that the meaningfulness of the gestures they express is itself perceived. They show no signs of what Dennett (1983), paraphrasing Grice, calls second-order intentionality; this he identifies as entailed for communication to be linguistic. Once that conditions were fulfilled, communicative gestures could themselves become objects of perception, and, as such, the communication they afford could be produced intentionally: For example, they could be used outside of contexts of immediate reference, and modified for use in different ways.

From an ecological perspective the matter to explain is how the meaningfulness of meaningful gestures could have been discovered. In the present account (e.g., Davidson & Noble, 1989; Noble & Davidson, 1989) an evolutionary scenario is described in which increasing visuo-motor control of the forelimbs of the bipedal hominid ancestors of modern humans, resulting from aimed throwing, leads to pointing, which in turn yields imitative gesturing. Such gesturing has communicative function, both in predation and in predator avoidance. The leaving of a trace of any such gesture on a plastic substance provides the means for making the gesture itself an object of perception. This scenario, while speculative, is consistent with the archaeological record of human evolution.

References

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