Bacteria Cognition and Natural Agency

Fermin Fulda[*1]

[1]Institute for the History and Philosophy of Science and Technology, University of Toronto (IHPST) – Room 316, Victoria College 91 Charles Street West Toronto, Ontario, Canada M5S 1K7, Canada

Abstract

Recent research on bacteria cognition has exposed the inherent capacity of these systems to respond appropriately across a wide range of conditions. But is the attribution of cognition warranted? This tendency, I argue, is predicated on two Cartesian assumptions: First, goal-directed behavior implies intentionality hence the representation of goals (desires) and means (beliefs). And second, intentionality is a kind of causal organization (e.g. computational architecture) that demarcates intentional from mere 'automatic' systems such that bacteria are, categorically, one or the other. However, a dichotomy arises between a mechanistic and an intellectualist conception of bacteria, neither of which captures their distinctive purposive responsiveness. I propose an alternative framework according to which, goal-directedness is a gross behavioral capacity of a natural agent to reliably respond to its conditions of existence as permeated with significance, that is, as a system of 'affordances' or opportunities for attaining its goals. Agency, thus conceived, is not a kind but a robust emergent pattern of adaptive interaction between a goal-directed system and its affordance-landscape. On this view, furthermore, *agency* is a prototypical concept that allows for degrees relative to a system's affordance-landscape. Hence, there are no necessary and sufficient conditions for demarcating agents so no dichotomy arises. All natural agents, I claim, have biological goals and hence are constrained by the demands of survival and reproduction. But cognitive agents are only those with the capacity to act irrespective of whether their goals are biological. Bacteria, I conclude, are biological *agents* (against mechanization) but not *cognitive* agents (against intellectualization).

[*]Speaker