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The Hand and Cognition… and Intersubjectivity, Agency, Culture, and More

A review of *The Hand, an Organ of the Mind: What the Manual Tells the Mental*

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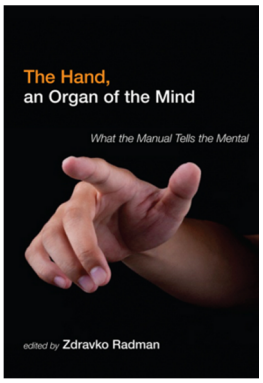

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The Hand, an Organ of the Mind, edited by Zdravko Radman, consists of seventeen essays by an impressive array of philosophers, psychologists, and cognitive scientists, as well as a foreword by Jesse Prinz and a postscript by haptic artist Rosalyn Driscoll.[62] As the title suggests, this collection concerns the role of the hand in cognition and consciousness, and aims to occupy a novel middle space in the polarized world of philosophy of mind and consciousness studies. As Radman points out, there has since Descartes been a methodological dualism in studying the mind, with variations of the mind-body binarism taking form in the contrasts of "organic versus inorganic, mind versus matter, 'I' (or self) versus 'it' (brain), cognitive versus motor, internal versus external, subjective versus objective"… the list goes on (Radman: xix). The place and function of the hand, however, does not fit well on either side of such a schema, and it is because of this fact that handedness has been neglected and under-researched in theories of mind and cognition. Indeed, as the authors of this collection demonstrate time after time, the hand serves as a unique theoretical vehicle that, if not entirely bypassing such traditional dualisms, at least complicates them insofar as it often shows itself to play a mediating role in the

[62] I would like to thank Georg Theiner for his helpful comments on an earlier draft of this review.

relationality between intra- and extra-cranial cognition, agency, and mindedness. Just some of the most stark claims in this work include: that not only is the hand a key ingredient in communicative practice in general (in gesture and writing), but that the specific gesture of pointing is integral to the phylogenetic and ontogenetic development of symbolic thinking all together (Cappuccio and Shepherd); that the hand and its tactile receptivity provide the basis for inter-empathetic subjectivity (DePraz); that the hand serves as a facilitating device for the cognitive integration of cultural artifacts via the redeployment of less specialized Pleistocene neural functionalities (Menary). This volume makes a hard case for the fact that the hand, as an organ through which we not only explore our social and objective world but also produce it, is integral to the human experience.

The essays in this text are grounded in several traditions and disciplines, ranging from neurophysiology and developmental psychology to contemporary robotics and artificial intelligence, and from the history of philosophy and the phenomenology of the classical German and 20th century French varieties to cognitive science and the "4E" informed branches of philosophical psychology.[63] For a reader who wants a state of the art, cross-disciplinary account of the hand, then this variety is a virtue. But a researcher with a specific problem to tackle may not benefit from such a wide theoretical scope. This latter point, however, should not be taken as any substantial criticism. If there is minor room for complaint here, it is regarding the text's organization, in that the essays sometimes seem unevenly distributed. The book is organized thematically, with each section containing works from any number of the aforementioned theoretical holds. However, some sections are longer than others, the first and second clocking in at around one-hundred pages each, while the third is under fifty and the sixth and final section (containing only a single essay and a postscript) is under thirty pages. Moreover, some sections seem to be grounded less pluralistically than others, and at times, it seems arbitrary why one particular piece shows up in one section rather than another. For instance, the first, longest section, "Hand-Centeredness" contains essays based more in laboratory work than philosophical reflection and argumentation. That's fine. There is nothing wrong with the content of those works. But to the non-specialist, the section is perhaps the most tedious—it certainly front-loads the text with a body of work that while quite rigorous and exact, is less reflective than the rest of the book. There were several essays based squarely in the phenomenological tradition that did not warrant their own section, though they could have had the editor decided as much. This is not a bad thing, how-

[63] The "4E" label includes the programs of extended, embedded, enacted, and embodied cognition that find themselves united insofar as they eschew the intellectualist paradigm that treats mentality as inherently representational and/or computationally representable. See Menary 2010.

ever. They were placed at appropriate junctures thematically linking them to works of a different tradition, providing measured counterbalances. And while the essays of section one are all "Hand-Centered," the same can be said of basically every essay in the collection. What does link the particulars of the first section is the disciplinary affiliation and background of its authors within experimentally based psychology and neuroscience. But I see no prima facie reason why certain contents of section one could not have been dispersed among other sections. The conclusions of those works were certainly philosophically relevant. As such, they could have been appropriately placed alongside more straightforward philosophical reflections, the claims of which being either buttressed or challenged by the results of the experimental psychologists. This would have the positive result of highlighting the philosophical implications of the chapters of section one, implications which as it stands are not as ready-to-hand as they could be in a different arrangement. This is a minor quibble, however, as I suspect not many people will read the text straight through. Given the interdisciplinary scope of the work, many will pick and choose according to their respective interests. But blocking off essays from one particular field might tempt a hitherto disinterested reader to continue along in her or her ignorance.

As mentioned, this is a lengthy work. There are seventeen essays divided among six sections, totaling over four-hundred pages. Unfortunately a full review of each essay would require more space than allotted here. But in the following I will summarize each work, highlighting its central themes. When called for, a more extended discussion will be presented.

1. "Hand-Centeredness"

While most of the essays in this volume are hand-centered, this section focuses specifically on the neuropsychology of hand-centered activity. Jonathon Cole's essay opens the discussion with a survey of relevant case studies of subjects with either partial or total sensory loss. Following the rare cases of those afflicted with neuropathy syndrome (where there is an "acute loss of proprioception and in most cases, touch"), Cole describes subjects' whose loss of proprioception results in cases of limb kinetic ataxia, or the loss of any controlled movement, even though the motor nerves themselves function normally (Cole, 7). Some subjects were able to relearn movement, however, but only with painstaking concentration to details that normally go unnoticed by unafflicted subjects. Such relearning, however, is only possible by constructing elaborate plans through trial and error. At the very least, Cole shows that the intellectualist paradigm of agency as the product of a ratiocinating and "central executive" planner only seems to obtain in rare and aberrant cases and that normally mundane actions are the result of an embodied coping mechanisms. While the essay at time concerns bodily movement in general, Cole does focus

on cases of relearning gesture, which seems comes easier than other types of bodily movements. Citing David McNeill (2005), Cole concludes that apraxic subjects experience less hardship in these cases because the system that controls the hands during gesture action is linked with a "thought-language-hand" system that differs from the system controlling instrumental action (Cole: 17).

Andrew Bremner and Dorothy Cowie focus on the ontogeny of *representations* of the hand, theories of which, they point out, are relatively obscure in developmental psychology when compared to more mainstream accounts of the role of hand action in cognitive development. They begin their essay by outlining the unresolved debate concerning whether hands (and environmental interaction in general) or inborn intelligence have priority in cognitive development. Piaget (1952, 1954) serves as an early representative for the hands-priority thesis, while the intellectualist position is finds support in Spelke et al. (1992) with a "core knowledge" approach that effectively argues that knowledge of how to interact with the environment is the result of a phylogenetic inheritance. Both theses turn out to be limited, however. Piaget undercuts the role of the hands and body, viewing them as ultimately hindering abstract perceptions and action schemas, whereas the "core knowledge" approach never calls into question just how such knowledge is able to be enacted. The authors turn to current research on infant hand representations, tarrying between top-down and bottom-up theories of body-schematization and internal body modeling. They conclude with a compromise: while infants do seem to start out with core knowledge, it is still the case that body schemas develop through manual interaction with the environment up until a much later age.

The last two essays in this section are respectively devoted to hand-centered space and peripersonal awareness. Nicholas Holmes' essay "Hand Centered Space and the Control of Movement" makes the case for a hand-centered visual representational field. To demonstrate that there are neuronal representations of hand-centered space, Holmes outlines several experimental situations, from the rubber-hand illusion to cross modal extinction and congruency tasks. Holmes shows that the hand occupies a unique role in in "determining a participant's ability to detect, discriminate, or pay attention to visual or somatosensory stimuli" (Holmes: 60). But Holmes points out that most of such experiments only study the hand in passive situations, not taking into account the primary function of hand-centered mechanisms—that of action-centered attention. Holmes closes his essay arguing that the most basic functions of hand-centered representations are the (evolutionarily relevant) actions of hand defense movements and desire-directed movements toward target objects. Continuing with the notion that the hands occupy a primary role in visual-representational action orientation, Matteo Baccarini and Angelo Maravita argue in "Beyond the Boundaries of the Hand: Plasticity of Body-Space Interactions following Tool Use" that during tool use "we can modify

our relationship with external space in terms of body/space representation" (Baccarini & Maravita: 82). Their main claim is that one's body schema is altered during intentional and effective tool use, which itself changes the potentialities for action in one's peripersonal space.

2. "Togetherness in Touch"

The second consists of literature focused on the intersubjective relevance of touch and of more ontologically themed essays on touch and perception and reality (the section's title is apt in this second instance if we think of "togetherness" asocially as an "ontological binding"). It commences with Harry Farmer and Manos Tsakiris' "Touching Hands: A Neurocognitive Review of Intersubjective Touch." This essay is an informative take on recent research into intersubjective touch, and includes sections surveying findings from evolutionary, psychological, and neuroscientific perspectives. The authors move from the social relevance of primate grooming patterns to contemporary socio-psychological factors that modulate human intersubjective touch, from gender and age to setting and type of touch. They then turn to the importance of touch in infancy for the development of social and empathetic intelligence. The essay closes with a review of the neural bases of intersubjective touch.

The two middle pieces of this section are related insofar as they deal with more general ontological and perceptual implications of touch. Matthew Ratcliffe's "Touch and the Sense of Reality" turns to classical phenomenology to question the hegemony of vision in the philosophy of perception, while Filip Mattens' "Perception and Representation: Mind the Hand" explores the subjective reasons that touch succumbs to visual hegemony in the first place. Ratcliffe claims that even when touch gets its due credit, it is often only the hands that get mentioned, and the more general form of "background touch" is overlooked. Such a sense, it is argued, is primary in connecting us with the environmental significance constitutive of our "world" (or *Weltheit* even though Ratcliffe doesn't specifically use this term). Discussions that focus only on the exploratory and actionable aspects of touch miss the sense of world-disclosure that undifferentiated touch, as underlying the perceiver-perceived relationship, fundamentally grounds. It is this touch that can best "illuminate the sense of commonality (…) that is presupposed by the possibility of encountering anything as 'there'" (Ratcliffe: 139).

Filip Mattens' piece is an appropriate accompaniment to Ratcliffe's. Mattens discusses the ways in which the hands deceive the intellect into upholding the "epistemological credo" that touch is primarily, like eye-sight, an object-sense (Mattens: 159). Mattens argues that this tendency obscures the fact that touch is primarily not a perceptual sense but a "vigilant sense"—"the tactile sense serves an organism not for touching but for sensing that it is being touched"

(Mattens: 166). The hand however reverses this logic insofar as its exploratory movements are often linked with what is seen; touch becomes responsible for retrieving objective information about the world. At this point the reader can see the usefulness of this collection—already there is opportunity for an encounter between Mattens work and Holmes' work on action-centered attention. Also, one is curious to see what Ratcliffe would have to say about Matten's talk of touch as primarily a mechanical encounter with an object's shape—a direction of theorization that he criticizes as ignoring the intersubjective significance of the world as disclosed through touch.

Moving on, Natalie Depraz' essay "the Phenomenology of the Hand" picks back up on the notion of intersubjectivity and the relevance of touch for inter-empathetic attunement. Her essay should be appreciated not only for highlighting this often under-theorized intersubjective aspect of touch, but also for providing the volume's most thorough philosophical history of hands and touch. Classical phenomenology aside, there is sometimes a noticeable paucity of historical awareness in this text and it would have been nice to see the authors cite and reflect on their philosophical forebears more often (e.g., the editor's claim in his own essay that "we are *both subjects and objects of our own doing*" seems straight out of Marx, but Marx is never mentioned) (Radman: 386).[64] Depraz however is acutely aware of history of reflection on the hand. She constructs a narrative of the dialectic between the theses "that humans are intelligent because they have hands" and "that humans have hands (i.e., can use their hands effectively) because they are intelligent." These positions seem to first arise with Anaxagoras and Aristotle but Depraz shows they respectively resurface in Engels and Bergson (such an opposition indeed motivates Bremner and Cowie's article mentioned earlier). What Depraz goes to show is that in the history of philosophy the hands are only a matter of interest as they relate to knowledge and mastery—regardless of whether the hands are the source of intelligence or vice versa, they maintain the function of facilitating knowledge of the world or of practically altering the world to our benefit. The function of the hand as facilitating intersubjective recognition is passed over in this respect. Depraz spends the remainder of her essay surveying phenomenological accounts of touch and inter-empathetic awareness in the works of Husserl, Merleau-Ponty, Levinas, Sartre, Danis Bois, and Michel Henry.

[64] Compare Marx: "When real, corporeal (*leibliche*) *man* (…) establishes his real, objective *essential powers* as alien objects by externalization (*Entäußerung als fremde*), it is not the establishing (*Setzen*) which is subject; it is the subjectivity of the *objective* essential powers whose action must therefore be an *objective* one. An objective being acts objectively, and it would not act objectively if objectivity were not part of its essential nature. It creates and establishes only objects because it is established by objects, because it is fundamentally *nature* (*weil es von Haus aus Natur ist).* In the act of establishing it therefore does not descend into 'pure activity' to the *creation* of *objects*; on the contrary its *objective* product simply confirms its objective activity, its activity as the activity of an objective, natural being" (Marx 1992: 389).

3. "Manual Enaction"

Most of the latter half of this volume is devoted to essays working within the various paradigms of "4E" cognition. Prominent theorist of embodied cognition Shaun Gallagher starts off this section. His "The Enactive Hand" covers three areas of concern for the hand in cognition, all in line with his thesis that rationality is proximally and for the most part action-oriented. The first section regards the complicated relationship between the hand and vision. Gallagher demonstrates through laboratory evidence (notably the rubber hand illusion) that although vision seems to trump the hand in certain settings (we are fooled by sight alone into thinking that the rubber hand is ours, evenly experiencing experience tactile sensation that is objectively not ours, even though it phenomenally seems so), we are not so fooled when motor-systemic awareness comes into play. Citing Iverson and Theleon (1999), Gallagher goes on to argue that the hand, vision, and neural circuitry take part in a holistic operation. Hand movement is neither a bottom-up environmental emergence of rational action nor is it a top-down determination of movement. Rather, the hand and brain exist in a "single integrated cognitive system" implicative of a "reciprocal unity of feedforward-feedback processes in which the hand and the brain form a dynamic system that reaches into the world" (Gallagher: 213). Gallagher goes on in the next sections to describe hands in their practical function of worldly engagement, which reads well along Baccarini and Maravita's piece on tool-use and body-space interactions. Gallagher closes by reviewing the social and communicative relevance of hand movements.

"Radically Enactive Cognition in Our Grasp," Daniel D. Hutto's contribution to the collection, makes a case for rejecting the representationalist understanding of the mind, or the idea that all thinking consists in rational deliberation, where thoughts are structured mental representations that have propositionally representable truth values which are computationally manipulatable. Hutto does not claim that such ratiocinative thinking does not ever occur—in complex future planning it obviously obtains. His point, rather, is that deliberative cognition only occupies a small domain of intelligent mental functioning and representationalist theories ignore a more primary form of cognitive activity in which "the specified body and environmental factors are fully *equal partners* in constituting the embodied, enactive intelligence and cognition of (…) artificial and natural agents" (Hutto: 231). Hutto looks to the hand to make his case, since it seems that much of successful manual activity does not rely on rule following and propositional attitudes but rather on spontaneous alterations that are situationally determined. If intellectualist assumptions were to obtain, then it would be the case that manual activity, and indeed all bodily movement, would result from the type of calculated planning the Jonathan Cole describes in patients with limb kinetic ataxia—which seems to be contradicted by psychological findings. Hutto goes on to provide an intricate discussion of radical and conservative takes on extended cognition, the latter not

fully jettisoning representations insofar as its supporters maintain that there exist mental representations encoded in bodily formats, or "action oriented representations." A crucial issue arises concerning the nature of informational content, which presents a stumbling block for this more conservative approach. After a novel series of argumentations, Hutto concludes that a cognitive system is such that its sensory systems do convey information, but not in any sense of passing on *meaningful* or *contentful* messages that articulate inner mental representations. Rather, "cognition activity involves complex series of systematic—but not contentfully mediated—interactions between well-tuned mechanisms" (Hutto: 248).

4. The Gist of Gestures

As the title suggests, this section deals with the cognitive role of gestures. Andy Clark's "Gesture as Thought?" makes the case that rather than being used to communicate already formed thoughts, gesture primarily plays an active causal role in thinking. Clark, keeping with his role as co-originator of the "Extended Mind Hypothesis," (EMH) argues that gesture is part of a coupled intra/extra cranial system, and constitutes an organismically extended mode of thought. Building on McNeill (2005) and Gallagher (2005), Clark describes how gesture may function in a self-stimulated feedback loop, where our "prenoetic" actions serve to materialize an ongoing cognitive process, a process which finds itself reinforced by the awareness of such actions. As such, gesture not only helps bring about an act of thought, but can also serve in the transition of one cognitive state to another.

In "Is Cognition Embedded or Extended," Michael Wheeler uses gesture to argue for his thesis of embedded cognition, a less radical approach than the EMH. Where extended cognition takes external environmental materials to be (possibly) legitimate realizations of the mind, embedded cognition holds that cognition is realized solely in the brain but can causally depend on the non-neural body and external devices. In dialogue with Clark's previous essay and Gallagher (2005), Wheeler argues that although gestures meet the criteria for cognitive self-stimulation, this does not cement the fact that such gestures are also the *material realizers* that instantiate cognitive states. Hearkening to a constant criticism of the EMH (Adams and Aizawa: 2008), Wheeler argues that though gestures may have a causal impact on cognition, they themselves do not constitute such cognition. Wheeler's essay is long and intricately argued, but a rewarding read for anyone unsure where she stands on the embedded versus extended debate. It is a remarkable fact keeping with this collection that the crux of Wheeler's position comes down to the hands.

The final essay in this section changes things up a bit, and we move from extended and embedded cognition to joint attention and symbolization. "Pointing Hand: Joint Attention and Embodied Symbols" by Massimiliano Cappuccio and Stephan Shepherd is a fascinating work with deep significance for anyone interested in anthropological and evolutionary-linguistic questions concerning hominization and glossogenesis. They frame their essay amidst the debate between dispositional and representational theories of social cognition. The first implies that for joint attention to obtain, the involved parties must engage in "reciprocal coordination mediated by embodied intentions" (Cappuccio & Shepherd, 304). The latter account specifies that the respective parties must form reciprocal "theories of mind" through which they reciprocally infer relevant propositional states concerning the attentional target. It should come as no surprise considering the other essays in this collection that the authors find fault with the representational account. They go on to provide a novel account of the development of symbolic joint attention, which is or can be representationally mediated, through a study of pointing gestures. Their basic thesis is that declarative (informationally assertive) pointing occupies a central role in the move from basic joint attention (BJA) to a symbolically mediated joint attention (SJA). BJA could be simple gaze-following where there is a shared attention to a target, reciprocal attention between both parties, and an iterative awareness of the others' attention. The point is that it does not make use of representations. However, while necessitating the same conditions to obtain as in BJA, because of the addition of representations SJA has the added bonus of producing a rich and varied world of meaning that is not available within a paradigm of BJA. Such states of SJA occur commonly enough in the day to day world—people awaiting the turning of a stop light for instance. All that is necessary is that mutual attention is given to a target (T) whose features are intrinsically irrelevant "except instrumentally to make the recipients aware of some background information related to shared attitudes toward T" (Cappuccio & Shepherd: 307). In such cases it could very well be that the participants formulate theories of mind to infer each other's intentions regarding T. But Cappuccio and Shepherd argue that it is through gestures such as pointing that we arrive at the possibility of such advanced symbolization in the first place. The core of their argument is that declarative pointing *intrinsically produces* a primitive form of representational intelligence, one which phylogenetically and ontogenetically grounds further non-bodily symbolization. They claim that pointing "incarnates the possibility of communal attention (…) and is simultaneously recognized by all parties as explicitly produced to coordinate awareness" and thus "symbolizes awareness in a prototypical form" (ibid.: 305). As such, SJA arises long before we develop the capacity to infer peoples' mental states. The authors convincingly present their case, engaging with the work Tomasello, Racine, and Peacocke, among others.

5. Manipulation and the Mundane

This section begins with Susan A. J. Stuart's essay "Privileging Exploratory Hands: Prehension, Apprehension, Comprehension." Stuart claims that the hands are essential to orienting the subject in space and its establishing the ego-centric point of view. Her thesis is that the "failure in functional symmetry establishes our physical spatiality and provides us with a situated perspective on the world" (Stuart: 331). What this ends up meaning is that the hands ground our presence in a manipulatable world: insofar as they are "enantiomorphic" organs (qualitatively identical but topologically non-identical) imbued with an inherent directionality, the hands by nature reach away from ourselves, in potentially different directions. Stuart bases her argument on Kant's proof for the existence of absolute space, though modifies it to highlight the point that it is only through *prehensive* exploration that we achieve any *com-prehension* of space at all. Stuart continues her discussion of the relevance of the hands as the "orienting structures of self-referential anchoring," noting the role of anticipation in corporeal exploration (ibid.: 335). Stuart mentions repeatedly the "enkinaesthetic" role of the hands (that they facilitate a felt "withness" with other people, agents, and things) but unfortunately does not expand on how this obtains. Her account in the end establishes the egocentricity of the subject, but only gestures to its inherent intersubjectivity.

In "The Encultured Hand," Richard Menary takes a step back from embedded and extended theories of cognition to argue that the hands facilitate the internalization of cognitive artifacts, thereby enculturating the mind. His argument proceeds in several steps. He first demonstrates that elsewhere in the animal kingdom, intentionality need not exist solely in the head but can be mediated by the environment. Using the example of cricket song in mating rituals, Menary shows that intentional directedness is structured in a triadic manner: a) a male cricket produces song b) a female cricket's dedicated interneurone hears the song and locates the male c) the crickets reproduce. Intentionality thus seems not simply to be a property of a mental state but is rather a complex where an organism directs itself by *acting*, an acting which is mediated by its environment and/or other agents. In like manner, Menary argues that human intentionality is mediated by our cultural environment. Certain practices, like writing or arithmetic, have the precise aim of expanding our cognitive capacities. Such practices are culturally bound and thus are normative. But it is Menary's point that once the practices are internalized, the rules are no longer referenced. Building off his previous (2007) work on cognitive integration, Menary proceeds to give an account of how it is that our brains can internalize such practices. After all, a cultural practice such as writing, he points out, is only 10,000 years old. There is obviously no gene for writing. How is it the case that our brains can internalize such a practice so well? His answer is that the Pleistocene brain is phenotypically plastic (a version of what Bernard Stiegler might call our "Epimethean default of origin") (Stiegler:

1998). Such plasticity evolved, Menary claims, as such as an adaptive response to environmental contingency. Menary goes on to show that learning-dependent plasticity "reformats the representational capacities of the brain in terms of public representational systems" (Menary: 357). The essay continues by exploring how such top-down cognitive internalization is coupled with more bottom-up cognitive niche construction, and closes by opening the social-political question concerning how our potentialities for action in the world fluctuate depending on what processes of integration we have undergone.

The section closes with the Zdravko Radman's "On the Displacement of Agency: The Mind Handmade." The essay pits itself against the idea that agency is derived from some sort of centralized cognitive executer. As Radman points out, such a conception is the offshoot of a more intellectualist picture of cognition in general, where an action must be the result of some propositionally representable mental activity. This picture is challenged not in favor of a picture of "blind embodiment and naïve coping" but rather with the alternative idea that there exists practical knowledge generated apart from abstract rationalization that still can effectively cope with the world (Radman: 370). For Radman, the hands are the perfect vehicle unto which we can ascribe something like bodily agency—they can skillfully and actively cope with their environment without recourse to central deliberation. The essay begins with a discussion of Gibsonian affordances where Radman illustrates that what is graspable to a subject depends on what matters to her in her ecological niche. It continues with an account of "manual perception" where it is argued that much of manual action depends on the interplay between manual guesswork and manual intelligence, or the idea that action is largely determined by "casting a net of the probable onto what will be picked out as our actuality" (Radman: 382). Radman cogently argues that agency is often displaced from the "inside our heads" to the points of engagement with the objective world (often the hands), and concludes that we should think of ourselves as a "participatory being that engages in worldly affairs (…) without having always to consciously deliberate" (Radman: 389). This conclusion is interesting but one wishes that Radman would have gone further. Theorists such as Lambros Malafouris (2008, 2013) and Colin Renfrew (2004) have argued that agency, and indeed, intentionality, should be thought of as co-operatively emergent phenomena not necessarily localizable within any single specific body. A thing in the world might have agentive status insofar as I am its possible "patient."[65] And as its patient I can realize an intention-in-action that such an

[65] The concept of patiency is developed by Alfred Gell (1998) for the purpose of illustrating the distributed and relational nature of causality with respect to agency. A patient is the counterpart to an active agent, though its passivity does not entail a lack of agentive power. A patient may in a different situation be an agent, and vice versa.

agent calls forth. One could thus view agency and intentionality as situationally emergent events in which things in the world fluidly participate depending on the interactive conditions present at a given place and time. Such a view surely seems compatible with an outlook that labels the human subject a "participatory being." But Radman's account only seems to displace agency from out of the head and into the hands. We are left to wonder whether he would endorse any further displacement.

6. Tomorrows Hands

In the last chapter in the book, "A Critical Review of Classical Computational Approaches to Cognitive Robotics: Case Study for Theories of Cognition?," Ettiene Roesch draws on his experience at the Brain Embodiment Laboratory at the University of Reading to elaborate contemporary robotics research. It may surprise some to discover (though not when one considers the themes of this volume) that attempts to design a robot with functional hands have been met with little success throughout the history of humanoid robot production. And if the hands are the gateway to the world, it is clear that contemporary research is not yet in a position to provide us with any robots with meaningful active relations. Roesch closes by maintaining that enactive robots do not yet exist. However, if one were to come about, it would have to comport itself not as a deliberative and precisely calculating machine, but as skillful and dynamic entity in constant adjustment with its environment.

To conclude, Radman has done us all a service in editing this volume—the first of its kind to my knowledge. As hopefully evidenced here, there is more than enough material in this book to fuel numerous discussions down the road. And with such a high frequency of conceptual interplay between its various essays, one should not be surprised to flip open a journal and happen upon replies and rebuttals to and from its various authors. It's easy to see how such a volume provides the opportunity for further nuance and specialization. But it's also a treat to come in at the ground floor of such an enterprise.

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