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Book review

# Review of Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence, Andy Clark; Oxford University Press, 2003, $26.00, 240 pp. ISBN: 0-1951-4866-5

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The notion of the cyborg has exercised the popular imagination for almost two hundred years. In very general terms the idea that a living entity can be a hybrid of both organic matter and mechanical parts, and for all intents and purposes be seamlessly functional and self-regulating, was prefigured in literary works such as Shelly's *Frankenstein* (1816/18) and Samuel Butler's *Erewhon* (1872). This notion of hybridism has been a staple theme of 20th century science fiction writing, television programmes and the cinema. For the most part, these works trade on a deep sense of unease we have about our personal identity – how could some non-organic matter to which I have so little conscious access count as a *bona fide* part of me? Cognitive scientist and philosopher, Andy Clark, picks up this general theme and presents an empirical and philosophical case for the following inextricably linked theses.

1. The human mind is *naturally* disposed to develop and incorporate tools.
2. Humans have *always* been to a greater or lesser degree cyborgs.

These two theses give the informal derivation of the title: *Natural*-Born Cyborgs. Clark's appropriation of the image of the cyborg is in the service of these theses and has little to do with some futurist utopian manifesto or nightmarish "post-human" scenario. His interest is in addressing a question central to cybernetics: "How does human thought and reason emerge from looping interactions between material brains and bodies, and complex cultural and technological environments?" In the service of answering this question, Clark considers a diverse selection of technological props or aids from the commonplace (the mobile phone) to discussion of implants and collaborative filtering programming to the more unusual (the prosthetic performance artistry of Stelarc).

Clark's project is threefold with one primary task and two derivative tasks. The primary task

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is to dispel the fear generated by the sense of exoticism typically attached to the notion of the cyborg. On closer examination the integration of technology (the artefactual) with the biological is so ubiquitous, it is in many respects banal: ''It lies on a direct continuum with clothes, cooking, bricklaying, and writing.'' (p. 174). Clark's broad conception of technology (counterposed by his overlooking of biotechnology) raises questions about the concept's extensional and intensional adequacy. His inclusion of language, for example, seems to render it so broad as to be vacuous (Clark, 2004; Clark, 2005b; McKenzie, 2004). Clark's second task is to emphasize the ''capacity to creatively distribute labor between biology and the designed environment is the very signature of our species'' (p. 174). And finally ''*who we are* is in large part a function of the webs of surrounding structure...'' (p. 174). Discussion of these three themes cut across the eight chapters that comprise this book.

Clark's Cyborg metaphor turns on the conjoined idea that (a) cognitive processes extend into the world and, (b) cognitive states extend into the world whereby objects are the repositories of data that can be accessed. Clark is a leading researcher in a loose anti-Cartesian non-representational coalition comprising dynamical-, embodied-, extended-, distributed-, and situated-theories of cognition (DEEDS). DEEDS should be set in contrast to the Cartesian inspired orthodox materialist-computationalism which has been closely tied to a representational theory of mind, the idea being that the fundamental relation of a person to the world consists in the relation of the content of an individual mind to the world of objects, events, and states of affairs as represented by that content. Implicit is the methodological supposition that cognition can be studied independently of any consideration of the brain, the body, and the physical or social environment. Cartesian (metaphysics and epistemology) is highly individualistic in the sense that it focuses on mental operations of cognitive agents in isolation or abstraction from other persons and contexts. The DEEDS literature holds that the most fundamental variety of human action consists in the apparently unthinking, skilled action that makes up much of our everyday activities, and that does not require mental guidance or intervention for its successful accomplishment (p. 33). It should be noted that such a critique does not commit one to the wholesale dismissal of representational theories of mind (Wilson, 2004). The relationship of the Cartesian legacy to cognitive science is often presented in caricatural form; for a nuanced assessment see Wheeler (2005). Of course, embodiment has been a major theme in robotics (see Bedau, 2005; Ziemke, 2002).

As a DEEDS theorist, Clark understands there to be a reciprocal relation between our conceptual creativity and the environment (natural and artefactual), to intimate, regulate and inform concepts and action. Whatever the resistance to the notion of the cyborg, it does not turn upon the integration of biological and artefactual as such but upon the perceived ''transformative potential of this coalition'' (p. 22). That there is a transformative potential is precisely Clark's point and this is to be embraced. To define ourselves in ''brutal opposition to the very world in which we live love and work'' (p. 142) is an incoherent notion. The history of human-artefact integration one might say is also a history of the civilizing process. The pencil and paper or the hammer are paradigm examples of transparent tools in that they are so functionally effective and finely attuned as to be invisible: ''[t]here is no merger so intimate as that which is barely noticed'' (p. 29). The artist's iterated process of externalising and re-perceiving turns out to be integral to the process of artistic cognition itself (p. 77). Clark here is emphasising the human capacity to develop *practical* (situational) intelligence, as opposed to the rigidity of brute (abstract) computational power – hence Clark's famous slogan ''Good at Frisbee, Bad at Logic'' (Clark, 2001, p. 133).

Since Clark's self-labelled position ''active externalism'' is a species of externalism, we briefly have to note the fault-line that divides internalism and externalism in recent philosophy of mind and language. As there is a voluminous and confusing array and conflation of several philosophical polarities (Millikan, 2004, p. 228), I make no apologies for the crude outline. Externalism is the view that the content of a mental state is in part

determined by elements of the external world. By contrast, internalism is the view that the content of mental states is determined by features of the conscious subject without recourse to environmental conditions. It should be noted that externalists are not committed to the claim that mental states are somewhere other than in the head, and individualists do not think that what is outside the head has nothing to do with what ends up in the head. There is a great deal of resistance to what seems like counter-intuitive aspects to Clark's "active externalism", in particular to the idea that cognitive states extend into the world. Sterelny (2004) takes issue with Clark (and Chalmer's) apparent over-reliance on a functional similarity between internal and external memory, or to put it another way, the difference between cognitive *states* and cognitive *content* (Dartnall, 2004).

Can we accept that a state of believing is *really* out there? (Dartnall, 2005, p. 142). Clark's response is that his and Chalmers' concern is with the *dispositional state* of believing. So, for example one might believe some propositional fact such as "Madrid is in Spain" even if this knowledge is not in use (Clark, 2004). The proposition might be shared by two or more agents even if the *vehicle* as distinct from the content is in one case both internal and biological and in the other case external and non-biological. What this means is that it just does not matter whether the data are stored somewhere inside the biological organism or stored in the external world. What matters is how information is poised for retrieval. In other words "it is not knowing so much as knowing how to find out" (p. 67). Our sense of location is not simply a function of our beliefs about the location of our body (p. 91): it is the two-way flow between brain, body, and world that matters.

Another grade of integration is exemplified by microchipped pets, implants such as an auditory prosthesis, the pacemaker, artificial heart transplantation and implantable neural biomimetic electronics (Berger & Glanzman, 2005). But it is the example of Kevin Warwick that seems to capture the cyborg of the popular imagination: Warwick has had neuro-surgical implants placed into the median nerves of his arm linking his nervous system directly to a computer. These examples serve to illustrate that whether the technology is external, invisible or is deeply embedded in the biological being, is neither here nor there: the mark of human intelligence and experience is, and has always been, a coalition with the artefactual. Of course, there are more "opaque technologies", technologies that are visible in that the required skills and capacities are not yet sufficiently developed. But this does not detract from Clark's point: such technology should contribute nothing to the complexity of the tasks they support – "complexity should reside in that of the task, not the tool" (p. 45).

These examples have mereological import to some and it is here the tricky topic of personal identity comes into play. This topic has, at best, been very cursorily treated by most DEEDS theorists; at worst, totally ignored. Though there are problems in the presentation of this topic in *Cyborg*, it offers the most sustained treatment yet. There is a voluminous literature in the analytic philosophical tradition going back to Locke that considers the notion of personal identity abstracted from any socio-cultural context. Lockean theories take psychological continuity to be the criterion of personal identity. Clark takes the view that we are not just a kind of rational or intellectual presence but a conglomeration of ongoing goals, projects and commitments that cannot arbitrarily be changed. One recognises oneself in part by keeping track of this flow of projects and commitments; others recognise me not only by my physicality but also by some distinctive nexus of projects and activities. It is Descartes' notion of a centralised controller, some central cognitive and conscious essence that makes me who and what I am (p. 138) that Dennett (1991) and Clark take to task. In Clark (2004) he explicitly says that at root he is offering a kind of no-self theory. This has strong resonance with Derek Parfit's (1984) and Dennett's (1991: 423) Buddhist-like conclusions. Parfit deploys science fiction inspired thought experiments to test our intuitions about self identity. Parfit distinguishes two views about the nature of persons, one the Non-Reductionist, the other the Reductionist. The former is the Cartesian Ego whereby a person is distinct from his brain, body and experiences. The latter, Parfit's

position, is that the existence of a person just consists in the existence of his brain, body, his thoughts, deeds and innumerable other physical and mental events – personal identity is not a separate further fact.

Clark's proposal is that all that should matter is that the conscious self has a broad sense of what the entire situated and embodied agent can and can not do: so fitted with a new prosthetic leg that now allows me to walk, my sense of what I can do must rapidly alter and catch up and this bundle of "taken-for-granted" skills, knowledge, and abilities that surely structures and informs our sense of who we are and what we know (Clark, 2005a, p. 8).

Orthodox cognitive science has systematically overlooked not only the location of thinkers in their physical environments, but has also overlooked the interactions amongst thinkers in the ambient social soup. Clark's theme of looping interactions between material brains and bodies, and complex cultural and technological environments is exemplified in another domain – the sociality of minds. The social and distributed cognition emphasis on the social context of knowledge has begun to redress the lacuna of de-contextualised theorising in the Plato-Descartes tradition. While Clark does not tackle social epistemology *per se*, his Chapter 6 entitled "Global Swarming" outlines a fertile source of ideas for social epistemologists. Clark discusses "collaborative filtering" (CF) as exemplified by Amazon.com which exploits the principles of "swarm intelligence". CF exploits similar principles to those underlying pheromone-based self-organization of ants and bees whereby each episode of use or access by an agent lays down a trace. After a sufficient amount of activity (here consumer activity), exploitable patterns emerge. Self-organisation as a general principle has much wider application in areas of information extraction and retrieval. This activity supports a kind of automatic pooling of knowledge and expertise and is so powerful precisely because tracks and trails in consumer space are laid down as a by-product (unplanned and emergent) of the primary activity, online shopping. One of the great advantages of this unplanned and emergent activity is that it is finely attuned to consumer behaviour. The downside is that there runs the risk of "a kind of *dysfunctional communal narrowing of attention*" (p. 158) that can be self-fulfilling. What would be interesting would be to examine the principles of CF in relation to the notion of group minds – can the aggregation of individual activity as outlined in CF give rise to minimal emergent group psychological properties? (Rupert, 2004, 2005; Wilson, 2004). Another question to be considered is how are the principles of CF to be integrated into theories of memetics of ideas?

In Chapter 7, Clark highlights some socio-political and ethical worries he has about human-centred technology. Clark grants that the seeds for the nightmarish scenario are latent, but is sanguine about the prospects of this vision coming to fruition. Clark is hopeful that there will be an organic realignment of moral and technological value. Every technology is a two-edged sword, conveying benefits and disadvantages. Clark is a technological agnostic: the proliferation of digital technology in our everyday lives is neither intrinsically good nor intrinsically evil. Of course there are socio-moral-political issues but these are germane to the general history of our relationship to technology from the Industrial Revolution to the Digital Age. I do not think that Clark can plausibly be characterized as buying into the unreflective hype of techno-culture hypercapitalism (Thompson, 2003, p. 190) or "pre-dotcom crash ebullience about technology" (McKenzie, 2004). As noted at the outset, Clark's work has little to do with some misplaced futurist utopian manifesto or nightmarish "post-human" scenario.

*Cyborgs* is, in publishing parlance, a trade book: it has no pretensions to be otherwise. This said, *Cyborgs* lays down the gauntlet to mainstream philosophical discussions of personal identity by offering some profoundly interesting metaphysical puzzles. I think the publisher's recommendation that Clark abstain from devoting a whole chapter to personal identity (in Clark's terminology "Soft Selves") as unsuitable for such a book (Clark, 2004, note 4) is an affront for the reader and the author, the author being one of the most accessible and stylish of writers around.

Clark, ever engaging his critics, has the unusual distinction of making his critics appear more eloquent than they really are. Thus the novice coming to Clark via *Cyborgs* should have no problem in following the debate as set out in either the now classic primary literature (Chalmers & Clark, 1998; Clark, 1997) or in the secondary literature referred to below.

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