Journal of Evolution & Technology

A peer-reviewed electronic journal published by the Institute for Ethics and Emerging Technologies

ISSN 1541-0099

Posthumans and Extended Experience

By Robert Pepperell
Senior Lecturer
School of Art & Performance,
University of Plymouth,
Plymouth, UK.
Please contact pepperell@ntlworld.com for correspondence

Journal of Evolution and Technology - Vol. 14 - April 2005
http://jetpress.org/volume14/pepperell.html

Abstract

This paper offers a posthumanist account of the relationship between humans and technology, the nature of human existence and the potential for extended life. The paper contributes to the life extension debate currently going on within posthuman studies, but rather than looking at extending life-span in a temporal sense I propose a metaphysically extended view of human existence. Arguing against those who wish to reduce human essence to a flow of symbolic information (uploading the mind, etc.), I posit the posthuman as a radically extended and embodied being whose experience is potentially boundless. To support this position, I outline the case for an ontological approach I term 'extensionism', which draws on recent philosophical notions of the 'extended mind' as well as more ancient Buddhist ideas of 'dependent origination'. Extensionism stresses the continuities between objects and events rather than the divisions. I use this approach to argue for the continuity between humans and technology, in contrast to those who see an inherent division, or even antagonism, between them. I conclude by offering a description of technologically-enhanced (post)human experience that transcends distinctions but is nevertheless grounded in the world.

Introduction

One of the most frequently discussed topics in posthumanist and transhumanist circles is life extension, which normally denotes the indefinite prolongation of life through chemical, cryogenic or other technological means. [1] Rather than proposing extending life-span, this paper stresses the potential for extending life-*experience*, that is, expanding our understanding of what being human is — even if that implies, as I will argue, that we consequently find ourselves becoming *post*human.

This paper presents a plausible argument about the condition of human existence at this moment in history. But the picture is very complex, as one expects, and even observers ostensibly arguing from similar positions can find themselves at odds. While taking a posthuman[ist?] stance, I resist the widespread tendency amongst advocates of posthumanism toward 'disembodiment' — the proposed distillation of human essence into some immaterial form. As I hope will become clear, I do not believe that humans or human experience can be reduced to an essence — digital or otherwise — free from the contingencies of corporeality. Furthermore, there are those for whom rapid technological progress seems to challenge the authority and sanctity of humankind, threatening to technologically displace all those qualities and values we hold sacred – creativity, intelligence, free will and of course, consciousness. There is understandable anxiety aroused by the prospect of the human as either technologically dematerialised or technologically displaced – that is, carrying on in some new form or not carrying on at all.

How then can we make sense of these complex and competing ideas — the hopes of liberation and the fears of displacement? Part of the problem, I suggest, lies in differing understandings of what 'posthumanism' means. Put in polarised terms, there is the posthumanism of *disembodiment*, which wants liberation from the encumbering limitations of the physical realm. Then there is the posthumanism of *embodiment*, which recognises hitherto concealed continuities between realms that were once held as distinct and bounded, such as mind and body, or human and machine. This includes, as we shall see, the continuity between humans and everything else in the world, with a consequent loss of the human supremacy implicit in more extreme tendencies of humanism. [2]

By advocating a post-humanism (literally *after*-humanism) of unbounded embodiment, which draws on some ancient and fundamental principles of Buddhism and places them in a contemporary technological context, I hope this paper goes some way toward establishing a plausible world view. In our enthusiasm for the liberating potential of technology, we should not, I claim, neglect the extraordinary potential for 'extended life' offered by grasping existence in its full complexity.

"Man's fall"

To what extent are humans unique or distinct from everything else in the world? There seem to be two conflicting responses: that we are essentially distinct from everything else in nature or that we are not essentially distinct from anything else in nature. To complicate the picture, arguments from theology and humanism have been used in favour of the first while evidence from science can favour both.

In the late nineteenth century there was vigorous public debate about the origin of humans and particular resistance to the notion that we descended from apes. This resistance was based in large part on the assumption of human uniqueness and supremacy, as the anti-Darwinian Bishop "Soapy Sam" Wilberforce declared:

> Man's derived supremacy over the earth; man's power of articulate speech; man's gift of reason; man's free will and responsibility; man's fall and man's redemption; the incarnation of the Eternal Son; the indwelling of the Eternal Spirit

> — all are equally and utterly irreconcilable with the degrading notion of the brute origin of him who was created in the image of God, and redeemed by the Eternal Son assuming to himself His nature. [3]

Homo sapiens was generally regarded as the supreme species on Earth and, depending on one's point of view, either the apex of God's creation or the crescendo of Darwinian evolution. Even for those most supportive of Darwin's suggestion of the evolutionary continuity between humans and animals, such as Thomas Huxley, it was evident that 'Man' was a superior being and to that extent a quite distinct creature. [4] Alfred Russel Wallace, the co-originator of the theory of natural selection, also argued that our physical features, brain size, and moral faculties set humans apart from all other species. But to Darwin's dismay, Wallace was forced to conclude these traits could not be explained by the laws of natural selection applicable elsewhere in nature but rather were evidence of some higher, guiding intelligence. [5]

Twentieth-century discussions about the nature of humanity focused more on scientific arguments than the religious ones. Scientists studying the complexity of our cultural behaviour, our use of language and intricate tools, our specific genetic makeup, or our neurological specialisation tried to account for human uniqueness according to the generally materialist principles of anthropology, evolution, genetics or neurobiology. For some philosophers, such scientific accounts confirmed a well-established presumption about the exceptional and distinct status of human beings. Asking 'what is it to be human?', Kenan Malik summarises the historical position:

> For much of the past 500 years, scientists and philosophers have taken it for granted that human beings are exceptional creatures, not simply distinct from other animals but superior to them, because of our possession of reason and consciousness, language and morality. [6]

But according to Malik, rather than sustaining this tradition of 'exceptionalism', some recent developments in evolutionary biology, advances in genetics, neuroscience and artificial intelligence pose new challenges to long-standing ideas of human distinctiveness. He fears humans are increasingly seen by science as just another kind of animal (which was at the root of many earlier objections to Darwin) or another kind of machine – that is, as something not essentially separate from the rest of the world.

> … the attempt to understand humans in the same language as the rest of nature ignores an essential quality of being human — our subjectivity. Humans are simply not like other animals, and to assume that we are is irrational. [7]

Like many before him, Malik posits the human as different from all other creatures and so implies a notional boundary between the human and non-human domains. However, such appeals to humanist exceptionalism can seem anachronistic when set against the trajectory of current science and technology. Rather than confirming the boundary between the human and non-human domains, the expectations bound up in technologies like xenotransplantation, artificial consciousness and intelligence, synthetic replication, biotechnical integration and cloning tend to erode the distinction between humans and animals, humans and machines, humans and the environment, or humans and other humans. We may expect to share organs with pigs, sport prosthetic limbs, find ourselves digitally extended into the world by a telepresence system, or confront identical copies of ourselves.

The 500-year tradition of exceptionalism (if Malik is right) had led humans to presume they were physically and mentally distinct, bounded by and from the world around them. For humanists the world is an object to reflect upon from the insulated vantage point of a unique subjectivity, not something humans *are*. Despite humanist protestations, however, it seems we are entering a new phase of social development, one that is sometimes called 'posthuman', in which humans are increasingly seen as less distinct from animals, machines and the environment. These developments make it more difficult to maintain the notional boundaries that for so long have held humans apart from the world and each other.

Embodied posthumanism

As already noted, the term 'posthuman', along with 'transhuman' and 'post-biological', has been employed in a number of different ways. For some commentators, such as Francis Fukuyama in *Our Posthuman Future*, the posthuman is the biotechnologically mutated non-human — a creature that remains biologically encased but divorced from its natural biological origin [8]. For others the posthuman is the technologically encased successor to the soon-to-be-obsolete biological human — a cyborg-entity inhabiting data-space, enjoying a computationally generated consciousness unconstrained by the physics of materiality and the pressures of mortality.

The robotics researcher Hans Moravec has been a prominent and influential advocate of the notion that human consciousness is essentially a process of abstract symbolic manipulation, one that in the future could be simulated in a disembodied computational medium. He has written enthusiastically about the "bodiless mind" [9] and in a recent interview made this claim:

> It's not the physical thing itself where the consciousness resides. It's in the abstract interpretation, which, in the case of consciousness, is self-closing. . . I see no reason why you couldn't do exactly the same thing for a robot, or for an abstract simulation. So you have a person who's really just a simulation inside of a computer, but they interpret themselves as having thoughts, feelings, beliefs, and they feel themselves to be real and to experience their existence. [10]

Although a highly attractive scenario for those wishing to mechanically emulate human beings, this kind of dualism [11] overlooks some crucial aspects of human existence. For instance, we are conditioned by physical and biological constraints without which our experience would have a very different meaning, or perhaps no meaning at all. To give a few brief examples: our sense of subjectivity — the knowledge we have of ourselves as sentient beings — does not seem to be wired into our brains in the form of some pre-given 'program' (at least I know of no evidence that it is). Rather it develops as we interact dynamically with the world and other sentient beings who also occupy mobile bodies, giving rise to what the philosopher Edmund Husserl called 'intersubjectivity'. [12] Likewise, our sense of desire for others, or the pleasures of satiation, are physically incarnate as much as they are mentally experienced; they arise from, and gain their meaning from, the extended corporeal realm of sensory being. Finally, our sense of the value of life — with its routines and vicissitudes — is almost wholly underwritten by our sensitivity to its annihilation (biological death). [13]

Support for an embodied interpretation of posthumanism, and recognition of its historical importance, can be found in recent critical commentaries in the field. In *How We*

Became Posthuman, N Katherine Hayles gives an account of the emergence of posthumanism and criticises the tendency found in some of the relevant literature to regard human thought of the future as becoming technologically disembodied. She argues for the importance of "putting embodiment back in the picture":

> . . . embodiment makes clear that thought is a much broader cognitive function depending for its specificities on the embodied form enacting it.

. . . and goes on to assert the historical significance of this position . . .

> This realization, with all its exfoliating implications, is so broad in its effects and so deep in its consequences that it is transforming the liberal subject, regarded as the model of the human since the Enlightenment, into the posthuman. [14]

By grasping this historical shift we arrive at a different understanding of our human predicament from that of our humanist forebears, different even from some of our posthuman colleagues whose concern with extending life by migrating consciousness from brains to machines, to some degree, misses the point. When advocating extended life we should recognise that we are really advocating extended *experience* (after all, what would life be without experience?), and an experience based on the contingencies of embodied existence at that. The real posthuman, then, is properly conceived not as an abstract flow of symbolic information but as a radically extended and embodied being whose experience, I will argue, is potentially boundless.

Extensionism

We live in a age characterized by various kinds of technical and social extension: our capacity to gather information about the natural world at galactic and sub-atomic scales has been extended by devices such as radio telescopes and particle accelerators; we can communicate over immense distances with almost no delay, expanding our purview to an astonishing degree; global trade broadens markets for goods and services across national boundaries, extending once localized commodities and cultures across continents to a greater degree than ever before. These are obvious and uncontroversial examples.

But there are other cases of technical and social extension that are perhaps less obvious. Our propensity to externalize mental data by the use of recording and retrieval devices has led some philosophers to consider whether the mind extends into the world rather than being, as is often supposed, confined to the brain. The philosophers David Chalmers and Andy Clark have proposed the notion of the 'extended mind' to describe how internal mental states 'in here', such as beliefs, extend into external physical conditions 'out there'. They argue that if external objects play a role in constructing or modifying our beliefs, then those objects can reasonably be said to form part of those beliefs:

> While some mental states, such as experiences, may be determined internally, there are other cases in which external factors make a significant contribution. In particular, we will argue that beliefs can be constituted partly by features of the environment, when those features play the right sort of role in driving cognitive processes. If so, the mind extends into the world. [15]

Coincidentally, from another perspective the biologist Rupert Sheldrake has also written and lectured on the 'extended mind', suggesting recent experimental evidence demonstrates the mind is not restricted to the brain but extends outwards to the objects we perceive. [16] Whether or not one accepts Sheldrake's claims, or Chalmers and Clark's argument, they are part of a pattern of ideas that could be characterised as 'extended' ways of thinking, and would include the debates amongst ethicists about the degree to which human rights can be conferred on animals as well as contemporary advances in astronomical remote sensing that stretch our conception of the scale of the universe.

Seen together, these different kinds of extended thought have a cumulative effect on our understanding of what it is to be human. Whereas we might have imagined human beings to be spatially or temporally localised, increasingly we might think of them as spatiotemporally distributed in mind and body. The use of communication and recording devices, for instance, undermines our habitual notion of the individual as someone who exists in only one specific place at one moment. When confronting a person on the phone, radio or television, do you perceive them or an electronic signal that represents them? Are the person and the signal identical or separate? And where precisely is a person who is being broadcast? Surely they are, to some extent, embodied in the broadcast itself. One could reasonably contend that the person being broadcast and the signals that carry their sound or image combine to form a distributed whole through which the original human agent becomes vastly extended across space, and in the case of recordings, across time.

To take another case, think about this text you are reading. It only makes sense because I use language to express my thoughts in material form, which you can later reconstruct as thoughts in your own mind. In a strange way, my mind has been extended through the medium of text to your mind, and so exists beyond my brain. In a sense, the page you are reading is partly human, partly me, and now partly you — a state of affairs that would be consistent with the externalist approach argued by Chalmers and Clark above.

For the sake of convenience, I have borrowed the term 'extensionism' [17] to describe this tendency toward extendedness in contemporary thinking. In brief, extensionism looks at objects and events in terms of how they extend from one to the other rather than how they are to be distinguished from one another. In fact, elsewhere I have argued that there are no essential distinctions between any objects or events in the world at all, other than the distinctions generated by human cognition. [18] As a consequence, the argument goes, objects and events do not really have boundaries or edges (except the ones we impose upon them) and therefore, being without edges, extend indefinitely.

I can illustrate the extensionist approach with a brief example. Think of a coin. Even though it appears as a discreet object, with clearly demarcated edges, there are a number of dimensions of its existence that extend beyond its apparent boundaries. The value of the coin, for example, is not intrinsic to its material makeup but gained from its currency within a wider financial system; the emblems and symbols it carries refer to, and draw their significance from, an extensive cultural milieu; the fundamental particles composing the metal from which it is struck were formed in the crucible of the cosmos, with a history dating back to the beginning of, and with a future as extensive as that of, the universe.

These few examples testify to the wealth of associations, purposes, connections, histories and potential ramifications of each and every object, which we largely choose to ignore for the sake of convenience, restrictions of time, or simply because they lie beyond our perception or conception. Yet despite our ignorance of such extended dimensions, all objects possess them, and to a degree so numerous as to be effectively infinite.

There is a strong resonance between the view just outlined and a founding principle of Buddhist thought known as 'dependent origination'. Put simply, the principle states that no object comes into being or exists in isolation. Each object depends on an indefinite series of other objects to give it form and identity. The *Dictionary of Buddhist Terms and Concepts* describes it succinctly:

> . . . all beings and phenomena exist or occur only because of their relationship with other beings or phenomena. Therefore, nothing can exist in absolute independence of other things or arise of its own accord. [19]

This insight, at once simple and profound, demands an extraordinary gear change in our habitual understanding of the world. Here it informs a mode of analysis, termed extensionism, which insists on the subjective contingency of multiplicity. In other words, that the appearance of a universe made of many things is a construct of the human mind [20]. It is this appearance of multiple distinctions between putatively isolated objects that leads us to habitually discount the dependent attributes that constitute the object's extended dimensions.

One could summarize the extensionist approach, as outlined here, in the following way:

All objects have extended dimensions, but we normally acknowledge only a fractional part of their true extent because of constraints inherent in our perceptual apparatus and the coercive effects of time. Rather than regarding discernible objects in the world as integral and discrete we must recognise that they, and their repercussions, extend indefinitely through space and time.

It is not the purpose of this paper to consider the ramifications of this statement in detail. This would require another kind of article altogether. Instead I wish to briefly consider how an extensionist perspective might inform a conception of human and posthuman existence.

Extended humans

In common respects, human beings are regarded as specific conglomerations of biological tissue or as particular expressions of a genetic sequence. For most social purposes the physical extent of a human coincides with the boundary of the outer skin. But definitions of humans that rely on a skin-level demarcation, or genetic sequences, tend to discount many other 'extended' dimensions of human existence that not only compose the active lives of individual people but also the overall phenomenon of humanity. If we can accept, as suggested above, that the repercussions of all objects extend indefinitely through space and time (whether we acknowledge them or not), then the apparent boundaries that delimit each individual human are in fact provisional, since we too extend indefinitely through space and time.

To give some examples: just as with the coin, our physical structure is composed from fundamental particles as old as the universe, particles that were once immeasurably dispersed across space and will be again when our bodies decompose; our genetic code can be traced back to the origins of life on Earth, will be perpetuated indefinitely in some mutated form (barring an unforeseen cataclysm) and is distributed across all members of the species [21]; the stored contents of our minds (ideas, images, words, etc.) are largely composed of stimuli drawn from widely-distributed sources in the environment and can be re-distributed through written or oral communication, as mentioned above.[22]

The upshot is that individual humans in the sense of isolated, separate objects do not really exist, other than in our imaginations. What exists instead are non-contained beings who, in numerous ways, are distributed far beyond their local space and time, caught in an infinite chain of events without beginning or end. Each act I make, whether trivial or expansive, has further consequences that will ripple through infinity, just as each act is the extension of an indeterminate number of prior events.

When viewed from the extensionist perspective proposed here, humanity as a whole is constituted by the totality of all the repercussions of individual human existences.. The result is that our conception of human beings must include our wider cultural environment as well as our physical structure, and in particular our technological environment, not just as an external adjunct to the human condition but as an inherent part of what constitutes us in the first place. To put it succinctly:

Humanists might regard humans as distinct beings, in an antagonistic relationship with their surroundings. Posthumanists, on the other hand, regard humans as embodied in an extended technological world.

Humans, posthumans and technology

By including the extended technological world in our conception of what constitutes a human being, we further revise the traditional humanist view that holds we are individuated from one another and separated from the (technological) world. Posthumanists find themselves extended by and embodied in the very machines they once regarded as distinct. Put concisely, technology is embodied humanity.

Yet despite this unity, there are many futurologists, science fiction writers and movie-makers still attached to the idea of technology as an alien predator, a potential impostor with which we are destined to come into conflict. The premise that machines might usurp human uniqueness, or turn on their creators and take over the world has been hashed out in countless plays, books and motion pictures. [23] Even sophisticated writers on technology sometimes assume that the devices surrounding us are somehow 'other' than human, almost a self-sufficient living realm with their own laws of evolution and logic of existence. [24] At its worst this conviction leads to 'technological antagonism', the belief not only that technology causes change but that it threatens human uniqueness, even survival — a view that fails to take account of who creates the technology in the first place.

Fears about technology seem particularly pronounced when a threat to the mystery and uniqueness of human creativity is perceived. Talking a year before being beaten at chess by Big Blue, IBM's RS/6000 SP-based computer, Gary Kasparov warned:

> To some extent, this match is a defense of the whole human race. Computers play such a huge role in society. They are everywhere. But there is a frontier they cannot cross. They must not cross into the area of human creativity. It would threaten the existence of human control in such areas as art, literature, and music. [25]

A prima facie case of such a threat is the work of David Cope, a musician and computer programmer who, over some twenty years, has developed a system called Emmy (Experiments in Musical Intelligence) which creates original music in the style of certain historical composers. This is achieved by sampling a range of their works and identifying within them patterns or 'fingerprints' that are unique to that composer's style. These patterns are then 'recombined' to produce new musical pieces bearing the personality of the composer who was sampled. The efficacy of his system is demonstrated by an experiment in which one is asked to listen 'blind', as it were, to four short tracks of piano music, at least one of which is composed by a human and at least one by Emmy. This is something akin to a musical Turing test [26] in which the aim is to distinguish the human composition from the mechanical one. Very few people are able to do so. [27]

In *Virtual Music*, a volume of essays on Cope's work, several writers, including the eminent theorist Douglas Hofstadter, author of a seminal work on artificial intelligence, *Gödel, Escher, Bach* [28], express deep anxieties about the implications of Cope's work for the mystery and uniqueness of human creativity. At one point, talking of the pattern-based composition technique used by Cope, he says, ". . . the day when music is finally and irrevocably reduced to syntactic pattern and pattern alone will be, to my old fashioned way of looking at things, a very dark day indeed." [29]

However, in the same book the music theorist Eleanor Selfridge-Field reminds us that, despite those who think of Emmy as an autonomous agent threatening human uniqueness, the whole enterprise is manifestly 'human-dependent'. She writes:

> To consider that what Experiments in Musical Intelligence does is an entirely automatic process is to miss the fact of this [human] dependency. The program's functional context remains bounded by human values. [30]

One could expand upon her point by arguing that in order for this seemingly autonomous process to occur it requires the integration of at least three dense accretions of human skill and intelligence, including:

a. the musical sensibility of the composer encoded in the work that was originally sampled,

b. the quantity of painstakingly constructed computer code embodied in Emmy (consisting of some 20,000 lines of Lisp written over 18 years), and

c. the accumulated human endeavour bound up in the Macintosh computer system through which the data processing is conducted.

It is only by combining these and many other materialised accretions of human ingenuity that the musical experience can be generated.

Once machines are regarded as the distributed embodiment of human intelligence and skill, and not as an autonomous or alien force, many of the philosophical dilemmas associated with technological antagonism are dispelled. For the music written by Emmy is no more composed by machine than it is by a human, insofar as the machine is humanity in extended form. I have the sense that Cope would agree — to an extent. Speaking of Bruce Mazlish's critique of the 'fourth discontinuity' between humans and machines [31], Cope writes, "Machines do not represent another discontinuity. Computers and computer programs like Experiments in Musical Intelligence represent *extensions* of the human intellect, tools that allow us to achieve yet greater accomplishments." [32]

The contradictory nature of experience

Admittedly the description of human existence offered in this paper so far runs counter to the common-sense view held in daily discourse. This view holds we habitually engage with a world composed of discrete objects, creatures and events, including apparently autonomous technological objects. Indeed, without this habit we could not sustain any intellectual discourse since the fabric of language itself is composed from a mass of distinctions, each referring to something by a process of exclusion and separation, e.g. the cat is *not* the mat. But it is an error to conclude that such mental distinctions imply correlative distinctions in the world — that the cat is *really* separate from the mat.

Things in the world, as has been proposed, are inherently continuous with one another, not just because they lack precise boundaries by dint of their infinitely extended dimensions but also because they only come into existence, as far as we are concerned, when they impinge upon our awareness. And, insofar as any number of seemingly discrete objects impinge upon our awareness, they form a unity of presence within the mind, a unity of presence that nevertheless contains a diversity of objects. The peculiar character of daily experience, therefore, could be said to arise from the state of simultaneous contradiction whereby we perceive both unity and diversity at once. Although it seems implausible by orthodox logical standards, our habitual experience forms a perceptual whole that is also fragmentary, just as the world appears fragmentary whilst in fact being a whole. But while we are implicitly aware of the whole with the potential for expansive existence it offers, we remain circumscribed by the conceptual boundaries each perceptual fragment erects.

I would contend that by its very nature this experience is neither primarily mental nor exclusively physical, as neither are the objects in the world of which we are aware. The contradictory nature of experience transcends such distinctions to become the mark of human life; not life as mere biological or material process, but as the veridical sensation of presence felt in oneself and the world.

Extended experience

I have argued that we are entering a period in which we are coming to recognise the continuities not just between humans and machines but between all things that might previously have been held as bounded and separate. At the same time we must recognise the contradiction that it is only by first perceiving such boundaries that we can then transcend them. In doing so we are becoming increasingly posthuman – but not in the disembodied sense sometimes implied by the term. Instead we are physically grounded but conceptually extended, driven by material necessity but notionally transcendent. The historical epoch in which the human appeared to stand as a figure with a unique and permanent essence in an antagonistic relationship with the technological environment is closing. And although we are looking forward, we do so in a way that resonates with some ancient philosophical traditions. Buddhist thinkers have long spoken of the 'non-self' or *anatta* whereby the apparent distinctions giving rise to a sense of unique, distinct self are abrogated:

> The third Sign of Being is *anatta*, which literally means that no 'compounded thing' has an *atta* (Sanskrit: *atman*). The Buddha taught that in none of the constituents of the personality, the physical body, feelings, reactions, various mental attributes and discriminative consciousness is there a permanent element which distinguishes that man from any other. [33]

To recognise the lack of permanent entities, such as human selves, is to disavow what others regard as the unique human essence. To recognise the continuities between domains previously held only as distinct, or even as antagonistic, is to recognise their interdependence and ultimately their unity, as the principle of dependent origination holds.

The disavowal of the unique and distinct human proposed here need not lead to the abstracted, dislocated existence touted by some posthumanists, but to a human implicated in a wider corporeal-technological realm. It will be a being that, if it ceases to be human at all, will not be abandoned as a redundant shell, but implicated so widely in its extended eco-technological environment that it can no longer be demarcated. After all, the machines are really human, and through our mechanically embodied existence we may yet find salvation from the limits of bounded experience and the means to a fully extended life.

Notes

[1] For example, see the Immortality Institute at http://www.imminst.org.

[2] Humanism here refers to the belief "in human effort and ingenuity rather than religion" (Collins English Dictionary) with its tendency towards anthropocentrism — the view that Man is the central and most important entity in the universe.

[3] Wilberforce, 1874. In Oxford, England, in 1860 Bishop Wilberforce famously engaged Thomas Huxley in debate about the implications of Darwin's evolutionary thesis on the origins of Mankind. It has since become a legendary encounter in the

history of science, in part because the pro-Darwinian Huxley was reputed to have humiliated Wilberforce.

[4] For an account of the implications of Darwin's ideas, and Huxley's response to them, in the context of a discussion of the uniqueness of humans in relation to machines see Mazlish 1993.

[5] Wallace, 1870.

[6] Malik, 2001.

[7] ibid.

[8] Fukuyama, 2002.

[9] Moravec, 1995.

[10] in Brown, 2002.

[11] Dualism: the philosophical view that mental and physical realms are distinct. In this case it refers to the supposition that the mental realm is abstract/symbolic in a way that is independent of the physical world.

[12] In his excellent introduction to Husserl's later thought, Dan Zahavi writes of Husserl's analysis of the body in which he claims that: ". . . the experience of another as incarnated subject is the first step toward the constitution of an objective (intersubjectively valid) shared world." (Zahavi, 2003).

[13] The full arguments for an embodied view of cognition are far too complex to rehearse here, and readers are encouraged to refer to eminent proponents such as Varela et al. (1991), Damasio (1994), Lakoff and Johnson (1999), to cite a few. However, it is worth mentioning a couple of further points in favour of the case. Evidence from psychology suggests that phenomenal consciousness (the bit we know about) may be but a small fraction of the total volume of cognitive activity in the subject. The work of Libet et al. (1983) suggests our awareness of our own will may lag someway (1/5 second or so) behind the decision made by our bodies to take an action. This result poses severe problems for proponents of disembodiment, since it is not clear how one could separate the phenomenal part of consciousness from the unconscious parts on which it supervenes in order to upload it, many of which may be deeply integrated into the body. And a final point: even if we were to follow those advocating disembodiment in accepting a silicon-based consciousness, we would be able to point out that it is still *embodied*, but in silicon rather than flesh!

[14] Hayles, 1999. See also *Avatar Bodies: A Tantra for Posthumanism* (Weinstone 2004) in which the argument is made for a spiritual posthumanism constituted by relations between boundless living bodies.

[15] Chalmers & Clark, 1998.

[16] Sheldrake, 2003.

[17] A term more usually associated with the ethical debate about extending human rights to animals.

[18] See, for example, Pepperell, 2003. It should be said that this is a philosophical position held by many, not least by Friedrich Nietzsche (1984) who writes in Aphorism 19 of *Human, All Too Human*, "The assumption of multiplicity always presumes that there is something, which occurs repeatedly. But this is just where error rules; even here, we invent entities, unities, that do not exist."

[19] Matsuda, 1983.

[20] This is a situation verging on paradox: One could say there are no distinct things in the world, since distinctions exist only within human minds. In this way human minds are distinct and, since they exist in the world, distinct things do exist in the world, as do the distinctions that reside in the minds, one of which is the distinction between mind and the world.

[21] In fact although there are minute variations between one individual's genetic sequence and another's, enough to give a probabilistic forensic identification, the similarities far outweigh the differences. If human beings are expressions of genes, as evolutionary biologists and neo-Darwinists are fond of saying, then the individual variations are negligible compared to the total homogeneity of the 'pool' from which the individual emerges. In this extended sense, the genetic characteristics of the human are not bound in one individual but distributed; they act in concert through all the individuals that share (nearly) identical genes.

[22] One could also cite in this regard the 'quantum non-locality effect' whereby certain individual particles making up matter are known to have 'pairs' or 'twins' that mirror immediately the behaviour of their other part, regardless of distance. Matter composed of such particles cannot, therefore, be said to have singularly localized spatial co-ordinates. For an accessible exposition see Peat (1990).

[23] There are numerous examples in recent mainstream cinema, including *2001: A Space Odyssey* (Kubrick 1969), *The Terminator* (Cameron 1984), and *The Matrix* (Wachowski 1999).

[24] As an illustration, in his book about contemporary music and technology, *Strange Sounds*, Timothy Taylor (2001) criticises technological determinism as "pernicious" (p. 26). Yet in summing up he cites the DJ's use of the turntable as an example of where "human agency struck back" against technology's deterministic effects on "peoples' behaviour with respect to music" (p. 204). Such slips merely reinforce the notion of technology as some malign force emanating from an external domain — precisely the delusion Taylor elsewhere strives to debunk.

[25] Kasparov 1996 (Quoted in Cope 2001).

[26] The 'Turing test' is the general name for the "imitation game", the test of machine intelligence proposed by the mathematician Alan Turing in 1950 (Turing, 1950).

[27] I have tried this myself and was surprised to discover, along with many musical experts, that there was no obvious mark or feature by which Cope's compositions could be easily differentiated from others. In fact, my guesses were at least consistent: I incorrectly attributed all the non-Emmy generated pieces to Emmy and vice versa.

[28] Hofstadter, 1981.

[29] Cope, 2001.

[30] ibid. (My insertion in box brackets).

[31] Mazlish, 1993.

[32] Cope, 2001 (My emphasis).

[33] Humphreys, 1985.

References

Brown, D. J. 2002. An Interview with Hans Moravec. http://norlonto.net/index.cfm/action/interviews.view/itemID/44. (accessed 05.02.04).

Chalmers, D. & Clark, A. 1998. The Extended Mind. *Analysis* (vol. 58), 10-23.

Cope, D. 2001. *Virtual Music: Computer Synthesis of Musical Style.* Cambridge: MIT Press.

Damasio, A. 1994. *Descartes' Error*. New York: Putnam & Sons.

Dennett, D. 1992. *Consciousness Explained.* London: Viking.

Fukuyama, F. 2002. *Our Posthuman Future: Consequences of the Biotechnology Revolution.* New York: Farrar, Straus and Giroux.

Hayles, K. 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics.* Chicago: University of Chicago Press.

Hofstadter, D. 1980. *Gödel, Escher, Bach: An Eternal Golden Braid.* New York: Vintage Books.

Humphreys, C. 1985. *Zen: A Way of Life*. London: Hodder & Stoughton.

Libet, B. et al. 1983. Time conscious intention to act in relation to onset of cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act. *Brain* 106:640.

Lakoff, G. and Johnson, M. 1999. *Philosophy in the Flesh: the Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.

Malik, K. 2001. *What is it to be Human?: What science can and cannot tell us.* London: Academy of Ideas.

Mazlish, B. 1993. *The Fourth Discontinuity: The Co-evolution of Humans and Machines.* Yale: Yale University Press.

Matsuda, T. ed. 1983. *A Dictionary of Buddhist Terms and Concepts.* Tokyo: Nichiren Shoshu International Center.

Moravec, H. 1995. *Bodies, Robots, Minds*.

http://www.frc.ri.cmu.edu/~hpm/project.archive/general.articles/1995/Kunstforum.html. (accessed 15.12.04)

Nietzsche, F. 1984. *Human, All Too Human*. London: Penguin.

Peat, D. 1990. *Einstein's Moon: Bell's Theorem and the Curious Quest for Quantum Reality.* London: Contemporary Books.

Pepperell, R. 2003. *The Posthuman Condition: Consciousness Beyond the Brain.* Bristol: Intellect Books.

Sheldrake, R. 2003. *The Sense of Being Stared At, and Other Aspects of the Extended Mind.* London: Crown.

Taylor, T. 2001. *Strange Sounds: Music, Technology & Culture*. London: Routledge.

Turing, A. 1950. Computing Machinery and Intelligence. *Mind* (Vol. 54), 433-57.

Varela, F. et al. 1991. *The Embodied Mind*. Cambridge: MIT Press.

Weinstone, A. 2004. *Avatar Bodies: A Tantra for Posthumanism*. Minnesota: University of Minnesota Press.

Wallace, A. R. 1870. The Limits of Natural Selection as Applied to Man, in *Contributions to the Theory of Natural Selection: A Series of Essays*. New York: Macmillan.

Wilberforce, S. 1874. *Essays Contributed to the Quarterly Review* (Vol. 1), pg. 92-95.

Zahavi, D. 2003. *Husserl's Phenomenology.* Stanford: Stanford University Press.