



# laetus in praesens

Alternative view of segmented documents via Kairos

10 March 2013 | Draft

## Cyborgs, Legaborgs, Finaborgs, Mediborgs

### Meet the extraterrestrials - them is us

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## Introduction

Discussion of the identity of the modern human being tends to be relatively simplistic, requiring little comment. However the extreme dependency resulting from industrialization and development has effectively modified that identity in ways of which there is only a limited degree of recognition. This is an exploration of how the human being has already been effectively transformed into a cyborg through immediate dependence on technology in daily life -- with the technology becoming an extension of that identity. As argued here, using "cyborg" as a cognitive template, similar transformations of identity are associated with human dependence on legislation, finance and medicine -- through which identity is effectively defined.

Whilst cyborgs are a theme of imaginative science fiction, possibly characteristic of extraterrestrials (as with reference to the "[Borg Collective](#)" of *Star Trek* fame), the perspective to be explored in what follows is that those imagined characteristics are now a feature of human identity to an unexpected degree. Rather than anticipating extraterrestrials "from elsewhere", development has engendered "extraterrestrials" on planet Earth -- and "them is us" (adapting the much-cited phrase of [Pogo](#): *We have met the enemy and he is us*).

## Transformation of humans into cyborgs

[Cyborg](#), according to *Wikipedia*, is an abbreviated expression for "cybernetic organism", namely a being with both organic and cybernetic parts. The term is often applied to an organism that has enhanced abilities due to technology, notably as actively explored by the military. The term is already used to refer to a human with bionic, or robotic, implants -- as with current prosthetic applications (Ben Popper, *Cyborg America: inside the strange new world of basement body hackers*, *The Verge*, 8 August 2012). *Wikipedia* offers sections on [cyborg proliferation in society](#), in terms of medicine, the military, art, and body modification. It may be understood as [human enhancement](#). and include [powered exoskeletons](#).

Framed in this way, the transformation of humans is seemingly confined in a very particular manner -- to **devices attached directly and physically to the body, at least semi-permanently**. For individuals so directly "enhanced", the appellation may well be (jokingly) accepted -- as with dentures, spectacles, or even a wristwatch. Much more subtle is the manner through which identity is extended by the use of technology on which there is regular if not permanent dependence. In this case, the **indirect attachment to devices is primarily psychological**, as with regular use of familiar tools which need not be attached to the body, even when employed.

Tools of any kind, freely taken up, are well recognized as a means of extending the capacity of a human (Sam Lilley, *Men, Machines and History: the story of tools and machines in relation to social progress*, 1948; Teresa McCormack, et al., *Tool Use and Causal Cognition.*, 2011). Identification with tools is an acknowledged process, although less clear is how identity is (unconsciously) extended through the use of tools which come to define the person in the eyes of others -- and in their own sense of identity. How artificial is the boundary between an individual unclothed and one defined through particular clothing, or through a wardrobe of possibilities? Is a person a larger "complex" when identified with an automobile -- effectively a cyborg? With a weapon?

Arguably there is a spectrum of degrees of attachment by which the common sense of "cyborg" can be usefully extended to encompass identity extended through expertise in use of tools. When is a tool-user to be distinguished as a cyborg on this spectrum? Interesting cases are offered by those controlling [earthmoving equipment](#), or the remote control of [unmanned aerial vehicles](#) (drones).

The argument applies most evidently in the case of portable communication equipment (smartphones, etc) without which the person may feel "lost" and "bereft" -- even "undressed". The operating identity of the modern human is increasingly to be identified "through" such equipment from which disassociation is problematic, most obviously in the case of [social networking](#) and the associated [online identity](#). How much of an individual's virtual identity, is "really real" is explored by Tina Indalecio (*Exploring Identity in the Virtual World - Is that REALLY you? Psychology Today*, 30 April 2010).

A particular concern in the design of such environments, especially for simulations and video games, is ensuring a sense of [telepresence](#) ("virtual presence"). This allows a person to feel as if they were present, to give the appearance of being present, or to have an effect, via [telerobotics](#), at a place other than their true location. At what stage is such engagement to be understood as a key transition in the transformation of a human being into a cyborg? This would appear to be a function of the person's dependence on that modality -- on their identification with it.

The argument that the device can be removed in some way obscures the continuing dependence on its presence as a vehicle for identity. The individual is no longer to be defined without an array of such devices. Many people are clearly dependent on an array of such devices in the home -- most evidently the intensive users of electronic equipment.

Intercourse with others may be significantly determined by their enhancements as cyborgs -- if any. Inequality in enhancements may severely inhibit effective communication. This condition highlights the question of how to engage with an individual independently of such technology.

The point is well recognized in the case of a face-to-face meeting between persons in which the dialogue is repeatedly interrupted by electronic communications. However, rather than "interrupted", the dialogue may be understood as between a person enhanced with such capacities. Removing them to facilitate dialogue would be considered as being as questionable as removing clothing in order to meet "in the nude" -- although some meetings are specified as requiring people to switch off such equipments. Variants of the issue are evident in various forms of internet chat and dialogue. The identity of the individual, possibly as an "avatar" is essentially buried in the communication facilities and what can be expressed thereby. Rather than "cyborg", a more appropriate appellation could well be "cyberborg". Wikipedia notes that social networking effectively defines a community as a collective form of cyborg -- resembling even more closely the fictional "[Borg Collective](#)" of *Star Trek* fame.

Playful reference to "extraterrestrials" is appropriate in that it could be readily argued that, enhanced in this way, people are no longer psychologically "grounded" ([Sherry Turkle, \*Cyberspace and Identity\*, Contemporary Sociology](#), 28, 1999; J. R. Suler, *Identity Management in Cyberspace, Journal of Applied Psychoanalytic Studies*, 4, 2002). As many have already noted, they are beings of the technosphere, if not of cyberspace. Their identities are no longer confined to the biosphere and their actual location in some "space" may be a matter of debate -- possibly to be better understood in terms of non-locality. For individuals unenhanced in this way, the enhanced are indeed "extraterrestrial".

The effective transformation of humans into cyborgs through medical implants and other prosthetic devices, helps to make the point that "enhancement" may also be understood as use of technology as a "crutch". In this sense increasing numbers of people are effectively "on crutches", of which spectacles may be the simplest example. Another simple example is the phenomenon of people using an automobile to drive a block to a shopping centre -- through loss of ability or desire to walk, or the insecurity associated with exposure on the roadway. Dependence on air conditioning and heating technology offers another example.

Curiously the process of industrial development may then be understood as the progressive transformation of individuals into cyborgs

## Transformation of humans into legaborgs

Whilst recognition of the transformation into cyborgs is readily to be understood, that into "legaborgs" is quite another matter. However, just as individuals are dependent on and defined by technology, they are also restrictively defined by legislation and the consequent civil administration regulations. Examples include:

- "male" and "female" -- but rarely transexual
- "single", "married", "divorced" -- but rarely the intermediary categories through which people are typically obliged to survive
- "employed", "unemployed" -- but rarely issues such as "underemployed", "long term unemployed", "bonded labour" and the like
- "legal" or "illegal" -- especially as these may apply to immigrants and those "without papers", or "without an address"
- "accredited" or "qualified" -- as required with respect to certain professions, or in order to undertake certain activities
- "licensed" or "unlicensed" -- as with recognized capacity to drive a vehicle or engage in some practice (as with "accredited")
- "criminal" -- as with those convicted of a crime, irrespective of their innocence or mitigating circumstances

These examples may be extended or reframed in terms of religious law or tribal law. In each case engagement with the individual may be primarily determined by the legal framing -- effectively by the "enhancement" ensured by legislation. Those without "complementary" legal enhancements may well be severely constrained in their ability to communicate effectively with each other.

The point to be made is that despite recognition of human identity, as framed by the variants of the [Universal Declaration of Human Rights](#), or because of them, human identity is defined legally -- and subject to legal interpretation. People are enabled to express their identity through the legal attributes with which they are associated -- and possibly only through those. These may well extend their capacities beyond those available to those who are not appropriately "accredited" or "licensed" -- those who have not been legally recognized as "citizens", for example. Such is the power of this framing, that (for whatever reason) some may even be legally defined as "non-existent", reinforcing any social tendency to define them as "non-persons". Individuals without the requisite enhancements may well experience themselves as non-persons.

It is interesting to note how individuals increasingly frame their existence through the network of legal provisions, extended by new

legislation and contractual provisions. They are defined by their "rights". These are enabling "vehicles" through which they can navigate the network of social relationships. This legally defined network can be seen as corresponding to the electronic network enabling individuals and groups as cyborgs. There is a profound irony to the possible need to recognize that legal recognition of "human rights" merits interpretation as being effectively a degree of "instrumentalisation" of the human being. Such a framing is also evident through legal instruments which effectively define human beings in any way.

The sense of "professional identity" effectively corresponds to that of virtual identity in electronic communication -- as an "avatar". This may become especially obvious in interaction with the legal system whereby some are left with the overriding impression of the inherent inhumanity of those with which they have to deal. There may be little sense that a human being lies within those legally enhanced to that degree.

As with the case of cyborgs, the legal "enhancements" can also be usefully recognized as "crutches". Without them, as with legal recognition of [entitlements](#), an individual may be severely incapacitated, as is obvious with respect to social security provisions. A legally enhanced individual is then appropriately to be understood as a "legaborg".

Those that have not been transformed in this way are increasingly unable to function and survive in modern society. Curiously the process of industrial development, with the legislative support of the "rule of law", may be understood as the progressive transformation of individuals into legaborgs.

## Transformation of humans into finaborgs

Just as individuals are defined (and define themselves) as legaborgs, a related transformation can be observed with respect to financial enhancements. The identity of people is increasingly defined in terms of their financial status and the dependencies associated with it. People have financial identities through their tax number or social security number, possibly even an employee identification number. Membership of many organizations and commercial services may be identified in terms of a number with which financial obligations are associated. The condition is evident with respect to bank account numbers and the like.

One consequence is that engagement of individual with daily life is through what their financial resources enable them to do. For the well-endowed, many opportunities present themselves. They can move freely through the financial flows which characterize social systems. Their identities are not to be understood as disassociated from their wealth which allows them to operate in particular ways.

For the less well endowed, the ability to function within society is challenged. There are many opportunities which are not open to them. Worse still is the case of those with very limited financial "enhancement". They face immense problems of survival on a daily basis -- evident in the case of minimum food or shelter.

This suggests that transformation of humans into "finaborgs" is increasingly a necessity for survival on planet Earth. More problematic, intercourse with others may be significantly determined by their enhancements as finaborgs -- if any. Inequality in enhancements may severely inhibit effective communication -- or discourage it completely.

As in the case of legaborgs, the sense of "professional identity" effectively corresponds to that of virtual identity in electronic communication -- as an "avatar". This may become especially obvious in interaction with the financial system whereby some are left with the overriding impression of the inherent inhumanity of those with which they have to deal. As became obvious during the subprime mortgage crisis, and the repossession of homes by banks, there may be little sense that a human being lies within those financially empowered to intervene in that way.

Especially interesting is the manner in which collectives now function. As with the fictional example of the "[Borg Collective](#)", collectives are increasingly defined by the financial flows within them (membership, salaries, dividends, profits, investment, and the like). A primary focus of communication within collectives is now with respect to such financial flows. Beyond the "bean counter" caricature, major institutions are indeed to be understood through accounting spread sheets. This suggests unexplored possibilities for simulation (*Animating the Representation of Europe: visualizing the coherence of international institutions using dynamic animal-like structures*, 2004).

Individuals, as finaborgs, engage with one another primarily in these terms -- effectively through budget line items and the constraints of blancing accounts. Media reports relating to issues of governance give significant emphasis to these financial issues -- in terms of which the enhancement or handicapping of individuals and collectives is defined. Discourse in other terms is increasingly of little consequence. The preoccupation is with the "bottom line" and "at the end of the day".

Again, as with the case of cyborgs and of legaborgs, the financial "enhancements" can also be usefully recognized as "crutches". Without them, as with recognition of financial entitlements as necessities, an individual may be severely incapacitated, as is obvious with respect to social security provisions. A financially enhanced individual is then appropriately to be understood as a "finaborg".

Curiously the process of industrialization, with the development of financial systems, may be understood as the progressive transformation of individuals into finaborgs. Those that have not been transformed in this way are increasingly unable to function and survive in modern society.

## Transformation of humans into mediborgs

To the above examples of human transformation and dependence can be added the ever increasing dependence on medical facilities, whether in terms of health care more generally, or more specifically with respect to medication in all its forms. This dependence suggests that humans are increasingly transformed into "mediborgs" -- ironically envisioned in terms of the extreme case of eventual dependence on life support machines. This is of course a prospect for the elderly, and for those in quest of immortality through

systematic organ replacement.

A point to be stressed is the case of [medication](#). Increasing proportions of the population are dependent on medication, or perceive themselves so to be. Whether it is an occasional pill, or a complex mix of pills each day, this dependence contrasts with those of human beings to whom these facilities are not available or by whom they are considered unnecessary. Those enhanced in this might be more specifically termed "pharmaborgs", as a subset of mediborgs -- although this would not then include those that dependent on ["alternative" or "complementary" medication](#).

Curiously the process of industrial development, with the development of lifelong health care systems, may be understood as the progressive transformation of individuals into mediborgs.

As with the cases above, intercourse with others may be significantly determined by the "complementarity" of their enhancements as mediborgs -- if any. Mismatch in enhancements may severely inhibit effective communication -- as with those required to enhance the senses (spectacles, auditory devices, and the like). This is notably only too evident in the case of those "on life support".

## Conclusion

**Convergent evolution?** As a consequence of industrialization and modern lifestyles, the development of the above argument suggests a degree of convergence in human transformation. Thus cyborgs, legaborgs, finaborgs, and mediborgs are on a course of rapid convergent evolution. The distinctive characteristics are combined into a transformed human, appropriately recognized more generally as a "borg" -- consistent with the cited account from science fiction.

An alternative framing is of course the affirmation of [transhumanism](#) regarding the possibility and desirability of fundamentally transforming the human condition by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.

**Instrumentalisation:** For the modern citizen of a global civilization, the extent to which the evolutionary transformation has already occurred can be recognized in the degree to which a human is at the nexus of an extensive array of "instruments". Indeed the transformation may be understood as a process of "instrumentalisation". Unfortunately no estimates are made of the array of technical instruments, legal instruments, financial instruments, or medical instruments at the core of which the modern human "operates" on a daily basis.

The number of "instruments" in the toolkit (as more generally understood) of the enhanced human should not be difficult to count. Observation of the executive of a corporation throughout the day would render this evident through the moment-by-moment dependence on: technical instruments, legal instruments ("rights", "contracts", etc), financial instruments (accounts, shares, "numbers", etc), and medical instruments (pacemakers, spectacles, medication, etc).

**Imaginative depiction:** It is perhaps extraordinary that the imaginative representation of horrific extraterrestrial cyborgs, in the daily diet of comics strips and videos, may well constitute an unconscious depiction of the modern human. This depiction clearly resonates with the imagination of the young. It may be indicative of a "naive" interpretation of the nature of the world in which the young now recognize that they are expected to live -- in imitation of their parents.

Ironically it is the images and footage of heavily-equipped "frontline" foot soldiers in the war against terrorism which offer the closest approximation to depictions of living cyborgs. Such depictions, focusing necessarily on tangible enhancements, are framed as heroically courageous by military propaganda. The irony is all the greater in that Afghanistan offers insights into the final triumph of the "heavily under-instrumentalised" -- dependent on a transcendent sense of what it means to be human. This sense might be understood as of merely token significance to those who have successfully progressed their transformation into borgs.

**Socialisation:** Understood in this way, "us adults" have indeed transformed ourselves into "extraterrestrials". The young are being imaginatively groomed to "instrumentalise" themselves in turn -- in an unexplored process analogous to [socialisation](#).

Socialisation, consistent with the cybernetics of cyborgs, is now a matter of "getting with the programme". Development implies working within one or more programmes by which action and identity are defined. The programme may involve use of technology, legal obligations, financial obligations, or medical prescriptions -- or possibly some combination of such distinct programmes.

Failure to be "in a programme" can then be construed as a failure of socialisation. An educational programme and a training programme offer the most typical examples -- as with a work programme, or even a prescribed diet. Industrialization requires programmed human beings.

**Problematic implications:** Possible reservations regarding specific "borg mentalities" have been separately considered in a speculative vein (*Beware of Legality, Accountability, Marketability, Security! Be where the Four Horsemen of the Apocalypse are not?* 2012).

Of particular interest is the possibility of recognizing the exploitation of resources by various forms of borg mentality. The most striking of these emerges from consideration of the transformation of drivers of automobiles into cyborgs -- through their dependent identification with the mobility thereby achieved and the manner in which the vehicle is then a symbol of personal identity. The trauma of "being without a car" offers an indication of the level of dependence -- possibly to be explored as "co-dependence".

The increasing dependence on limited petroleum resources then lends itself to comparison with a form of drug addiction by the emergent cyborg identity -- consistent with exploration of the oil-drug metaphor (Christopher Bailey, *Oil Addiction: diagnosis, not metaphor?* *Ecopsychology*, 2009). Such dependence may also be compared with the burgeoning fascination with [vampire mythology](#), as speculatively explored (*Global Civilization of Vampires Governance through Demons and Vampires on Spin*, 2005). Again the fascination of the young with this mythology may be indicative of an unconscious recognition of the transformation of parents -- once

they have had "a taste" of the borg modality.

**Cognitive "borg cloaking" interfaces:** In principle it will continue to be possible to recognize the human being "under" the array of enhancements -- as explored in fictional accounts of vampires. However any reframing of their identity as "superhuman", as a consequence of enhancements, may confirm the sense in which they are as "alien" as "extraterrestrials".

Whilst the relative significance of enhancements may be framed like clothing (which the individual is free to use or not), it is clear that it will be increasingly impossible for an individual to function in society without these enhancements. The example of clothing is significant in that in many contexts it is unacceptable for people to appear unclothed, if not forbidden (as reinforced by law). Borg-like enhancement may become a legal or social requirement -- for survival.

There is some irony to the fact that those "fully enhanced" may come to be regarded controversially as are the fully covered women of the Islamic tradition (*Facism as Superficial Intercultural Extremism: burkha, toplessness, sunglasses, beards, and flu masks*, 2009). Will there be a future call for "liberation" from cognitive exoskeletons -- and condemnation of those who sustain that culture?

**Engagement with any "other":** The "borg" framing helps to clarify the challenge of the individual to engage meaningfully with the environment. The case of finborgs, omnipresent in institutions of governance of every kind, raises the question as to whether their mode of "spreadsheet discourse" inhibits all useful engagement -- or transforms it into a kind of "modelling language", fundamentally divorced from the grounded reality with which many problems are associated and experienced (cf. *Uncritical Strategic Dependence on Little-known Metrics*, 2009).

The reverse is also of relevance. How is it possible to engage meaningfully with the human being "within" the finborg or legaborg enhancements? Is there still a human being inside the "cognitive exoskeleton"? Transformation into various forms of borg, may then be essentially a process of [dehumanisation](#) in ways which have yet to be understood. Borgs may be fundamentally alien, as anticipated by the science fiction account.

Understood as "extraterrestrials", the question of how to "contact" borgs -- and how to "communicate" with them -- is then curiously anticipated and mirrored by ongoing consideration on whether there are intelligent beings elsewhere in the galaxy (*Communicating with Aliens: the psychological dimension of dialogue*, 2000; *"Human Intercourse": "intercourse with nature" and "intercourse with the other"*, 2007)

**Borg legal rights:** This human transformation raises interesting legal questions regarding the rights of transformed humans -- following the arguments regarding the rights of robots, as argued by [Sohail Inayatullah](#) (*The Rights of Your Robots: exclusion and inclusion in history and future*, *Metafuture.org*). The question may also be framed more generally in relation to development of [artificial intelligence](#), greater than that of ordinary humans -- as might follow after the [technological singularity](#) ([Alex Knapp](#), *Should Artificial Intelligences Be Granted Civil Rights?* *Forbes*, 4 April 2011).

How does "enhancement" relative to the "ordinary" human being modify "human rights"? Do the rights of significantly enhanced cyborgs, legaborgs, finborgs, or mediborgs take precedence over those of the relatively unenhanced? However, as noted, is the legal recognition (and enforcement) of human rights itself an instance of instrumentalisation and dehumanisation -- rather than the reverse, as is so frequently upheld?

**Alternative modes of human transformation:** Clearly the modern emphasis on socio-technical enhancement according to the "borg principle", together with possible biological adaptations (prosthetics, implants, etc), is only too evident. There is however the intriguing possibility of a complementary (or independent) psycho-spiritual transformation, as speculatively explored separately (*Authentic Grokking: emergence of Homo conjugens*, 2003).

Framed in this way, the various forms of "borg" can be understood cognitively as "conceptual exoskeletons" -- as "languages" empowered by particular metaphors for engagement with the environment. The languages are then understood as cognitive tools -- as interfaces or programmes. Such framing language has been described in terms of [generative metaphor](#) (Frank J. Barrett and David L. Cooperrider, *Generative Metaphor Intervention: a new approach for working with systems divided by conflict and caught in defensive perception*, *Journal of Applied Behavioral Science*, 26, 1990, 2). Curiously, as emerges from the above argument, these frameworks are to some degree usefully understood as metaphors of each other.

**Integrating conceptual languages:** The four varieties of "borg" presented here can be usefully considered as a subset of a larger variety of borgs (and their associated languages). A larger set might be derived from a separate discussion (*12 Complementary Languages for Sustainable Governance*, 2003).

A case is then to be made for integration of the cognitive "tool set", as separately discussed (*Enabling a 12-fold Pattern of Systemic Dialogue for Governance*, 2011).

A much-cited early integrative exploration of the insights offered by the cyborg metaphor is that of [Donna J. Haraway](#) (*A Cyborg Manifesto: science, technology, and socialist-feminism in the late Twentieth Century*, 1985), and the commentaries by others on that framing (*Donna Haraway: "A Cyborg Manifesto", 1985): an outline*; Carolyn Keen. *On Haraway, "Cyborg Manifesto"; 25 years later: Donna Haraway's "A Cyborg Manifesto"*, *Sentient Developments: science, futurism, life*, 25 October 2010). Haraway proclaims herself to be a cyborg, as noted by [Hari Kunzru](#) (*You Are Cyborg*, *Wired Magazine*, 5, 1997).

The Manifesto has notably been republished as *A Cyborg Manifesto: science, technology and socialist feminism, AnarchoTranshumanism: a journal of radical possibility and striving*). Consideration is now given to "cyborg anthropology" by [Amber Case](#) (*An Illustrated Dictionary of Cyborg Anthropology*) as a way of understanding how people live as technosocially connected citizens in the modern era -- "with bodies extended into hyperspace".

Recognized as developer of [cyborg theory](#), Haraway offers this as "an ironic dream of a common language for women in the integrated

circuit", noting in her extensive and rich discussion of the metaphor that:

By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centres structuring any possibility of historical transformation. In the traditions of 'Western' science and politics -- the tradition of racist, male-dominant capitalism; the tradition of progress; the tradition of the appropriation of nature as resource for the productions of culture; the tradition of reproduction of the self from the reflections of the other -- the relation between organism and machine has been a border war. Stakes in the border war have been the territories of production, reproduction, and imagination.

Through her use of the metaphor, Haraway offers an alternative framing of the problematic issues highlighted above by suggesting that the cyborg calls for a non-essentialized, material-semiotic metaphor capable of uniting diffuse political coalitions along the lines of affinity rather than identity.

**Hyperconnectivity of borg mentality:** This optimistic framing is consistent with the widely welcomed "hyperconnectivity" enabled by modern communications (*Hyperaction through Hypercomprehension and Hyperdrive: necessary complement to proliferation of hypermedia in hypersociety*, 2006). It is however useful to explore the extent to which this "connectivity" (through hyperspace) across conventional boundaries is acquired at the price of commensurate "deconnectivity" from the grounded reality of the planetary environment from which a variety of "hyperconnected problems" are currently emerging.

Somewhat ironically, in the light of understanding of the lateralization of brain function, this could be understood in terms of a breakdown of "global awareness", as implied by "disconnection" between the hemispheres of the brain (cf. R. W. Sperry, *Hemisphere Disconnection and Unity in Conscious Awareness*, *American Psychologist*, 1968). Thus what is appreciated as "hyperconnected awareness" may well be dangerously ignoring forms of connectivity with nature and "otherness" -- now relegated by industrial development and instrumentalisation to the collective unconscious, as might be consistent with the arguments of John Ralston Saul (*The Unconscious Civilization*, 1995). As with many issues of environmental degradation, the point is well made by considering the disconnection between smartphone users and the network of suppliers sourcing the materials required (George Monbiot, *My search for a smartphone that is not soaked in blood*, *The Guardian*, 12 March 2013).

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