

IATROGENIC PERMUTATIONS: FROM DIGITAL GENESIS TO THE ARTIFICIAL OTHER

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According to international media headlines, November 1994 saw a spectacular and completely unprecedented event: fifteen months after his execution by lethal injection, convicted murderer Joseph Paul Jernigan was dramatically resurrected in cyberspace. Journalistic embellishments aside, there was nothing miraculous about Jernigan's reappearance. Rather, after leaving his body to medical science, he became the first template for the US National Library of Medicine's ambitious Visible Human Project. Accordingly, Jernigan's corpse was dissected, then planed into cross-sections one millimetre thick; these segments were then exhaustively scanned and finally converted into high-resolution three-dimensional digital recordings. The resulting complete anatomical model could not only be viewed, examined and manipulated in a number of different ways but could also be made to model living functions: "the heart [could] be made to beat, the veins to bleed, [and even] the flesh to bruise and lacerate" (Waldby 16). In the informatic Visible Man, the supposedly clear and rigid distinction between animate and inanimate—or life and death—had, at the very least, begun to blur. Thus, when a second subject, the Visible Woman, joined her male counterpart online, media reports predictably announced a new technological Eden in which "Virtual Eve joins Virtual Adam" (Waldby 111).¹

In the same year that the Visible Man debuted online, Australian science fiction author Greg Egan was also exploring the idea of digital bodies in his novel *Permutation City*. His goal was to take digital existence and conscious software "absolutely seriously, and push the logical consequences as far as possible" (42) To this end, his novel is divided into two main sec-

tions. The first deals with the issues arising from the introduction of conscious informatic “Copies” of (mainly deceased) humans in the not-too-distant-future. The impact of this “digital genesis” is examined from the perspectives of both embodied biological humans and their emergent digital counterparts. The second section focuses more intensely on identity formation, subjectivity, and day to day existence for informatic subjects within a closed, coherent, and independent digital environment. Individually, both *Permutation City* and The Visible Human Project are seminal sites from which to address contemporary cultural anxieties about embodiment and subjectivity in the digital millennium. Despite quite different contexts for their construction and development—one emerging from the nexus of biomedical technology and capital punishment, and the other (most directly) from the mind of an author of speculative fiction with a strong background in computer science—there are many points of connection between these two, broadly termed, texts. Moreover, when analysed comparatively, these texts illuminate significant common themes and intersecting tropes. Most important among these is a consistent questioning of human subjectivity, identity and embodiment in the face of new biomedical and technological advances.

As cultural critic Catherine Waldby has noted in her seminal work on the biomedical imaginary, the Visible Human Project was continually framed by Genesis references. In the popular media, for example, “the launch in late 1995 of the Visible Woman data [. . .] was almost universally presented as the provision of a mate for the Visible Man, an Eve sent to cyberspace to provide companionship for a solitary Adam” (111). Genesis iconography in this instance can be read in two ways: as *the* beginning, in the literal religious interpretation; or as evoking the continuation of a Western tradition with a past deeply rooted in Christian mythology. Ostensibly, reading the Visible Human Project as a new beginning seems the more compelling interpretation: the Visible Human figures are, after a fashion, miraculously reanimated in a bold new digital world where they will never age or decay, infused with a form of artificial vitality.² In contrast, some critics argue that the Project is the latest high-tech step in Western medicine’s anatomical tradition that can be traced back to the earliest anatomy sketches of the sixteenth century.³ Waldby, however, takes a more complex approach, arguing for a form of Genesis located within medical science: an *iatrogenesis*.

Conventionally, iatrogenesis refers to the secondary and unintended by-product of medical procedures. So, for example, the nausea and hair loss associated with chemotherapy are iatrogenic illnesses; they are pathologies

directly resulting from medical science's intervention in the human body. Catherine Waldby redeploys iatrogenesis and coins the ironic term "IatroGenic desire," explained as:

a wilful reconfiguration of the everyday meaning of iatrogenesis. [...] It is the desire to create, not disease, but rather bodies which are stable, self-identical rather than fields of perverse contingency. [...] IatroGenic desire is a kind of authorial desire in that it wants to "make up" entities as acts of technical creation, through technically specifiable procedures which will produce reliable forms of life. [...] As it circulates in the early twenty-first century, IatroGenic desire could be summarised as the desire for *programmable matter*, for a capacity to order materiality according to the algorithmic efficiencies of the computer. (113-114. Italics in original.)

IatroGenic desire thus designates the Visible Human Project as symptomatic of the biomedical imaginary's fantasy of erasing the chaotic specificity and contingency of individual material bodies in favour of stable universal forms. Through Waldby's reading, the Visible Human Project entails acts of medical creation which reify the informatic over the material and the universal over the specific.

Turning to *Permutation City*, the Genesis of the conscious informatic Copies is, ironically, the Visible Human Project itself. As Egan describes them, Copies are:

elaborate refinements of whole-body medical simulations, originally designed to help train surgeons with virtual operations, and to take the place of animals in drug tests. A Copy was like a high-resolution CAT scan come to life, linked to a medical encyclopaedia to spell out how its every tissue and organ should behave. [...] A Copy possessed no individual atoms or molecules; every organ in its virtual body came in the guise of specialised sub-programs which knew (in encyclopaedic, not atomic, detail) how a real liver or brain or thyroid gland functioned. (23)

Copies are the end point of IatroGenic desire: while their virtual bodies may retain some cosmetic surface differences, with the exception of initial mental specificity, their physiology is produced entirely through medical knowledge. As Michel Foucault has argued, medical science has always

exercised power in authorising knowledge about the body.⁴ In the case of Egan's Copies, this authorising power becomes absolute; the virtual embodiment of each Copy is literally created, controlled, and maintained by medical science. In their informatic context, the body of Western medical knowledge literally *forms* the Copies' bodies. Despite some literary critics concluding that Copies are thus "non-bodies," (Farnell 78)⁵ I contend that even in their informatic context, Copies are to still to some extent embodied. However, their embodiment is markedly different to that of subjects in the material world. Indeed, given that ongoing debates about the relationship between mind and body have influenced how subjectivities are formed in modernity, it is precisely the differences in the Copies' embodiment which make them useful sites for inquiry into embodiment's shifting cultural meaning.

For at least one Copy in *Permutation City*, traditional biological embodiment is considered the key marker of "humanity." The Copy known as Peer rejected his former name and the impulse to live *as if* still human, just in digital form. Rather, Peer revels in his post-human status:

He plunged his fist into his chest, effortlessly penetrating the shirt, skin and ribs, and tore his heart out. He felt the parting of his flesh, and the aftermath—but although aspects of the pain were "realistic," preprogrammed barriers kept it isolated within his brain, a perception without any emotional, or even metabolic, consequences. And his heart kept beating in his hand as if nothing had happened; the blood passed between the ragged ends of each broken artery, ignoring the "intervening distance." (Egan 63)

Peer treats his infidelity to biological rules as evidence that he is no longer part of, or restricted by, the material world from which his template originated. Similarly, the placement of terms such as "realistic" and "distance" in quotation marks highlights the informatic rather than material basis on which these terms seemingly function for Copies. However, as fellow Copy Kate reminds him, things are not that cut and dried. While they may be primarily informatic, their software and patterns must still be processed on physical hardware in the material world. Moreover, a perceived threat to their ongoing access to that hardware is a threat to their very existence. For Peer and Kate, these worries are particularly acute since they both have relatively limited estates. To make the most of their posthumous funds, their programs bounce across the internet, being maintained in whichever

system has the lowest processing costs. Being on the wrong side of the “digital divide”—the gap between the “haves” and “have-nots” in the informational economies of the material world—appears to have a direct correlation with the experiences of Copy-hood. Peer and Kate have become commodified subjects in an eerily literal fashion.

Several critical analyses of *The Visible Human Project* map a similar push toward bodily commodification. Sarah Kember argues that contemporary medical and imaging technologies such as the ultrasound already attempt to cast reproduction as a commodified relationship between a foetus and medical science evinced by “scanned images of fetuses which effectively eliminate the mother’s body from view,” emphasising seemingly technologised creation (78). Catherine Waldby extends the idea, arguing that the “vital icons” of the Visible Human figures and their iatrogenic origins illuminate a “biomedical imaginary [. . .] which is directed towards the mastery of corporeal matter and vitality along the lines of the commodity and the mechanically reproducible invention” (136). Indeed, the fear of being reduced to merely another reproducible commodity is a constant one for many of the Copies in *Permutation City*. The most powerful and outrightly ironic invocation of this anxiety is seen in the character of Paul Durham, who, when faced with making a second generation copy of his digital self, refuses, stating: “I want one life, one history. One explanation. Even if that has to come to an end” (301).

The narrative of *Permutation City* actually begins with two different incarnations of Paul Durham: one is biological, while the other is an informatic Copy. The biological Durham is obsessed with Copies and is attempting to investigate them using himself, or rather his Copy, as test subject. (For ease of discussion I will refer to the biological version simply as Durham and the informatic version as the Copy. However, this use of terminology should not be taken to unproblematically imply the primacy of the biological Durham over the Copy.) When the Copy initially awakens he is immediately overwhelmed by two feelings: firstly, the realisation that he is no longer “Paul Durham,” despite possessing all of “his” memories; and secondly, a deep abiding sense of lack due to the absence of the material world. Indeed, the loss of the material is too much for the Copy and he immediately attempts to commit digital suicide. The Copy is not alone in these feelings; the narrative reveals that *every* Copy that has a biological original still alive in the material world has terminated themselves (1-7). Readers discover that in *Permutation City*, the first ever Copy was of John Vines, a Boston neurosurgeon, who, in 2024 ran a fully conscious

Copy of himself in a crude Virtual Reality. Taking slightly less than three hours of real time (pulse racing, hyperventilating, stress hormones elevated), the first Copy's first words were: "This is like being buried alive. I've changed my mind. Get me out of here" (39).

Ironically, while the biological Durham and Vines exhibit N. Katherine Hayles's first characteristic of posthumanism—namely that they "privilege informational pattern over material instantiation" (2)—their respective informatic Copies do not. For the Copies, materiality and biological embodiment are considered integral to meaningful existence. In *Permutation City*, embodiment also remains part of the legal definition of humanity. Copies have no legal status, are not recognised as "being alive," and have the ability to self-terminate not due to radical new euthanasia laws but rather as a "requirement [that] arose solely from the ratification of certain, purely technical, international software standards" (6). However, the Copy's story does not end there; during his suicide attempt, the Copy discovers that Durham, his biological template, has illegally removed the self-termination software.

As his enforced existence continues, the Copy's attitude toward embodiment starts to change. Forced to confront digital embodiment, the Copy begins exploring his software body in a distant, philosophical manner:

He took a sharp vegetable knife from the kitchen drawer, and made a shallow cut against his left forearm. He flicked a few drops of blood into the sink—and wondered exactly which software was now responsible for the stuff. Would the blood cells "die off" slowly—or had they already been surrendered to the extrasomatic general-physics model, far too unsophisticated to represent them, let alone keep them "alive"? (9)

In flicking the blood away, the Copy explores the question of where "he" begins and ends. Does his corporeal boundary extend to anything processed and simulated by the software designated as the Copy of Paul Durham? Does the meaning and value of anything once part of the Copy lessen, when expelled from that informatic system? Implicitly, the Copy is also exploring whether his digital body is actually alive in any way: the inverted commas surrounding the words "die" and "alive" simultaneously distance the concepts from their material origin, while also questioning whether there are equivalent digital processes.

In the following days, the Copy slowly acclimatises to digital embodiment. When out exploring the limits of his virtual reality environment, he starts enjoying the “perfect spring day” being simulated around him:

He let himself surrender for a moment to a visceral sense of identity which drowned out all his pale mental images of optical processors, all his abstract reflections on the software’s approximations and short-cuts. This body didn’t want to evaporate. This body didn’t want to bale out. It didn’t much care that there was another—“more real”—version of itself elsewhere. It wanted to retain its wholeness. (11)

Despite both his body and mind being completely informatic, the Copy regains a functional sense of normality by rendering his experience of them in the dichotomous manner characterising his remembered “material” past. In the informatic and material permutations of Paul Durham, Greg Egan presents no easy, unambiguous answers to the question of artificial embodiment. The material version Durham is decidedly posthuman in his preference for pattern over materiality, while the Copy begins unable to cope without materiality *per se*, but then slowly accommodates an informatic context by mimicking his material “past.” At this point it is worth noting that Durham’s goal is to facilitate the “launch” of an independent self-contained and self-sustaining digital environment populated by Copies. Since embodiment remains ambiguous in digital identity formation, Durham must employ different strategies to make his virtual world habitable for Copies.

During the construction of his digital haven, Durham employs software developer Maria Deluca. Maria is far more skeptical about Copies in general, and her uncertainty about the authenticity of informatic existence juxtaposes strongly with Durham’s exuberance. Ross Farnell argues that Durham’s euphoric embrace of Copies in comparison to Maria’s dubiousness is constructed along the lines of the traditional gender dichotomies of liberal humanism and thus entails “essentialist correlations between the female, the body and matriarchy” (76). Farnell’s argument is supported by the inclusion in the narrative of Francesca, Maria’s mother, who is discovered to be dying from a terminal illness. Maria’s almost instinctual desire to preserve Francesca makes her decide to pay for Francesca to be scanned. However, Francesca refuses the process, explaining: “I *do* believe that Copies are intelligent. I just wouldn’t say that they are—or they aren’t—the same person as’ the person they were based on. There’s no right or wrong answer to that; it’s a question of semantics, not truth” (77). Through Francesca, another level of questioning about Copies arises; even if Copies

are intelligent, does the reinscription digitally of their mental pattern actually involve recreation of *that person*, or the creation of something altogether new and different? At a more basic level, the question becomes: can a person be reduced to a binary pattern? Francesca's concerns also beg the question as to the role of the intersection of people and technology which actually perform the scans, thus creating Copies.

Sarah Kember examines the role of the medical "creators" of the Visible Human figures, and argues that "the re-creation of Adam and Eve in cyberspace" amounts to a patriarchal "omnipotence fantasy enacted in the face of medicine's generative limitations and by means of a fetishistic use of technology" which attempts to facilitate the complete appropriation of reproductive ability away from women into the hands of male-dominated medical science (88). In *Permutation City*, Paul Durham certainly seems to be driven, in a large part, by a similar parthenogenic impulse. However, Durham's aims are not limited to creating digital life, but are more grandiose in that he wants to create a completely separate digital universe for Copies. Indeed, one of the most evocative passages in the entire novel occurs when the biological Durham believes he has successfully "launched" the digital world he created which also contains Durham's Copy. During their work together, Durham and Maria form a bond which sees them sharing a bed the night after the launch. Maria struggles with vivid nightmares in which she dreams of giving birth, but she suddenly awakens when the "child" turns out to be nothing but a blood-stained statue, carved from smooth, dark wood" (203). However, when she visits the bathroom, she discovers Paul Durham dead on the floor. He had committed suicide by pushing a knife into his stomach and ripping out his own intestines. Maria exclaims, "it was Durham who'd *keep pushing*, Durham who looked like he'd tried to give birth" (204). This bizarrely grotesque parody of birth illuminates a strong critique of the parthenogenic impulse. Durham's ambition to play the role of creator is parodied and cast as completely irrational to the extent that the biological Durham can see no reason to continue existing once his digital Copy is living the life to which he aspires. Durham appears to have completely reified his digital existence to the extent that a biological existence he would deem "lesser" has no appeal whatsoever. Moreover, in taking his own life, Durham ironically completes an act he prevented his digital Copy from taking earlier in the novel. At a broader symbolic level, this scene in *Permutation City* evokes a powerful critique of Western medical science's IatroGenic desires and parthenogenic fantasies.

The reason that Durham had originally employed Maria was because her first and foremost passion was the Autoverse. Egan describes the Autoverse thus:

The Autoverse was a “toy” universe, a computer model which obeyed its own simplified “laws of physics”—laws far easier to deal with mathematically than the equations of real-world quantum mechanics. Atoms could exist in this stylised universe, but they were subtly different from their real-world counterparts; the Autoverse was no more a faithful simulation of the real world than the game of chess was a faithful simulation of medieval warfare. It was far more insidious than chess, though, in the eyes of many real-world chemists. The false chemistry it supported was too rich, too complex, too seductive by far. (20)

The Autoverse is similar enough to the material world to support a rich chemistry, but it is different enough for it to act in confrontingly unexpected ways. Indeed, the Autoverse is to chemistry what the contemporary computer game *The Sims* is to suburban life. Due to its unpredictability, the Autoverse was designed primarily as a testing ground for Artificial Life. Artificial Life is the bottom-up approach to informatic life, starting from cellular automata or digital bacteria and encouraging these basic originary units to mutate into more complex lifeforms. When Maria becomes the first person to create an Autoverse bacterium that usefully mutates and survives, it is then that Paul Durham turns his attention to her. He commissions Maria to create a “seed for a biosphere;” that is, an outline for a complete Autoverse planet with a single organism which, given time and computing resources, could conceivably “evolve” into various intelligent lifeforms (94). When pressed by Maria into explaining the seed’s purpose, Durham frames his response in familiar Genesis iconography. He explains he is creating an informatic “Garden-of-Eden” configuration, a beginning point for his closed self-reliant digital universe (164). Durham’s virtual universe has a number of elements, including, he tells Maria:

your contribution: the seed for an alien world. [. . .] Sure, we’ll no doubt have our own software descendants, and recreated Earth animals, and no doubt, novel, wholly artificial creatures as well. We won’t be alone. But we still need a chance to confront the Other. We mustn’t leave that possibility behind. (168)

Durham views “the Other” as fundamental to the Copies’ attempts to construct coherent digital subjectivities. Rather than escaping the self/other binary, the Copies actually try to shore up their sense of self against a manufactured, artificial Other.

Seven millennia after the Garden-of-Eden configuration is successfully deployed, the Copies' highly populated digital universe is thriving. The central attraction is Planet Lambert, a complete Autoverse world grown from Maria's biosphere seed, which Copies can observe but with which they cannot yet interact. Subjective time is moving faster in the Autoverse region of the digital universe than in the Copies' own digital realm, which they have rather arrogantly dubbed Elysium (the Ancient Greek equivalent of Heaven). In their faster timeframe, Planet Lambert is already diversely populated and includes the partially insectoid but highly intelligent Lambertians.⁶ I would argue that the Lambertians are most usefully examined through the concept of "IatroGenic life;" that is, of artificial life created specifically as an Other against which Copies, whose origins are already located within IatroGenic desire, can define their sense of subjectivity. Iatrogenic Life functions both as a support for Copies' sense of subjectivity, but also points to the contingent, ambiguous and constructed origins of that sense of self. Indeed, as the Elysians are, in some ways, playing God, the Lambertians thus fulfil the role of mortals over which the creators can eventually rule. However, just as the Copies intend literally to "confront the Other" and announce themselves to the Lambertians as their Creators, the Copies discover that their own world is destabilising.

When the Lambertians unexpectedly develop a stable ontology explaining their world without need for Creators, their system and physical laws ripple outwards, engulfing the Copies' surrounding digital world of Elysium, forcing the Copies to flee. Ironically, rather than reinforcing their sense of self, creating an Other proves lethal for the Copies. Also ironic is that the Lambertians endure while their self-appointed Creators perish. Part of the reason for the Lambertians' survival is found in Hayles's argument: that in a dematerialised context there is an epistemic shift away from a presence/absence binary, to a spectrum bounded by pattern and randomness (29). Given that the Autoverse-indigenous Lambertians are modelled atomically, while the Copies remain *ad hoc* patchworks of organ-level sub-systems, simply put the Lambertians endure because they are more complex patterns. Moreover, these patterns derive not only from the Lambertians' digital consciousness or minds but also from their informatic bodies. Extrapolating more broadly, Greg Egan's deployment of the Lambertians makes two powerful points: firstly, that Otherness is not an unproblematic given but rather a construction with destructive tendencies; and secondly, that even in a completely digital context, embodiment and bodies still matter.

In tracing the pathway of iatrogenic permutations from the Visible Human Project to Greg Egan's *Permutation City*, a number of important

themes are addressed. Most significant among these is the textual articulation that, while the shift from material to a digital context may hold the *potential* for radical questioning of identity and existing social and cultural structures, the shift in itself does not *necessitate* such inquiries. Indeed, the epistemological uncertainty of subjectivity in the face of the virtual may not lead to a radical break with existing structures of knowledge and power at all. Rather, the desire to maintain a coherent sense of self may cause these structures to be transplanted into emerging digital contexts with minimal challenge. *Permutation City* most clearly illustrates the continuation of inequitable power structures in the Copies' creation of an artificial Other, against which to stabilise their own fluid subjectivities. However, while the resulting IatroGenic life—in the form of the Lambertians—may initially fulfill their designated role as Other, by the novel's conclusion this role has been ironically inverted. *Permutation City* may present a pessimistic view of the potential for significantly challenging existing modes of subjectivity, at least in the example of the informatic Copies. However, it nevertheless presents a stronger critique of failing to make the attempt, a critique dramatically illustrated by the fall of the Copies. While both *Permutation City* and the Visible Human Project leave a provocative question mark after each of the three categories of technology, subjectivity and embodiment, the main value of comparatively reading these two texts is the important reminder that none of these categories can be conclusively divorced from the other.

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Notes

1. *Washington Post*, 5 December 1995 as quoted in Waldby.
2. See Waldby, 117-129.
3. As discussed in Eugene Thacker, "Lacerations: The Visible Human Project, Impossible Anatomies, and the Loss of Corporeal Comprehension." *Culture Machine* 3 (2001), <http://culturemachine.tess.ac.uk/Cmach/Backissues/j003/Articles/Thacker/Impossible.htm>, accessed 10th June 2002. (However, it is *not* Thacker's contention.)
4. Michel Foucault, *Madness and Civilization: A History of Insanity in the Age of Reason* (New York: Vintage Books, 1973).
5. Farnell does qualify in a footnote that Copies may have some form of "corporeal instantiation," as pointed out by N. Katherine Hayles, but he does not pursue this point in his main argument.
6. The Lambertians' insectoid character is most likely a nod toward Artificial Life designers who often utilise ants as a model for their research as noted in Alison Adam, *Artificial Knowing: Gender and the Thinking Machine* (London and New York: Routledge, 1991) 139.