

Re-Engineering the Human: New Reproductive Technologies and the Specter of Frankenstein

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Abstract—The virulent debates that have dogged research on, and the diffusion of, a wide range of technologies indicate a growing loss of confidence in what we might call, the techno-scientific endeavour to reshape the world. Utopian images of a world rendered ever more amenable to human desires are now closely shadowed by just as compelling dystopian visions of monstrosity and disaster that are nevertheless constructed from the same cultural material. The paper uses the case of the debates over developments in reproductive technology to offer some observations on the ways in which such technologies routinely become enmeshed in cultural ambivalence.

Keywords—Culture, media, new reproductive technologies, society.

I. INTRODUCTION

THE human body, argues Mary Douglas [7], commonly functions as a conceptual model or symbolic stand-in for the social collectivity as a whole. From the late twentieth century onwards, occidental cultural images of the body have been increasingly shaped by their ambivalent encounter with new reproductive technologies. Concepts such as the human clone or the ‘designer baby’ signposts the ways in which the body has come to be viewed as the site of an ongoing biotechnological revolution, a veritable new genesis. At the same time, visions of benefits to come, from remedies for infertility to the eradication of diseases, are routinely coupled with anxieties about the (in)ability to control the pace and direction of technological developments. The promised power to re-constitute living things, raises the spectre of human values inexorably weakened by techno-scientific advance. This subversive anxiety has long acted as a kind of counterbalance to the continuing cultural investment in the other image of techno-science as empowerment, as the motive force of beneficial change. New technological developments, even unsettling ones, are assimilated into everyday language by drawing upon the stock of cultural images and metaphors already in place [30]. We need therefore to examine more closely how the socio-moral dilemmas associated with new technological developments find their medium of expression. The paper examines the representational resources utilised in the discursive struggles over the determination of the meaning

of the new reproductive techniques. We explore the cultural imagery used in UK print media to communicate the nature of ‘what is happening’ and ‘why it matters’. We focus on the use of chimerical figures such as the ‘Designer Baby’ or the ‘Human Clone’ as metaphors for the power of the new technologies to re-make both society and the body. The paper draws on an analysis of some 700 articles covering new reproductive technologies which have appeared over the past 10 years - principally in UK broadsheets and in (so called quality) tabloids. It is important to stress that we do not aim at any comprehensive presentation of the content of *what* was said in quantitative terms. Rather we seek to illustrate *how* it was said and the discursive resources that were employed in doing so. Images of ‘technology’, it is argued, function simultaneously as mirrors of ‘society’, as a means for articulating and rhetorically rehearsing the various philosophical antinomies and moral conflicts characteristic of occidental (post?) modernity.

II PARABLES OF CREATION

A shared reference point for debates over reproductive technology is the successful ‘cloning’ of an adult sheep by scientists at the Roslin Institute in Scotland. The birth of ‘Dolly’ the sheep clone in February 1997, whipped up a frenzy of speculation on the prospect of human cloning. President Clinton immediately demanded that the National Bioethics Advisory Commission report to him within 90 days on the “troubling implications” of mammalian cloning. That same week the matter was raised in the House of Commons at Prime Minister’s Question Time with the parliamentary committee on science and technology commencing an urgent inquiry into the Roslin experiments. The Vatican urged a worldwide ban on cloning, while physicist Joseph Rotblat, Nobel laureate and anti-nuclear weapons campaigner declared that genetic research posed a danger far greater than the Bomb “because of these dreadful developments that are taking place there”. A Harvard professor wrote to *Nature* demanding that publication of the Roslin results be suppressed as such dangerous knowledge should not be publicly available. In California the death penalty was proposed as the only punishment fit for the cloners of humans. The sheep clone is, *Time* magazine announced, “an epochal - a cataclysmic - creature” [31]. The scale and vigour of such reactions revealed that something more was seen to be at issue here than an (however complex) experiment in biology. Rather, it seemed, it was Pandora’s box itself that had been opened. Within less

Manuscript received September 17, 2006.

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than a year, Dolly had been followed by Polly, the transgenic sheep clone; the ectogenetic goat; and the headless tadpole clone. Could the dreaded human clone be lurking far behind? While the technoscientific establishment (including the Roslin researchers [19]) invoked human reproductive cloning for the sole purpose of denying it (as technologically unfeasible or ethically reprehensible), such denials only served to keep its image in the press. Meanwhile, beyond the boundaries of respectable technoscience, an informal race was developing among controversial mavericks such Richard Seed, Panos Zavos and Severino Antinori, as to who would be the first to clone a human.

On the 27th of December 2002, Dr Brigitte Boisselier director of Clonaid the 'research arm' of a bizarre New Age cult the Raelians, proclaimed to the world's media the creation of the first human clone: a 7lb baby girl named Eve supposedly born the day before to a 31 year old 'American mother'. Within days of this announcement, Clonaid maintained it had produced a second human clone this time born to a Dutch lesbian couple. Three more, the sect claimed, were to be born within the next few weeks (e.g. [18]). The group's assertions were greeted with near universal derision. Ian Wilmut and the Royal Society poured scorn upon the Raelians' pronouncements and declared deep concern about the welfare of anyone involved in cloning experiments. While Clonaid had promised that all the babies in question would undergo genetic testing to prove their status as clones, the promised tests never materialized. Clonaid argued that a threatened lawsuit by Miami children rights advocate Bernard Siegel who was seeking to place Eve under court protection and remove her from her family "had given them cold feet" [32]. However incredulous the Raelians' claims might have been, there was scant reassurance to be had for those concerned about the implications of human cloning. As the *Daily Mail* commented:

"... there [is not] much comfort to be taken from the possibility that the Raelian claim is unfounded. For most analysts predict it is only a matter of time before some, perhaps similar, group produces a human clone with all the profound emotional and social consequences such a breakthrough threatens... the result could be the stuff of nightmares for us all" [3].

What kind of stuff are nightmares made of? Here is, for instance, the predicament of the human clone (Eve?) as imagined in a *Daily Telegraph* editorial:

"Imagine finding out, when you are just old enough to understand it, that you have been artificially created as the precise copy of someone else. Perhaps you are the replica of the woman you thought was your mother, which would mean that the closest thing you have to a father is really your grandfather. Or perhaps you have been cloned as a copy of a famous scientist, doomed always to have your life measured against hers. You might even have been manufactured by cultists who believe in alien abductions. For once the technology needed for human cloning becomes available, it would be hard to restrict its use" [6].

From this account, the human clone emerges as an anomalous, excessive object, something that jumbles up social categorisations. Drawing upon Durkheim's [9] arguments on the distinctiveness of the sacred and the profane Douglas [7] argues that boundary work is an essential element in sense making. The ordering and naming practices that allow some objects to be grouped together but not others, can thus be seen as the means through which human collectivities render the world intelligible. Following this line of reasoning, new reproductive technologies can be understood as problematic objects insofar as they represent the possibility of displacement and disruption of the classifications constitutive of the extant social and moral order. As Douglas notes, classificatory schemata generate cultural anomalies and ambiguities: objects, which do not fit, or alternatively, which may fit more than one (ostensibly distinct) category. Concepts such as 'designer babies' or 'genetic engineering', for instance, belong simultaneously to distinct and even incompatible realms of experience and systems of meaning. The new technologies thus stand in for the possibility of bringing together into a single identity previously contradictory signifiers, as once natural boundaries - between nature and artifice, birth and manufacture, the womb and designer commodities - are displaced by technological change [30] [10] [12]. What may once have been construed as an oxymoron - e.g. a designed human being - now appears as all but inevitable.

The controversy that is the focus of this discussion, revolved around a number of anomalies including *inter alia*: Post-Menopausal Mothers, Black Women implanted with White Donor Eggs, reproduction through the use of ova from cadavers and aborted fetuses, transgenic sheep clones, pigs with human hearts, mice with human kidneys, and ectogenetic goats. All of these examples could be read as physical metaphors for boundary displacement. Boundaries constituted by age (the post-menopausal mother); race (the Black mother with the White child); life and death (the use of eggs from aborted fetuses and cadavers); parentage (the clone); species, (the mouse with a human kidney); the body (the ectogenetic goat and the headless clone); genetically desirable and genetically undesirable (embryo selection); and so on. All can be represented as ruptures in the fabric of the social and moral order. To the extent they can be seen to bring existing conceptual/social categories into confusion, they subvert an otherwise orderly reality. Correspondingly, their uncertain status is conveyed within media discourses by the adoption of a vocabulary of displacement, transgression and violation. Each such category slippage is articulated in terms of feelings of anxiety, disorientation, fascination and awe. Thus: "The intention to reverse the changes brought by the menopause" noted a *Daily Telegraph* editorial [5], "strike[s] most people intuitively as an unacceptable interference with the limits that nature has set"; while anti-abortion campaigner David Alton MP was reported in *The Sunday Times* to have spoken of a: "macabre and gruesome development which denies the great gift of life itself to the unborn but uses it to create new life

unnaturally in a laboratory" [20].

Regarding the natural relationship between generations (that is, mother, daughter, granddaughter and so on), Oddie [24] argued in *The Sunday Times* that:

"Even Mary Shelley would have found it difficult to imagine the possibilities that could now open out.... An older woman could become mother to her own granddaughter, the macabre possibilities are endless"

Categorial structures carry a moral urgency, moral breakdown is therefore often seen to follow closely on from boundary transgression. Given such premonitions, the developments underway can be seen as but steps along a slippery slope to moral bankruptcy [22] - as indicated in the following statement in *The Independent* by John Habgood [13] Archbishop of York:

"From the choice about whether to have a baby by means of a donor, it is a small step to choices about what kind of baby, and from there, as experience in the United States has indicated, to litigation if the "product" is not up to specification."

Thus the sacred is invaded by the profane, human life commodified and rendered into a consumer product.

The concept of unstoppable contamination once the boundaries are breached is the crucial component in *slippery slope* arguments where the spectre is raised that such transgressions may become the norm, assimilated into routine procedures of reproduction, and thus rendered mundane. Since the new technologies are said to be in the business of bringing into existence what was up to then deemed impossible, boundaries can no longer be policed by nature itself. As Lee M. Silver of Princeton University put it, Dolly's creation "basically means there are no limits. It means all of science fiction is true" [25].

"How long will it be before ... parents sit down in front of a computer screen and design their child?" Daily Mirror [4]

"The nature of a person will become far less a matter of chance and more one of choice. We may not be able to choose our parents, but we will be able to change our children by amending or indeed designing their genetic make-up. States will have the potential to engineer the nature of their citizens." The Independent [17]

Visions such as this further reinforce a view of technology as an autonomous force, a kind of genie that once released, cannot be returned to the lamp. Society thus appears condemned either to repeat a horrific past (Nazism) or to enact some vision of a dystopian future (*Brave New World*) - thus one article in *The Sunday Times* was entitled "The Master Race: Designer Babies"[16]. The notion of the 'designer baby' can therefore be seen as representing the paradoxical combination of two contradictory threats: the spectre of individual difference overwhelmed by standardization (Nazism/*Brave New World*) coupled with the spectre of social institutions giving way under the pressure of unconstrained individual choice (captured in the notion of babies as designer

goods) [15].

Against this background the status of the clone deserves a closer examination. The notion of the 'exact copy' foregrounds concerns about the effects of technology on the human Self. Cloning in this sense, constitutes a challenge to embodiment, the Self's ontological basis. As such, it is seen as an assault upon human self-recognition, threatening personhood and identity with dissolution: If individuals can be 'copied' then their individuality is compromised. Hence the suggestion by the American Institute of Bioethics (1997) that the cloners of humans should be prosecuted under US anti-slavery legislation. However, if reproductive technology stands accused of undermining identity, it is also accused of its opposite: of rendering identity excessive. The rich and powerful, the Hitlers and Saddam Husseins of this world, it is claimed, will take the opportunity provided by the new technology in order to duplicate themselves (Ira Levin's *Boys from Brazil* often enlisted as the literary reference for this argument). In either case the boundary between Self and Other is subject to slippage and breakdown.

The notion of boundary transgression, and thus pollution, illuminates the abhorrence usually associated with anomalies - the so-called *yuk factor* - but further, it also indicates the role of pollution fears in shoring up particular moral positions and social arrangements [7]. Pollution ideas are deployed in order to safeguard boundaries protecting cherished categories. In the case of the new reproductive technologies, what is seen as threatening is not the fact that these interfere with natural processes (all medical interventions do), but that they do so in a manner that is qualitatively different from before:

"If normal medicine is the maintenance and restoration of what nature has given, human genetic engineering has to do with steering nature out of its normal channels, taking upon ourselves the creation of life itself: literally, playing God.... reference to Frankenstein and his monster is by no means inappropriate." [24].

'Normal' medical practice thus appears as the restoration of a natural order subverted by disease and abnormality, in contradistinction to genetic engineering which constitutes a technological perversion of that order. The possibility which exercises the author of this extract is that genetic engineering may be smuggled in as normal medicine. However, the same vocabulary of purity and pollution can be manipulated in order to show the same set of developments in a reassuring light. In other words, positive perceptions of the new developments, while perhaps less prominent in comparison with the (mostly) negative responses we have examined so far, also tend to rely upon similar imageries of displacement and of purity versus pollution. Briefly, arguments in favour of the new techniques involve a shift of focus in what is considered the polluting object. Attention is now being focused on the possibility of genetic abnormality, hereditary disease and so on. Where *nature* is seen to be cruel or flawed - as in the case of the child born with a genetic disease or a woman unable to conceive *in vivo* - then science and technology

may be called upon to repair the natural order. As Dr Weatherall of the Institute of Molecular Medicine in Oxford has argued:

“if modern evolutionary theory has told us anything, it has made it abundantly clear that nature does not always know best.” [35].

Thus, positive responses to new developments in reproductive technology tend to be couched in a therapeutic vocabulary. They often draw upon pictures of healthy babies - “a little miracle of science” [2] - within happy families: a vision of technology and society working in harmony towards a better future [22]. What opponents argue are grotesque violations of the natural order, are revealed as little more than morally sound extensions of established medical practice. They are still ‘new’ but no longer qualitatively different. Thus re-situated, a contested technology can now be seen as constituting the means of salvation for the suffering and the desperate [11]. The rhetorical tension between hope and fear, positive and negative, utopian and dystopian narrative tropes, that attends and indeed fashions the debates surrounding new reproductive technologies

III. GENETIC ENGINEERING BETWEEN FACT AND FICTION

We have already referred, or alluded to, the profusion of future-oriented images in accounts of new reproductive technology. Such imagery tends to draw, either directly or by implication upon a shared teleology of technology. It could be argued, that a key moment in the history of this imagery occurs in the 1920s when the notion of reproductive technology provided a new discursive register for social debates - such as that between the socialist British biologist J.B.S. Haldane [14] and philosopher Bertrand Russell [26] - on the potential of scientific knowledge to generate and uphold new forms of social organization. Haldane’s paper, *Daedalus, or Science and the Future* takes as its starting point the potential of “biological interventions” to transform society and sets out to outline how this is expected to rewrite the logic of the social order. Using (in part) the format of a retrospective essay by a twenty first century undergraduate “on the influence of biology on history during the 20th century” (p.39), the paper argued that the future of society would be shaped more and more by biological knowledge and its applications, just as in the past physics and chemistry had been the driving force of change. The argument was illustrated via a (part factual part fictional) narrative of developments in reproductive technologies culminating in a world in which ectogenesis - conception and development outside the womb - is the dominant form of reproduction, with “less than 30 per cent of children born of woman”. A world where parents could effect any improvement they chose upon the gene pool, shaping each generation as desired “*from increased output of first-class music to.... decreased convictions for theft*” [14]. In this context human cloning if accomplished provides an excellent means for increasing the number of society’s most useful members. In such a society, “*a great mathematician, poet or painter, could most usefully spend life from 55 years*

on in educating his or her own clonal offspring”. Haldane’s vision is of a world being perfected through the deliberate application of certified knowledge and the corresponding displacement and suppression of unwarranted beliefs.

“Our essayist would then perhaps go on to discuss some far more radical advances made about 1990, but I have only quoted his account of the earlier applications of biology.... If reproduction is once completely separated from sexual love mankind will be free in an altogether new sense. At present the national character is changing slowly according to unknown laws. The problem of politics is to find institutions suitable to it. In the future perhaps it may be possible.... to change character as quickly as institutions. I can foresee the election placards of 300 years hence, if such quaint political methods survive, which is perhaps improbable, “Vote Smith and more musicians”, “Vote for O’Leary and more girls”, or perhaps finally “Vote for Macpherson and a prehensile tail for your grandchildren”. We can already alter animal species to an enormous extent, and it seems only a question of time before we shall be able to apply the same principles to our own” [14].

In *Icarus or the Future of Science* - Russell’s [26] response to *Daedalus* and its rewriting of both life and politics - counterpoises the metaphor of Icarus who having acquired the power of flight “was destroyed by his rashness”.

“I fear”, he concluded, “that the same fate may overtake the populations whom modern men of science have taught to fly.... Technical scientific knowledge does not make men sensible in their aims.... science has not given man more self control, more kindness or more power in discounting their passions”

We may see in the rival positions articulated by *Daedalus* and *Icarus* the ambivalence associated with cultural representations of technoscience. Let us return briefly to Haldane’s attraction to the mythological figure of *Daedalus*. *Daedalus* “the first to demonstrate that the scientific worker is not concerned with gods” (p. 37) was intended as a replacement for the transgressive figure of Prometheus “the chemical or physical inventor” (p.36) as a more appropriate metaphor for modern biology’s power to reshape society. But perhaps one might see a subtext here: Prometheus was of course the model for Mary Shelley’s [27] inventor Victor Frankenstein, himself a common metaphor in debates over reproductive technologies [22] [34]. Destroyed by his rashness - not unlike Icarus - Frankenstein, the *New Prometheus*, has nevertheless a lot in common with Haldane’s “scientific worker”. What distinguishes Frankenstein’s experiment from the activities of the alchemists, occultists, and other such real or fictional predecessors is his Baconian materialism - symbolized in his project of the machine-like construction of a human being from an assortment of parts taken from corpses:

“I will pioneer a new way.... and unfold to the world the deepest mysteries of creation” (p.37) *exclaims Shelley’s anti-hero. “banish disease from the human race and render*

man invulnerable to any but violent death.... Life and death appeared to me ideal bounds which I should first break through and pour a torrent of light into our dark world. A new species would bless me as their creator and source; many happy and excellent natures would owe their being to me.” (pp.30-44) [27].

Frankenstein's plan for perfecting the world and its inhabitants has proved enduring in both fictional and factual treatments of the theme of artificial reproduction, and his dream has continued to excite the techno-scientific imagination. For instance, in *The Second Creation* (their 'insider' account of the making of Dolly), Wilmut et al [36] set out the implications of their work as follows:

“As decades and centuries pass, the science of cloning and the technologies that flow from it will affect all aspects of human life - the things that people can do, the way we live, and even, if we so chose, the kinds of people we are. Those future technologies will offer our successors a degree of control over life's processes that will come effectively to seem absolute. Until the birth of Dolly scientists were apt to declare that this or that procedure would be 'biologically impossible' - but now that expression seems to have lost all meaning. In the 21st century and beyond human ambition is bound only by the laws of physics, the rules of logic, and our descendants' own sense of right and wrong”.

A glimpse of this post-natural age where the limits set by biology have been transcended was also conveyed three decades ago by Alvin Toffler in *Future Shock*. In a section entitled “The Pre-Designed Body” [33], he voiced the expectation that:

“New genetic knowledge will permit us to tinker with human heredity and manipulate genes to create altogether new versions of man.” (p. 183).

With unintended irony, Toffler's vocabulary echoes that of Frankenstein. Influenced by Haldane, the ensuing discussion encompasses a wide range of possibilities including cloning, the development of artificial wombs, and eugenics etc.

“within a mere ten to fifteen years a woman will be able to buy a tiny frozen embryo, take it to her doctor, have it implanted in her uterus... The embryo would, in effect, be sold with a guarantee that the resultant baby would be free of genetic defect. The purchaser would also be told in advance the colour of the baby's eyes and hair, its sex, its probably size at maturity and its probable IQ.... We shall also be able to breed babies with super-normal vision or hearing... and countless other varieties of the previously monomorphic human being” (pp.185-7).

Clearly, Toffler's “practopia” is the realization of Archbishop Habgood's nightmare image. Toffler thus goes on to raise the possibility of “breeding men with gills ... for efficiency in underwater environments” (p.187) or even a “*prehensile tail*” (p.188). Haldane had of course already made that suggestion in *Daedalus* (p43). Returning to the theme in 1963, he proposed the grafting of animal genes as a means of inducing human phenotypes better adapted for particular tasks. For instance, life in space, could he recommended, be improved

by “prehensile feet, no appreciable heels, and an ape like pelvis” [8]

The idea of resolving the nature/nurture, society/individual antinomies by designing humans to meet required specifications has thus proved a remarkably persistent theme in discussions of the future possibilities of new reproductive technologies. Questions of aptitude and skill are thus recast. Instead of simply *training* individuals to master particular skills, the seductive/unsettling alternative is envisaged of *breeding* such skills in them. The vision of (genetically) re-engineering, so to speak, the workforce is raised as a possibility. Lyon and Gorner [21] for instance claim that:

“Astronauts on interstellar voyages would benefit if they were able to subsist on a plentiful, nonperishable food supply. Thus we might want to outfit them with termite digestive genes so that they could live on a diet of cellulose... (It is almost assuredly going to be possible to produce human hybrids with capacities far beyond the norm. ... Would underwater farmers with webbed feet and gills be considered as fully human as the rest of us?”(p.566).

Thus molecular biology opens up the 'human' to re-engineering and modification. It becomes subject to assembly and disassembly. Organisms are to be viewed no longer as entities but more like jigsaws open to recombination. Recombinant DNA processes, it is envisaged, will become the basis of a genetic *ars combinatoria*, dis-assembly and re-assembly not only within but also between species. Taking an example of the media representation of this vision, the “prospects for the future” were summarised by *Newsweek* [23] in the following terms:

“Someday science may be able to manipulate men hormonally to carry fetuses, or put human embryos into animal surrogates - could your mother, as well as your forefathers - be a chimpanzee?” (p.43).

It is perhaps easy to dismiss this belief in the total plasticity of human biology, what is interesting however is the way such visions rely upon and embody the idea of an autonomous 'internal' logic of scientific and technological development. The same notion of the technology is prone to both unbridled enthusiasm and radical self-doubt. Thus Frankenstein imagines a “race of devils” emerging from his laboratory for which “future ages might curse me as their pest” [27] Victor's dark doubts are a simple reversal of his earlier, utopic vision. In similar terms Toffler [33] voices his own doubts:

“Might we not unleash horrors for which man is totally unprepared? In the opinion of many of the world's leading scientists the clock is ticking for a 'biological Hiroshima” (p.184).

IV CONCLUDING REMARKS

The vision of irreversible change, speaks to technological optimists and pessimists alike, those excited by, and those in awe of the dawning “age of biological control” [36], and those repulsed by it. As fantasies of self-creation, the 'designer baby' and the human clone function as symbols of a new era

of ontological insecurity. When every barrier is (seen as about to be) breached and the apple of knowledge eaten to the core, it is not surprising that ambivalence about the new technologies is a persistent motif in discussions of scientific and technological work. Post-natural bodies, for instance, represent the joyful opening of new possibilities, but simultaneously generate effects of anxiety, disorientation and revulsion. The notorious 'yuk factor' can perhaps be understood as the new Prometheuses of modernity looking at their works and feeling sick. An essential tenet of the Frankenstein mythos - from Shelley's tale to *Jurassic Park* - is that moral and intellectual failure often accompanies techno-scientific success and that the forces unleashed are destined to exceed any controls set up to contain them.

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