

THE NEW IMPERIAL ORDER FORETOLD

VARDA BURSTYN

In the world of *The Matrix* and its sequels intelligent machines have taken over a devastated planet and factory-farm human beings as their primary energy source. Packed like larvae in ghastly, slimy breeding quarters, guarded and oppressed by avatars of the machine, humans are induced to experience a life-long hallucination of ordinary existence, a hallucination geared to ensure that they will remain passive and unresisting fuel to the great, omnipotent computers. At the end of the three-film cycle the few resisters have won a temporary and – in light of what has gone before – completely unrealistic reprieve with an uncertain future.

In the past twenty-five years Hollywood has produced quite a crop of grimly dystopian films, from *Blade Runner* to *The Matrix* (reloaded and otherwise) – and not a single utopian one, to my knowledge. The same themes are constantly reiterated: apocalyptic disaster due to human folly (war, artificial intelligence run amok, environmental or nuclear disaster, plague, or all the above); the total power of elites and their weaponry; the dwindling to less-than-nothing of the value of ordinary people (as against rich, genetically and technologically enhanced people, and/or machines); the driving, irresistible force of greed; and heroic resistance by a few, which may win a momentary victory but does nothing to really overthrow ‘the system’. This body of work is disturbing evidence that such horrors are seen as a great box-office draw because they resonate at the emotional level for many, many people, and – perhaps – that the film-makers are unable to envision more positive futures.

Are the futures depicted in these films really possible ones – projections of things that already exist? Or are they meant to be symbolic or metaphorical? In these early years of the twenty-first century – the ‘New American Century’, if the imperialists have their way – it is sobering and enlightening to re-read, with these questions in mind, two earlier futurist visions that have deeply influenced the makers of these and other modern dystopias – Aldous

Huxley's *Brave New World* and George Orwell's *Nineteen Eighty-Four*. These books have been extraordinarily influential, both on generations of readers whose political consciousness has been affected by them, and on generations of writers, in non-fiction as well as fiction. A re-reading today yields some very striking lessons in assessing our present, and in thinking about our future.

Huxley came from a comfortable family of distinguished intellectuals and scientists; Orwell (born Eric Blair), by contrast, came from a family of minor colonial officials long stationed in Burma, who, once back in England, clung precariously to their status in the lower middle class. Huxley attended Oxford and afterwards moved in a circle of writers, living easily in France, Italy, and England – with an American sojourn providing the model for *Brave New World*. Orwell was sent to Eton, but instead of going on to Oxford or Cambridge he spent five years in the colonial service in Burma. Hating the role of imperial enforcer, he returned to England to eke out a hard existence as a chronicler of the lives led by the poor and dispossessed, and went on to fight with the Anarchists in the Spanish Civil War.

Accordingly, *Brave New World* is full of hot showers and leisure activities and good clothes, while *Nineteen Eighty-Four* is full of cold, crumbling, smelly apartments and terrifying torture rooms. Yet the two authors' nightmare futures have some important similarities. For example, both feature steep social hierarchies with tiny elites and vast, powerless masses: Huxley suggested ten 'World Controllers', Orwell an 'Inner Party' approximating 2 per cent of the population. Both picture the disintegration of love, parenting, and family: in *Brave New World* parents are considered an obscenity, in *Nineteen Eighty-Four* they are betrayed by their children. And both visions emphasize the power of communications technologies, of multitudinous forms of propaganda and deliberately induced collective amnesia, which condition people into accepting a social order that has utterly abandoned them.

Still, there are fundamental differences between the worlds they portray. Huxley's *Brave New World* rests on the seduction of adults, not their terrorization. 'A really efficient totalitarian state', he wrote in his introduction to the 1945 reprint, 'would be one in which the all-powerful executive of political bosses and their army of managers control a population of slaves who do not have to be coerced, because they love their servitude.' His *Brave New World* has more groovy personal transportation vehicles than all the motor ads in an issue of *Vanity Fair*, with fabulous apartments and autoerotic gadgets, luscious, legal drugs, and glittering entertainments – the Feelies and Scent Organs, playing in huge entertainment complexes. And sex. Everyone gets sex – though only with their peers, to be sure. The most important

quasi-religious rite in *Brave New World* is the ‘Orgy-Porgy’, performed in the name of the Supreme Being – ‘Our Ford’.

‘Everyone is happy now’, goes the *Brave New World* slogan, because everyone’s been conditioned to love what they do – from the moment of *in vitro* conception through manipulated gestation in bottles to ‘hypnopaedia’ and aversion-conditioning in childhood; then seductively and with the mind-numbing joys of the drug Soma in adulthood. Infantile comportment – that is to say, mindless obedience – is considered optimum, even for Alphas. *Brave New World* is global, with ‘Savage Reservations’ for the few atavistic holdouts, and some remote islands for incorrigible nonconformists. But there are no wars, and no demonstrations or riots, because delicious, pacifying Soma melts away all opposition.

Orwell’s future is grimly different: ‘How does one man assert his power over another?... By making him suffer Power is in inflicting pain and humiliation. Power is in tearing human minds to pieces and putting them together again in shapes of your own choosing If you want a picture of the future, imagine a boot stamping on a human face – forever.’

So *Nineteen Eighty-Four* is a claustrophobic study in grunge and grey, steeped in poverty and misery. The Proles – the majority – and the members of the Outer Party live in draughty, filthy housing, where the food is disgusting, friendship doesn’t exist and the sun never shines. The tiny ruling elite – members of the Inner Party – have all the good stuff. Personified by Big Brother, they have achieved a suffocating, terrifying degree of control over everyone else, thanks to the surveillance potential of advanced communications technology – above all, two-way television. Love is impossible under these conditions; sex is merely for procreation. Children inform on their parents and cheer as they are taken to prisons and torture chambers. And there’s no Soma to relieve the pain.

The elite rules through a monopoly of information, with vast bureaucratic apparatuses for rewriting history and institutionalizing lies, as well as for producing pornography, sports, and crime writing for the Proles; and through unrelenting, vicious brute force. Big Brother is watching everyone, and so is everyone else. Big Brother never hesitates to mete out imprisonment, torture, and death to all non-conformists. Co-workers disappear from work with terrifying regularity. Hence there’s no dissent, no opposition, no alternative.

And war, entirely absent from *Brave New World*, is at the centre of *Nineteen Eighty-Four*’s politics, economy, and culture. War never ends. It’s fought with enemies who used to be friends and friends who used to be enemies. The most important communal rite in Orwell’s future world is an orgy not of sex but of hatred. ‘Hate Sessions’ create intense and infantile emotional bonding

to Big Brother. In *Nineteen Eighty-Four* all is deprivation, pain, and madness.

Today, it's these differences between the novels that continue to attract most comment, and are the focus of a still-lively debate about which author was more 'right'. For Christopher Hitchens and John Rodden, among many others, Orwell was the real seer, especially because he projected an imperialist world – three huge supranational powers dominating the globe. For Neil Postman, by contrast, Huxley was the true prophet of the rise of the ultimate consumer society and the orchestration, through entertainment media and creature comforts and drugs, of passive consent to tyranny. And for Frances Fukuyama, Huxley was far ahead because of his prediction of eugenic genetic engineering and its potential to destroy what is valuable and rewarding in human experience.¹

My view, by contrast, is that in fact both writers were 'right' – that we are living in a Janus-faced present that features the fundamental characteristics of both their visions. We are living in *Brave New Nineteen Eighty-Four*.

LIVING IS BUYING

'In the nurseries, the voices were adapting future demand to future industrial supply.... I love new clothes, I love new clothes, I love ...'

Aldous Huxley, *Brave New World*

Let's begin with life at the heart of the Empire. In the United States today, malls dot the landscape like an intractable skin disease. These are the outlets for the huge transnationals, consumer palaces for the masses and for the elites. From high-toned boutiques to Wal-Mart, the malls are groaning with goods produced by low-wage workers in the South. They have become the archetypal American meeting-places, and represent a whole social system exported by the United States to the rest of the world. US television and radio weather forecasts announce whether or not it's a good day 'to get out to the malls', because this has become the central American experience. The malls are straight out of *Brave New World*: mountains of household and personal goods, food in surfeit, and entertainments – films and video games – so realistic that, like Huxley's Feelies, they provide surrogate experience for a complacent and compliant population.

It's hardly news that consumerism is the *raison d'être* of the corporate order, or that this order will do almost anything to secure buyers. But it is still unnerving to learn how closely the manipulation of the consumer's mind has truly approached what Huxley imagined – that is, full, reason-destroying conditioning.

With the introduction of demographics in the 1950s corporations and

their advertisers took a look at rough indices of consumption patterns, such as sex, age, region, community, socio-economic status and ethnicity, the better to target consumers for their products. Each succeeding decade brought refinements in this interrogation, with ‘psycho-demographics’ – a deeper study of emotional responses via focus groups and questionnaires – emerging in the 1980s and 1990s to yield even more profitable indicators.² But in the first decade of the twenty-first century, a new level of consumer ‘management’ has been reached. It’s called neuromarketing, and it uses MRI (magnetic resonance imaging) machines, developed for medical diagnosis, to bypass all ego-mediated critical perception and go straight for the unconscious, uncontrollable, limbic response. Leading the way is an Atlanta-based business called BrightHouse.³

In 1994, after a successful career in advertising, a fellow called Joey Reiman closed his \$100 million advertising agency and founded BrightHouse, a firm whose clients have included Coca-Cola, Pepperidge Farm, K-Mart, and Home Depot. Convinced that advertising firms were producing so much clutter they couldn’t effectively communicate ideas any more, he set out to launch a marketing revolution. BrightHouse now refers to itself as ‘the world’s first Ideation Corporation™’ and declares that it ‘emerged from stealth mode’ to launch the ‘Thought Sciences Institute’.⁴ The TSI ‘bridges the gap between business and science and provides its clients with unprecedented insight into their consumers’ minds.’

BrightHouse boasts of having the ‘most-advanced neuroscientific research capabilities and understanding of how the brain thinks, feels, and motivates behavior’, adding that this knowledge of the brain enables corporations to ‘establish the foundation for loyal, long-lasting consumer relationships.’ This new field seeks, in the words of *Forbes* magazine, to ‘find a “buy button” inside the skull’,⁵ or, in the words of BrightHouse, ‘to more effectively engage and drive the target audience’s behavior.’ Indeed.

Neuromarketing is not developing unchallenged. A coalition of progressive consumer groups and prominent educators and scholars of childhood is totally opposed to it, calling it a terrifying form of hucksterism with frightening implications of just the kind Huxley warned about.⁶ These critics claim that repeated exposure to the strong magnets in MRI machines could harm the human subjects of the research in various ways, but the real threat, they claim, is to the people – especially children – who are the consumers targeted by the neuromarketeers.⁷ American children, immersed like no others in commercially driven and saturated culture, are already in deep trouble. Epidemics of learning, attention and behavioural disorders have been documented; obesity, bulimia and anorexia are rampant; and so are a variety of psychological problems associated with immersion in violent screen culture

– all of which are interwoven with incessant advertising. For the critics of neuromarketing, the project of further extending the reach of advertising into childhood is socially suicidal.

BrightHouse’s neuromarketing experiments are conducted under supposedly benign and scholarly auspices of the Emory University Hospital in Atlanta. BrightHouse’s principals hold teaching positions at Emory and the neuroscience wing at Emory University is the epicentre of the neuromarketing world. Emory University was founded by the Methodist Church in 1836. The mission statement of its School of Medicine commits it to ‘advance the detection, treatment and prevention of disease processes.’ By what perverse criteria might neuromarketing be considered the prevention of a disease process? In Huxley’s *Brave New World*, *not consuming* was considered a serious pathology, to be treated pharmacologically and with psychotherapy. Welcome to Brave New World. The future is now.

THE RESURRECTION OF BIG BROTHER

To know and not to know, to be conscious of complete truthfulness while telling carefully-constructed lies, to hold simultaneously two opinions which cancelled out, knowing them to be contradictory and believing in both of them; to use logic against logic, to repudiate morality while laying claim to it ... that is doublethink.

George Orwell, *Nineteen Eighty-Four*

When the governments of Eastern Europe and the Soviet Union collapsed in the late 1980s and early 1990s, many commentators pronounced Big Brother and his special brand of ideological doublethink dead. In reality, Big Brother had relocated to the United States, where, grown huge on the fear generated by September 11, 2001, and the political initiatives taken since, he morphed into a hybrid creature, made up at once of the heads of the huge corporations – industrial, military, finance, communications, armaments, pharmaceutical, agricultural – and the politicians and the state institutions that serve them. Doublethink Dubya is only his perfectly-fitting figurehead.

Leaving aside the questions posed by many improbable or suspicious aspects of the official account of the events of 9/11, many of the ways in which the Bush Administration has used the events of that day to advance an agenda of doublethink and hypersurveillance would make Orwell’s Inner Party drool with envy. The Patriot Act and the Department of Homeland Security have created a vast range of laws and actions that increasingly subvert the democracy the Bush administration pretends to defend. Today, as even a monopolized and subservient media are unable to ignore the overflowing

supply of scandals, lies, and atrocities, Orwellian criticism of US actions since 9/11 has become quite common. Web sites on Orwell have sprung up like mushrooms. Maureen Dowd, an editorial writer for the *New York Times*, describes the Bush regime in Orwellian terms almost weekly. ‘It’s their reality’, she wrote in April 2004. ‘We just live and die in it.’

In Bushworld, our troops go to war and get killed, but you never see the bodies coming home. In Bushworld, flag-draped remains of the fallen are important to revere and show the nation, but only in political ads hawking the president’s leadership against terror. In Bushworld, we can create an exciting Iraqi democracy as long as it doesn’t control its own military, pass any laws or have any power. In Bushworld, we can win over Falluja by bulldozing it.⁸

Inside the US, the de facto criminalization of dissent, hence the direct and undisguised undermining of democracy, has been enormously ramped up. To take one graphic instance, at the FTAA Summit in Miami in November 2003 – a meeting that did not go well for the US – ‘the more control the US trade representatives lost at the negotiating table’, as Naomi Klein observed,

the more raw power the police exerted on the streets. Small, peaceful demonstrations were attacked with extreme force; organizations were infiltrated by undercover officers who used stun guns; buses of union members were prevented from joining permitted marches; people were beaten with batons; activists had guns pointed at their heads at checkpoints ...⁹

The latest techniques honed in Iraq – from a Hollywoodized military to a militarized media – were now being used on a grand scale in a major US city. Manny Diaz, the mayor of Miami, proclaimed that the police response should serve as ‘a model for homeland defence’. And well he could boast. The response brought together over forty law-enforcement agencies, from the FBI to the Department of Fish and Wildlife. Miami police chief John Timoney classified FTAA opponents as ‘outsiders coming in to terrorise and vandalise our city’, thus equating domestic democratic protest with foreign terrorism – and making Miami eligible for the huge pool of public money available for the ‘war on terror’.

Meanwhile, also in the fall of 2003, the attorney general of Florida, serving under Governor Jeb Bush, revived a hundred-year-old law prohibiting pimps from boarding ships in Florida harbours to solicit for prostitution, believe it or not, in order to prosecute Greenpeace USA. The ostensible excuse was an action taken a year earlier in which activists had attempted to place a banner on a ship, protesting against its cargo of contraband mahogany from

the Amazon rainforest. Commentators, including editorial writers for the *New York Times* and the *Washington Post*, denounced the initiative as unprecedented in US history and extremely dangerous, the first step on the way to breaking Greenpeace, and, in its footsteps, other national and international NGOs critical of the transnational order. The word ‘Orwellian’ got a heavy workout in this coverage, and for good reason.

Fortunately, in May, 2004, a Miami judge threw the case out of court. But there are other manifestations – less subject to judicial and public oversight – of the use of the ‘war on terror’ as a pretext for tightly concentrating and deepening the power of the forces that make up the US’s equivalent of Orwell’s Inner Party. Two months after September 11 a super-elite of corporate CEOs, including the heads of International Group, Bechtel, Citigroup, Dow Chemical, Lockheed Martin, Exxon Mobil, GE, Ford, and Raytheon, were linked together in a structure entitled CEO (for ‘Critical Emergency Operations’) COM LINK. This is a hot-line that ‘allows chief executives to speak directly with Secretary of Homeland Security Tom Ridge and other officials during a terrorist attack.’¹⁰ It was created by the exclusive Business Roundtable, an association of Fortune 500 corporations, in cooperation with the Department of Homeland Security. It has already been utilized on several occasions when the ‘terror threat level changed’, and it meets from time to time to stage simulations of emergencies in which it might swing into action.

The Business Roundtable’s web site approvingly notes that more than 85 per cent of America’s infrastructure – the power grid, financial services, information services, railroads, airlines, water – is now controlled by the private sector, and this serves as the government’s justification for the hotline. This unprecedented and unequalled communications apparatus creates the possibility, if not the likelihood, that in an emergency it would be the White House and the unelected CEOs of the top corporations that would make all key policy decisions, displacing and usurping the houses of Congress, state governors, and other governmental structures. Indeed, with the announcement, in April, 2004, that the Department of Homeland Security was awarding \$350 million to Northrup Grumman to build a super-intelligence network that could coordinate intelligence services at all three levels of government, CEO COM LINK will have at its disposal a fully Orwellian surveillance system. ‘It’s a paradigm shift at the classified level’, the DHS security chief told Information Week, in order to ‘help the government fight terrorism ... and defend the U.S.’s borders and trade.’¹¹ Hiding in plain view, CEO COM LINK itself has never been publicized or even discussed by politicians or White House officials. It is, in sober truth, the Orwellian Inner Party.

BYE-BYE LOVE, HELLO HATCHERIES

It took eight minutes for the eggs to go through [the machine].... A few died; of the rest, ... all were returned to the incubators ... [each eventually] becoming anything from eight to ninety-six embryos Identical twins, but not in piddling twos and threes as in the old viviparous days, when an egg would sometimes accidentally divide; actually by the dozens, by scores at a time.

Aldous Huxley, *Brave New World*

If *Nineteen-Eighty-Four's* signature is Big Brother, *Brave New World's* is its babies-in-bottles, its biotechnologically produced elite of superhuman Alphas and competent Betas, and its masses of stunted Deltas, Gammas, and Epsilon 'semi-morons'. Each class is reproduced, not by inherited status or wealth, or by merit and effort, or even by media manipulation and coercive power, as in *Nineteen-Eighty Four*, but by genetic engineering and artificial procreation, closely directed by a miniscule, omnipotent elite. This is a society composed of something entirely new, which I call 'bioclasses'. It's the 'application of industrial principles to human reproduction', in Huxley's words, that creates the kind of people who keep the consumer totalitarianism of *Brave New World* ticking over. For Huxley, this process was an extension of the eugenics movement – a movement based on the idea that some human life is worthy, other life is less worthy, or not worthy at all. *Brave New World* practiced 'negative eugenics' by discarding babies and gametes that were undesirable; and 'positive eugenics' by producing, to specification, those babies and gametes that were deemed to be valuable to fill the pyramidal layers of an acutely stratified society.¹²

But just as the eugenic mass production of bioclasses is the most sinister of Huxley's projections, involving a universal totalitarianism with dominion over cells and tissues, its potential components are also the least visible and least well understood in today's world. The necessary technologies are no longer science fiction, but their development is taking place behind the closed doors of labs and clinics, with little government oversight or public regulation. As a result, public knowledge of the extent and power of 'reprogenetics' (as one of its most ardent proponents has dubbed it), and the ambitions, aspirations, financial backing and goals of those engaged in it, remains very limited.¹² As well, there is a misperception that, thanks to President Bush's Christian fundamentalism, there is little motion toward these technologies in the US. Not so.

In vitro fertilization (IVF) – far from a perfect technology, with its low success rates, its massive doses of hormonal drugs for prospective mothers,

and its uncertain record of health for children successfully carried to term – has become a major money-maker for a group of physicians who call themselves ‘techno-docs’. It is very well established in the United States, and is the first step toward ‘babies-in-bottles’.¹³ In taking the embryo out of the maternal body and putting it in a petrie dish, IVF made possible something entirely new: the discarding of ‘defective’ embryos – or, through micromanipulation, their modification for therapeutic purposes. This also meant that for the first time, inheritable germ-line modification (IGM) – designer babies, made to order – became possible. *New Scientist* has recently reported that Japanese scientists have found a way to alter the genetic makeup of sperm, so that designer manipulation of a potential embryo can take place even before in-vitro conception.¹⁴ And in April 2004 scientists reported that they managed to create two baby mice without any sperm at all, just through manipulation of the ovum, further liberating them from the old biological imperatives and making IGM even easier.

Of course, an artificial womb is also required for the creation of bioclasses. This entered the experimental field in 1999, when Dr. Yosinori Kuwabara and his colleagues at Juntendou University in Tokyo began the construction of an artificial uterus, successfully ‘birthing’ a goat foetus from a tank that contained mimicked amniotic fluid and a mechanical umbilical cord. Two years later a team of scientists from Cornell University’s Weill Medical College announced that they had succeeded, for the first time, in creating an artificial (human) womb lining.¹⁵

Still, without some form of cloning – the process described with stunning prescience in the quotation from Huxley at the beginning of this section – mass eugenics and real bioclasses would not be possible, since every manipulated embryo would presuppose individual attention and the high risk of failure on each attempt. Cloning technology isn’t there yet, either in animals or humans. Most attempts fail in the petrie dish or the first few weeks post-implantation. Moreover, as the editors of *Wired* noted in their March 2004 issue, of those carried successfully to term, so far ‘all cloned mammals live sick and die young.’ But the work is being pushed ahead, and major breakthroughs in ‘therapeutic’ cloning were announced in February 2004.¹⁶

Most cloners, such as US scientists Dr. Robert Lanza and Dr. Young Chung of Advanced Cell Technology near Boston, who made the first stem-cell breakthroughs and are cloning human embryos for the therapeutic value of stem cells (totipotent cells that can be used to repair any differentiated body tissues), loudly disavow any intention of proceeding to ‘reproductive cloning’, declaring it unethical and out of the question. But the history of reprogenetics is nothing if not the story of technologies that travel from the margins to the centre. And so, by the late 1990s, mainstream American scien-

tists and doctors such as Gregory Stock – no less a personage than the director of the Program on Medicine, Technology and Society at the University of California at Los Angeles (UCLA) – had begun to advance such intervention as not only ‘inevitable’ but also desirable.¹⁷

Princeton professor of molecular biology Lee Silver is among the most prestigious of cloning’s advocates, but by no means its only one.¹⁸ Silver argues that a truly Huxleyan future is inevitable, if not necessarily marvellous. As he sees it, the market will permit wealthy parents to select, enhance, and clone their most promising embryos – creating, eventually, a ‘gen-rich’ class; while the economically poor, bereft of enhancing reprogenetics, will become ‘gen-poor’ as well. Eventually, Silver believes this will create a process of speciation, in which the two classes of humans may no longer be able to procreate together. Although in Silver’s scenario it is the market rather than World Controllers who bring this about, the result would be the same: *Brave New World* would be upon us.

A few years ago, Silver was one of very few voices in the wilderness. Today, you can go to the web site for the Human Cloning Foundation and see advertisements for many books with titles such as *Who’s Afraid of Human Cloning?*, *When Science Meets Religion*, *Cloning: For and Against*, and *Flesh of My Flesh: The Ethics of Cloning Humans*.¹⁹ You can visit GenLife.com and order a service that allows you to store not only your pet’s DNA but also your own, in the expectation that one day in the not-too-distant future you will be able to bring both you and kitty back to life. Until that day comes, you can store your head or your whole body with Alcor Life Extension Foundation. Or GenScript Corporation offers a new technology that allows you to synthesize genes, which enables many applications in gene science, including allowing you to ‘Design your own genes/cDNAs (deletion, mutation, and rearrangement etc.).’²⁰ The Center for Genetics and Society has grouped and listed the many different players in the highly variegated sector of those who think artificial is better than natural when it comes to procreation. The main clusters include neo-eugenicists, libertarians, pro-cloners, and a category called transhumanists, who are an eclectic group of people that includes influential scientists (such as Ray Kurzweil), physicians, and bioethicists, who seek to use informatic technologies as well as reprogenetics in taking us beyond our current morbid and mortal status.²¹

Whether these very technologies eventually become the means for the imposition of bioclasses is, of course, an open question. But if the transhumanists and the techno-docs and all the others who hubristically and instrumentally appropriate and deploy procreative and genetic properties have their way, the enabling technologies for bioclasses will develop, and power-hungry bureaucrats and politicians, always spouting the rhetoric of

therapeutics and happiness, of course, will surely attempt to impose them to this end – in one way or another.

KILL, KILL, KILL FOR PEACE

Oceania was at war with Eastasia: Oceania had always been at war with Eastasia. A large part of the political literature of five years was now completely obsolete. Reports and records of all kinds, newspapers, books, pamphlets, films, sound tracks, photographs—all had to be rectified at lightning speed....

George Orwell, *Nineteen Eighty-Four*

The key features of war in Orwell's novel are this: it is central to society, it is prosecuted constantly, enemies and friends change places in a cynical dance of regimes and alliances that benefits the elites and screws the popular classes across the globe and this dance is concealed by propaganda, censorship, and lies. Are we there yet?

In *The Clash of Fundamentalisms*, Tariq Ali shows how, for more than fifty years in the Arab east, from Turkey to Afghanistan, the US state funded dictators, tyrants, feudal emperors, and dynasties against the secular, democratic forces whose victory might have spelled the end of the region's ruthless exploitation and underdevelopment – lying about it to its own people, of course.²² It did this to protect US access to oil, and to maintain its edge in its geopolitical battle with the former USSR. Ali also chronicles how, countless times, once a regime had served its purpose for the US, it was abandoned. ('Pakistan was the condom the US wore when it entered Afghanistan', one furious Pakistani general told him.) In these ways, Oceania-like, the United States laid the foundations for the fundamentalist terrorism that has arisen in many countries, and now uses this to justify feeding the maw of a ravenous military-industrial complex and the devastating wars it unleashes. The process has been Orwellian in every aspect: war is more than ever at the centre of the US economy, as in *Nineteen Eighty-Four*. War is justified by doublethink ideas – 'fighting to defend and extend democracy' is as close as dammit to the Party slogan, 'war is peace'. Meanwhile, 'politics and mainstream media coverage', Ali observes, 'have invoked disinformation, exaggeration of enemy strength and capability, TV images are accompanied by brazen lies and censorship The aim of all this is to delude and disarm the citizenry. Everything is either oversimplified or reduced to an exhausting incomprehensibility' – a scenario that seems to be taken directly from *Nineteen Eighty-Four*.²³

Just as Oceania's enemies morph into its friends, and vice versa, the US's

former friends (Iran, the Taliban, Saddam Hussein, large parts of the Saudi Royal family, to name only a few) have turned into its enemies, while a number former foes have become its friends. Again, consider one striking example: post-9/11, the Bush administration and several arms of government have come to embrace that odious group of Russian billionaires called the Oligarchs, even though in his early days in office Bush vowed to bring them down in order to advance the cause of democracy in Russia.²⁴ Deeply implicated in this extended move is the Carlyle Group, the Washington-based private equity fund with more than \$17.5 billion in assets under its management, and investments in thirteen countries across three continents. The Carlyle Group is the power base of the Bush circle. With an overlap of cadres that has included James Baker, Bush Sr. and Jr., Dick Darman, Frank Calucci, Dick Cheney, and a host of other familiar faces, it can accurately be said to drive many critical administration policies and initiatives. The Carlyle group used to contain Shafiq bin Laden, one of Osama's brothers. Apparently no more. After 9/11 he was asked to withdraw his funds, along with a number of other Arab investors. This caused a drain on finances that Carlyle decided should be plugged by Russian money. Hence a stunning about-face in White House attitudes, and a set of initiatives to bring the most powerful Oligarchs into Carlyle, and to help them establish themselves in the US.

Goodbye Arabia, hello Eurasia. At least for now.

THE FEELIES GO TO WAR

'Take hold of those metal knobs on the arms of your chair', whispered Lenina. 'Otherwise you won't get any of the feely effects.'

Aldous Huxley, *Brave New World*

We are seeing many of the central features of both Huxley's and Orwell's dystopias come to life; more than this, they are actually fusing. With the technologies made possible by computers, the entertainment industry is not only producing a simulacrum culture of mass distraction very like Huxley's Feelies, but using the technologies and writing of Huxleyan mindless entertainment to wage Orwellian war.

For almost ten years now, a mind-blowing convergence of military, entertainment and informatics industries has been taking place, working to use simulation capabilities from all three sectors to enhance the ability of Hollywood and Silicon valley to make entertainment products (video games now outsell films and videos combined) on the one hand, and to enable the United States military to increase its capacity to wage deadly war on the other. Generously funded, extensively orchestrated, with goals that seem

benign and matter-of-fact to its personnel but to others are sinister in the extreme, this new convergence has been dubbed ‘militainment’.

Jonathan Burston, in his excellent introduction to the players and the products of this new hybrid, lists the participants: CADRE (the College of Aerospace, Doctrine, Research and Education) at Maxwell Air Force Base in Montgomery, Alabama; SIGGRAPH (Special Interest Group on Computer Graphics and Interactive Techniques); and SIGART (Special Interest Group on Artificial Intelligence). These groups come together to brainstorm at the North American Simulation and Gaming Association annual meeting. Moreover, Burston writes: ‘The city of Orlando, Florida, is headquarters for the Department of Defence (DOD)’s Simulation Training and Instrumentation Command (STRICOM), whose mission is to create “a distributed computerized warfare simulation system” and to support “the twenty-first century warfighter’s preparation for real world contingencies”.’²⁵ Orlando is also home base to ‘Team Disney’ – ‘the legendary cohort of R&D “imagineers” at Disney World.’ And the regional offices of Silicon Graphics and defence giant Lockheed Martin are ‘more or less across the street from STRICOM’ in Orlando. Finally, there are the nearby Universities of South Florida and Central Florida – all comprising what STRICOM likes to call ‘Team Orlando’.

Not to be outdone, California is the base of what Burston appropriately calls ‘the most notable development inside this ominous new techno-industrial formation ... the disingenuously-named Institute for Creative Technologies (ICT).’ The ICT has resulted from a \$45 million grant from the US military. It’s housed in offices designed by *Star Trek* designer Hermann Zimmerman at the University of Southern California (USC) in Marina Del Ray. Its mandate is ‘to enlist the resources and talents of the entertainment and game development industries and to work collaboratively with computer scientists to advance the state of immersive training simulation.’ Senior executives from NBC, Paramount and Disney collaborate with the military and with designers from the digital effects houses of Silicon Valley and have a dazzling array of ongoing simulation projects.²⁶

As James Der Derian writes in his book about ‘militainment’, the enemy soldier has become nothing more than an electronically signified ‘target of opportunity’; one that is much easier to ‘disappear’ than a living soldier, in both the symbolic and material register.²⁷ New wars

are fought in the same manner as they are represented by simulations and public dissimulations, by real-time surveillance and TV feeds In this high-tech rehearsal for war one learns how to kill but not to take responsibility for it, one experiences ‘death’ in a virtual manner only, but not the tragic consequences of it. It’s a new kind of drama without tragedy where television wars and video war games blur together.

By its potential power to create totally immersive environments – where one can see, hear and perhaps even touch and emotionally interact with digitally created agents – militainment is leading the way into a brave new world that threatens to breach the last firewalls between reality and virtuality and break down inhibitions to violence and killing among ‘warfighters’. This is particularly troubling if you consider the implications for young people, because militainment has your children in its sights. The ICT’s web site states: ‘In addition to specific military training tasks, the Experience Learning System (ELS) will have applications for a broad range of educational initiatives.’ That’s ‘educational’ in the doublethink sense. Cut to the video arcades, cut to millions of homes in which children, mostly boys, play video games such as ‘American Soldier’ and ‘Quake’ and ‘SOCOM: Navy SEALs’, designed by the US Army and Navy respectively to attract young people to the military, and to train up their beliefs and their reflexes so they will become good ‘warfighters’.²⁸

Significant numbers of parents, educators and scholars have organized into a variety of groups and coalitions to address the harms of such games within a regime of childhood impoverished by overworked parents, a surfeit of screen and computer culture, disappearing spaces for play, floundering public schools.²⁹ A leading spokesperson for this current, Gloria DeGaetano, a former teacher and now media consultant and lecturer and author of *Parenting Well in a Media Age*, has been joined by Lieutenant-Colonel Dave Grossman, a former West Point psychology professor, military historian and army ranger who now chairs the Department of Military Science at Arkansas State University. They argue that ‘due to overexposure to gratuitous violent imagery, our children undergo a systematic conditioning process that alters their cognitive, emotional and social development in such ways as to embed in them a desire and/or conditioned reflex to act out violently without remorse.’

A constant diet of violent portrayals can make people more distrusting and exaggerate the threats of violence that really do exist. Nightmares and long episodes of anxious behaviour are common for young children exposed to violence on TV or film. Research demonstrates that media violence distorts a person’s concept of reality, changing his or her attitudes and values. It creates, for example, a perceived need for guns, which in turn creates violence, which reinforces the ‘need’ for guns, and so on, in an endless, tragic spiral.³⁰

It’s a scenario eerily reminiscent of Orson Scott Card’s *Ender’s Game*, in which children were unknowingly enlisted into waging war by involving them in ‘games’.³¹

‘IT’S LIFE, JIM, BUT NOT AS WE KNOW IT’: BIG BROTHER AND NANOTECHNOLOGY

Yet if Orwell and Huxley were brilliantly prescient about so many things, neither of their famous novels foresaw the massive scale of today’s environmental crisis (though Huxley did eventually become a dedicated environmentalist). It was a serious failure, because both the contours and the urgency of today’s global crisis are profoundly shaped by the degree of biospherical catastrophe that humans have wrought. Still, the dangers they pointed to can help us in evaluating the dimensions of this crisis because these are very much the result of dangerous technologies deployed by powerful elites without regard for their impacts.³²

Regarded from this perspective, no technologies are more potentially frightening than those that are, once again, quietly taking shape in richly-funded experimental labs under the name of nanotechnology.³³ Here biology, chemistry, informatics and the cognitive sciences converge at the molecular level below and beyond wood and metal, tissues and genes. Nano science is the science of manipulating atoms and molecules. Its potential for both social control and environmental disaster outstrips even that of genetic engineering. Pat Mooney, a long-time UN adviser on technology, predicts that nano – or what he terms ‘atom’ – technologies will surpass old biotechnologies worldwide within fifteen years, making this the ‘Nanotech’, not the ‘Biotech Century’.³⁴ Yet today the average person couldn’t tell you what nanotechnology was if her mortgage depended on it.

Proponents claim that nanotechnologies can eventually deliver virtual immortality, create limitless food supplies, achieve miraculous environmental remediation, in short, fix everything. As Mooney points out these are paradisaical claims – which, he cautions, is a sure sign that, according to the law of unintended consequences, their potential dangers will be commensurately hellish. And this road to hell is being paved with corporate dollars. Whether endowing prestigious university labs and nano-niche start-ups, or funding research in their own R&D labs, the Gene Giants – Monsanto, Dow Chemical, DuPont, Aventis, Novartis – are becoming the Nano Nabobs. These are the folks who stealthily brought us genetically engineered soya, corn, canola (rape), and cotton, who introduced fish genes into strawberries, who are pushing ‘terminator seed’ technology through the international trade organizations, who are invading and destroying native flora and fauna, colonizing and privatizing the source points of life itself.³⁵ Already their investment in nanotechnology R&D worldwide exceeds \$4 billion – not including their investments in the production of elementary nano-products and related technologies – without any public or scientific evaluation or

scrutiny whatsoever. And, in December 2003, Washington authorized \$3.7 billion to finance nanotechnology research.³⁶

The potential of nanotechnology to effect the Huxleyan agenda of eugenics and tranquilizing pharmacology is unsurpassed, since its microtechniques would allow for extraordinarily refined manipulations of the components of pharmaceutical substances, genes and cells. Hence nanotechnology has the potential to accelerate radically the fabrication of designer animals, insects, plants and micro-organisms of all kinds. In humans it could give reprognetics the tools it needs to attempt a fully Huxleyan system of reproduction – again, for those who could afford it, or for those who lack the power to resist its imposition.

But that's not all. While the manipulation of matter is very much a Huxleyan feature, a number of the potentials of nanotechnology express Orwellian prospects much more directly – for example, the potential for surveillance and war. The US Army's NanoSoldier Institute is working on creating an invincible warrior, fitted out with impermeable nano-armour, wielding nano-weapons (think Robocop multiplied a couple of hundred thousand times.) And of course, the potential of atom technologies for the monopolization and patenting of matter itself has a terrifying Big Brother dimension.

And worse: critics say that nano science and unregulated nano production are attempting to create atom technologies that could endanger the human race and the biosphere in ways even more deadly than biotechnology. This is hard to fathom. What, one asks, could really be worse than the genetic contamination of the world by herbicide-resistant weeds and pesticide-resistant cockroaches that have been able to survive in oxygen-depleted environments?

The answer, in a phrase, is 'Grey Goo' – the reduction of all matter to a primal molecular mush, created by self-replicating nanomachines that use all matter as basic fuel – this is the great fear and the ultimate caution about nanotechnology, as expressed even by one of its first, most famous and most visionary architects, Eric Drexler.³⁷ Pat Mooney suggests the danger may lie in 'Green Goo': 'Molecular self-assembly is what living materials do best. You don't need tiny tin robots. Science is merging biotechnology and nanotechnology into nanobiotechnology in order to fashion unique amino acids, proteins, molecules and cells. These will be organized in new manufacturing processes that could replace conventional machines and workers.'³⁸ The Goo does not yet exist, but, apparently, it could. Grey or Green, the Goo gives new and unwelcome meaning to the *Star Trek* refrain, 'It's life, Jim, but not as we know it.' And with this we come full circle back to the world of *The Matrix*.

FUTURE TENSE

Sir Martin Rees, astrophysicist and British Astronomer Royal, has declared that the human race has only a 50/50 chance of surviving another century. He predicts that natural disasters, asteroid impacts, man-made viruses, and nuclear terrorism could wipe us out before the year 2100.³⁹ The chances of the species coming to a dead end are, indeed, high. This is because at this moment humanity has not yet found a way to exercise intelligent control over harmful technologies, old or new, that could make it impossible for the web of life to reknit and renew itself. Nor have we yet found effective ways to take the necessary socio-political measures to ensure the conditions that would create a healthy population and contain new or renewed epidemics that have the potential to bring us to our collective knees, or worse.

If we do succeed in hanging on, however, we might well ask ourselves: what are the trajectories inherent in the rule of the transnationals and the new American empire, should resistance fail to turn these scenarios around? If, in the past, the most compelling visions of the future belonged to two British socialist men, perhaps the most compelling visions of the future seen through contemporary lenses belong to two North American left-leaning and feminist women, Marge Piercy and Margaret Atwood. Neither's novels make for happy reading, for the loss of democracy on which both are predicated is embedded in environmental catastrophe and total corporate control. In Piercy's 1991 novel *He, She, and It* the world partakes of *Nineteen Eighty-Four*, in the sense that the vast majority of humanity have the status of Proles and live diseased lives of appalling poverty and complete ignorance in eco-ravaged metropolises; a tiny, ruthless elite of corporate personnel live in material luxury and spiritual servitude in artificially sustained domes of luxury and good health from which they rule the world. Small islands of scientists live apart from both, able to survive, at least for the most part, because they invent technologies that are useful to the elite. At the same time, Piercy's Planet Earth is *Brave New World* as well, in that the elites use genetic engineering to enhance themselves, in order to maintain power (and the very few rebels steal it to enhance their ability to fight).⁴⁰ In Piercy's first futurist novel *Woman on the Edge of Time*, written in 1972, utopia (cooperative and egalitarian communities, in gender and racial as well as economic terms) and dystopia (a horrible, consumerist, eco-blighted corporate world) co-existed and did battle in a contained war-zone where the outcome was left uncertain.⁴¹ In *He, She, and It*, the corporate order has spread like a fungus and the rebels have shrunk back to the far margins.

In Margaret Atwood's *Oryx and Crake*,⁴² corporate greed drives a long, horrible social and environmental degradation, until, as in Piercy's vision,

the Proles live in endless urban slums ('the pleeblands') and the corporate elite in protected domes, lulled by drugs and video everything, blithely producing monstrous transgenic plants and animals to fill every perceived need. But all this institutional madness gets rolled up into one character – a geek genius at the 'Watson and Crick Institute' – who plays God with no compunctions and attempts to destroy humanity, the better to make room for his new, improved humanoid species. He seeds an apocalyptic plague, and at the end, it's an open question whether humanity or the humanoids, or either species, can make a comeback in a totally ravaged world. In both these women's novels, and in Orwell's and Huxley's books, resistance is almost nil – and, except for its own sake, for a handful of existentially troubled individuals, utterly futile.

Since I became an environmental activist more than thirty years ago, I have dreaded the potential of hierarchical societies – whether capitalist or bureaucratic – to bring humans and our planet to levels of irreversible destruction, simply in the course of doing business. (As the book and documentary film entitled *The Corporation* point out, if corporations were individuals they would be classified as psychopaths – incapable of regard or concern for their environment or for others, capable only of self-seeking greed and violence.)⁴³ But every day I remind myself that unlike Orwell's, Huxley's or even Piercy's and Atwood's future worlds, resistance to the corporate order today is neither small, nor contained, nor futile. It is both local and global and inherently anti-imperialist. It fights against every ill I have written about, through direct action, through legal and political work, through art and theatre and video and comics, and it has a sharp, life-affirming sense of humour. Unlike the monoculture of the dystopias it is fabulously diverse, and it constitutes the hope of this world. My wish for the future is that, despite the brilliance of all these progressive futurists, the pessimism of their visions will be challenged by the victories of this resistance and that before this century is out, some far-sighted writer will write a novel of life and hope, and not just a requiem for all that is valuable and good.

NOTES

- 1 Christopher Hitchens, *Why Orwell Matters*, New York: Basic Books, 2002. Neil Postman, *Amusing Ourselves To Death: Public Discourse In The Age Of Show Business*, New York: Penguin Books, 1986, c1985. Francis Fukuyama, *Our Post-Human Future: Consequences Of The Biotechnology Revolution*, London: Profile, 2002.
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- AdBusters*, a magazine devoted to deconstructing consumerism and advertising. See also my discussion of the evolution of advertising in *The Rites of Men: Manhood, Politics and the Culture of Sport*, Toronto: University of Toronto Press, 1999.
- 3 BrightHouse: The IDEation Corporation, www.brighthouse.com.
 - 4 Press release, 3 June 2002, www.brighthouse.com.
 - 5 Melanie Wells, 'In Search of the Buy Button', *Forbes.com*, 1 September 2003.
 - 6 See 'Commercial Alert Asks Feds to Investigate Neuromarketing Research at Emory University', 17 December 2003, http://www.commercialalert.org/index.php/category_id/1/subcategory.
 - 7 See Sharna Olfman, ed., *All Work and No Play: How Educational Reforms Are Harming Our Preschoolers*, Westport: Praeger, 2003.
 - 8 Maureen Dowd, 'The Orwellian Olsens', *New York Times*, 25 April 2004.
 - 9 Naomi Klein, 'America's Enemy Within', *Guardian*, 26 November 2003.
 - 10 Tim Shorrock, 'Executive Privilege: Inside Corporate America's Homeland Security Hotline', *Harper's Magazine*, April, 2004, pp. 81-83. Curt Weldon, a Republican congressman from Pennsylvania, a former firefighter, and head of a House Committee on emergency preparedness, claims that, by contrast, the public sector has been struggling to link and coordinate its efforts over the last two years, without either the economic or intelligence resources available to CEO COM LINK.
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 - 13 See Alastair G. Sutcliff, 'Health Risks in Babies Born After Assisted Reproduction', *British Medical Journal*, 325(20 July), 2002, pp. 117-18; and Janis Kelly, 'Increased Risk of Cerebral Palsy in Babies Born After In Vitro Fertilization', *Neurology Reviews.com*, 10(5), May, 2002.
 - 14 In Brief, 'Sperm goes GM', *New Scientist*, 181(31 January), 2004, p. 16.
 - 15 See Natalie Angier, 'Baby in a Box', *New York Times Magazine*, 16 May 1999 and Fr. Joseph Howard, 'The Construction of an Artificial Human Uterus', *American Bioethics Advisory Council Quarterly*, Spring, 2002, <http://www.all.org/abac/aq0202.htm>.
 - 16 Jonathan Amos, 'Scientists Clone 30 Human Embryos', BBC News Online, 12 February 2004.
 - 17 See Gregory Stock's homepage, <http://research.arc2.ucla.edu/pmts/>. See also Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future*, New York: Houghton-Mifflin, 2002, for a fluent argument for germ-line intervention.
 - 18 Lee Silver, *Remaking Eden: How Genetic Engineering and Cloning Will Transform the American Family*, New York: Avon, 1998. See also Allen Buchanan et al., *From Chance to Choice: Genetics and Justice*, Cambridge: Cambridge University Press, 2002, where four American bioethicists argue that public policies should be adopted to make IGM freely available to all. Cf. Martha C. Nussbaum, 'Brave Good World', *New Republic*, 4 December 4 2001.

- 19 To get a sense of what's what and who's who in the pro-cloning world, see: Human Cloning Foundation at <http://www.humancloning.org> and <http://home.cfl.rr.com/chaosdriven>. This last site is aimed at scientists and contains a published scientific protocol for cloning.
- 20 You can visit GenScript at http://www.genscript.com/gene_synthesis.html.
- 21 Web sites with large lists of transhumanist links are available from the Center for Genetics and Society. Some seem pretty mundane. Others, such as Transtopia at <http://www.transtopia.org/transhumanism.html> give a good indication of the full program.
- 22 Tariq Ali, *The Clash of Fundamentalisms*, London: Verso, 2002.
- 23 The stories of censorship of US war-related policy are legion, and censorship by omission rather than commission is the most powerful form of censorship today. To take just one example, in February 2004 a suppressed report by a group of Pentagon analysts was leaked to the press. This report, *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, claimed that looming environmental catastrophes present an infinitely greater threat to the national security of the US than terrorism, and urged the White House to urgently turn its attention to this. While the *Guardian* picked the story up in the UK, and progressive web sites around the world trumpeted the news – after all, this was hardly the Greenpeace or the Sierra Club speaking – there was a virtual blanket of silence in the mainstream media and among national politicians in the United States. A few days after the leak, the sensational story slipped quietly into oblivion.
- 24 Andrew Meier, 'The Oligarch's Ball', *Harpers*, April, 2004, pp. 79-81.
- 25 Jonathan Burston, 'War and the Entertainment Industries: New Research Priorities in an Era of Cyber-Patriotism', in Daya Kishan Thussu and Des Freedman, eds., *War and the Media: Reporting Conflict 24/7*, London: Sage, 2003. For further analysis, see his 'Synthespians Among Us: Re-thinking the Actor in Media Work and Media Theory', in James Curran and David Morley, eds., *Media and Cultural Theory: Interdisciplinary Perspectives*, London: Routledge, forthcoming. Also see www.sticom.army.mil.
- 26 Burston writes: 'The ICT's Flat World project "updates flats, a staple of Hollywood set design, into a system called Digital Walls" (Hart 2001), transforming an empty room into a convincing 3-D simulation of some far-away battle terrain (into which a trainee is "immersed"). It is only one of the ICT's several state-of-the art virtual reality projects, all of them instantly evocative of *The Matrix*. In November 2002, for example, the ICT premiered its long-awaited Mission Rehearsal Exercise (MRE), a curved-screen simulation in front of which officers-in-training are presented with a number of different options for emergency action, each of which results in a different outcome, in a virtual Bosnian village. Trainees interact with digital actors, who themselves "listen" and "respond" with instantly variable "emotions".'
- 27 James Der Derian, *Virtuous War: Mapping the Military-Industrial-Media-Entertainment Network*, Boulder, CO: Westview Press, 2001.
- 28 See 'Army is looking for a few good gamers', [CNN.com/Sci-Tech](http://www.cnn.com/2002/TECH/ptech/05/22/e3.army.game), May 22, 2002 <http://www.cnn.com/2002/TECH/ptech/05/22/e3.army.game>.

- 29 Gloria DeGaetano, *Parenting Well in a Median Age: Keeping Our Kids Human*, Fawnskin, CA: Personhood Press, 2004.
- 30 Gloria DeGaetano and Dave Grossman, *Stop Teaching Our Kids to Kill: A Call to Action Against TV, Movie and Video Game Violence*, New York: Crown Publishing, 1999. See also, Dave Grossman, *On Killing: The Psychology of Learning to Kill in War and Society*, Boston: Little Brown & Co., 1995.
- 31 Orson Scott Card, *Ender's Game*, New York: Tor Books, 1985.
- 32 See Varda Burstyn, 'The Dystopia of Our Times: Genetic Engineering and Other Afflictions', in *Socialist Register 2000*, London: Merlin Press, 2000. Also see Laurie Garrett, *Betrayal Of Trust: The Collapse Of Global Health*, New York: Oxford University Press, 2001; and Ronald J. Glasser, M.D., 'We are not immune: Influenza, SARS, and the collapse of public health', *Harper's*, July, 2004.
- 33 For information on the players, the extent, and the scale of development of nano/atom technologies, as well as for an excellent critique of their dangers, see 'The Big Down: From Genomes to Atoms', ETC Group, 2003, available at <http://www.etcgroup.org>. The ETC Group monitors scientific and industrial publications and makes the information available on its web site.
- 34 See Mooney's comment in 'The Big Down'. See also Jeremy Rifkin, *The Biotech Century: Harnessing the Gene and Remaking the World*, New York: Jeremy P. Tarcher/Putnam, 1998.
- 35 See Kathleen Hart, *Eating in the Dark: America's Experiment with Genetically Engineered Food*, New York: Pantheon, 2002, and also 'Gone to Seed: Transgenic Contaminants in the Traditional Seed Supply', Union of Concerned Scientists/Citizens and Scientists for Environmental Solutions, 23 February 2004.
- 36 See Ted C. Fishman, 'The Chinese Century', *The New York Times Magazine*, 4 July 2004, p. 31.
- 37 K. Eric Drexler, *Engines of Creation*, Garden City, NY: Anchor Press/Doubleday, 1986; and K. Eric Drexler and Chris Peterson with Gayle Pergamit, *Unbounding the Future: The Nanotechnology Revolution*, New York: Quill/William Morrow, 1991. Grey Goo now has a convention of its own in science fiction. See Greg Bear, *Blood Music*, New York: Arbor House, 1985; and Kathleen Ann Goonan, *Queen City Jazz*, New York: Tor Books, 1994, and *Crescent City Rhapsody*, New York: Avon Eos, 2000.
- 38 *Green Goo: Nanotechnology Comes Alive!*, ETC Group Communiqué, 77, January/February, 2003, www.etcgroup.org.
- 39 Interview with Martin Rees, http://www.bbc.co.uk/pressoffice/pressreleases/stories/2003/08_august/08_hardtalk_reesmartin.shtml.
- 40 Marge Piercy, *He, She, and It: A Novel*, New York: Alfred A. Knopf, 1991.
- 41 Marge Piercy, *Woman on the Edge of Time*, New York: Alfred A. Knopf, 1976.
- 42 Margaret Atwood, *Oryx and Crake*, Toronto: Seal Books/Random House, 2003.
- 43 Joel Bakan, *The Corporation: The Pathological Pursuit of Profit and Power*, Toronto: Penguin, 2004; Mark Ackbar, Jennifer Abbott and Joel Bakan, *The Corporation*, Big Pictures Media Corporation, Canada, 2003.