

TECHNOLOGY@UTOPIA

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Abstract

Since Francis Bacon's *New Atlantis* was published in the seventeenth century, science and technology have figured prominently in the construction of utopian visions. In the latter part of the nineteenth century, and for most of the twentieth, the map of Utopia indicated socialism as the preferred political route whilst science and technology provided the means of transport. Technological utopianism, which uncritically equates technology with progress, is identified as a strong and influential element which passed from utopian literature into social theory and popular culture in the late nineteenth and twentieth centuries, manifesting itself currently in notions of an Information Society promising virtual democracy, virtual community and individual empowerment via the global telecommunications network. The essay suggests that technological utopianism is a rather naive form of technological determinism and concludes by arguing that whilst building utopia is impossible without technology, technology alone cannot be expected to deliver it. Achieving utopia, or even cybertopia, has always been, and remains therefore, very much a political as well as a technological task.

Key words: utopia, science, technology, cybertopia

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"When looms weave by themselves, then man will be truly free"

Aristotle *The Politics*

INTRODUCTION

For Thomas More, building utopia was essentially a zero-sum game – meaning in this context, that the wealth of a nation was largely static and the most one might hope to do was to share out the ‘cake’. In More’s *Utopia* all might live a good, if relatively spartan, life by dint of very hard work and re-distribution. Francis Bacon's *New Atlantis*, appearing a century later, changed this view irrevocably. For him science and technology offered a way of harnessing and controlling the capricious natural world and putting it at the service of humankind. Whereas More's Utopia looked to the equitable sharing of the somewhat meagre (by our standards) material resources of the period, Bacon looked to science as a way of providing mastery over nature and for the abundant provision of goods and services. In the last century and a half, utopists have largely assumed that science and technology will have little problem in finally solving the material problems faced by humanity.

The idea that scientific progress, and, by extension, technology could give rise to a utopia in which the age-old restriction of scarcity could be at last overcome has been present in virtually all utopian literature since *New Atlantis*. Kumar (1987) identifies the key elements of almost all utopian writing in the last century and a half as science (plus socialism) in varying proportions and varieties. This, as J.L. Davis notes, is one feature that utopian writings have tended to share with modern dystopias. "All three of the classic dystopias of the early twentieth century - Zamiatin's *We*, Huxley's *Brave New World*, Orwell's *Nineteen Eighty Four* - start with the assumption that the problems of production, distribution, and social order have been solved" (1981, 385).

Utopian and dystopian thought can provide both analysis and insight into how science and technology function within the contemporary world, provide visions for the future, and give warning signals. It would too crude, however, to frame the effect of utopian literature on the wider world in terms of impact, since the term suggests that it arrives falling from nowhere, impinging upon an unexpectant audience. Clearly such works, like all art forms, are closely bound up with the society which gives birth to them. They reflect upon that society, help to change it, and yet are inextricably a part of it. Cruder analyses such as base-superstructure approaches have given way to more sophisticated understandings of the complexity of the relationships involved between cultural artefacts and expressions and the material world of economics and politics: "... economic, political and social processes do not operate outside of cultural and ideological conditions. The distinction between 'material' and 'ideational' factors in sociological analysis is thus considerably weakened, if not invalidated altogether" (Hall & Gieben 1992, 13).

In their use of science and technology, utopian¹ and dystopian works help to shape and define our perceptions of science and technology itself. The current debates about CCTV (closed-circuit television), data protection, and privacy draw heavily on the symbolism of Orwell's 'Big Brother'. Genetically modified (GM) foods were quickly labelled 'Frankenstein Foods' by the popular press. Issues surrounding the development of Artificial Intelligence (AI), at least in the popular arena, appear to be influenced by the 'computers out of control' storylines in any one of a hundred films and television programmes, perhaps mostly notably the computer HAL in Stanley Kubrick's film 2001.

Just as science may be found in utopias, utopianism may be found in science. "Traces of utopian thinking can be found practically everywhere on the frontiers of science; they rear in mundane and practical embodiments in practical projections of what the future ought to look like" (Nowotny 1984, 4). Unfortunately many utopian 'scientific' projections of what ought to be end up as extrapolations of the worst trends in contemporary science. Using utopian works as a means of providing a vision and goals for science should not be viewed negatively, nor should the role of modern dystopias be overlooked as a means of expressing how science and technology have been misused in the last 200 years.

Science and technology cannot be excluded from any realistic vision of the future. The trend from the 1960's onwards to view science and technology as a double-edged sword, and a commensurate wish to return to a simple pre-industrial idyll, usually utilising various forms of 'alternative' or 'appropriate' technologies, can be somewhat misleading, since alternative technology is another and different manifestation of technology, it is not the absence of technology. Indeed, current developments in the most developed area of the so-called alternative technologies, that of renewable energy provision, rely very heavily on high-tech, science based research and development. For example, using photovoltaic materials to produce electricity from solar panels requires a knowledge of solid state physics, electronics and materials technology. Various wave power machines under development around the

world are designed and tested in university laboratories using the latest sophisticated computer modelling techniques.

Given our reliance on science and technology in the contemporary world and in any imaginable future, it is imperative that we develop our understanding of them in order to secure the futures(s) that we might wish. The utopian tradition is one where such insights have been usefully developed and explored for many centuries, and yet it is an aspect of utopian work that has received scant attention until quite recently.

SCIENCE AND/OR TECHNOLOGY

Given that the main focus of this essay concerns the role of technology and science in utopian/dystopian visions, the term technology is used almost exclusively throughout. Whilst science and technology are different entities with different intellectual properties and histories, it is evident that they are now so interlinked and interdependent that it must be understood that one comes with the other. Whereas it was the case that most of the important technologies utilised and developed during the early part of the industrial revolution were craft-based rather than science-based, most important contemporary technologies are now firmly based in science. The development and production of most modern technologies whether they be product technologies (artefacts we use and consume) or process technologies (machines and systems that make or facilitate things), require relatively high inputs of scientific knowledge. Whereas, for example, the science of thermodynamics was developed subsequent to the invention and development of the steam engine, important contemporary technologies such as computers, biotechnology, telecommunications and so on, require a solid prior understanding of the science underlying the processes involved.

Conversely, the practice of science is highly dependent upon technology, since most scientific activity occurs only because it is closely linked to the development of some technological outcome. Basic science (science carried out for its own sake without some direct or known useful outcome) is still undertaken but it is dwarfed by applied science. It is now virtually impossible to contemplate one without the other.

Modern science since the early seventeenth century has provided the Western world with much more than a basis for developing technology. As a means of understanding the natural world, and ourselves, it has exerted a more powerful influence. Science and technology are not being conflated in this analysis, rather it is recognised that in the contemporary world the institutionalised practices of science are wedded to technological development to such a degree that they are, for the most part, akin to two horses pulling in harness.

TECHNOLOGICAL UTOPIANISM

Technological utopianism is "the belief in the inevitability of progress and in progress precisely as technological progress" (Segal 1985, 1). Achieving utopia therefore requires little more than the unfettered development of science and technology. What distinguishes this view from most utopian works which, since Bacon, have sought to achieve utopia by harnessing science and technology for the greater human good, is this rather naive equation of technology with progress.

In its purest literary form technological utopianism appeared in a series of US novels in the late nineteenth and early twentieth centuries following the publication in 1888 of *Looking Backward* by Edward Bellamy. *Looking Backward* is certainly the best known of this sub-genre and arguably the best in terms of literary merit and wholeness of conception and vision. Indeed Segal (1985) suggests that so influential and popular was *Looking Backward* that those writing in a similar vein immediately thereafter were simply rereading already familiar ground. The book spawned many imitations in print and societies devoted to discussing Bellamy's vision subsequently sprang up all over the USA.

Technological utopianism can be considered as an optimistic form of technological determinism since it is technology that becomes both the engine of change and the salvation of society. For Bellamy in *Looking Backward*, technology solves the problem of scarcity, and relieved of this problem mankind is assumed to change for the better. The price of this, though one which Bellamy thought a small one, was that society needs high levels of political centralisation and a willingness to 'fit in' with the machine culture (Lewis 1987).

Though technology (and science) continued to be a prime focus for the utopian novel, few embraced it so whole-heartedly and uncritically. Indeed by the early part of the twentieth century, the dystopian form had largely replaced the purely utopian expression, and technology, along with totalitarian ideologies of left or right, took on a darker expression. It is not difficult to see why this might be given the historical context of World War 1 followed closely by the great depression and World War 2. By the 1960's, utopian forms were either limiting, simplifying, or downplaying the role of modern technology - itself not necessarily original since William Morris had outlined something similar in *News from Nowhere* as early as 1890.

TECHNOLOGY AND UTOPIA

Lewis Mumford, in an essay first published in 1965, shed light on two interesting aspects of utopian writing: the autocratic, if not totalitarian nature, of most utopian political and social systems, and secondly, the nature of the technologies which support such systems (1973). This reflected very closely the actual development of early civilizations where, he argued, political centralisation was a consequence of a number of factors relating to the controlling nature of divine kingship, a religious underpinning, and a strong desire for order over both people and the natural world. Mumford argued that the early city states developed an 'invisible machine' to provide the means to sustain itself. This machine was composed of people (mostly coerced labour), and was organised in military fashion to complete major civic tasks like building irrigation systems, large buildings such as temples, defensive fortifications, and so on. All this was achieved without any technology beyond a few simple hand tools and instruments. Most importantly for Mumford, this set the pattern for the technological traditions that followed, and its apotheosis can be seen in the mass production assembly lines of Henry Ford.

Mumford was aware of a second technological tradition handed down to us from the same period, that of a smaller scale craft tradition, under local or individual control and exhibiting none of the de-humanising aspects of his 'invisible machine'. This analysis opens up some interesting perspectives on the relationships between technology and society. Big Brother in Orwell's *Nineteen Eighty-Four*, had clearly achieved mastery of the population by use of sophisticated centralised telecommunication systems which involved almost universal surveillance and monitoring which conform closely to Mumford's definition of authoritarian

technology (large-scale, under centralised control, etc.) By contrast, the forms of technology to be found in Morris's *News From Nowhere* appear to be de-centralised, craft-based, under local or individual control, conforming to Mumford's notion of a democratic form of technology (Mumford 1964).

The Alternative technology movement that arose both within, and out of, the 1960s and 1970s so-called counter-culture, and other political and environmental movements, loosely formulated various criteria for technologies that did not have centralising, alienating, and polluting tendencies associated with conventional technical forms. This has variously led to appropriate technology, alternative technology, intermediate technology, and even utopian technology (Dickson 1974). The premise behind these ideas is that the forms of technology that we had developed were not conducive to a truly democratic, ecological, and harmonious lifestyle, because they are products of a social system dominated by market economics at the expense of other, more human, considerations. The supposed neutrality of technology (and science) served only to mask those forces which shaped technology in such a narrow and destructive fashion. In a sense what this movement, in its most extreme forms, called for was a return to the democratic technics of Mumford or the craft based production systems of William Blake and William Morris. The impasse which this analysis led to, however, was as follows: If technology is an expression of the cultural forms that produced it, then it follows that in order to produce and operate alternative technology one first has to have an alternative society. The logic of this view insists that political and social change must proceed, or at least develop sufficiently, before the 'appropriate' technology may be introduced.

Fritz Schumacher's *Small is Beautiful* (1974), Ivan Illich's *Tools for Conviviality* (1973), and others, argued persuasively for the need to re-orient technology away from the large-scale, capital intensity of modern mass production to a smaller scale, human-centred mode. Whilst these arguments found resonance in the search for renewable energy sources in the West and were adapted to good effect for use in developing countries, it is clear that the trajectory of modern technological development has barely been dented.

The relationship between size and scale, ownership and control, democratic and authoritarian, however, are almost never easy to tease out in respect of the major technologies of our time. Computers and Information Technology, being perhaps the most important set of technical innovations of the late twentieth century, illustrate this well. Dorothy Nelkin argues that despite the fears of the intellectual community, and the public, about IT in the last 30 years, and the almost universally negative way in which this set of technologies is portrayed in literature and the mass media, the concern has largely shifted to biotechnology and genetic manipulation, which, she argues poses much less of a threat (1994).

Part of the problem in identifying and analysing the socio-political origins of technology is that there is much ambivalence once it is in the public domain. Laptop computers can be liberating but can also allow work to enter the home and encroach upon valued free time. Mobile phones may be a blessing to some but an intrusive nuisance to others. The technological dystopia par excellence of the twentieth century is Huxley's *Brave New World* written in 1932. In it he accurately predicts many scientific developments, particularly in the biological sciences, and uses them to help fashion his nightmarish account. His last novel published in 1962, the utopia *Island*, described his vision of an idyllic world yet used many of the technologies and practices present in the dystopian *Brave New World*.

Recent scholarship about technical change points to a multiplicity of factors that converge to shape technology, some fairly clear and unambiguous, others more opaque and complex. Robot technologies in manufacturing industries superficially appear to present a clear-cut case of technical change for the sake of efficiency and competitive advantage. They

seem to represent the next 'logical' stage of development in automation, yet the reality is more complex. General Motors built an almost fully automated plant for the production of axles and gearboxes which actually increased the costs of production but which was justified as an experiment and an 'investment' for the future (Forrester 1987). The highly acclaimed Fiat car advertisements of the late 1980s which depicted a fully automated car plant with suitably operatic background music and the slogan "designed by humans, built by robots", may have been a piece of propaganda aimed at their workers, who, at that time, were undertaking a series of wildcat strikes (Anon. 1993). Kennedy (1994) suggests that Japan's fascination with robot technology and their large-scale implementation in that country is, to a degree, due to a combination of a shortage of labour and a xenophobic fear of foreign labour. Fleck argues that "robots have become a symbol of national technological progress, a sort of international virility symbol to such an extent that many companies have introduced them without concern for economics" (1984, 208). It has even been suggested that the creation of robots, particularly those having some similarities to human form, represent a male wish for procreation, the result of a form of womb envy (Pannafiou 1984).

Whatever the reasons that brought a technology into being, there is always the possibility that it could be used in ways not intended or foreseen and have unintended consequences. Who, a century ago, would have predicted the impact of the motor car - for good or ill? Castells (1996, 1997, 1998), writing about the use of global information networks sees this new meta-technology being used by different interest groups and organisations from governments and corporations to criminal gangs and pen-pals. Whilst a 'utopian technology' may have some features which many might agree on - for example: be non-polluting; long-lasting; use little or no finite resources, and so on, the appropriation of technology is another factor to be considered since any new technology, utopian or otherwise, holds out the possibility of a multiplicity of uses, and abuses.

Science in utopia is likewise problematic. Davis, whilst believing that both science and utopia are inherently optimistic and progressive, suggests that there exists a dilemma which cannot easily be resolved in practice as "science has endless capacity for innovation and change whereas utopia has a desire for control and order....utopia will therefore stop science or be overthrown by it." (1984, 16) Kumar echoes this point: "Science knows no end. It constantly undermines existing beliefs and practices" (1991, 55). This view finds sympathy in *Brave New World* where science was viewed as a subversive activity that threatened to undermine the status quo.

TECHNOLOGY IN UTOPIA: THEORY AND PRACTICE

The utopian tradition is a large and long-standing one and its fragmentation in recent decades into different genres and the proliferation of new media do not help any attempt at an overarching analysis. There are however, some broad themes that can be identified.

Academic theories of technical change in the early part of this century which were predominantly deterministic in character, appear to chime strongly with the use of technology in utopian writings, as exemplified by the technological utopians and the Technocracy movement, the Futurists, and even in the early Worlds Fairs. In the inter-war and post-war periods, not unnaturally perhaps, technology took on a darker complexion, exemplified by works such as *Brave New World* and Orwell's *Nineteen Eighty-Four*. Mechanisation, rather than automatically bringing salvation, was viewed with increasing alarm as a possible route to human enslavement whether via the state or the modern corporation. It was around this period

that the roots of 'social shaping' approach to technology studies began to be articulated, most notably in Lewis Mumford's now classic account, *Technics and Civilisation* (1934).

The social shaping approach to technical change blossomed in the 1960s and 1970s. David Dickson's *Alternative Technology and the Politics of Technical Change* (1974), being one of the most significant works of this period, dovetailing both historical and contemporary analyses of technical change with the counter-culture movements of the period. This approach has remained dominant since, and the field has expanded, developed and diversified considerably, but whilst there are differences of emphasis and approach, the fundamental premise that technologies are shaped by social forces remains. The particular complexities and nuances of the technology/society relationship were, however, not always fully reflected in the literature as Sibley has pointed out, "In general, utopian writers have been too sanguine about selectivity. They have tended either to accept technological development wholeheartedly or to restrict all technology to rather primitive levels of development" (1971, 49).

The most comprehensive exploration of science and technology in the post-war period has undoubtedly been through works of science fiction where utopian and/or dystopian scenarios, and the use of science and technology to generate them, is a distinctive feature of the genre. Though extremely popular, science fiction was largely dismissed as pulp fiction until fairly recently despite the, rather belatedly, acknowledged quality of some of the early writers such as Isaac Asimov, Arthur C. Clarke and Ray Bradbury. More recent reappraisals of science fiction have meant a warmer critical reception by the literary establishment for writers such as Kurt Vonnegut Jr., J.G. Ballard, and Ursula K. LeGuin. That recognised mainstream literary figures have also written works of science fiction (for example Doris Lessing's *Canopus in Argos* series) has also helped establish the genre more firmly in the literary hierarchy. A recent 'classic', William Gibson's *Neuromancer* (1984), managed to establish its own, much imitated, sub-genre, Cyberpunk. Gibson's imagined use of new information technology has parallels with Huxley's *Brave New World* in that he described some technologies that came to be realised within a few years of publication.

Most accounts of technology in these, and other, recent works recognise the great power of science and technology but have not tended to see them as inevitable determinants of the social order. Utopian writings and theoretical approaches to technical change appear to have moved with the *zeitgeist*, with one notable exception, and that is a persistent strand of technological utopianism.

THE RE-EMERGENCE OF TECHNOLOGICAL UTOPIANISM

Though naive technological determinism largely disappeared from utopian literature in the early part of the twentieth century it did not die but merely slumbered, re-appearing throughout the latter half of the century, albeit in more restrained form, and as social theory of one type or another. Two, related strands, serve to illustrate this re-appearance: The emergence of 'futurology' or 'future studies' in the 1960's and much of the early writings about the development of the 'Information Society' from the mid-1980s to the present.

In the decade from the late 1960s to the late 70s there was huge growth in interest in long-term social change, manifesting itself in tangible form with the setting up of government 'think tanks' and commissions whose primary aim was to prepare reports on the future (Bell & Mau 1972). Alongside these reports, academic and more popular works vied for attention, perhaps most notably: *The Year 2000* (Kahn & Wiener 1967), *Mankind 2000* (Jungk & Galtung 1969), *The Coming of Post-industrial Society* (Bell 1973), and *Future Shock*

(Toffler 1970). Although different in conception and approach, they shared a faith in the development of a technocratic elite and were pervaded, at least implicitly, with technological determinism and a belief that what could be achieved would be achieved. Kumar (1978) and Frankel (1987) have exposed the implicit determinism of these and more recent contributors to the genre.

In many of these accounts political, social, and economic analysis gives way to little more than extrapolation and speculation. There are strong echoes here of the visions exhibited in the Worlds Fairs earlier in the century being presented to us as sociological analysis (Segal 1995, Bush 1979). Here again scientific and technological progress alone could ensure a utopian future, all we needed do was to wait and relax.

THE INFORMATION SOCIETY AS 'CYBERTOPIA'

The last two decades have seen an outpouring of writing about the unfolding of an information society. Whilst there are numerous views and definitions as to exactly what constitutes an information society (Webster 1995), at its simplest and most uncontentious, it is a society where the value and importance of information outstrips in importance the traditional key inputs into an economy of land, labour and capital. That is to say that knowledge of all kinds, e.g. scientific, technical, financial and so on, are the prime commodity and resource of the economic system. It follows from this that the key technology of an information society is the computer, or, more broadly, Information and Communication Technology (ICT) - a convergence of electronic communication technologies (telephones, TVs, fax machines, printers, etc.) around the modern digital computer.

The thrust of much academic, and almost all popular writing about the information society is unarguably utopian in tenor: "The roseate picture of a post-industrial wonderland far outweighs references to the possibility of mass unemployment and authoritarian states" (Webster & Robins 1986, 20). Little has changed since this was written. Information technology we are told, holds the promise of wealth, global democracy and political participation, and, harking back to the futurologists of the 1960s, the advent of 'leisure society'. *The Mighty Micro* (Evans 1979) is a good example of the early populist work in the field. Evans predicted that by the end of the millennium, artificial intelligence would mean that computers would be our intellectual and emotional partners, war would be coming to an end, the printed word would be dead, and so on.

There is a strong determinist component in all of these accounts. The technology in, and of, itself is leading us forward to this new future. Political and sociological analysis is either cursory, shallow, or altogether absent. Since the early 1990's the main technological focus of the information society has been on the achievements and potential possibilities of the internet with its ability to provide on-line community largely free of spatial or temporal constraints. Once again "the technical fact of communication itself is celebrated as an inherent good, without any discussion of the resulting shape of the community that is wired up in this way. New Age dreams of universal, seamless networking are oddly congruent with features of a modern corporate communications ideology" (Stallabrass 1995, 10).

This new generation of technological utopians see technology harnessed not to the state for the common good, but to private corporations. Alvin Toffler (1970, 1980, 1990) is often cited as the high priest of this new breed, largely by virtue of his high profile and his million-selling books, but also because of his links, and influence, in US political circles particularly on the radical right. Other elements of the mass media such as television advertising for high-

tech products such as computers either implicitly or explicitly make the connection between technology and the good life. Segal has examined this latter phenomena in promoting technological utopias, concluding that:

Contemporary high tech is thus replete with many ironies of the unanticipated consequences of technological progress along the route of technological utopia. That such consequences are painfully familiar to those truly knowledgeable about technology's past is yet another irony. So long as its various promotional enterprises turn a profit and generate positive public relations, high tech may not care what ordinary citizens, much less cultural critics, feel about these dilemmas (1995, 210).

Utopia then has become de-regulated, privatised and is being increasingly sold to us not as something which is achievable by political action, and certainly not any longer through socialism, but rather we will consume our way to utopia.

Barbrook and Cameron note that "a loose alliance of writers, hackers, capitalists and artists for the West Coast of the United States have succeeded in defining a heterogeneous orthodoxy for the coming information age: the Californian Ideology" (1996, 44) achieved by a "faith in the emancipatory potential of the new information technologies" and that "In the digital utopia, everybody will be both hip and rich" and that "not surprisingly this optimistic vision of the future has been enthusiastically embraced by computer nerds, slacker students, innovative capitalists, social activists, trendy academics, futuristic bureaucrats, and opportunistic politicians across the USA" (1996, 45)

The discourse of the information society is largely one of technological utopianism. With few exceptions, those who argue the case for the existence of such a thing as an information society, as distinct from say, an *advanced industrial society*, or from those who talk of the increased *informatisation* of society (Giddens 1990), speak of it in generally optimistic tones. (Webster 1995). Among more popular writings, the tone is even more upbeat (cf. Negroponte 1995).

In what might be called 'first generation' technological utopianism in the latter part of the last century, technology plus a strong dash of socialism was the answer, but the contemporary 'second generation' embraces the invisible hand of the free market and aggressive global capitalism as the primary driver for technical, and thereby social, progress. Those left behind in the digital era are presumed either to be blessed by the 'trickle down' from above or rate merely as a footnote. Barbrook and Cameron point up this elitist fantasy against the hard reality of the 'digerati' on the affluent West Coast of the United States as most "white people in California remain dependant on their darker-skinned fellow humans to work in their factories, pick their crops, look after their children, and tend their gardens" (1996, 62). Athens maybe, but not quite yet without the slaves.

It is not the expression of optimism that is objectionable in these works, for to decry optimism would be to decry the utopian tradition and the possibility of a better life, rather it is the uncritical coupling of technology to social progress, and the assumption that what could happen, will happen. The dangers inherent in this are that by assuming a linear and deterministic model of technical change the possibility of human intervention is relegated or dispensed with altogether. It does not allow us to question the vested interests that lie behind the developments in technology, nor does it recognise fully the extent to which society chooses which technologies to adopt, and the ways in which they may then be adapted and used for purposes other than those originally intended. There is a world of difference between the position that technology *could* help in the creation of utopia and that of holding that

technology in of itself *will* create them. The latter argument suggests an abandonment of engagement and critique, or indeed anything other than sitting back and accepting the inevitable. The former recognises that utopia cannot be built without technology whilst the latter expresses the view that technology alone, without human intervention, will somehow lead us there.

Technological utopianism in one guise or another has been one of the most persistent and influential myths of the late nineteenth and twentieth centuries. It is pernicious and retrograde since it abdicates criticism and action in favour of the status quo. If we would but wait and not 'rock the boat' we will reach the promised land. There are countervailing voices of course. Dystopias are one way of fending off the 'utopias' presented to us in the form of cable TV, time-share apartments, exotic holidays, new cars, fashionable clothes and the security of being a passive consumer in the late twentieth century. As Michael Crichton (the creator of Jurassic Park) says "Dystopian Science Fiction has a long, honourable tradition and stands as a critical, fearful view of new technology. This is a useful counterpoint to the mindless enthusiasm which is trumpeted by PR companies to pump up stock" (quoted in Orr 1993, 12). It can be hard, however, to hear these voices above the clamour of optimistic technophiles that pervades much of the mass media.

TECHNOLOGIES FOR BUILDING UTOPIA

The totalitarian, centralised utopias of Bellamy are, thankfully, no longer fashionable. In their place, postmodern heterotopias hold out the promise of the good life without the stultifying conformity of centralised social planning and regimented technological regimes. Recognition that any one utopia necessarily involves precluding others, and that happiness is a logical impossibility without the yardstick of unhappiness to measure it by is a refreshing and welcome advance. The "wisdom of Homer consisted in saying, once and for all, two things: first, that utopia is dangerously seductive, and second, that it must seem extremely boring to any person with an interest in living" (Martensson 1991, 479). Utopia as earthly paradise, a world without change, a place without struggle, effort or unhappiness where all material wants are fulfilled is an arid, static, and sterile vision.

In planning utopia it is much easier to say what we don't want rather than what we do, and any meaningful utopia must allow for change and therefore opposition. "Much as I detest fundamentalists, physical-fitness freaks, neo-conservatives, and right-wingers of virtually all kinds, I don't think I'd want to live in a world in which they don't exist" (Brockway 1981, 44). Kumar has suggested that perhaps contemporary welfare capitalism is the least worst of all the available systems (1987, 421) echoing George Orwell's view of some forty years earlier, whereby "Foreseeing some dismal Marxist utopia as the alternative, the educated man prefers to keep things as they are" (Orwell 1948, introduction). But welfare capitalism appears to be having great difficulty in holding its own in the face of global *laissez-faire* capitalism facilitated by financial de-regulation and information technologies (Gray 1998).

Echoing this theme, Ezrahi (1990) has noted that that Enlightenment meliorative rationality in the liberal democracies began to break down in the latter part of the twentieth century, giving way to an eclectic pluralism most obviously manifest in the positing of a postmodern condition in which all grand narratives, including the belief in progress, science, and by extension technology, were undermined. "The scientific intelligentsia of the late twentieth century cannot defend eighteenth and nineteenth, or even early-twentieth century notions of objectivity, rationality and truth without discarding respectable philosophical and

historical views which have cast serious doubts on the validity of the very notion of knowledge as a neutral mirror of the world." (280) Such cognitive relativism has infused the body politic, and hence the utopias of the latter part of the century have tended not to embrace broader society but appeared to fragment into what Ezrahi terms micro-utopias. Many commentators see this uncertainty and relativism as one root cause of the resurgence of religious fundamentalism, and it might not be unreasonable to suggest that the resurgence of technological utopianism is symbolic of a need in the Western world to place faith in technological progress as the old certainties crumble.

In these postmodern times it therefore possible to identify technologies whose characteristics lend themselves to utopian ends? The unfettered development of technology by global capitalist enterprise appears to be as unwelcome as the totalizing regimentation of the state controlled monoliths of Bellamy and others. A first step must be to bring technological and scientific development under greater control than is presently the case. We cannot wish away the current hegemony of the market economy even if we wanted to, but we cannot afford to allow the degree of *laissez-faire* expansion to continue unopposed. It would not be an easy task. Echoing Lewis Mumford writing much earlier in this century, John Gray pessimistically asserts that "an imperative of late modern societies everywhere is to gain control of technology...yet it must be doubted if late modern societies have the cultural resources to sustain such prudent risk aversion" (1997, 184). In the same vein Gray later writes "in truth the relations of human beings with technology are never merely ones of ends to means. Our lives are profoundly conditioned by the technologies we develop whether or not we will it so. The notion that a Luddite act of refusal of technology by any community could bring it under human control is a characteristic humanist folly" (1997, 185).

There will always be some room for the appropriation and adaptation of technologies to different, and perhaps more convivial, ends. Computers, for example, are generally viewed as universal machines and therefore highly adaptable to a seemingly infinite range of tasks. Nihilistic computer hackers are not to be condoned, but the mere fact that they can, and do, cause so much damage and alarm, indicates that any Big Brother might occasionally get a poke in the eye as he watched over us. Knei-Paz (1995) notes that the nature of modern technology, in particular ICTs, means that it is increasingly difficult for any one state, corporation or institution to control. The demise of state communism in the former USSR has been attributed by many to be due, in no small measure, to the inability of the state apparatus to control access to information, and the ability of its citizens to circumvent any controls by the use of proliferating numbers of telephones, photocopiers, fax machines and so on (Stonier 1983).

Technology is by no means infinitely adaptable, however. The scale, sophistication, and complexity of much modern technology often mitigates against flexibility, and one can think of many instances where technology has achieved a kind of 'closure' and is frozen into a particular shape that defies major change. It is difficult to see, for example, how a mass production line could operate with a hugely different organisation of the workforce since for the most part it is deliberately planned to sacrifice most other considerations to the goal of efficiency. Braun also identifies this aspect of modern technology, asserting that:

I believe that even with a given technological trajectory, society can move in many different directions merely by political action...on the other hand, I do believe that a given technological trajectory forecloses some social options and, hence, the achievement of some utopias does require the direction of technological development, in addition to other political action. (Braun 1994, 855)

In a similar vein, Winner (1977) has also argued convincingly that large-scale or fundamental technological developments tend to become deeply embedded within societies and difficult, if not impossible, to change. Winner's concept of 'technological drift' has often been mistaken for determinism by his critics, but this is not the case. Winner acknowledges that technology is the product of social forces, but that once built and assimilated into society it becomes a factor that influences both social structure, social behaviour and further technical developments. For example, national electricity grids and mains electricity supply are unarguably the result of social, political and economic decisions made over half a century ago, yet their existence shapes further technological developments and facilitates certain social activities such as how, and even when, we might work. Any new technical developments requiring power supplies must realistically be designed to work with the existing system, and although we could change the system should we wish it, expense alone would make it prohibitive. Thus "every thoroughgoing history of technological system-building points to the same conclusion, namely that technological innovations of any substantial extent involve a reweaving of the fabric of society, a reshaping of some of the roles, rules and relationships that comprises our ways of living together" (Winner 1997, 992).

If we accept that technology (and science) are products of social forces rather than vice versa, then the technology of utopia must arise out of society's desire to create utopia. To achieve this, desire alone will not be enough, since without the power to effect change, all one is left with are utopian dreams. The rather mundane and sobering conclusion is that however much the new technological utopians wish it, current technological trajectories may be the new chains of digital enslavement as much as they may be a route to freedom, and that the achievement of utopia remains primarily in the (broadly defined) political domain. Technology can be adopted, adapted and appropriated differently where we are able, and there is always the opportunity to create small-scale experimental communities, but the mass of humanity are unlikely to have even these options unless they somehow gain the means to do so. This is not to embrace pessimism, or to deny that positive advances have been, and can continue to be made by the judicious use of technology. That we in the Western world are largely sheltered, well-fed, have clean water, sanitation and good medical provision is testament to that, but we should note that these developments arose because of the political will and the economic ability to utilise and develop these technologies, they did not invent themselves, nor was it inevitable that they were utilised on a mass scale.

We are a highly technologically dependant society, and increasingly so. The resources of the planet are finite and showing signs of severe depletion and/or distress. These two facts mean that we cannot achieve even modest utopian dreams without technology and that we must control and direct our existing technological developments accordingly. There is nothing in the history of technology that suggests that this will happen spontaneously, and so the seductive voices of the technological utopians must be resisted whether they be sincere dreamers or cynical corporate apologists, yet their persistence, ubiquity and influence suggests that this will not be an easy task.

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NOTES

¹ My use of the term utopian is deliberately broad throughout. It does not refer narrowly only to those works of fiction beginning with Thomas More's eponymous work, but also in the wider sense of the demand for a change to a better world. "Utopia describes a state of impossible perfection which nevertheless is in some genuine sense not beyond the reach of humanity. It is here if not now" (Kumar 1991: 3).

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