

CYBERCULTURE, CYBORG POST-MODERNISM AND THE SOCIOLOGY OF VIRTUAL REALITY TECHNOLOGIES

Surfing the soul in the information age

Ralph Schroeder

The relation between humans and machines has come to assume a central place within the social sciences, particularly in debates about the role of science and about information technologies. Cyberculture plays a key role in these debates, drawing its inspiration in large part from virtual reality systems. This article examines the affinities between two aspects of cyberculture: cyborg post-modernism, which revolves around the notion that the boundaries between humans and machines are becoming irretrievably blurred, and the cyberpunk movement within youth culture with its futuristic ideas about information and communication machines. While cyberculture may be far ahead of the current state of the technology, it is argued here that its new conception of the relation between politics, technology and art is an important reflection of changes within the cultural industries that surround information and communication technologies within advanced societies.

‘Every need to which reality denies satisfaction compels to belief.’

J. W. von Goethe (1809)¹

The idea behind virtual reality (VR) technologies, of a computer-generated simulated world which users can experience and manipulate, first surfaced in the 1960s.² Only recently, however, with the increase in computing power, has it become possible to

Dr Ralph Schroeder is lecturer in sociology in the Department of Human Sciences, Brunel University, Uxbridge, Middlesex UB8 3PH, UK (Tel: +44 895-274000; fax: +44 895 232806). He is currently engaged in research on the social aspects of virtual reality (VR) technology. The author would like to thank Thomas Osborne, Colin Blackman, and an anonymous *Futures* referee for comments on an earlier draft of this paper, and Warren Giles and Bryan Cleal for their valuable fieldwork on VR. The research for this article was made possible in part by support from the Brunel Research Initiative Enterprise Fund.

produce workable and sophisticated VR systems. With the first applications of VR has come a wave of speculation about its future uses. VR has come to be seen, alongside other advanced information and communication technologies (ICTs) such as electronic mail and artificial intelligence, as paving the way to a future in which human beings are intimately tied to the way they embody themselves within electronic signals. VR is also seen as one component of the emerging realm of 'cyberspace', the realm of non-material messages and interactions that are being created by electronic media.

In receiving extensive publicity, VR systems are not unlike other new developments within the ICT sector. But in this case, they have also provided inspiration for debates within cultural studies, where VR has informed debates about the possibilities of changes in the relations between human and machines, and within youth culture which has incorporated VR into a vision of the future in which technology plays a consciousness-altering role. These two currents of thought, cyborg post-modernism and cyberculture, share the idea that electronic media and new computing technologies will bring about a new era in the relation between science, art and politics.³

This article examines some manifestations of this new worldview. Some pioneers of VR technology, including Brenda Laurel and Jaron Lanier, have been among its principal exponents, suggesting that the creation of virtual worlds and of shared cyberspaces will have revolutionary social consequences and allow hitherto unimagined forms of human expression. Such a view is echoed in the work of academic theorists like Donna Haraway and Alluquere Rosanne Stone, who believe that advanced information technologies may have radical political consequences, an idea which they pursue through the image of cyborgs which blur the distinction between humans and machines. These ideas can also be found in the use of VR as a theme in youth culture, for example the cyberpunk nightclubs and cafés in London and San Francisco. Here too, we find an agenda for cultural and political change, in this case, again, premised on innovations in human-machine interface technologies.

Just as hackers have influenced the development of personal computing,⁴ cyberculture is likely to contribute to shaping the development of VR technologies. But this is only part of the importance of cyberculture. If cyberculture and cyborg post-modernism are partly a response to VR technology and related advances in information and communications systems, they also articulate changing attitudes to new technologies in seeking to redefine their role. Even if this worldview is currently closer to fiction than to the state of science, it is worth examination since it may signal a more general shift in contemporary thinking about technology.

Cyborgs in the mi(d)st

Before we locate the cybercultural worldview within the larger context of current thinking about technology, let us briefly examine some of its manifestations. First, there are those involved with developing the technology itself. The most well known visionaries in this group are Brenda Laurel and Jaron Lanier, both promoters of the technology when it first began to attract widespread attention, as well as being founders of VR companies.⁵ Prophetic notions abound in their public utterances. Thus Lanier speaks of 'an experience when you are dreaming of all possibilities being there, that anything can happen, and it is just an open world where your mind is the only limitation . . . The thing that I think is so exciting about virtual reality is that . . .

it gives us this sense of being able to be who we are without limitation; for our imagination to become shared with other people'.⁶ Nevertheless, he cautions that 'there is a really serious danger of expectations being raised too high'.⁷

With Laurel we find a similar juxtaposition of other-worldliness and realism. 'With virtual reality systems', she writes, 'the future is quite literally within our grasp'.⁸ It will 'blow a hole in all our old imaginings and expectations. Through that hole we can glimpse a world of which both cause and effect are a quantum leap in human evolution',⁹ a suggestive image even if it is not quite clear what the second part of the sentence means. In a somewhat different vein, she writes: 'I think that we can someday have Dionysian experiences in virtual reality, and that they will be experiences of the most intimate and powerful kind . . . Dionysian experience is the experience of being *in the living presence* of not only the artist but also huge spiritual forces'.¹⁰ Although, again 'it seems that there are some rather serious obstacles to be overcome before virtual reality can deliver the robust kinds of experiences that we fantasize about'.¹¹

An extension of this vision is that Laurel thinks that there will be some kind of merging between VR machines and humans. Laurel refers to these human-machines as 'fusion people'.¹² Here is one of the many points where there is a direct continuity between the prophetic developers of VR and academic writing on cyberculture, and we may therefore pursue the cybercultural worldview further in these writings.

Academic theorists derive their inspiration not so much from VR systems as such, but from this human-machine fusion.¹³ Alongside a far-reaching vision based on the possibilities of the new technology, we find here a systematized sociocultural programme. Metaphors abound in these accounts of the future. In Stone's 'evocation of cyberspace', we find her describing the 'cybernetic act' as consisting of 'the desire to cross the human/machine boundary . . . a desire literally to enter into such a discourse, to penetrate the smooth and relatively affectless surface of the electronic screen and enter the deep, complex, and tactile (individual) cybernetic space or the (consensual) cyberspace within and beyond'.¹⁴ But again, there are some this-worldly obstacles to these other-worldly pleasures: 'No refigured virtual body, no matter how beautiful, will slow the death of a cyberpunk with AIDS'.¹⁵

Bodily cyber-pursuits are a part, then, of the political agenda of cyberculture. One important aspect of this is gender politics. Haraway 'would rather be a cyborg than a goddess'.¹⁶ Her idea of doing away with the 'troubling dualisms'¹⁷ within the Western tradition and thus realize a 'utopian dream of the hope for a monstrous world without gender' rests on 'high-tech culture [which] challenges these dualisms in intriguing ways',¹⁸ including, for example, that 'cyborgs might consider more seriously the partial, fluid, sometimes aspect of sex and sexual embodiment'.¹⁹ In her 'cyborg manifesto . . . liberation rests on the construction of the consciousness . . . of possibility . . . this is a struggle over life and death, but the boundary between science fiction and social reality is an optical illusion'.²⁰ Hence, her cyborg is 'not utopian nor imaginary; s/he is virtual'.²¹

These ideas, then, are part of the programme of cyborg post-modernism, which is sometimes also known as 'cyborg anthropology' (the name of one of the panels at the 1992 annual meeting of the American Anthropological Association). Common throughout these writings is the notion that advances in human-computer interface technology may provide the vehicle for new ways of life. The same premise also forms the basis for the atmosphere currently generated in cyberpunk nightclubs and cafés. If the 'liberation' to which Haraway refers seems to take place at the level of theoretical debate in scholarly books and journals, a similar change in consciousness

and lifestyle seems to be emerging within certain strands of youth culture.

At the Cyberseed club in London, for example, the compere, Brian Davis, announcing the evening's programme, enjoins the audience to 'surf the soul' and to 'mellow out'.²² Identifying himself and the audience as 'cyberpunks', the content of his brief introductory talk is designed to put his listeners in the right mood for the evening's entertainment. He proclaims that 'science is magic' and goes on to explain how the frame of mind of clubgoers should be informed by this insight. In a similar vein, Martin Kavanagh, leader of the UK's VR users' group, outlines the group's activities and announces the activities of the 'Virtualitea' (*sic*) room of the club where the computers are located.

The programme itself consists of a live performance of Japanese 'new age' music as well as the club's regular recorded 'rave' music. The promotional leaflet promises 'altered images, altered sounds, altered minds and altered states' and lists among the club's attractions 'VR machines, SEGA computer games, psychoactive cocktails, brain machines, cyber and VR demos, massage, tarot and guest cyber scientists and artists'.

These attractions take place in three dark and interconnected cellar rooms, two of which contain bars. In the largest of these rooms, various graphic and photographic images are projected on to the walls, including colourful contemporary works of art and pictures of faraway places and peoples. These images change frequently and, since they envelop the room, they could be said to give the impression of a VR-like experience. The second room features a bar with 'psychoactive cocktails' (that is, drinks containing 'smart drugs') and is otherwise given over to massage and tarot. It is the third room, however, which features the computing element of the club. Here the clientele is gathered around three personal computers, one displaying fractal images, a second operating a computer game and a third called the 'brain machine'. This machine consists of a computer-synchronized stroboscopic light operated via head-mounted glasses and earphones. The user who wears these, according to the accompanying leaflet, 'can experience deep relaxation, concentration/accelerated learning; a new sense of the body; hallucinations and great visuals [and] true alterations of consciousness'.

By midnight, attendance has reached between 30 and 40 young people who pursue the computer-related activities, dance or sit in a meditative state during the 'new age' music performance and talks. Although the audience is similar to that at other clubs in London, the atmosphere in the Cyberseed club is unique in so far as the activities are more subdued or 'mellow'. Rather than focusing exclusively on dancing, clubgoers wander around among the various attractions, seeking, it seems, to 'alter' their mood or consciousness.

But while the club announces itself as 'Europe's First Virtual Reality Club', the connection with the technology itself is tangential. The way computers are used may be unusual for a nightclub. Yet the main connection to actual VR systems here is the commercial 'Virtuality' VR entertainment machine produced by W Industries (£1 per minute of play) at the entrance of the club, which is available 'at a reduced price', as the compere points out, for clubgoers.

At the Horseshoe Café in San Francisco,²³ the connection with VR is more remote still, despite the fact that references to VR feature prominently. On a shelf next to the bar is an array of leaflets announcing forthcoming club attractions, including 'mind-melting visuals' in the 'Virtual Reality' club, 'look/see projections and hyperdelic video' at the 'Carefree' event, and 'live interactive adventures' and 'media immersion' at the '12 Hour mysterious Salad'. The music announced for

these events is similar to that which is playing in the background at the Horseshoe Café itself.

The main connection with VR at the café, however, is a personal computer in an alcove towards the back of the establishment. The screen of this personal computer is built horizontally into a table with the keyboard on one side. Several people, dressed mostly in black with T-shirts featuring science fiction logos, are crowded around the table, their attention absorbed by the computer screen which is part of SF (San Francisco) NET, an electronic mail network (or 'bulletin board') that provides a forum for discussion among 18 locales in the San Francisco area (at 50 cents for 20 minutes). The Horseshoe Café is one of the focal points for this network, with other participating cafés and locations listed in a leaflet next to the computer. It also lists a variety of discussion topics, including 'politics, environment, astrology, science/technology [and] philosophy'. The leaflet announces that 'the information age is upon us and it is not just a sterile world of numbers and statistics. It is also a world of people and the amount of information each person represents'.

The discussions on this information exchange network are explicitly identified with cyberculture both by users and by the club owner, Wayne Gregori. Gregori refers to those who send abusive messages as 'cyberjerks', while another user or 'netsurfer', whose network name is 'Cyber Monk', refers to his 'cyberfamily'.²⁴

Apart from the difference in VR-related equipment between the two venues, there is also a different atmosphere at the Horseshoe Café. The café occupies a large room which faces the street with a large shopfront window and it is open not only during nightclub hours but also during conventional restaurant business hours. Among the 40 or so customers, the beverage of choice is coffee, again of the more conventionally psychoactive type but served in the large variety that is customary in the San Francisco area. The main activity apart from conversation consists of reading the newspapers and books that are lying scattered among the tables. Science fiction seems to be the favoured genre, although Lewis Mumford and Jean Baudrillard were also in evidence. Despite the similarities between the young and fashionably dressed participants, by contrast with the Cyberseed club the Horseshoe Café mainly offers an atmosphere of relaxed conversation, whether electronically or in the more traditional café style.

Again, although the connection with VR technology itself is limited, the Horseshoe Café clearly partakes in cyberculture inasmuch as the prefix 'cyber' is used to designate 'non-material' forms of communication via electronic media.²⁵ This sense of the term, which also evokes a vision of the future in which VR-like technologies abound, provides the theme around which the Horseshoe Café is based. Compared with the Cyberseed club, which promotes altered consciousness through arts-related activity, the Horseshoe Café seems to be more oriented to consciousness alteration by means of 'bookish' pursuits—but perhaps this is a difference in style rather than substance. If both clubs are drawing on the publicity surrounding VR technology, their main connection with it lies in fostering the 'consciousness' attendant on its future uses.

Even if technological innovations have on other occasions generated new cultural trends, the links between the developers of the technology, academic theorists and youth culture in this case seem to be particularly intimate. Laurel, for example, acknowledges Stone's work as an important influence,²⁶ while Haraway thinks that the work of 'story-tellers exploring . . . high-tech worlds' ought to 'inform late twentieth-century political imaginations'.²⁷ Or again, the politics of information and of gender of the UK Virtual Reality Users' Group Newsletter, which partly

provides the inspiration of the Cyberseed club, bears a strong resemblance to the politics of the academic theorists and the visionary developers of the technology. Elsewhere, cyberpunks have been described as the 'shock troops of postmodernism'.²⁸ Meanwhile, Lanier's and Laurel's ideas about consciousness alteration are closely in keeping with the themes of both VR-related venues—as, incidentally, are their styles of dress. These affinities and reciprocal influences among the three groups could be added to at length. They all point to a common worldview and a common way of life among the members of a cultural avant-garde in London and on the US West Coast, two global centres of the information and communication industries.

Virtual worlds and contemporary directions of world rejection

The incorporation of new technological developments within the worldview of culture carriers seems at first sight to be ill suited to a period in which there is widespread scepticism about scientific and technological achievements. Yet, as we see, cyberculture involves a fundamental reinterpretation of the importance of science and technology which, when it is placed in the social context of its carriers, not only fits well but is likely to endure. This appeal of cyberculture can best be explored by reference to Weber's disenchantment thesis.

Seventy-five years ago, in the lecture 'Science as a vocation', Max Weber talked of the 'disenchantment of the world'²⁹ by science, by which he meant the replacement of meaningful worldviews by impersonal explanations of the world and of nature. Nevertheless, he recognized that intellectual strata would remain predisposed towards endowing the world with meaning: he spoke of 'the need of some modern intellectuals to furnish their souls with . . . guaranteed genuine antiques . . . by way of [a] substitute [for religion] . . . they produce surrogates through all sorts of psychic experiences to which they ascribe the dignity of mystic holiness'.³⁰

But what if these substitutes for religion are no longer available? What if, instead, certain advances within science themselves come to be seen as the key to producing new forms of expression or new psychic experiences? Such notions of a transcendence of the mundane uses of technology and of transforming culture lie at the heart of the cyberculture and of cyborg post-modernism.

One common feature of all the ideas and practices outlined above is that future ICTs will make possible new forms of human self-expression and that these, in turn, will herald a new technology-centred era which will release human beings from the material constraints of their current lives. Since the dehumanizing effects of science and technology are, paradoxically, among these, this worldview envisions a fusion of science and art, with the former providing the means and the latter the cultural ends. Eventually, with the emergence of a society in which communications within cyberspace become all-important, the pioneering carriers of this worldview may create a completely new culture.

There is, however, a central tension within this worldview. On the one hand, its future promise relies on technological innovation, on purely technical or instrumental advances within specialist fields of research and the production of machinery. On the other hand, real advancement of this vision of the future can only come about through cultural innovation, through new patterns of thinking and of experience—and these alone.

This tension stems partly from the high premium which is placed here on the

sphere of culture. The fascination attached to ICTs typically derives from the fact that they offer a seemingly endless supply of novel experiences, the consumption of which plays an ever greater role within advanced societies, particularly in the domestic sphere.³¹ VR systems potentially provide a perfect extension of this trend since they hold out the promise that human beings may one day be able to live within artificially generated virtual worlds limited only by their imaginations. If such a way of life should come about, it would represent, in Weberian terms, a completely re-enchanted world.

From a purely technical viewpoint, however, the capacities of VR systems are in fact above all a tool for manipulating human experience. This is because VR systems are machines which stimulate the human sensory or perceptual apparatus. They consist of computer-generated simulations which are designed to create the impression that users are perceiving an environment with which they can interact. That is, they are means of creating artificial or 'virtual' environments. Virtual environments are in this case generated by means of a computer and other technical aids, such as head-mounted displays and data gloves, which allow the human perceptual apparatus to recognize objects in a non-physical environment.³² Ultimately then, the technical aim towards which the development of VR systems is advancing is to establish how the senses operate and to re-create this process by means of machines.

If these machines are in the end able to reproduce the workings of our perceptual apparatus completely, far from providing a limitless sensorium of the imagination, as the cybercultural worldview would have it, they may rather come to provide an impersonally manufactured and calculated stimulation of the senses. Instead of seeing them as a means of enchantment, they might become a means of disenchanting what was previously one of the last refuges from the disenchantment of the world, namely human perception and experience. Science and technology in this case would not only have come to dominate the external world, but could be able directly to manipulate the awareness that human beings have of the world, albeit an artificial one.

These possible consequences of VR technology are not spelled out here in order to counterpoint a technocratic dystopia with the utopian elements of the cybercultural worldview. After all, how VR systems are developed and the uses to which they are put is not subject to scientific and technical aims alone. The point is to contrast the technical problems that need to be solved within a particular area by various technological means, with the worldview to which this technology has given rise and which consists of projecting on to the technology various human wishes for fulfilment. This tension, between mundane technical problem solving and extra-mundane visions of the future, or, to employ Weber's terms again, between instrumental rationality and value rationality, is one which we would expect to reproduce itself throughout the various manifestations which cyberculture may take.

New romancers³³

Having given a brief account of some ideas and activities of these three closely related groups of culture carriers, we may now locate the cybercultural worldview within a wider social and cultural context which, I argue, provides fertile soil for its continued appeal.

The material basis of this worldview is the growing economic importance of ICTs in advanced societies. This aspect of contemporary social life is well

documented. ICTs now occupy a central place in the economies of advanced societies.³⁴ To this must be added the continuous expansion within institutions of higher learning, providing an enlarged base for the employment of commentators on the cultural industries and its products.³⁵ These two growth areas overlap and reinforce each other, with the rising demand for expertise in the area of the mass media and information technologies contributing to the growing market for the products of cultural industries and *vice versa*.

Equally powerful perhaps is the ideal basis of this worldview. Cyberculture derives its strength from a major current within contemporary intellectual life towards a romanticization of culture and of science through a merger between the two. The idea that culture and science will become thoroughly intertwined may thus be seen as a product of the growing autonomy of academic production from social life, whereby the more mundane role of science and technology in providing the engine of economic growth can be ignored while the realm of science/culture is invested with a life of its own.

The theoretical ground for this cybercultural fusion of science and art has been prepared for some time, especially among philosophers and sociologists of science. So, for example, Feyerabend denies the efficacy of science and invokes Dadaism as an alternative scientific method.³⁶ Similarly, in the sociology of science the focus has recently come to be placed on the representational and literary qualities of scientific knowledge, rather than its instrumental or wealth-creating consequences.³⁷

The fascination with science as a form of culture within cyborg post-modernism is, incidentally, perfectly compatible with a science-rejecting viewpoint inasmuch as once science has become subsumed within sociocultural life or merged with art, its effects need no longer be seen as the feared 'external' ones of an instrumental domination of nature or society. The youth-cultural version of overcoming the tension within this worldview is slightly different from the academic one: here, the idea is to emphasize the countercultural possibilities of technology. Thus cyberculturalists see themselves as outlaws or renegades. As Elmer-Dewitt puts it, they have 'a way of looking at the world that combines an infatuation with high-tech tools [with] a disdain for conventional ways of using them'.³⁸

Although cyberculture is mainly sustained by the social organization of intellectual life, it is also a product of advances in computing and related technologies. VR is well placed to occupy centre stage among these advances since it is likely that computer-generated simulated worlds will play a central role in the improvement of human-computer interface technology, an area on which much scientific effort is currently converging and to which resources are being devoted on a large scale. As long as innovations continue within this area, cyberculture will continue to be able to draw on the promise that future applications of these innovations may bring, thus sustaining its dream of a merger between science and art and of finding new outlets for self-expression in the creation of new worlds by means of advanced ICTs.

The wider context for this appeal, however, is the shift in thinking about science and the expectation of deriving meaning from science. Such hopes that science may herald the dawn of a new age are not new. They also accompanied the advent of the 'steam age' and of the 'space age', for example. Yet since VR technologies seemingly create a whole new horizon for human expression, and since science is no longer seen as a tool for mastery over the world but rather as the handmaiden of magic, perhaps VR is the perfect vehicle for the belief in merging human beings with information and communication machines, or that cyborgs represent a form of

consciousness suited to the new age.

VR technologies are rapidly being developed by a growing number of research institutes and firms for a variety of anticipated scientific applications and commercial products. On the basis of comparisons with similar technologies, social science may be able to identify which of these applications, if any, are likely to have an important social impact. But it is hard to disagree with Ellis's cautious conclusion that these developments are still some way off: 'It is difficult to foretell the future practical mass-market applications for virtual environments . . . some of the ultimate mass-market applications are likely to be unknown today. Possibly, once the world is densely criss-crossed with high bandwidth, public access, fiber-optic "information highways", mass demand will materialize for convenient, virtual environment displays of high-resolution imagery'.³⁹

Whatever the case may be in VR research and industry, VR technologies and new beliefs about science and technology, particularly in the form of cyberculture, are likely for the various reasons outlined here to continue providing inspiration within contemporary culture. The reality of cyberculture, however, as I hope to have shown, remains the Weberian one whereby beliefs reflect the predispositions of the intellectual strata which are their carriers, as well as the Durkheimian one whereby the role of knowledge and belief mirrors more fundamental features of social reality. Whether, in addition, we can discover the 'cyborgs in us all'⁴⁰ or experience hitherto unimagined states of consciousness within our computer-simulated environments—I will show you meaning in a handful of silicon chips, as T. S. Eliot might have said—remains to be seen. The conditions which have thus far sustained cybercultural ideals, however, whether technological, social or cultural, may be with us for some time yet.

Notes and references

1. Johann Wolfgang von Goethe, *Elective Affinities* (Harmondsworth, Penguin, 1971 (first published 1809)), page 298.
2. Ivan Sutherland, 'The ultimate display', *Proceedings of International Federation of Information Processing Congress*, 1965, pages 506–508; see also the author's overview of the early history of virtual reality 'Virtual reality in the real world: history, applications and projections', *Futures*, 25(9), November 1993, pages 963–973.
3. The use of the term 'cyborg' in cyborg post-modernism does not necessarily correspond to the typical usage in science fiction, where the term refers to a wholly artificially created organism or being. Instead, as we see below, it envisions some kind of fusion between human beings and machines, and particularly electronic media.
4. Steven Levy, *Hackers: Heroes of the Computer Revolution* (New York, Doubleday, 1984).
5. The role of Lanier and Laurel in early VR development is detailed in Howard Rheingold's *Virtual Reality* (London, Secker and Warburg, 1991). Lanier has since withdrawn from VPL, the VR company which he founded, while Laurel, who previously co-founded Telepresence Research, now works at Interval Research Corporation, a recent VR start-up company.
6. Jaron Lanier, panel session on 'Virtual environments and interactivity: windows to the future', *Computer Graphics*, 23(5), December 1989, page 8.
7. Jaron Lanier cited by Benjamin Woolley in *Virtual Worlds: A Journey in Hype and Hyperreality* (Oxford, Blackwell, 1992), page 20.
8. Brenda Laurel, *Computers as Theatre* (Reading, MA, Addison-Wesley, 1991), page 197.
9. *Ibid*, page 198.
10. *Ibid*, page 196, emphasis in the original.
11. *Ibid*, page 186.
12. Brenda Laurel interviewed by Jas Morgan in 'Brenda Laurel the Lizard Queen', *Mondo 2000*, No 7, 1992, page 84.
13. Although in some cases, it is hard to sustain this separation. Whereas Stone and Haraway seem to focus on the relation between humans and machines, Kroger draws more directly on VR,

- characterizing the 'age in which we live' as "'the Age under the Sign of the Will to Virtuality'" and identifying virtual reality as the 'dream of liberal fascism' (Kroker interviewed by Sharon Grace in 'Codes of Privilege: Arthur Kroker', *Mondo 2000*, No 11, 1993, page 62). He asserts that 'the dominant form of consciousness in the world today is television' and 'view[s] television now as almost a preliminary phase in preparing the masses of humanity for virtual reality' (*ibid*, page 64). Liberation is nevertheless possible: 'I would say the most radical action is saying "No" while saying "Yes" to technology—or in critically distancing yourself while drowning your body in high tech. Cruising the electronic frontier at hyper-speed with a copy of Nietzsche's *Will to Power* in your virtual hands' (*ibid*, page 65). While Kroker's inspiration may be overtly Nietzschean, he also hints at the Feuerbachian roots of his ideas: 'I do most of my writing at McDonald's' (*ibid*, page 63).
14. Alluquere Rosanne Stone, 'Will the real body please stand up?: Boundary stories about Virtual Cultures', in Michael Benedikt (editor), *Cyberspace: First Steps* (Cambridge, MA, MIT Press, 1991), pages 108–109.
 15. *Ibid*, page 113.
 16. Donna Haraway, 'A cyborg manifesto: science, technology, and socialist feminism in the late twentieth century', in her *Simians, Cyborgs and Women* (London, Free Association Books, 1991), page 181.
 17. *Ibid*, page 177.
 18. *Ibid*, page 177.
 19. *Ibid*, page 180.
 20. *Ibid*, page 149.
 21. Donna Haraway, 'The promises of monsters: a regenerative politics for inappropriate/d others', in Lawrence Grossberg, Cary Nelson and Paula Treichler (editors), *Cultural Studies* (London, Routledge, 1992), page 329.
 22. All quotations refer to the author's visit on 24 June 1992.
 23. The author's visits took place on 4 and 5 August 1992.
 24. Cited by Katherine Bishop, 'The electronic coffeehouse', *The New York Times*, 2 August 1992, page 21.
 25. On a second visit to the Cyberseed club in London on 3 December 1993, the various activities were similar to those on the previous occasion. It was noticeable, however, that the use of the prefix 'cyber' had become more common: the cyberfashion show, for example, was preceded by a session in which the compere demanded that members of the audience conveyed their ideas about what constitutes 'cyberstyle' and 'cyberculture' to other clubgoers by means of a microphone. As this event, unlike the first, was covered by television, these pronouncements were also intended for more widespread consumption.
 26. Laurel, *op cit*, reference 12, page 84.
 27. Haraway, *op cit*, reference 15, page 173. A selection of cyberpunk stories and commentaries on cyberpunk fiction can be found in the volume edited by Larry McCaffery, *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Science Fiction* (Durham, NC, Duke University Press, 1991).
 28. On the back cover of McCaffery's volume, see reference 27.
 29. Max Weber, *From Max Weber: Essays in Sociology* (London, Routledge and Kegan Paul, 1948), page 155.
 30. *Ibid*, page 154.
 31. See, for example, the essays in Roger Silverstone and Eric Hirsch (editors), *Consuming Technologies: Media and Information in Domestic Spaces* (London, Routledge, 1992).
 32. Roy Kalawsky, *The Science of Virtual Reality and Virtual Environments* (Reading, MA, Addison-Wesley, 1993), especially pages 43–85.
 33. This is a variation on the title of William Gibson's science fiction novel *Neuromancer* (New York, Berkley, 1984) which makes use of VR-like technology.
 34. For example, James Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Cambridge, MA, Harvard University Press, 1986).
 35. Randall Collins, 'On the sociology of intellectual stagnation: the late twentieth century in perspective', *Theory, Culture and Society*, 9, 1992, pages 92–94.
 36. Paul Feyerabend, *Science in a Free Society* (London, New Left Books, 1978), pages 100–105, 120.
 37. For an overview of recent arguments, see Steve Woolgar, *Science: The Very Idea* (Chichester, Ellis Horwood, 1988).
 38. Philip Elmer-Dewitt, 'Cyberpunk!', *Time* (US edition), 141(6), 8 February 1993, page 59.
 39. Stephen Ellis, 'Nature and origin of virtual environments: a bibliographic essay', *Computing Systems in Engineering*, 2(4), 1991, pages 344–345. 'Information highways' in this quote is a reference to the use of this term by the US vice-president, Al Gore. Some of Gore's ideas about electronic media and VR are described in Schroeder, *op cit*, reference 2, pages 969–970.
 40. Gary Lee Downey, 'Human agency in CAD/CAM technology', *Anthropology Today*, 8(5), 1992, page 3.